# Advanced Project Financing

## Structuring Risks

## 2nd edition

Richard Tinsley

EUROMONEY BOOKS

# Advanced Project Financing

## Structuring Risk

Second edition

# Advanced Project Financing

## Structuring Risk

Second edition

Richard Tinsley

EUROMONEY BOOKS

Published by
Euromoney Institutional Investor PLC
Nestor House, Playhouse Yard
London EC4V 5EX
United Kingdom

Tel: +44 (0)20 7779 8999 or USA 11 800 437 9997
Fax: +44 (0)20 7779 8300
www.euromoneybooks.com
E-mail: hotline@euromoneyplc.com


1st edition published 2000

ISBN 978 1 78137 265 4



Typeset by Phoenix Photosetting, Chatham, Kent

# Contents

# Preface to 1st edition

When examining the success rate of project financing, one is struck by the ability of some to structure the transactions well and, by contrast, the foolhardiness of others. Repeated failures are indicative of the absence of a systematic approach being learned or embedded in the culture of an organisation.

Modern business literature is replete with references to risk in terms of management, control of risk by derivatives and statistical strategies. But the definition of risk itself is very variable. There are seven identifiable risk systems. Which definition to choose? Which system is right? It is here that project finance debt in its modern form comes into its own since it has some 50 years of risk structuring with variations known for many centuries.

Project finance is predicated on the necessity to organise each risk category, to assist in identification, as a means to structure the many solutions that could be deployed to address each risk facet. Project finance practitioners also know that risk is a matter of heavy negotiation and trade off. Risk is not simply allocated to 'the party best able to bear it'. It is negotiated as far away as possible and mitigated in a way that it cannot spring back.

Accordingly a business has evolved to meet the requirement of many companies and entrepreneurs to release recourse to that entity's balance sheet at the soonest possible moment, as soon as the project has been completed. Thus the whole basis for project financing revolves around an understanding of the future project cashflows and the impact of the various risks on them. The project financier buttresses her/his position with an 'as comprehensive as possible' security package surrounding the project's rights and interests to come up with the self-contained package needed in such a self-sustaining environment. Enter the special purpose vehicle as a means of gathering this all together.

The purpose of this book is to set down a risk system that I have been using for about 35 years on numerous project financings – in 36 countries. Besides the obvious benefit of a systematic approach to project analysis as far as measuring the cashflow effects of each risk, I have drawn on my experience of some 200 transactions and over 800 project proposals to provide solutions that can be considered.

Like any system, its main benefit is to help identify what is missing or outside the norm in any proposal or structure. It also gives confidence to the user that each and every matter has been considered. However, common sense is probably the most important analytical tool, especially when used in conjunction with comparisons with other projects of that genre from around the world.

Some industry specialists seem to feel that they can learn little from the financing structures in other industry sectors. This is not my experience as there are far more similarities between sectors than differences. Indeed, the cross-fertilising of project finance structures applied in one sector to another can be very rewarding.

Project finance has been adapting to greater availability of funding sources. US/Canadian bankers pioneered resources transactions in far flung parts of the globe. The European banks were introduced to the North Sea mega oil deals. The classic power purchase agreement (PPA) provided a contractual foundation to US and UK utilities who wanted to grow beyond domestic market limitations. In recent times, toll roads have been added to the menu (and have provided plenty of indigestion). Telecoms and the merger and acquisition (M&A) businesses have adapted project finance templates to have financing that stands on its own feet.

The steps away from contract and trigger structures towards study acceptance speaks to a greater capability and maturity of the project finance business with the attendant dangers that the studies may not equate to the reality. The lesson from the resources sector is that cost competitiveness becomes the defining cashflow defence line; so we have many years of anticipated cost efficiencies ahead, following from the amazingly innovative examples from the telecoms and the M&A businesses which occurred in the 1990s.

Project financing is counter cyclical. When business conditions are bullish and equity is easy to obtain, then project finance growth slows, only to pick up again when the equity markets are depressed and financiers have become withdrawn. A well-structured project finance is in many ways superior to any corporate credit through careful cash controls and safety valves/reserves as well as the tight security package which all combine to corral the enterprise's activities. With the typical focus of the bankers on the downside, this architecture is largely defensive for both the debt and equity parties.

The rise in capital markets as a source of project finance debt in the mid-1990s has increased the likelihood that the project (structure) will be changed to suit the financing, rather than the traditional financial engineering approach to tailor the funds to the project's needs. Institutions really do not like the complex structuring surrounding completion risk – something addressed in the 2nd edition of this book. It is here that the banks retain their competitive edge since bankers can offer all sorts of flexibility still frowned on by the institutional debt markets. More deals carrying elements of both the bank and capital (debt) markets are emerging as the benefits of each are drawn to the table. The emergence of equity flourishes adds benefits from that market while keeping to the limited recourse/non-recourse nature of the familiar project finance deal.

A project financing offers much more than the risk structuring described in this book. One aspect often neglected is the reality check that the due-diligence process brings, not just the technical or financial parts, but also the interplay of risk categories. An experienced project financier will have seen more projects of differing qualities than any sponsor.

Project finance is often seen as the last thing to do in the project process. What is often regarded as the last-minute waltz with the banks/underwriters could more easily be made symphonic by deciding to work on the lyrics and the score together. It is a fervent hope that this book will demystify the process and will spur earlier dialogue on the risks, structures, and packaging approaches that will achieve each party's objectives efficiently.

Without doubt the demand for project finance debt is enormous. Those in the business will regard it as highly competitive and thinly priced. Yet the amount of money provided by the classic project finance route is only 10% or less of the amounts needed. The gap is in preparing projects in a way acceptable and attractive to the various project financiers. Once a project is properly packaged, then any financier is eager to provide the funds – a tribute to the robustness that has grown in the project finance structure. *Project finance is a tool to get the maximum debt into the deal – safely.*

- For legal practitioners, it is hoped that this book will assist in understanding project financing beyond the perspective of the documentation.
- For the bankers, it is hoped that better and systematic rigour is applied to risk analysis. Another hope is to reinforce the institutional knowledge to prevent the mistakes that seem to be repeated.
- For the equity parties and sponsors, any better understanding will help make the approach less fearful, frustrating, and more financially sound, and to encourage an early dialogue to see what can be achieved. *A good project financing can protect the equity party just as much as the debt participants*.
- For the syndicate desk, it is not simply a matter of selling a rating or a name/sector deal. There are trade-offs that need thorough understanding since you are asking the debt parties to take a fixed return for taking essentially all the project risks post completion.

This book is the better for all the comments and questions from the many participants of project finance courses that I have had the pleasure of speaking to over recent years. To them and my professional colleagues, I owe much inspiration. I have also had the benefit of living in the highly innovative (and over-banked) project finance market in Australia. But it is from experiencing project finance structures around the world that I find them more or less the same everywhere. There is no such thing as 'That won't work in India'. Therefore, may I encourage readers to keep an open file on project finance transactions everywhere. The field is exciting, hugely challenging, and always changing/growing. To paraphrase the saying: 'if you see nothing new in project finance, you are bored with life.'

I hope this book provides a peg for the many structures that exist and a place from which you can all innovate.

It is my mother who provided the original encouragement to view the world as an internationalist; Ireland, you see, being the centre of the world!

*Richard Tinsley*
*President,*
*International Advisory & Finance,*
*Sydney, Australia*
*2000*

# Preface to 2nd edition

When updating the 1st edition, there are some striking similarities in this version. Not much has changed. Hybrids have developed; funding sources have come (and gone); and everyone is trying to figure out what to do with capital and the global financial crisis (GFC) – unleashed in the bankruptcy of Lehman Brothers in 2008. The GFC counterparty nerves are still in evidence as people are afraid of doing business with anyone else.

Perhaps the greatest things to have happened to the project finance business since the 1st edition of this book was published by Euromoney are:

- the fall from grace of the monoline/financial guarantors, without whom the capital markets would not have bloomed (for project finance). Many of them were simply mad to believe that people who cannot afford to repay are worth an AAA/Aaa rating! *This is where the sub-prime greed came home to roost*;
- the rise of the bond markets, whereby institutional investors can gain a funding position in infrastructure transactions;
- the increase in public-private project finance structures which showed many governments 'getting it'. Nevertheless the end of the UK's landmark Private Finance Initiative (PFI) version shows that the UK government gets the large balance sheet importance of its continuing public-private partnership (PPP) project finance obligations;
  - infrastructure projects have finally been seen as PPP developments deserving government income-tax exemption. This is expected to make a serious diversification of project finance funding (supplementing the banks);
  - the moves by institutional investors and pension/superannuation funds has largely been into the PPP and infrastructure spaces; and
- the 'Macquarie' model of high fees extracted from project finance concessioning has come to its end.

Project finance has, nevertheless, shown some resilience to the GFC. Project finance is, after all, counter-cyclical. Moody's has helped with its default study of 4,067 project financings which showed two things:

1. project finance ratings improve over time; and
2. recovery of a defaulted project financing shows a remarkable 67% recovering *all* of the debt (plus outstanding interest).

Project Financiers have never been busier. We are not quite sure what this all means; but whatever the interpretation given, project finance structuring can take a bow. There is no doubt now that all the effort on understanding risk and what is the appropriate structuring (to mitigate/control that risk) is worthwhile. Read on.

Finally, I must acknowledge the simple fact that this book would not exist in any form without the encouragement and support of my wife, Dr Wendy Cox, whose love and support saw this endeavour of an update to the 1st edition.

*Richard Tinsley*
*President,*
*International Advisory & Finance,*
*Sydney, Australia*
*June 2014*

# About the author

**Richard Tinsley** is President of International Advisory & Finance, a project finance boutique, headquartered in Sydney, Australia. His career includes 30 business cards from such fields as quantity surveying in the construction industry, to economics and engineering in the resources sector, project analyst and negotiator in the automobile industry, to professional independent director, chief financial officer, and managing director of publicly-listed companies. Australia is the fifth country in which he has lived permanently.

All this culminated in a 35-year career in project financing in each sector of the business – commercial bank (US and Australia), merchant bank (London), investment bank/Wall St (Sydney office), and now international project finance advisor. He usually is at the treasurer's/government's side negotiating against/with the bankers and institutions.

An author on many aspects of minerals economics and project finance, he first expounded the risk system of this book to a Vancouver conference in 1982. Since then he has been tracking the application of this risk system and has an almost perfect record: the deals he has declined go wrong! Although some of the deals approved have stumbled, the tight structure inherent in project finance has enabled the recovery of the workouts.

Because of his extensive knowledge of documentation, he is often referred to by his colleagues as a 'bush lawyer', content to draft just about anything including acts of parliament for the benefit of his project. A knowledge of the complete structure has also proved invaluable in negotiations as well as in making sense of the myriad inputs to the project finance process. The lawyers he has worked with know that there is no such phrase as 'Let's leave it to the lawyers'. One 'Thank You' he truly appreciates after a two-week negotiating session against one of Australia's foremost project finance solicitors was: 'You never once used "Trust me" in these negotiations.'

Trained as an engineer and economist and with a background in the construction industry, he nevertheless admits to having to retrain his engineering attitude to analysis. This risk system was the catalyst since it is the trade-offs that count, not so much the precision of the spreadsheet. The deal must have strong incentives for both sides to make it work. In this respect too, he realised early that it is people who do deals, not spreadsheets. However, a good knowledge of spreadsheet mathematics and a better feel after some 50,000 or so spreadsheet runs by now, mean that the solution set that will work in a project finance can be identified much more quickly by use of this systematic approach to risk and structure. He no longer leaves the entire modelling job to the analysts either!

This interest has now extended to writing a *Practical Introduction to Project Finance* and a self-training CD-ROM, *A Guide to Project Finance*, both for Euromoney. The extension of generic project finance modelling and risk matrices is the next field of endeavour.

# List of case studies

# List of exhibits

# List of boxes

# Introduction

Project finance is an attractive financing alternative enabling project sponsors to shed risks to the banks or capital debt markets. To the owner or parent entity, the non-recourse aspect is prized since it allows that company or group to go on to develop other projects – to become a serial developer.

A knowledge of the risks and the structures of project finance to handle risk are paramount in achieving the best deal for both sides. This book provides a risk system which can be applied to any project in any industry sector, indeed the financing of any venture. It also outlines each structuring solution that would be acceptable to the project financiers – all 180 of them (structures).

## Project finance's origins

Looking for the earliest examples of what is meant by project finance will lead to early Greek merchants who funded vessel-specific expeditions. The first known French concession in 1554 granted to Adam de Craponne for a canal between the Durance and Rhône rivers – which still exists – was a precursor to build own transfer (BOT). An outline of the rights and obligations are shown in Box I.1. The concessionaire must self-finance without support from the public authority granting the concession. One of the key conditions was a non-discriminatory tariff and an undertaking to keep up with new canal technology.[1]

**Box I.1**
**First BOT contract**

Rights:
- hardship;
- unforeseen impediment; and
- *fait du prince* (extras).

Obligations:
- continuity of operations;
- adjust (to new technology); and
- non-discriminatory tariff.

The advent of the railways in 1800s also saw a form of project financing – usually funded via bonds or share/stock offerings.

Modern project financing is often thought to have originated with production-payment financing in the Texas oilfields in the 1930s. A driller would fund the well drilling costs in exchange for a share in future oil proceeds. In West Texas, it was hard to miss striking oil every time! At that time, a Dallas bank granted a non-recourse loan to develop an oil and gas property to be repaid from the cashflows from those wells. Resources transactions, especially mining and oil and gas, led the way in the 1960s mainly driven by US banks. Their techniques were imported into Europe in the late 1970s for a string of large project financings, particularly for North Sea offshore oilfield developments.[2]

The risk-shedding character of project finance has now been adapted to portfolio financings, privatisations, and mergers and acquisitions (M&A) across a wide range of industry sectors.

## Project finance defined

The basic definition for a project financing is:

> A funding structure that relies on future cashflow from a specific development as the primary source of repayment with that development's assets, rights, and interests legally held as collateral security.[3] Where the sponsor/project developer gives completion and start-up (financial) support this is called Type 1 project finance; and where the project financiers rely on the builder/contractor to do this, it is labelled: 'Type 2 project finance' – the builder/contractor's 'package' provides completion support.

Further discussion on the conflicting definitions of project finance is given in Appendix 1 at the end of this book. This book examines the structures and risk mitigants that can be considered to address the 16 classes of risks in the project finance business. The text is supported by 223 case examples.

It is the usual practice for the project financiers:

1 to fund the special purpose vehicle (SPV) even though cashflows have not yet commenced;
2 to be able to rely on other financial or contractual resources to repay that funding (if the project fails to be completed); and
3 to roll up the capitalised interest during construction (IDC) into the financing.

Prior to satisfying the option conditions (Type 1 – the option granted) is to withdraw:

1 balance sheet support, if a corporate;
2 budgetary support, if a government; or
3 monoline guarantee. (A monoline is a financial guarantor of debt service (DS) by the project's borrower, an SPV. Therefore, the monoline becomes the project financier.)

If the project entity is already generating sufficient cashflows – such as in a privatisation or acquisition – then this pre-option architecture is redundant. The principle remains the same – immediate reliance on the enterprise's cashflows as the primary repayment source, holding the project as (legal) collateral.

Although there are many similar definitions, the exceptions are noteworthy: project finance is not simply the raising of finance for a project. It is a term of trade or a 'defined' term.

## Type 1 and Type 2 project finance structuring

Since 2009, the idea of a 'unified' theory of project finance has been debunked. For once and for all (time), there are two types of project finance.

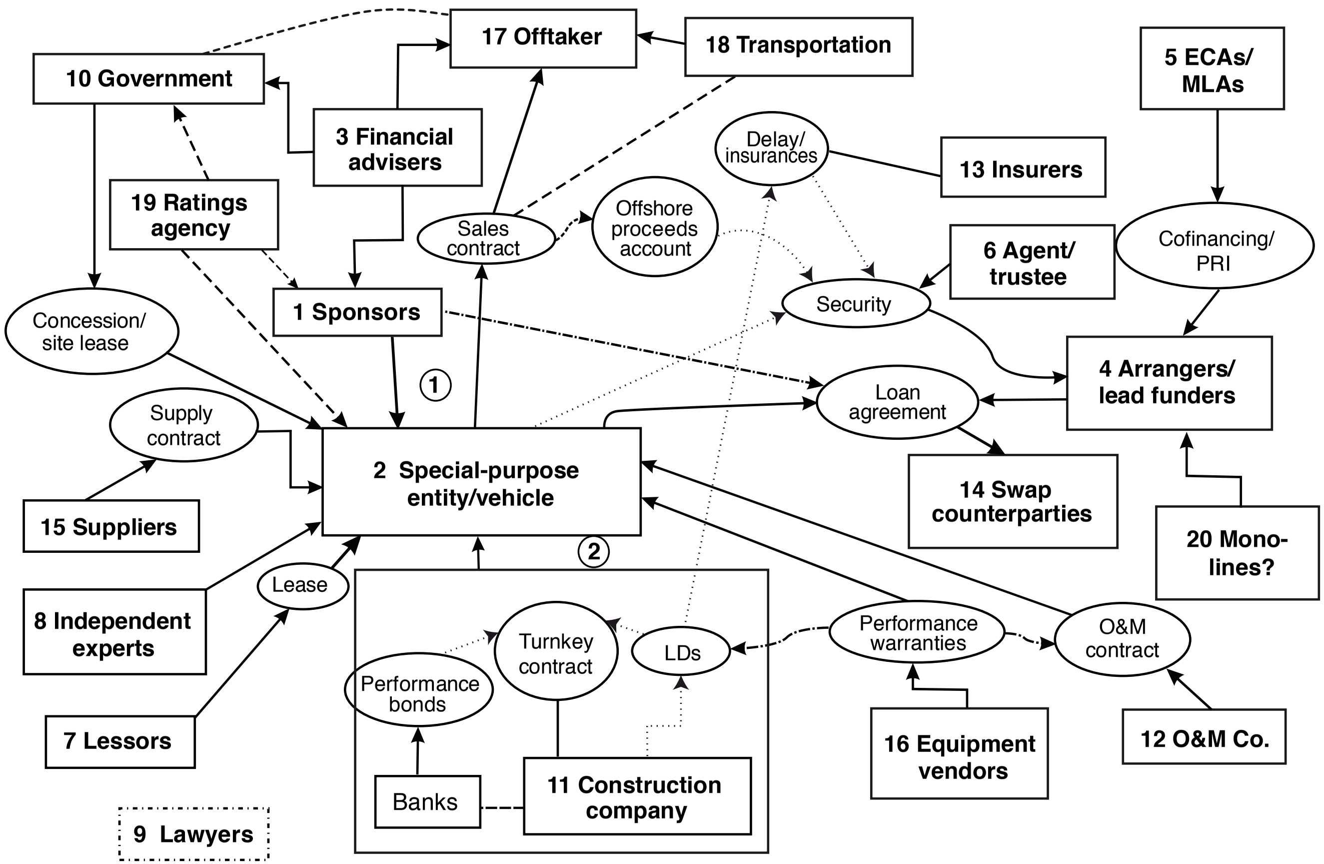
In Type 1, sponsor/developer support is given for the first two phases (see below) pre-completion. This is evident in all resources project financing, many power deals, and some infrastructure project finance transactions. This commitment by the contractor (to construct a project according to a contract) should be separated from the type of completion test commonly seen in a Type 1 project financing.

All public-private partnerships (PPPs) are Type 2 where the pre-completion recourse is capped by the contractor's financial support package. This also applies to many infrastructure project financings and some power project finance. This package usually includes a turnkey construction contract (TCC), and associated liquidated damages (LDs) ceiling (see Chapter 19) as may be extended by delay in start-up (DIS) insurances. This is laid out in Exhibit 19.3. The problem with TCC, LDs, and DIS is that they have an agreed ceiling of financial support, in contrast to Type 1 deals where the support pre-completion is often unlimited. It makes good sense that one structure applies pre-completion followed by another structure limited to the resultant project's cashflows, the true 'project finance' phase as outlined below.

As will be evident later, project finance is a highly structural tool since, after the option exercise for a Type 1 situation in particular, the lenders/bond investors wish to have strong control over the continuing operations (cashflow generation) backed up by full entitlement to that enterprise (legal collateral over all of the project's assets, rights, and interests) in the event of a default. This is referred to as 'step-in' rights. The usual organisation is a spider diagram showing a web of contracts, ownership, step-in, and advisory relationships as shown in Exhibit I.1.

Exhibit I.1

**Project finance participants**




*Source:* International Advisory & Finance 2014

## Balance sheet

### *Off balance sheet*

Off balance sheet (OBS) finance was a common objective of early project financings, where deferred income (as in a production payment) or lease obligations were not recorded on the balance sheet as senior debt. International accounting and financial reporting standards have now moved just about every obligation and indebtedness onto the balance sheet, if not formally, then requiring a statement in the notes to the company's accounts. Not every country has yet moved to adopt these standards. The expectation, however, is that they will (have to) over the next few years.

So what can be done to get the deal OBS? There is no special project finance tool available now.

### *Deconsolidation*

The preponderance of joint ventures and consortia undertaking project developments makes it relatively easy to hold a party's interest to 50% or less in the SPV, thereby enabling the project debt to be 'equity' deconsolidated. Only the investment in the SPV is booked on that party's balance sheet.

Two equal equity stakeholders can agree together to (equity) deconsolidate above or behind the SPV or to enter into arrangements to fund each other yet keep their interests at 50:50 (or a lower percentage) to achieve deconsolidation of the debt off each balance sheet.

**Case study: Colowyo, US**

In the Colowyo project financing in Wyoming, the project company was owned 50:50 by W R Grace and Hanna. In addition to the project finance debt not appearing on these companies' balance sheets, the bank also did not include the debt in its legal lending limit established for both companies.

### *Portfolios*

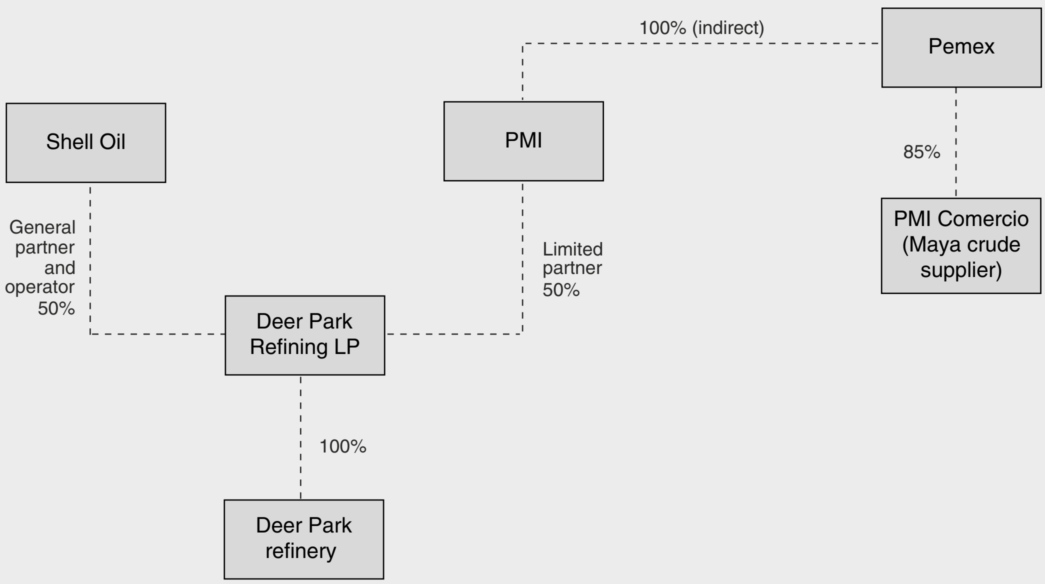
Some developers continue to spin off portfolios of project interests to lower their holdings (to 50% or below). These portfolio entities are designed to stand on their own (balance sheet) full to the brim with project financings, with the objective of keeping that debt pool off the parent's accounts and therefore, hopefully, not affecting the parent company's rating. This also provides a mechanism for a developer to roll out one project after another and thereby use project financing as an overt (serial) development tool.

**Case study: Deer Park, US**

Shell (50%) and Pemex (50%) established Deer Park Refining LP, as shown in Exhibit I.2. It is a variant of a cost corporation SPV. Recourse for the US$550 million rated 144A project-note issuers was limited by ceilings on refinery margin stabilisation (US$200 million) and standby credit lines (US$150 million).[4]

Exhibit I.2

**Deer Park**




PMI Comercio is 7.5% owned by each of Nacional Financiera S.N.C. and Banco de Comercio Exterior S.N.C, both of which are more than 99% owned by the Federal Government of Mexico.

*Source:* Davis, HA, Euromoney Books

## *Defeasance*

Another financial tool to take project debt off balance sheet is defeasance, a cash offset (further discussed in Chapter 8).

Possibly the most aggressive example of defeasance is the Transurban City Link electronic toll road financing in Melbourne, Australia. Two of the seven debt facilities (totalling A$1,249 million – approximately US$825 million) are 'secured by cash collateral equal to the amount of the loan which is set off against the loan liability'.[5]

Variations on defeasance are frequently found in cross-border transactions. The target is tax structuring, not just the balance sheet treatment, and is often packaged with leasing.

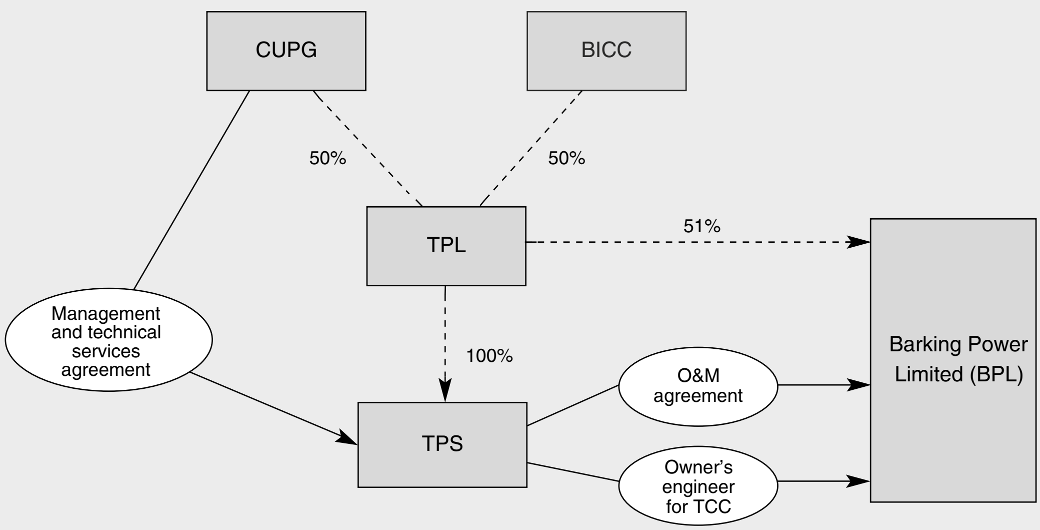
So although off balance sheet use has been *de riguer* for project financings, it is no longer the driving force.

**Case study: Barking, UK**

Secondary (equity) deconsolidation was done in the £661 million Barking project in the UK. Here Thames Power Limited (TPL) is a 51% shareholder in the incorporated special purpose borrowing vehicle, a company called: Barking Power Limited (BPL). TPL's shareholding is split 50:50 between BICC (who owns one of the TCC companies) and CUPG (a Canadian utilities company which is providing management and technical services to a 100% owned TPL operating subsidiary Thames Power Services Limited (TPS), shown in Exhibit I.3. During construction CUPG has voting control of TPL and during operations TPL has control of BPL. But right above TPL, its shareholders have deconsolidated their interest.

Exhibit I.3

**Barking**




*Source:* Author's own

## *Non-recourse*

A sponsor company seeks to take full advantage of the option to remove its balance sheet at the launch of the true Type 1 project finance phase of the financing – after completion. This option is able to be exercised once a cashflow demonstration test has been satisfied – the completion test. After completion – the same as for an existing project – the key recourse is, as before, to the project cashflows collateralised by its pool of assets, rights, and interests.

Pre-completion – with cash outflows for construction and start-up/commissioning – has to be structured and funded somehow. Inevitably the financier requires financial support either fully to a creditworthy sponsor (Type 1), or financial guarantor (monoline), or to the TCC's package (Type 2). Completion, as we will see in Chapter 19, is buttressed by all manner of financial props, contingent supports, warranties, bonding, and so on.

Rarely will the project financier allow the option (to non-recourse) to be granted prior to completion. In the few occasions when financiers have accepted completion risk fully, such as in MIM's A$345 million Oaky Creek project financing in Queensland, Australia, bankers have been stuck with forced rescheduling when output and markets failed to generate the expected cashflows.[6]

One needs to be clear about what 'non-recourse' means. To the project financier, this means that repayments originate from the project's cashflows, and not the parent companies. But the project financier does not want the parent or sponsor to withdraw its people or entrepreneurship from the deal and will seek contractual recourse to ensure continuation of that commitment and ownership.

### *Completion test and option conditions*

The option conditions embedded in the completion test (Type 1 project financing in particular) are often the most negotiated facet of a project finance transaction. Some project developers put up a project development case which is more difficult to satisfy than is expected in reality. Once the completion test conditions are agreed and documented, the sponsor unveils the real project which can then easily beat the agreed completion test performance criteria and allows the switch to non-recourse to occur earlier!

Other sponsors always present a higher capital expenditure (capex) requirement and a longer development timetable after the project finance commitment letter has been issued, knowing full well that they can better both parameters (with the project built under budget and ahead of time). Some project financiers, most notably in the institutional private placement market, prefer to avoid this gamesmanship by waiting to do the project financing after completion. This also serves to simplify the documentation. The author can cite numerous instances when the 'project costs' have (mysteriously) risen by the amount of equity given in the commitment letter!

### *Limited recourse*

Many financial limitations may be agreed within a project financing whereby recourse is constrained in three main ways, or any combination of these:

1 *time* – recourse stops after an agreed fall-out date;
2 *amount* – recourse has a ceiling or cap in money terms; or
3 *event* – where satisfaction of some event or trigger is required, (perhaps exceeding a financial hurdle in some way).

**Case study: SmarTone, Hong Kong**

Limited-recourse architecture was built into the SmarTone cellular telephone project financing in Hong Kong. Besides the original US$90 million project financing – to roll out the cell stations and market the system – an additional US$30 million (amount ceiling) was held as cash collateral which could be accessed, if needed, for up to 18 months after completion (time limit) should subscriber cashflows be insufficient. To the project financier, this cashflow deficiency pool had the first two elements of limited recourse.

**Case study: Sydney Harbour Tunnel, Australia**

SmarTone can be contrasted to the 30-year, US$375 million, Sydney Harbour Tunnel in Australia. Here, if the cashflows from the tunnel tolls are insufficient for debt service, then any cashflow deficiency is made up from the state's treasury – unlimited recourse – and thus, by reduction, not a project financing in the first place.

Although both types of project financing move to non-recourse post-completion, three instances remain which may spring recourse back to the original sponsor/parent.[7] These are:

1 *fraud*, where information has been manipulated by the sponsor/promoter/project developer;
2 *misrepresentation*, where incorrect or inadequate disclosure or statements have been made or omitted; and
3 *wilful negligence*, where any ordinary concept of diligence and stewardship has been deliberately abandoned, or worse.

Another full-recourse event is common such as the SPV owners being subject to recourse (to their balance sheets) for increased interest withholding taxes above an agreed in advance threshold. These 'springing' structures will be identified in each of the relevant chapters dealing with risk later in this book. It is the main reason why project financiers do not like to use the words 'non-recourse' because there is full recourse to the parent – beyond the SPV – in these four circumstances.

## Advantages

### *Capital shortage*

Entrepreneurs, small companies and cash-starved governments can see dozens of high-leverage project financings in the press as evidence of the money pot in the hands of the project financiers. Other developers seek to optimise this success by project financing one development, then another.

Many new projects exceed the capital resources of the developer(s), or the number of projects being developed concurrently can stretch the budget of even the biggest corporate. Mega-projects can be outside the reach of even the largest corporations or even governments and are ready targets for structuring a project finance deal.

**Case study: Griffin, Western Australia**

For the Griffin transaction, the company's net worth was approximately US$1 million. It required US$28 million to finance a major expansion of operations to satisfy a take if delivered contract to its main customer. By way of a 100% debt deal – lease, working capital, and local currency – under a project finance umbrella, the requisite moneys were provided to meet the contract delivery timetables.

**Case study: AES**

AES owns or had an interest in 120 power plants with a capacity of 43,000MW (in 16 countries to date). With eight plants under construction and more than 70 projects totalling 35,000MW under consideration in 70 countries,[8] it seeks to finance/refinance its developments with as much project financing as it can get and in the process deals with 75 banks.[9]

### *Risk transfer*

The ability to transfer risk to the financier is at the heart of the project finance process. Companies with significant market risk, cyclical operating, conditions, or price challenges eagerly isolate those risks, on the financiers' behalf, into the SPV.

Even large companies facing political risks will use a project financier as a way to get political risk cover on the debt side of the project. Roughly half of all project financings are to secure political risk coverage.

**Case study: Shell, Malaysia**

Shell arranged project finance for its Sarawak, Malaysia, production with a particular desire to cover currency inconvertibility.[10]

**Case study: Sonangol, Angola**

Angola's military enclave, Cabinda, has seen the oil majors continue a string of large export finance transactions, again in part to cover the incipient political risk over the last decade.[11] Cabinda has a permanent 9,000-strong army protection unit.

### *Deal sequestration*

The intention with most project financings is to create and finance a discrete entity, the SPV, as a way to control and limit the parent/sponsors' financial risk and exposure. The discipline to sequester a deal in this way provides a useful negotiating framework with suppliers, offtakers, and governments. There is no mistaking where the buck stops or who is mitigating what risk.

For some project financings, the goal may be to specifically quarantine the project from other group activities. This can apply in both directions. The financiers may wish to protect the SPV from other corporate activities. In this way, a well-structured project finance deal may be much more secure and bullet proof than an amorphous group credit transaction.

The developer, on the other hand, may seek to ensure that in the event of project failure, the debt does not bounce back onto its balance sheet.

**Case study: Freeport, US**

When Freeport Minerals' nickel mine was expropriated in Cuba, Freeport stood aside from the banks who had political risk cover. Freeport went on to develop the Greenvale nickel mine/plant in Queensland, Australia, which collapsed under oil price operating cost pressures. Again the banks (and Germany's KfW) took the loss of US$326 million and Freeport continued with its other projects and subsequent merger, unaffected by two major project finance failures in succession in the same sector (nickel).

A sponsor may elect to isolate a project into an SPV for other reasons:

- companies with tough labour conditions will establish a separate entity for a new project to establish new workplace agreements. In this way they seek to shed existing labour inefficiencies;
- small companies or weak credits may have a new project which is substantially better than themselves. The new project or acquisition may be able to attract much more funding on better terms and conditions than the weak sponsor; or
- project supports from take or pay contracts, strong offtake, or through investment/linkage to a strong consumer may be more bankable than anything the sponsor may be able to achieve.

### *Ratings management*

Some project financings are established to hide the enterprise from the parent's business activity to endeavour to protect the parent's rating. As referenced earlier, some developers package up project bundles as a self-sustaining project financed SPV which can gather their own rating (hopefully not influencing the parent company's rating).

### Case study: Edison Mission, US

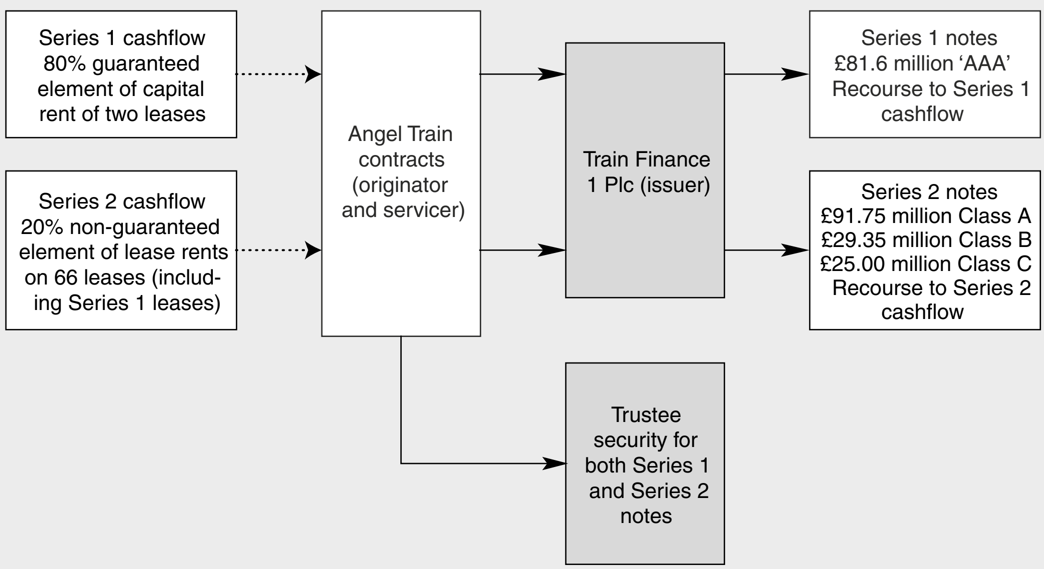
Edison Mission Energy Funding Corp (then S&P rated BBB and Moody's Baa1) raised US$450 million in senior, unsecured notes for four California power plants. Its 50% owner, Edison Mission Energy, meanwhile operates 22 US and 27 international power plants with a combined US$5 billion balance sheet of equity, bank lines, but only US$200 million in rated senior-unsecured notes.

### Case study: Train Finance 1, UK

The £228 million Train Finance 1 plc for British Rail is for the rolling stock lease component for the privatised UK rail operators.[12] The underlying 8 to 10 year leases are 80% guaranteed by Her Majesty's Government, so it is a hybrid sovereign/project deal. (See Exhibit I.4.) The use of leasing is a direct clue to the asset-driven character of a deal.

Exhibit I.4

**Train Finance 1**




*Source:* Author's own

However, major ratings agencies are not easily deterred and are accustomed to digging through to sub-ordinated and quasi-debt deals.

### *Securitised project financings*

Securitised transactions are developing whereby project cashflows are being pooled into a payment or lease class which is then dedicated towards debt service. The usual credit enhancement is some cash/collateral (10% to 15% of the total debt) sitting beside a secure stream of receivables. A monetisation (securitisation of gross revenue) may be employed to enhance the solidity of payments.

**Case study: Calpine, US**

Calpine, a well-known deployer of project financing, established a portfolio of four merchant power plants in four states of the US. The idea was to pool these diverse cashflows into a US$1 billion revolving facility to use to build other plants.[13] This is a hybrid corporate/project finance transaction adapting a cash-sweep variation onto a monetisation (securitisation of gross sales revenue).

Large oil companies, such as Argentina's YPF or Mexico's Pemex, have issued notes repayable out of oil receivables (under a good contract). This is not project financing *per se*, more a corporate transaction dealing with sales from a non-specific portfolio of revenue generators, akin to a commercial paper issue.[14]

### *Better returns*

Many regard project finance as a tool to achieve high gearing/leverage and long repayment terms. Therefore, it will automatically enhance the rate of return calculations, however calculated. In most instances the rate of return should be able to be doubled – always given that adequate cashflow coverage of debt service – via the debt-service cover ratio (DSCR) – exists.

Many governments like to use internal rate of return (IRR) thresholds to curb windfall/excess profits, especially in privatisations or for granting new concession contracts and, of course, to keep the returns to the private sector at politically acceptable/defensible levels. Thankfully, most of these IRR regimes have not contemplated the boost from high-debt leverage achievable in project financing.

Where a company board has established an IRR hurdle (for all its projects), then a smart board will realise that different projects attract different leverage. In almost every case, project finance, if viable, will boost the return above the board's hurdle rate.

### *Consortium control*

Due to the highly structured nature of a project financing, a horizontal as well as vertical discipline is naturally achieved. Each consortium member is, in a sense, protected from, yet supported by the other. Project financing might may be particularly useful where significant conflicts of interest exist with some consortium participants.

Large projects are often undertaken by a consortium of entities, such as participants who provide:

- land;
- technology;
- operations management;
- construction;
- financial clout;
- local connections;
- transportation;
- supply/resources;
- offtake/market; and/or
- government or development capital.

### *Tailoring*

In a project financing, the drawdown and repayments may be linked long term to a particular enterprise rather than being lumped into corporate credit facilities which are often relatively short term and subjected to regular review. Project bankers prefer progressive loan drawdowns matched to certified actual project expenditures; whereas the project bond market practice is usually a one-time advance of the total amount – although some staged drawdowns are slowly emerging. Money on deposit rarely earns the borrowing rate of interest – labelled 'negative carry' or 'negative arbitrage', thus surplus cash is viewed as inefficient.

For the repayment period, a project finance structure may be specifically hard-wired to cashflow generation. It can be very flexible.

**Case study: Black Thunder, US**

For Arco's Black Thunder project in Wyoming, US, the US$120 million production payment was repaid from a maximum 60% of the net monthly operating cashflow.[15]

### *Covenant busting*

Project financing can be engineered to get around outside constraints, such as:

- borrowing or balance sheet limitations imposed by other group lenders;
- security restrictions are put in place by lenders, the World Bank (negative pledge), bondholders, or sometimes governments; or
- regulator limits on activities or returns.

This can be achieved in a manner which does not threaten the original intent because the new enterprise is being launched on the premise of standing alone and apart.

**Case study: EZ, Australia**

EZ Industries' bankers controlled its balance sheet and legal security through a trust deed. Anxious to undertake a large new project, Elura, it structured a US$130 million production payment without reference to its bankers. The project finance covenants were written exactly to fall outside the trust deed shackles.

**Case study: Edison Mission, US**

Edison Mission Energy was set up with a kitty of US$500 million by Southern California Edison, a 100-year-old electricity utility in the US, specifically to become an unregulated non-utility. It has consistently used project finance leverage to maximise its development and acquisition opportunities. It is no accident that the first entry on its website is titled 'A leader in project financing'[16] having closed over 40 transactions for a total of more than US$15 billion, 11 of which were non-US dollar denominated deals.

### *Flexibility*

A well-structured project financing can be highly flexible. Banks may be able to achieve this through automatic resetting devices based on the project's performance or the sponsor's expansionist desires (while still leaning on the 'cashflows first' principle).

Bond structures have far fewer covenants and are thus seen as providing more (within-covenant) flexibility than banks. But attempts to reset or reschedule a bond structure will be met with the easy to understand human gesture of throwing hands up in the air. The management of the deal (agency/trustee) is little better than a post office. The nature of the bond investor and his/her portfolio is essentially screen-based and does not extend to the idea of handling waivers and going to bondholders' meetings. So it is essentially the banks that can offer flexibility.

**Case study: Pego, Portugal**

Tejo Energia's €1.14 billion project financing was arranged for a partial privatisation by the state electricity utility, Electricidade de Portugal (EdP) under a 15-year power purchase agreement (PPA). The 12-year bank facility was specifically designed to be refinanced within six years after start-up. Two years after completion the banks extended the transaction beyond the PPA life to year 19 and halved the loan margin to 80 basis points.[17]

### *Workouts*

The flipside to flexibility is the attitude of project financiers to a workout. In conventional balance sheet lending, the task is to reshape the entity, sell this, merge that, and sack so many. In a project finance bond issue, the bondholders have great difficulty getting together to agree anything. Banks, however, structure a project finance with an eye to its future cashflow potential anyway and always recognised that an exit by foreclosure or sale was unlikely to be sufficient to pay off the debt. Bankers are, therefore, more likely to work to preserve the enterprise, including recapitalising it (by providing 'new' loans) and re-shaping the repayment profile. The project finance legal structure allows the banks to step-in to the shoes of the project to take the next steps to redressing the cashflow difficulties. As a last resort the banks will still try to bring in a new player to own, operate, and reinvigorate the venture, rather than move to an outright sale.

**Case study: Barrack Group, Western Australia**

When the Barrack Group, in Australia, collapsed after failing to raise new equity, JPMorganChase, as the lead bank to the Group, was caught as a senior lender, subordinated lender, and (hedging) margin lender. One struggling project was, however, project financed separately. A new manager was installed to restore the (struggling) operation and, within a year, the entity had repaid its US$15 million loan with interest. The main banking syndicate wrote off the rest of the Barrack Group to the tune of more than US$100 million, in excess of half of their exposure. Their workout process included the sale of the main cashflow generator for the entire Barrack Group for US$20 million!

### *Privacy*

If matters surrounding the deal are commercially sensitive, then the quarantining of the deal and deal information inside tight confidentiality restrictions is another reason to select project financing. If suitably warned, many banks can be excellent in this area. However, some national business cultures are 'leaky'. A private placement document is far from 'private', since numerous 'hands' have viewed and had input to the Offering Memorandum or placement document.

**Case study: IAF, private placement**

IAF's private client was offered two monetisation deals as laid out in Box 11.1. The deals were essentially priced the same, but with more money and a longer term on offer via a US private placement versus a bank deal. Privacy was a key reason to choose the banks since if the customer of the client could get hold of the financial disclosure in the offer document, it would without doubt use that against the client in the next round of price and volume negotiations. The underlying shifts in the monetisation base also required future flexibility on amounts and term. The identity of this deal is? Confidential, of course!

### *Project validation*

The project finance process involves a high level of due diligence (discussed in Chapter 9) and credit intensity. With the banker taking all the risks so structured without an equity return, it is natural to see extensive stress testing of the 'downside' and 'break even' cases. *It is always raining on a banker's parade.*

This effort should be welcomed, rather than endured. *The project financier's (second) opinion might just be right.*

Avoid:

- the blockbuster deal that 'everyone is/must be in'. The result could be Eurotunnel.
- the pioneering deal: 'This deal will set the pace.' Many times it is better to be second or third;
- the me-too deal. 'We're getting left behind. Everyone else is doing these deals.' There were so many deals without any proper FX cover done in the late 1990s in Asia, there is not sufficient space to list the examples;
- the tombstone or market-image deal. 'We must have our name on it. It's a prestige client/deal.' The result could be Gautrain or Iridium; and
- the relationship deal under pressure from the sponsor: 'You must do this [tough] deal otherwise we'll reduce your other business with us.' Or under pressure from the banker: 'We must be seen as the lead/top tier to retain/build our relationship.' Project finance is not a relationship 'product'.

The underlying premise of project finance is to set the deal loose from the relationship as soon as completion is achieved and sufficient cashflows for debt serve (DS) are evident.

### *Simple arithmetic*

A great advantage for project financing is its simple maths – which are given in Chapter 5. The valuation measures such as IRR can be ignored from a structuring viewpoint. Derivatives can be added later, after the basic structure's building blocks are in place. There is considerably more discussion on hedging in Chapters 11 and 23.

Although a project finance spreadsheet can be elaborate, the deal can be structured without regard to a balance sheet or accounting Sources and Applications. Over-reliance on accounting ratios is one of the shortcomings experienced in the industry. (See Box 3.11.) The concentration on cash is sufficient discipline for the mathematics.

### *Longer term*

The leaders in long-term project finance have been bond issues, which can stretch to the 30-year-plus. Bankers are also accustomed to structuring their longest-term exposures as project finance credits, but all banks are facing much heavier emphasis on capital through regulations such as the Bank for International Settlements (BIS) Basel II (capital adequacy) and Basel III (liquidity – higher tier capitalisation). As a result banks want shorter term/length project finance deals.

**Case study: Petrozuata, Venezuela**

Petrozuata, a Venezuelan semi-crude export oil project, burst through the national term for a bond issue – which was 12 years maximum – by issuing some 25-year paper. Its US$1 billion 144A project finance bond issue was also rated higher than Venezuela sovereign debt, thus doubly 'pierced the sovereign ceiling' for Venezuela.

## Disadvantages

### *Documentation*

Because of the highly structured nature in many project deals – the natural result of risk allocation – the complexity and often cumbersome documentation is seen as the primary barrier to project finance.

### *Extra cost*

Large companies frown on the perceived extra cost and complexity of project financing, preferring to use the collective corporate capital pool for the necessary development monies. Some company treasurers also fear the reverse leverage that might spring from increased interest rates in a highly geared structure while others fear the controls of the classic project finance covenants that banks, especially, seek.

As will be explained in Chapter 5, project finance margins are not priced for risk. (This will disappoint the derivatives desk.) Instead the structure is adjusted to cover and balance the risks. The structures are complex and the adjustments and tradeoffs are four dimensional. Project finance pricing – the spread or margin – is very cheap given the risks assumed. To use economist's jargon, it is inefficient intermediation. The market for a well-structured deal remains very competitive so pricing spreads have always been low. A choice of project finance will not devolve to a pricing comparison.

**Case study: BHPB, Papua New Guinea**

BHPB selected project finance for its Ok Tedi development in Papua New Guinea (see Exhibit 21.7), since the margin was lower than it could achieve on balance sheet!

**Case study: Petropower, Chile**

The Petropower project was able to raise 18-year debt on a project finance basis for a Chilean project in a well-crafted structure shown in Exhibit 19.4. At 1.7% over the equivalent US treasuries, (taking away 0.25% to equate to Libor and take a further 1% to 1.5% to then 'price' Chilean political risk), then the treasury staff can celebrate a practically free project finance deal for this co-generation and refinery transaction.

When asked 'what is the cost of your (project finance) money?' the author's thoughts stray and the meeting is mentally ended. If the borrower can only appreciate a cut-price deal, they can go to another barber shop for shaving. Project finance is inexpensive when evaluating risk, flexibility, and the other many advantages listed above. The choice, more than not, devolves to whether money can be raised at all. It is the availability of (structured) money versus not getting the money.

### *Too long*

Project financing is difficult to execute quickly. The various stages are outlined in Chapter 1, and nine months to one year is a handy estimate for a deal already well prepared and well presented. The shortest is around three months – where a small group of experienced project finance players are dealing with a wholly (pre)packaged, simple, straightforward deal with known and trusted developers.

The longest period for a project seen by the author was 40 years, largely taken up with the effort to get the government onside. The Hubco project is (in)famous for its 10-year, 3 Information Memoranda roller-coaster ride for a large political-risk package for Pakistan. If time is truly of the essence, then project finance has great difficulty as a financing ingredient in the deal.

**Case study: Cooljarloo, Western Australia**

In the Cooljarloo integrated project development, an A$320 million dual-currency project financing was structured together with a US$250 million Euronote facility with put option. The documents had 30 pages of 'thou shalt nots' with 450 commandments in all.[18] Faced with a 40% cashflow reduction below projected levels at loan signing two years earlier, the project finance bankers had great difficulties in agreeing anything, with the smallest banks being the greatest nuisance, in the hope of being taken out. Needless to say, the borrowing company could barely move as it had to incessantly negotiate waivers for just about everything, as well as face pressure to reprice the deal (upwards).

### *Lender control*

The project finance structure is designed to control the risks. The tight packaging of project finance structures and documentation can create the appearance that the bankers are running the business. Inevitably, this spills over into controls over operations, special reporting, regular independent engineering reviews and (re)certification, constraints on security, permission to do anything new, regular waiver/compliance 'negotiations', and liaising with bank syndicate members. Here, the private placement and bond markets are far less restrictive.

**Case study: Papua New Guinea**

In a Papua New Guinea bank project finance transaction for two minority unincorporated joint venture (UJV) borrowers, the author tallied the number of items covenanted – positive, negative, and reporting – and the total was 287 items. If the companies' treasurers felt they were working as the bank's back office, they would have some justification.

**Case study: Hero Asia, China**

For US$107 million Hero Asia capital markets (project finance bond) transaction – a 144A bond issue for two Chinese coal-fired power plant developments – there are essentially three covenants:

1 no further indebtedness;
2 do not merge, consolidate, or sell yourself; and
3 honour your contracts.

### *Higher insurance costs*

Insurances are seen as a secondary structure in many aspects of project finance. While expensive, it may be the only backstop available for many risks. A comprehensive program is fully laid out and priced in Appendix 2.

A balance between insurance costs needs to be made against the amount of money raised. All sorts of credit enhancements can also be achieved by insurances such as DIS insurance, monoline wraps, and so on.

**Case study: Project procurement, US**

A professional partnership offered a combined cycle, three-machine power plant package. The LDs would be expected to be substantial, around US$500,000 per partner, and could only be accepted within a project finance deal if backed up by a substantial delay in start-up (DIS/DSU) insurance package to backstop these LD commitments. All parties recognised the need for DIS and negotiated accordingly.

### *Higher legal bills*

Of the participants shown in Exhibit I.1, the 20 participants which are not lawyers need a lawyer, and thus the amount of legal work mounts quickly. It may come to seem, when looking at a stack of project finance documents, that lawyers must be paid by the word.

A standard structure would be hard to implement for less than US$500,000 in legal bills, and a US$1 million bill or more is commonplace. Part of the problem is that the bankers abdicate the drafting to the lawyers as soon as the term sheet is signed. Since most lawyers are untrained in risk structuring – 'that's a commercial matter' – it is no wonder that the deals see plenty of paper and the five most terrifying words the author has experienced: 'Leave it to the lawyers.' Active participation in drafting and document scope setting is actually welcomed by smart project finance lawyers who enjoy the change from a plain vanilla corporate deal.

**Case study: Word-processing, lawyer**

A project finance lawyer followed previous transaction styles in that most boring of clauses, the notices clause. 'Please send by [methods] to the special purpose vehicle (SPV) borrower; Attention: Treasurer.' The addition of the words: 'and to another party nominated in writing' permitted a project financing to proceed since non-receipt of such notices to the bank was deemed a fatal flaw – irremediable defaults could creep in to topple the security structure.

### *Greater risk to lenders*

For the lenders, the deal represents a long-term commitment with many opportunities to go wrong and no easy way out except to book a loss/provision and run. The structure is built as robustly as possible, but when it comes to litigation, court systems will tend to 'defend' the borrower from the 'oppressive' lender with no one covering the interest bill during this talkfest and interminable delays.

Project financiers try to bolster the structure with belts-and-braces security and covenants as much as possible. That does not prevent a litigation lawyer finding many delaying tactics through the courts. The bankruptcy costs (agency costs) can be very high in a workout, as much from the delay as from the many professional teams that may need to be mobilised – engineers, lawyers, accountants. The margins and payments in a project financing are usually woefully insufficient to fund any serious workout.

### *Recourse*

Large companies are fond of saying: 'Look, project financing is of no use to us with its attendant controls and complexities. We have to stand behind every deal we do, especially to honour concession agreements in "risky" countries.' This is the concern that the continuing business of the company elsewhere will be tarnished from abandoning a deal and would compromise relations with governments and other financiers. The operative word here is 'abandoning'. From an earlier point, project financiers work very hard to avoid abandonment in any workout. If a company like Shell cannot 'take a walk', then project finance should not have been selected in the first place.

Most properly structured project financings are genuine in their quarantining of recourse and the stand-alone nature of the debt. The party which seems to open more back-door recourse is government. Credit committees recoil and should walk away from the deal when they hear the words 'the sponsor will back this deal anyway'.

**Case study: Rio Algom, Canada**

A major Canadian company, Rio Algom, structured a US$120 million project financing for a Nova Scotia development. Bank of America may have realised that it had a problem when it was only able to sell down US$10 million of the deal to Rio's main Canadian relationship banks. One month after start-up, the project defaulted on a loan repayment. The project finance banks eventually had to foreclose and sell the deal – at a US$50 million discount to Rio Algom.

## Summary

Project finance packaging appeals as a means to attract high leverage, often to get the resulting debt off balance sheet, to quarantine the project and its financing, and as a means to instil discipline with its associated powers and protections across the various parties in a project venture.

Project financing can represent a meaningful skill in packaging an enterprise to operate on a stand-alone basis to repay a debt, however funded. There are more than 180 structures, reviewed in this book, that can be employed to mitigate the many risks.

Advantages are many and the disadvantages controllable or avoidable. To succeed, the risk trade-offs need to be woven into a workable, yet flexible, set of arrangements which can be structured to survive the stresses of the future.

The reader is invited to explore the risks in no particular order; but to first examine the cashflow mechanisms and general structures that are available, perhaps then to investigate due diligence and finessing sector protocols.

The best Glossary[19] 'freebie' is from Latham & Watkins. Another glossary is at the end of this book.

---

1 Fillet, M, 'BOT contracts – the critical ingredients of the French model', *Project Finance International 74*, pp. 33–8.
2 Sarmet, M, Credit Lyonnais – International Project financing, *Banque*, No 392.
3 Tinsley, CR, 'Introduction and glossary', in *Practical Introduction to Project Finance*, 2000, Euromoney Books.
4 Davis, HA, 'Deer Park Refining Limited Partnership', in *Project Finance: practical case studies*, 1996, Euromoney Books, pp. 155–8.
5 Transurban City Link, Annual Report, Note 11, Borrowings Non-Current.
6 'Second thoughts about project risks', *The Banker*, 1982, pp. 109–12.

[7] Tinsley, CR, 'Risk trade off', at 2nd Mineral Economics Symposium, CIM, Vancouver, Canada, November 1982.
[8] UBS Securities 'The AES Corporation', *Equity Research*, 15 May 1977.
[9] AES; www.aesc.com/factsheet.html.
[10] Tinsley, CR, 'Handling political risk', Pacific Rim, *The AusIMM III*, 1960, pp. 427–31.
[11] Bell, J, 'UBS's Angolan success', *Project and Trade Finance*, 1997.
[12] Train finance 1 plc, Duff & Phelps Credit Rating Co, 1996.
[13] 'Calpine in construction deal,' *Project Finance International 173*, 1999, pp. 33–4.
[14] 'YPF structured export notes private placement', IADB; www.iadb.org /sds/utility.cfm/151/ENGLISH/pub/47.
[15] Financing Proposal Memorandum, Casper College Production Payment Foundation Inc.
[16] Edison International; www.edison.com /profileexa/eme/content1.htm.
[17] Morrison, R, 'New Pego loan sans covenants', *Project Finance International 102*, 1996.
[18] Reynolds, DG, 'The Tiwest Project: living with uncertainty', at 16th Annual AMPLA Conference, Australia, 1992.
[19] Latham & Watkins, *The Book of Jargon: project finance*, 2nd edition, 2013; www.LW.com.

Chapter 1

# Structuring stages

There are three stages in project finance for a new development. For an existing enterprise, the first two have already passed.ß

1 *Construction (pre-completion)* when the funding is required for capital expenditures, interest during construction (IDC), working capital, fees, and services. During this stage, interest is usually capitalised into the loan for both types of project finance.
2 *Commissioning/completion* when the project is starting up and testing the option conditions to release recourse to the sponsor group's balance sheet (Type 1) or the turnkey contract's transition to an operating enterprise (Type 2).
3 '*Pure' project finance* where the debt parties can expect repayment only from the project's cashflows (primarily) backed up by a collateral package of rights and interests. (See Appendix 1.)

Prior to entering these three stages, a company or sponsor group will have conducted technical, financial, and market feasibility work before pressing ahead with board approval or entering into a tender process. However, many projects may proceed to a full package and only then address the issue of getting funding. By then it is probably too late to reshape the concession, shareholders/joint venturer arrangements, or the market/contractual position. Certainly to try to reset these just to serve the interests of project finance structures is difficult and usually treated as an unwelcome intrusion in an otherwise 'wonderful' deal architecture. The danger, of course, of trying to retrofit clauses is that all conditions and agreements are reopened.

Early input on the preferred project finance structure can add greatly to the ease of structuring and can often achieve better overall terms and conditions. Structuring ideas should be drawn into the project early on by inclusion of financial advisers (see Chapter 4).

These early project finance inputs are usually incredibly simple and obvious. It is forgotten in the rush to 'feasibility' that decades of project finance experience (in the French concession case, this extends to centuries) can be mobilised to shorten the process overall, reduce the cost to financial close, and make the deal more robust.

## Technical feasibility stage

The depth of investigation at the technical feasibility stage can range from overnight computerised performance runs to multi-year, multi-million dollar studies. The many feasibility study types, some nefarious, are listed later in Box 9.1.

**Case study: Croydon Tramlink, UK**

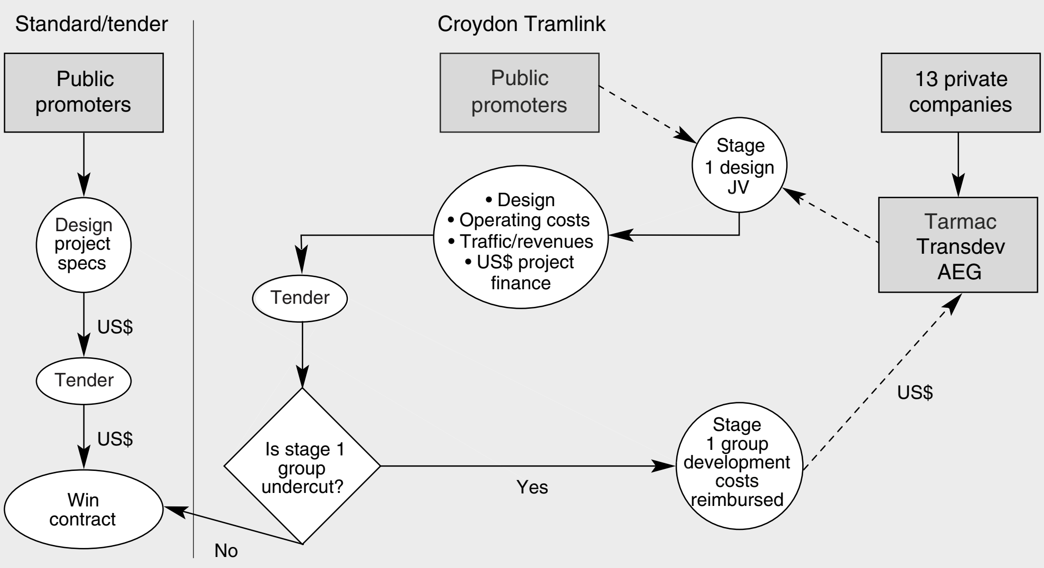
The Croydon Tramlink project was conceived to interconnect various London Underground (tube) stations and crossing railway services. The government decided to bring the private sector in at the design stage to determine:

- system design;
- system costs; and
- project finance capacity.

In this project, the project finance debt is the amount over and above the subsidy or grant from government (see Exhibit 1.1). Three co-developers were selected from a 'beauty parade' of 13 private companies to work with the public sector – a design public-private partnership (PPP) joint venture. The project was put out to tender and, if this original group's (Stage 1) offer is undercut by a lower price, lower fare, better system performance and lower subsidy/grant, then the Stage 1 group gets its development costs reimbursed. This arrangement is in strong contrast to a normal prescriptive tender where bidding parties each spend 0.5% to 1% of the contract price on the bidding process. This avoided the very costly and time-consuming open-bid process which often does not yield the best systems for the price anyway.

Exhibit 1.1

**Croydon Tramlink stages**




*Source:* International Advisory & Finance, 2014

The preponderance of engineering input at this stage needs to be tempered with the overall risks which require structuring solutions. Engineers do not gravitate naturally towards project finance structuring since the trade-offs can be subtle and not subject to slide-rule scrutiny. Many optimisation tools and risk determinations are overly quantitative, overly back of the envelope, or overly prescriptive, proclaiming: 'This is the way it's done' or producing a ready-made base case. The main premise of this book is that a systematic review of risk will flow to the choice of cashflow cases and suggest the selection of project finance structures.

**Case study: AIDC project approval, Australia**

In a survey of one organisation's hands-on project finance approval experience, Australian Industry Development Corporation (AIDC) reviewed 300 of its mineral-resource project-loan applications.[1] The number that proceeded to detailed evaluation was 82, from which 14 were eventually approved. Of the projects considered in detail, 63 were ultimately developed (77%). Of these, 50% had failed or were struggling within 18 months of completion. For the balance that did not proceed to detailed evaluation, the breakdown was as follows.

| *Concern* | *Number* | *Risk* |
|---|---|---|
| Insufficient reserves | 82 | Supply/inputs |
| Poor category of resources | 76 | Supply/inputs |
| Poor category of design | 43 | Engineering |
| Processing | 29 | Operating risk: technology |
| Environmental | 9 | Environmental |

This experience is similar to the author's where an 85% rejection rate[2] speaks volumes about the poor packaging skills of corporates and contractors plus their advisers, yet it also highlights how few have understood the project financier's requirements and structuring tools. Equally the project finance community has not explained that if a deal is structured in a different manner, it would be able to be done on more advantageous terms (funding amount, term, pricing, flexibility of repayments, and so on).

**Case study: Hubco, Pakistan**

Pakistan instituted a World Bank program to encourage independent power producers (IPPs) to set up (and project finance themselves) in order to alleviate a national power shortage. Prior to this, a Saudi promoter, Xenel Industries, had hired consultants to examine site and size choices with financial advisers venturing 'possible financial plans'.[3] Ten years, three information memorandums, one Gulf War, and sponsor group changes resulted in a parallel financing which wove together the following.

| *Aspect* | *Financing* |
|---|---|
| Government's obligations | World Bank Partial-Risk/ECO(partial risk) |

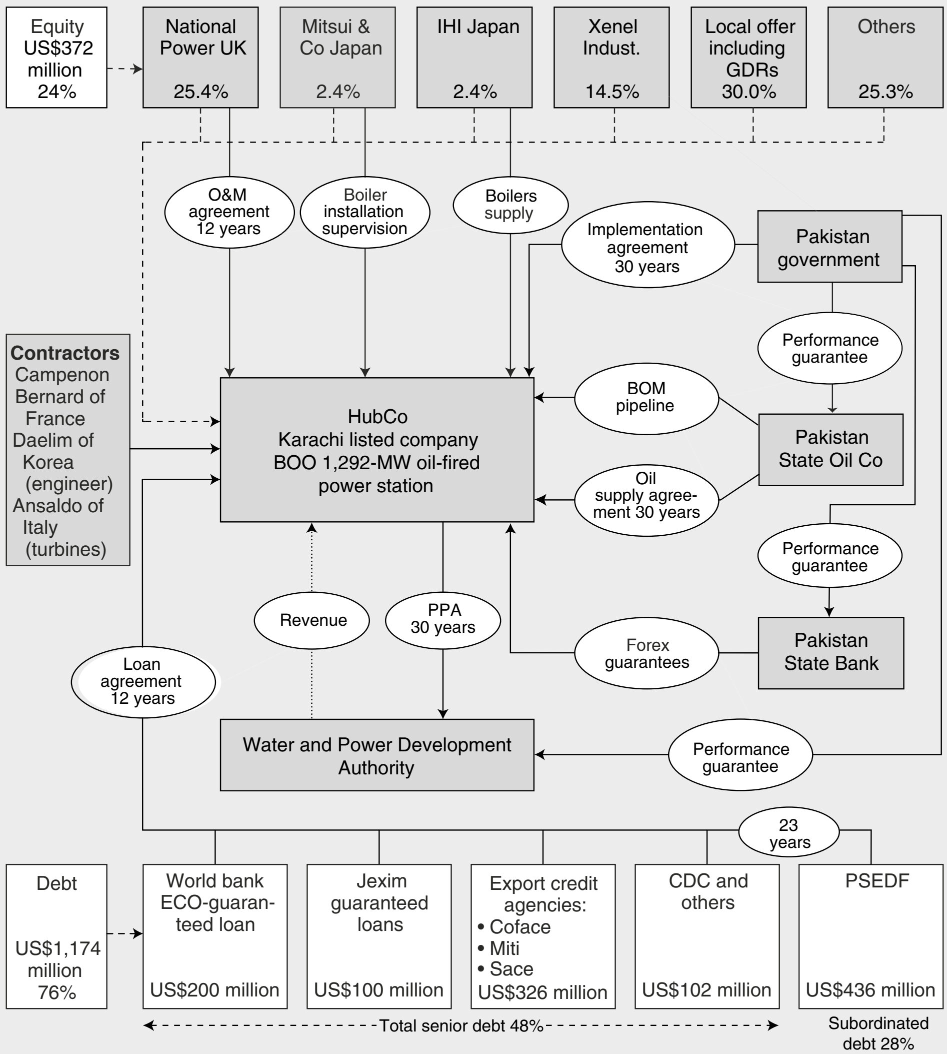
*Continued*

| | |
|---|---|
| Sponsor equity | Local and Global Depository Receipts issue |
| Subordinated debt | World-Bank fostered fund, PSEDF |
| Islamic lending | Asset basis, rupees |
| Suppliers/contractors | Export credit agencies (ECAs) |

This heroic achievement may seem elaborate indeed (see Exhibit 1.2), but this political risk structuring has been vindicated by changes of government and a military coup. The project finance structuring has been to the benefit of shareholders and not just the debt parties.

Exhibit 1.2

**Hubco**




*Source:* Author's own

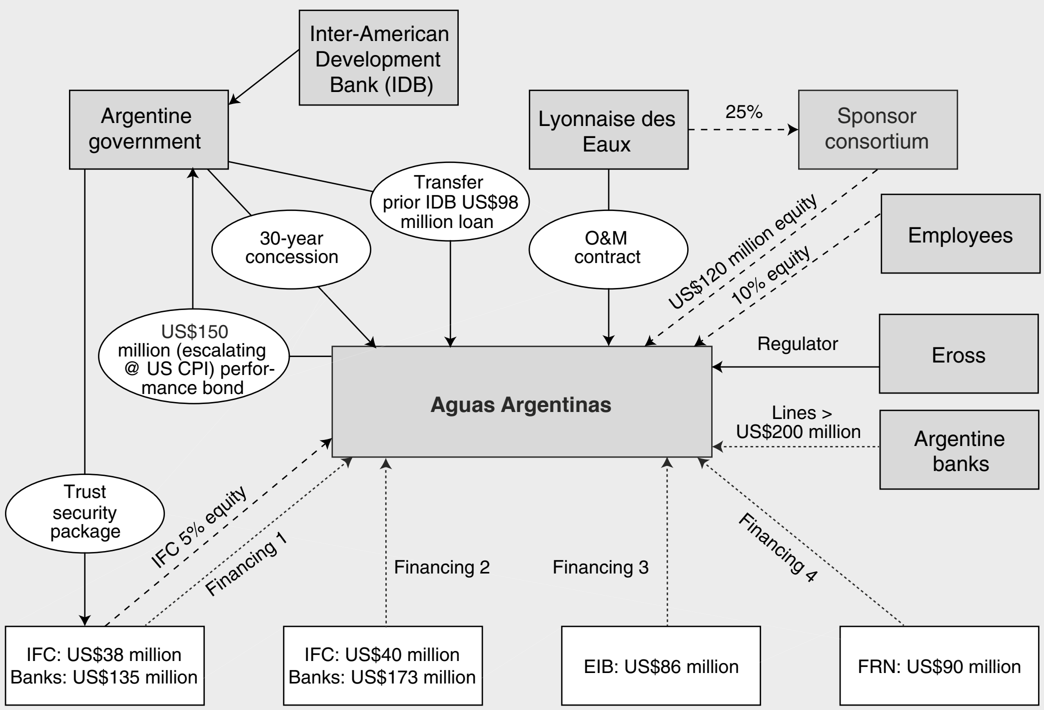
Project financiers, financial advisers, and lawyers seem to throw up this immensely complex aura surrounding project finance; yet one can whittle down the whole process dramatically through a systematic risk approach, as described in this book. The ultimate choices among project finance structures can be reduced to two to three prime alternatives for any project very quickly.

### Case study: Aguas Argentinas

IFC spurred on a project finance basis for the private development of water supply and sewage treatment in Buenos Aires, Argentina, under the stewardship of Lyonnaise des Eaux. Under this 30-year concession, the capex requirement is a total of US$4 billion.[4] Improvement of the existing system could help to internally fund that amount, but to get the system up to standard, a sequential project-finance approach was adopted with the goal ultimately of a transaction which has more of the characteristics of corporate balance sheet management rather than the tight discipline of policing project finance cashflows. The early funding sequence is shown in Exhibit 1.3 and the gradation out to a corporate floating rate note (FRN) was able to be done on its own rating (see Exhibit 1.4).

Exhibit 1.3

**Aguas Argentinas**




*Source:* International Advisory & Finance, 2014

*Continued*

Exhibit 1.4

**Aguas Argentinas tranches**

| | | | |
|---|---|---|---|
| Equity: | | US$120 million | |
| Financing 1 | IFC – A | US$38 million | 10 years |
| | 15 Banks – B | US$135 million | 8 years |
| Security: | Trust: Termination payment by government | | |
| Corporate: | Completion guarantees; termination deficiency guarantees. | | |
| Condition: | IFC 5% equity | | |
| Financing 2 | IFC – A | US$40 million | 12 years |
| | 21 Banks – B | US$173 million | 8 years |
| Financing 3 | EIB | ECU 70 million | 10–15 years |
| | EIB took the CIT risk and ten banks credit enhance the project finance for EIB. | | |
| Financing 4 | Aguas Argentinas (alone) | US$90 million FRN | 3 years |
| Local bank lines | In excess of US$200 million | | |

*Source:* Author's own

## Financial feasibility stage

The decision to seek project financing rather than raising new equity, using the debt capacity of the balance sheet, or using internal funding is usually very obvious. Project finance is a well-proven tool to achieve high-leverage and long-term debt, to shed risk throughout, but especially after completion. About half of all project financings are done to roll in political risk structuring. Any company seeking growth can effectively utilise project finance as a stepping stone for some or all of its business.

It will come as no surprise that analysis of project finance loans showed that none of the sponsor-related variables were found to be significant.[5] Once the risks are known and the structures established, the debt service cover ratio (DSCR) is adjusted by the cashflow profile to match that risk set (see Exhibit 5.3). Accordingly, project finance loan pricing does not reflect the risk. It is the structure of the financing that does this and the risk adjustment is through the DSCR.

If the structuring adjustment cannot be made (and there are, therefore, elements of venture funding) or there is significant participant risk remaining, then these may present differences that require margin increases to reflect the risks. The most common instances of this occur where there are (weak) sponsor supports and (weak) offtaker situations.

The comparison of a project finance debt to a corporate debt on a pricing basis alone will usually see the project debt appear to have higher margins/spreads. But when stacked against the risk shedding inherent in the selected structuring, project finance is cheap by any measure, even with the cashflow:DSCR adjustment. And given the option to deploy the balance sheet elsewhere, it is doubly good value. The project financier has agreed to take just about all the risk for a fixed debt return, leaving all the upside for the benefit of equity/ the sponsors (after completion).

Project finance may be resisted because it is so highly structural and therefore meticulous to negotiate and expensive to establish. However, the due diligence should be welcomed as a second opinion and validation of the concept. The close structuring can protect the equity investor too in cases where a particular risk threatens the cashflows at a later date. The author has uncovered countless items simply missed or misjudged in the project feasibility process that required tightening/tidying to the benefit of both the debt and equity side.

The difficulties of structuring multi-stage project financings is raised in Chapter 19. A start-small or two-stage project may be immensely more difficult if the customary completion test option release is desired à la Type 1. In certain cases the project may have to be re-designed to suit the fund-raising sequence. In most instances, the financing is raised as one major package to construct and commission a system. However, other systems may have market or concession requirements for continuous capex – such as telecoms and water projects.

## Market feasibility stage

One look at Chapter 11, will signal that either contracts are required, competitive analysis must be very smart, or the traffic/subscribers studies excellent (in certain sectors). It is not difficult to gauge what revenue breakevens are necessary for the project financing, provided the base case has been developed to properly reflect and test the risks (see Chapter 3).

The exact levels and project finance constraints will be valuable guidelines in concession or contract negotiations. Again simple contract clauses may add great strength to the project's cashflows.

**Case study: Botany, Australia**

For the 325MW Botany co-generation project, ICI wanted an in-house captive power and high-quality steam supply (co-generation). A neighbouring paper plant could accept low-quality steam (that is, at low temperature and pressure). However, the electricity pool/grid would be required to offtake (purchase) 250MW to 275MW – the non-captive power. By assigning a DSCR to the ICI/paper-plant cashflows of 1.2 and a DSCR of 1.4 to the amount necessary to raise project finance at the 80% debt level, it was possible to determine that a 150MW offtake by a merchant/trader would achieve adequate coverage. Therefore, the balance of 100MW to 125MW could be sold on a merchant power plant basis into the pool/grid. The project finance requirements helped specify the acceptable market risk levels.

### *Approach to banks*

Adopting a strategy of approaching the debt markets with a project financing is not especially different to other financings, with exception of the time it takes (see Exhibit 1.5). The highly structural requirements to batten down risk mitigants needs more time to absorb and concomitantly it opens more avenues of questions and due diligence. Banks have their own teams accustomed to this lengthy process and capable of acting as the internal deal 'champion' to shepherd the credit committee application through the various internal approval chains, culminating with credit committee approval. The various routes are shown in Box 1.1.

**Box 1.1**
**Project finance approval processes**[6]

*Progressive authority* with regard to underwrite, say, US$10 million to US$20 million being capable of local sanction. Most project finance commitments are large and require head office approval anyway, sometimes even board approval. Occasionally this authority is granted to a single individual.

The *credit* or *investment committee* has the authority. It meets once or twice a week. Committee members, used to corporate balance sheet/secured lending analysis or rated transactions, either rubber stamp a project finance credit 'submission/application' due to its complexity or send it back to the drawing board. Project finance deals are easy targets for more questions.

*Matrix* means that multiple approvals across departments, committees, and specialists are required. For banks, client relationship and exposure issues need co-ordination since the stepped nature of the sponsor supports in the project finance option is required in the pre-completion side of the deal. Bond ratings are often done by a matrix-style committee.

*Sequential* is an approval route that must first make it through a specialist group, then to the regional group, before it appears in head office.

Exhibit 1.5

**Typical project finance timetable**

| Stage Months: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technical feasibility | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial feasibility | <- | <- | <- | | | | | | | | | -> | | | | | | | | | | | | |
| Market/contracts | <- | <- | <- | | | | | | -> | -> | | | | | | | | | | | | | | |
| Terms & conditions* | | | | | | | | | | <- | <- | | | | | | | | | | | | | |
| Mandate/lead group | | | | | | | | | | | | | | | | | | | | | | | | |
| Syndication | | | | | | | | | | | | | | | | | | | | | | | | |
| Documentation | <- | <- | <- | <- | <- | <- | <- | <- | <- | | <- | <- | -> | -> | | | | | | | | | -> | -> |
| Financial close | | | | | | | | | | | | | | | | | | | | | <- | | | |

* Loan size -> denotes 'float' – indicative only.

*Source:* International Advisory & Finance 2014

Another feature of the banking market is a wide spread of skills and appetite for different regions. The credibility of the regional/country manager may be paramount in successfully steering a complex project finance through the project finance department, the regional office, head office country limit committees, and even the head office economics group (for forecasted assumptions). Alternatively some banks regard project finance as an airline service – someone somewhere is in the air on their way from head office to do this or the next deal. The correlation between project finance league tables and frequent flyer points is very high!

The danger of 'over promising' what can ultimately be approved can be very irritating and occasionally fatal – a type of internal syndication risk. One Australian project developer received visits from 200 banks. 'The company's treasury staff became quite adept at determining whether the visiting banker was a tourist, a scout, an officer, or a general.'[7]

The lead bank group will likely have in-house specialists and engineers and external consulting/retainer personnel. These have wide experience and can be very helpful in communicating industry or technical risk aspects which can intimidate the non-technical, non-specialist banker. However, one must be prepared for full scrutiny of all project aspects. It is useful to assemble extra copies of key reports which can be despatched on an as requested basis. The lead banks' representatives may be installed for some days at the data room/project secretariat while they do the due diligence directly or set the scope of the independent reviews. Co-operation in setting the scope of the independent reviews may stop the inevitable 'reinventing the wheel' which crops up when any newcomer tries to grasp the many facets that have been studied or are now proposed. Further advice is given in Box 1.2.

**Box 1.2**
**Help for the approval process**

An obvious way to assist in this is to provide extra copies of everything in the hope that the team can get additional personnel to share the assessment workload.

It is worthwhile preparing a computer spreadsheet model that is simple yet sufficiently flexible to run whatever sensitivities to an accuracy of 1% to 2%. A full set of assumptions on the Excel: Input Sheet (see Chapter 3) and the correct ratios (see Chapter 5) will save time.

The main time savings from a banker's perspective would be the provision of comprehensive tax sheets in the model so that this perennially shifting area does not consume programming time better spent on risk/sensitivity runs. Many banks want to remodel the transaction in their own style anyway as a type of audit. A capital markets deal will usually take the rating agency's cashflow projections and sensitivity scenarios.

The qualifications and track record of the participants and any independent authorities should all be packaged and prepared.

Market studies should be summarised, but the full reports will inevitably be requested. A presentation by the lead analyst/industry authority is well regarded.

A legal summary of the project's position, status of the special purpose vehicle (SPV), cross-border aspects, and concession/land aspects is preferable to a full set of the current draft of the legal documentation. This, perhaps, is short enough to be included in the project finance credit application (see Box 1.1).

A visit to the site, country or a similar project can be an excellent investment since the qualities and personalities of the various players can be assessed in a more informal way. The deal champion is being armed with facts, a track record, and a better vision of the project development itself and, best of all, would be able to meet the intended project management team (not just the feasibility engineers). Some corporates have annual bankers' presentations which try to achieve a similar end.

There should not be a mysterious air surrounding a bank's approval or the ratings process. If there is, then that is a risk.

Banks establish country limits which can impinge on project finance since each project finance deal usually requires big chunks of country exposure. The country limits committee will also have to pay attention to international political considerations as well, such as a US bank in Cuba. Banks have individual client limits (legal lending limits set according to the central bank) and may institute portfolio limits or sub-limits (such as US$2 billion in infrastructure or, infrastructure project finance being no more than 20% of total project finance exposure).[8] Occasionally a specific transaction may get crowded out or run up against internal limits. Most bankers will not disclose these constraints since they are usually juggling one or two deals. Many country loan portfolios comprise short-term exposures and, therefore, pay off/down quite quickly, which may naturally free up sufficient 'limit'.

The banks need the same information as the company and in the same order. A common approach is to use the executive summary of the feasibility study. However, that instantly pitches the screening process at the engineers. Ultimately, the project description will actually form a very small part of the credit 'approval' memorandum. Having said this, one needs to know if the bank's engineers have credit approval authority (or veto).

A banker/team of two or three people can devote around two to three weeks of work on any credit review. Much can be prepared in advance to speed that process as is shown in Box 1.2.

Finally, it is worth noting where in the bank's organisation the project finance function sits.

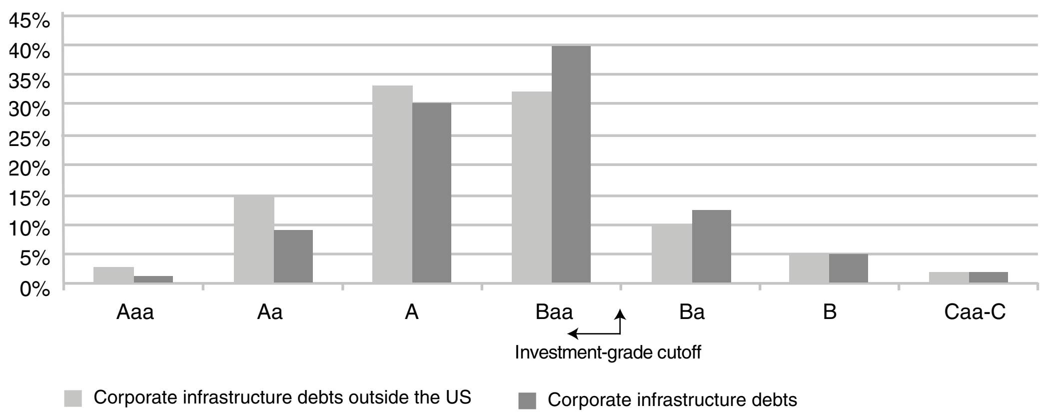
- Project finance run by the syndication desk, would usually be expected to be very aggressive on the term sheet and pricing to the point perhaps of being foolhardy.
- As part of the relationship desk, the division might be either pushed into a project finance deal or be acting more like a cost centre/service rather than a stand-alone business (which it is at its very core). Relationship-based project finance deals (especially with shareholders of the bank) may be subject to this additional pressure.
- Tying project finance to the structured finance teams may result in promoting the structuring effect rather than the core of the deal.
- Project finance within the international department will see strict demarcation with regard to who does what deal with whom.
- Established as part of an industry group, project finance will be used as a key portfolio ingredient.

### *Approach to bond underwriters*

The capital markets for project finance debt is primarily bonds, notes and private placements and the word 'bond' should be read interchangeably with notes and placements. The approach to bond underwriters or the private placement market is less iterative than with banks. A rating from two 'name' agencies means no further credit review may be needed. Most project financings lie just inside 'investment grade', the level above which many pension funds can only invest (BBB-/Baa3) as shown in Exhibit 1.6.

Exhibit 1.6

**Moody's ratings histogram, 1983–2012**




Rating distributions corporate infrastructure debts outside the US, average 1983–2012H1.

*Source:* Moody's Investors Service, 2013

A formal offering circular 'shell' document should be prepared and the dialogue with the ratings agencies progressed directly or through an investment banker/financial adviser. The status of independent reviews, GAAP accounts, and legal position of the SPV should all be crystal clear so that the underwriter's job has more to do with tweaking the cashflows and the terms according to their reading of the market at the moment.

The capital markets are driven by timing. Much is made of the red herring document and the 'circling' of issue pricing, but no self-respecting project finance deal should be reduced to a basis point shaving exercise. The flexibility and covenants are usually far more important as is the achievement of a term often much longer than the banks can accommodate.

- The covenant negotiations for a bond issue are many times simpler than that with the banks. Bondholders would never expect to actively exercise the style of step-in rights to the project documentation as would the project finance banker.
- The differences between the independent engineer's review for banks and bonds are explored in Chapter 19.
- If a company is already rated, then the impact of a project financing (or many of them) needs to be considered with regard to its effect on future ratings. The danger is that the rating agency looks through these structures – 'pierces the veil' – and consolidates the obligations even after the project finance option has been exercised to remove the company's balance sheet support from the deal. (See 'Ratings management' in the Introduction.) This applies to both types of project finance.

### *Board paper*

When presenting a project financed deal to the board of the sponsor or to the minister's desk, it is advisable to attach a two to six-page term sheet/offer letter(s) along with a loan outstanding chart, particularly if there is flexibility in the repayment profile (see Exhibit 3.2).

Even more important is to make mention of the fact that different projects attract different levels of project finance debt; therefore the standard internal rate of return/net profit value (IRR/NPV) benchmarks alone do not adequately express the position of this project versus all others. Intelligent analysis will also examine the project's cashflow effect on the future of the group/ministry. The risk matrix used to assess the project finance structure will also be of interest to the board. Directors are interested in cash, risk, returns, and management, and usually are receptive to the whole concept of (both types of) project finance.

### *Takeout (re)financing*

Another staging technique is to tailor the funds to the three stages of project finance. The banks fund the first two stages: construction and commissioning/completion, with the project finance funded by way of a takeout by the bond investors post-completion – which is their preference anyway.

**Case study: Burnie, Australia**

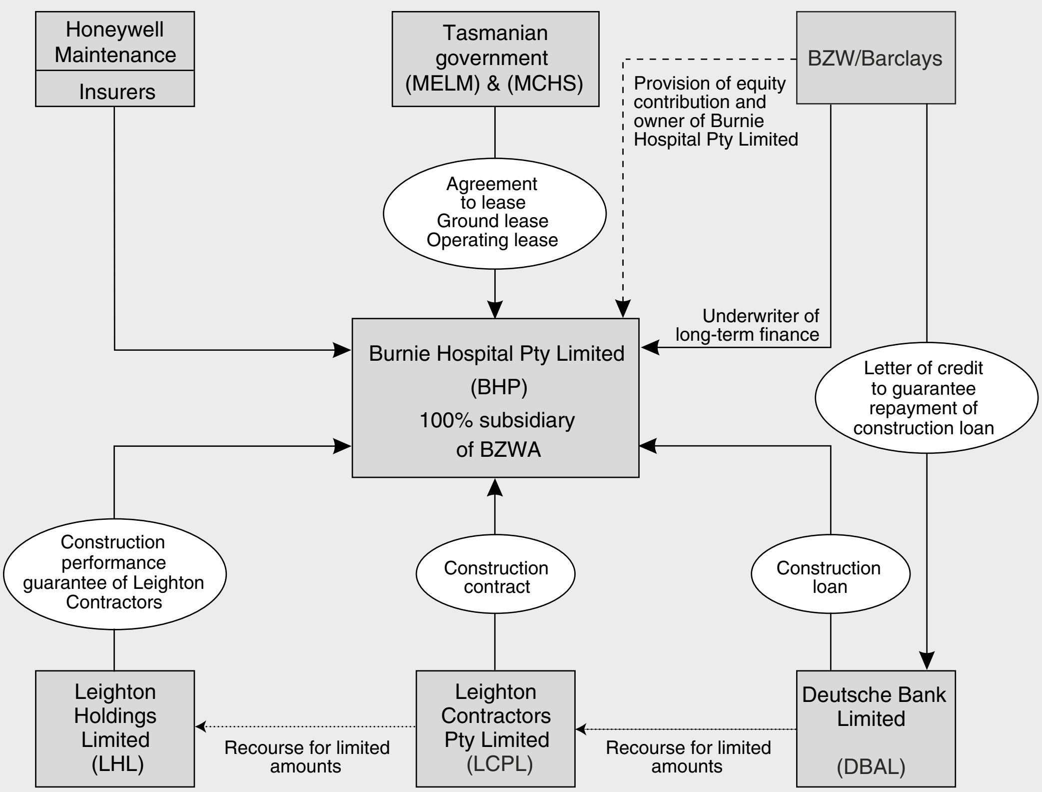
For the Burnie Hospital financing, BZW (Barclays) underwrote a takeout of the construction funding done by Deutsche Bank for a subsidiary of a German construction company, Hochtief. In addition to the two-stage takeout structure, Barclays used the bond issue funding as the debt portion of a leveraged lease, itself acting as owner/lessor of the hospital.

*Continued*

Case study *continued*

Exhibit 1.7

**Burnie Hospital**




*Source:* Author's own

## *Piercing the sovereign ceiling*

Project finance deals are able to be rated higher than the sovereign rating, an unusual but understandable circumstance given the tight structuring inherent in most project finance transactions. The main projects thus far have been export oil and gas. Export proceeds are definitively quarantined – labelled low 'diversion' risk[9] – in an offshore proceeds account. (See Chapter 21.) There is no or only low foreign exchange (FX) risk. Liquified natural gas (LNG) in Asia is priced as oil equivalent, which is denominated in US dollars. The project finance risks that remain are very low.

**Case study: Petrozuata, Venezuela**

The most dramatic example of 'piercing the sovereign ceiling' is the Petrozuata heavy oil upgrading project in Venezuela which not only pierced the sovereign ceiling, it doubled the term of bond compared with those of a sovereign issue (see Exhibit 19.7). The semi-crude product is shipped across the Caribbean to be refined in US Gulf Coast refineries, an important linkage for the ratings.

## Use in mergers and acquisitions

All of the previous discussion concerned projects 'to be developed'. However, if the project is already producing a cashflow such as in an acquisition, spin-off, or privatisation, then the structuring/quarantining discipline of stand-alone project financing is perfectly applicable. Due diligence differences are minor (see Chapter 9), with the exception that there is probably less time (permitted). All of the project finance structured solutions are valid if the preference is to have a highly-leveraged transaction – which is often the case – rather than basing the deal on the balance sheet, which is a corporate financing. Many leveraged buyout/management buyout (LBO/MBO) structuring techniques are very close to what is discussed for project finance in this book.

### *Equity/mezzanine*

The banks and bond professionals have extended their product offering beyond debt to mezzanine and equity co-investment as discussed in Chapter 2.[10] Mezzanine moneys may be used to finalise studies and contracts, and to fund the approach and packaging for the banks/bond underwriters.

Another form of equity financing – to be avoided in a project financing – is an 'equity-bridge' loan. This means loaning the sponsor(s) equity until after completion, a rather obvious conflict of interest. The equity-bridge loan is on a corporate finance, balance sheet basis.

## Project concept

Near the beginning of considering a project financing, it is worth asking two questions.

1 What exactly is the project concept?
2 How did our institution get to be invited/to lead/to underwrite?

It is surprising to see how many project concepts could lie behind the proposed deal. Besides the normal business and risk shedding motives, others include:

- a construction contract;
- an equipment sale;
- a means to impress government;
- a demonstration/showcase project;
- built for an operator/operation and maintenance (O&M) contract;
- to preserve market share; and
- a nation builder/good for the country.

Beware the blockbuster deal. Experience in project finance suggests it is better to be second, and let others pioneer.

## Summary

The stages of information gathering, feasibility, due diligence and approval in project finance require time to prepare, present and digest. Early dialogue on each party's aptitude and information requirements will result in substantial savings in time and money both before and after the 'feasibility' process. This will improve acceptance of the project as a 'bankable' proposition that can be readily approved/rated and subsequently syndicated.[11]

---

[1] Berglund, R, 'Financing/structuring a project', Euromoney Project Finance Course, Sydney, 1994.
[2] Tinsley, CR, 'Banking needs for project development financing', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration.
[3] Chapman, J and Menendez, A, 'Project development: the concept', in *Hubco Power*, 1995, Euromoney Publications.
[4] Standard & Poor's, 'Aguas Argentinas SA', *Infrastructure Finance*, 1999.
[5] Kleimer, S and Megginson, WL, 'A comparison of project finance in Asia and the West', in Lang (ed), *Project Finance in Asia*, 1998, Elsevier.
[6] See endnote 2.
[7] See endnote 4.
[8] Weber, B and Alfen, HW, *Infrastructure as an Asset Class*, 2010, Wiley.
[9] Moody's, 'Piercing the sovereign ceiling: issues in oil and gas project financing', Project Finance Sourcebook, 1998.
[10] Forrester, JP, 'Role of commercial banks in project finance', *The Financier ACMT 2(2)*, 1995.
[11] See endnote 2.

Chapter 2

# Funding sources

The demand for project finance debt is staggering. Any assessment of world power, telecoms, oil and gas, petrochemicals and infrastructure requirements soon ends up in the US$1 trillion per sector per annum arena. The link between these sectors and the development of an economy is very direct.[1]

Yet the key survey of project finance activity shows the total annual project finance funding volume for all sectors as only US$200 billion (see Exhibits 7.1 and 7.2), well short of requirements. The gap has to be met by multilateral and bilateral funding (by perhaps as much again) with the balance from corporates or national budgets.

A knowledge of how each funding source perceives its place in project finance is invaluable in gauging whether a particular project finance structure will be acceptable to that funding market. This chapter will review the various funding avenues. The structures each prefers are given in Chapter 8.

## Local currency funding

The availability of local currency bank lines should be wrapped into every project finance transaction. Most local currency banks are conventional secured lenders. A local bank may look to garner substantial collateral banking business such as wages, trade finance, banking, cash management, and foreign exchange (FX). It is important that they are not given any preferential security, such as property or receivables. Each should be encouraged to share in the project's security package on a *pari passu* basis.

In many countries, a new project financed development is a highly visible national endeavour. Many local currency bankers may consider opening a branch office at the project itself or the nearby town/suburb. In such circumstances, that branch manager is now the source of first-hand intelligence on the project's management and the employees. It is important to have such 'eyes and ears' available not least should things go wrong. The local bank may have an excellent reading on the 'actual' state of politics or the 'real' condition of the local participant in the project such as their capacity to co-invest part of the equity in the project when needed or to provide an early warning should some non-project part of the local investor group come under financial stress.

Local currency equity or quasi-equity markets are often much more significant than is realised outside the country. When a new development emerges for the benefit of the nation, their pension funds can be unlocked to a surprising extent. In addition, a new large project entity may be a way for flight capital removed from the country to return for a long-term well-structured project transaction. Whatever the view from outside on prospective local currency funding totals, it does not take much structuring and effort to double the first estimate.

A large project may be very attractive to a local stock exchange. Many projects have the co-issuance of an initial public offering (IPO) or placement as part of the equity structure. Global depository receipts (GDRs) are a tool to internationalise that placement/issue process. The equity investor is quite pleased to achieve the high leverage of a project finance (without the usual collateral/security to loan ratio approach of conventional secured lenders) while the project financier should be equally pleased to see a wide spread of equity co-investing in the enterprise's development or acquisition.

### *Banks*

Commercial banks are the main source of project finance debt (see Exhibits 2.2 and 7.1). Most bank treasuries heavily fund themselves on a floating rate basis with an elaborate liability management strategy. There is usually no attempt to match fund a project financing.

The great advantage of banks in project finance is their ability to offer a genuinely flexible transaction, which can respond dynamically to the project's cashflows and the industry's changing condition. This is the significant difference with the far more monolithic capital debt markets.

### *Bilateral agencies*

The relevant bilateral agencies are usually the export credit agencies (ECAs). Many only commenced project finance in the mid-1990s. Prior to then, the ECAs could rely on a bank, government, or large corporate's guarantee. The concept of accepting the suite of project finance risks upon completion is, therefore, relatively new to them.

The ECAs exist to promote that nation's goods, services, investment and, in some countries, imports (to that country) – this involvement is known as 'tied'. Although accustomed to the Berne Union rules concerning the financing of a bulldozer export (85% financing, 15% down payment), the acceptance of (sole) repayment from a string of future cashflows is a big leap for some.

The Organisation for Economic Cooperation & Development (OECD) sets the consensus rules for minimum interest rates and maximum term for ECAs and it has established a protocol for project finance quite different from the Old Rules which equally applied to the bulldozer (see Exhibit 2.1). The main features allow interest during construction (IDC) to be capitalised to completion and structured repayment profiles (see Box 3.2).

Exhibit 2.1

**ECA project finance 'consensus' term***

| | *1* | *2* |
|---|---|---|
| 1st principal repayment date | | <2 yrs** |
| Maximum loan half-life | 5¼ yrs | 7¼ yrs |
| Maximum repayment | 8½ yrs | 14 yrs*** |
| GNI/capita | >US$42,948 | (World Bank rules) |
| | | |
| * ECA financing <50% total; security – *pari passu*; any P < 25% loan. | | |
| ** Start of repayment = physical completion. | | |
| *** Power repayment term max is 12 years. Waste to energy, hybrid power, and CHP/district heating/cooling maximum is 15 years. Nuclear power and renewable energy is 18 years. | | |

*Source:* International Advisory & Finance 2014

- *US Exim* commenced project finance in 1994 with an unwieldy structure and tiny team. It has become a major powerhouse in the project finance business since it has shown the ability to underwrite very big ticket deals (greater than US$4 billion).
- *Export Development Corporation* (EDC), Ottawa, Canada has the most aggressive team undertaking a mix of transactions across a wide range of countries (including openings provided by US embargoes). EDC is noted for its willingness to create a package and to co-operate with others.
- *Export Credits Guarantee Department* (ECGD), London, has stirred itself into some very aggressive 100% political risk insurance (PRI) deals in areas where Britain is well regarded, even China.
- *Coface*, Paris, follows the lead provided by major French companies. Proparco is a French bi-lateral, active in Francophone Africa and French connections in Asia.
- *Japan Bank for International Cooperation* (JBIC) was formed in 1999 and has refocused its project finance effort away from Asia to balance its portfolio. In some cases, JBIC takes the political risk while the government's Nippon Export and Investment Insurance (NEXI) takes the other project finance risks on that investment. Surprisingly, some of its environmental projects are untied. JBIC also provides what it calls 'mezzanine' debt – actually subordinated debt – to Japanese companies making acquisitions overseas.
- Germany's *Hermes* has a very long history of working on project finance deals with KfW-Ipex. KfW-Ipex probably has the most project finance deals on its books. It has the advantage of a concessional funding basis which means it can usually undercut the German banks.
- *KSure* and *Korean Exim* have become very aggressive and practically own the project financing in the Gulf Cooperation Council (GCC) countries.
- *SACE* of Italy has a strong track record of project financed deals following Italian contractors and equipment. SACE is also famous for some untied environmental project financings.

- *SESCE* of Spain has solid rungs on the project finance boards especially in the Spanish-speaking world.
- *Sinosure* is finally starting to 'get' it with regards to tied project finance transactions, with probably the best stand-alone example being Mariveles, Exhibit 19.1.
- *Scandinavian* and *Swiss* agencies follow the likes of ABB, Ericsson, and Nokia closely in their project finance transactions. Notably, they often include structured-finance components in their deals, for example, defeasance and leasing.
- Australia's *EFIC* is a local player, very well experienced in project finance, and ventures occasionally into other regions east of the Pacific Ocean and west of the Indian Ocean.
- Other agencies capable of tackling project finance risks are the ECAs for Malaysia (*Malaysian Exim*), and South Africa (*ECIC*).
- *Overseas Private Investment Corporation* (OPIC) of the US is strictly not an ECA but offers PRI and project finance loans directly up to a US$250 million limit; in oil and gas this can be up to US$400 million (directly). It is more targeted at supporting US investment. An excellent and experienced team has one of the longest and strongest track records of any bilateral. An OPIC-insured note structure, shown in Exhibit 21.1, is a credit enhancement structure, cross-border.

### *Multilaterals*

The multilateral agencies (MLAs) – sometimes referred to as multinational development banks (MDBs) to avoid the acronym for mandated lead arranger (also MLA, see Chapter 24) – have developed project finance expertise which is a natural result flowing from the thousands of projects financed over decades of development financing. With similar sector preferences to those outlined in Chapter 7, the various teams have developed comprehensive programs, including due-diligence studies, equity/convertibles/mezzanine, and classic project finance debt.

The project itself has to have a development purpose yet be economically viable – similar to any project finance; it has to stand on its own feet after completion. It must also have the support of the local government who has, in any event, entered into a counter-guarantee/counter-indemnity to facilitate these MLA activities (see Exhibit 21.4). The MLAs may also act as the lender of last resort, which in itself is an important development backstop.

Determined pressure from non-governmental organisations (NGOs), the environmental response and the timetable of the MLAs has bought much more focus onto their activities. To an extent this could be stated to have increased environmental risk since the environmental impact statement (EIS) is no longer an acceptable mitigant on its own (see the discussion of EIS in Chapter 16).

**Box 2.1**
**Environmental defence document**

An environmental defence document (EDD) may be required because of the MDB's involvement, which can cost millions of dollars for any project. (This is illustrated by the case of Nam Thuen II, discussed in Chapter 21.)

The MLAs have very different organisations, internal politics, and staff capabilities. Besides the heavy environmental focus, the due diligence and approvals process can be lengthy. So it is always beneficial to start the dialogue early to ensure that the appropriate information trail and study scopes are being followed.

The World Bank (IBRD) has developed two project finance-specific programs: Partial Risk and Partial Credit.[2] The first is to stand behind the host government's commitments (see Exhibit 21.8) while the second is designed to extend the overall project finance term (with the World Bank taking the later maturities).

**Case study: Hubco, Pakistan**

The World Bank's partial risk guarantee (PRG) for the Hubco project is described in Box 2.2. (See also discussion of this under 'Multi-party structures' in Chapter 21.) The Hubco PRG is designed to be triggered in the event of a debt service default arising from non-payment on the part of a Pakistani government agency (backstopped in the first instance by the government of Pakistan itself) in accordance with contractual obligations which are set out in the project agreements with the project company. These are diagrammed in Exhibit 1.2.

**Box 2.2**
**Hubco partial risk guarantee**

There are four main categories of risk covered:

- breach of contract by government entities;
- availability and convertibility of foreign exchange;
- changes in law; and
- political *force majeure* events.

Furthermore, the guarantee can be called upon under two circumstances:

1. prior to termination of the project agreements, if the host government has failed to make a payment when due and such failure has caused the project company to fail to make a scheduled debt service payment; or
2. after termination of the project agreements, if the commercial lenders have accelerated the guaranteed loan and the host government has failed to pay a termination sum due under the implementation agreement or concession.

At the time this World Bank support was under the precursor program called the Expanded Co-financing Operation (ECO).

The *International Finance Corporation* (IFC) is the private sector arm of the World Bank and by far the most experienced. Their list includes 2,000 plus projects in developing countries on a project finance basis.[3] IFC often will add its seal of approval by conducting a feasibility study. Equity of 5% to 20% may be possible which IFC would sell later. A participation of US$30 million to US$40 million in the A side of its A–B loan structure would be standard (see discussion under 'Co-financing' in Chapter 21).

The exclusion of IFC B-loan exposure from banks' country limits may be very attractive. IFC also enjoys interest withholding tax exemption.

*IADB* or *IDB* is the acronym for the Inter-American Development Bank which is also Washington DC, based. Although historically not as active as IFC, it is doing medium and large transactions, even directly.

The *European Bank for Reconstruction and Development* (EBRD) wants to expand from its former Soviet Union base into the Maghreb in northern Africa following the 'Arab Spring'. It has shifted somewhat from major projects to more programmatic funding. Russia's bond default in 1998 caused some indigestion.

The *African Development Bank* (AfDB), based in Tunis, is very actively pursuing project finance opportunities, obviously in Africa.

The *Asian Development Bank* (ADB) is the MLA for Asia, based in Manila, Philippines. Its largest shareholder is Japan. It takes its development role very seriously and usually wishes to be involved on both the debt and equity side of the transaction, up to a ceiling of about US$50 million. It is not much of a player in project financings.

South America's *Corporacion Andina de Fomento* (CAF) has done some progressive project financings for its member countries in South America.

The *European Investment Bank* (EIB) in Luxembourg has commenced to accept project finance structures and political risk guarantees directly onto its own balance sheet.

The *Nordic Investment Bank* (NIB) has a project investment loan facility which can be undertaken without a government guarantee and is effectively private sector project finance.

### Multilateral political risk insurance

*MIGA*, the World Bank's PRI arm, has developed excellent skill in project finance deals and was rewarded by board sanction to triple its exposure (co-insured) to US$150 million per transaction. It is well regarded for its ability to work with other agencies and insurers (see under 'Political risk insurance' in Chapter 21).

*Africa Trade Insurance* (ATI) is a Nairobi, Kenya, operation obviously focused on Africa with a broad country and affiliate membership.

The *Islamic Corporation for the Insurance of Investment and Export Credit* (IsCEC), (pronounced 'Ice-eck') a subsidiary of Islamic Development Bank (IsDB), Jeddah, Saudi Arabia, is the third multilateral providing PRI for project financings.

There are other, smaller, multilaterals doing project financings.

## Capital markets

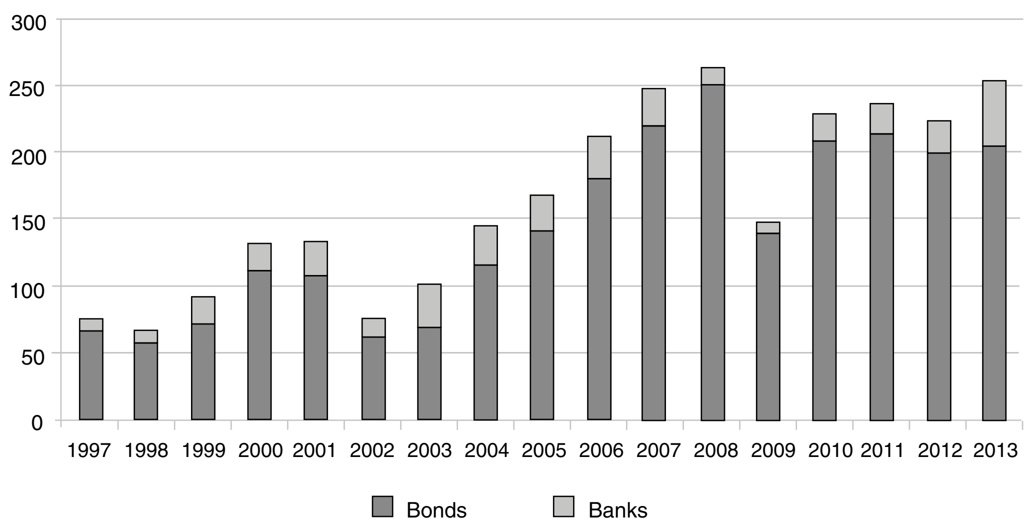
Project finance debt deals are most often done as bonds or notes. Because of their long-term nature, the investor is essentially taking a private placement style of transaction with not much effort made in trying to make any project finance bonds/notes issue a highly liquid widely-traded issue. A publicly traded project finance bond issue is still rare.[4]

The introduction of Rule 144A to the US SEC regulations for private placements in 1990 has led to about half of the world's project finance bonds from this source. This dropped the escrow period and disclosure requirements for pre-qualified US professional investors, around 4,000, and set a floor per investor of US$100,000 (now US$500,000) each. The floor represents no constraint to project finance deals placed in the millions of dollars per institution/fund.

The rise of the 144A market for project finance coincided with a decline in interest rates and spreads/margins in the US such that many project finance deals represented superb yields by comparison. The rise was also matched by a determined effort by the major ratings agencies to rate project finance transactions (see the discussion under 'Ratings' in Chapter 8). This timing also tracked an upsurge in US high-yield, the so-called 'junk' bonds and, together with non-US issuers, finally exceeded the bond issuer totals of the 1920s.

Exhibit 2.2

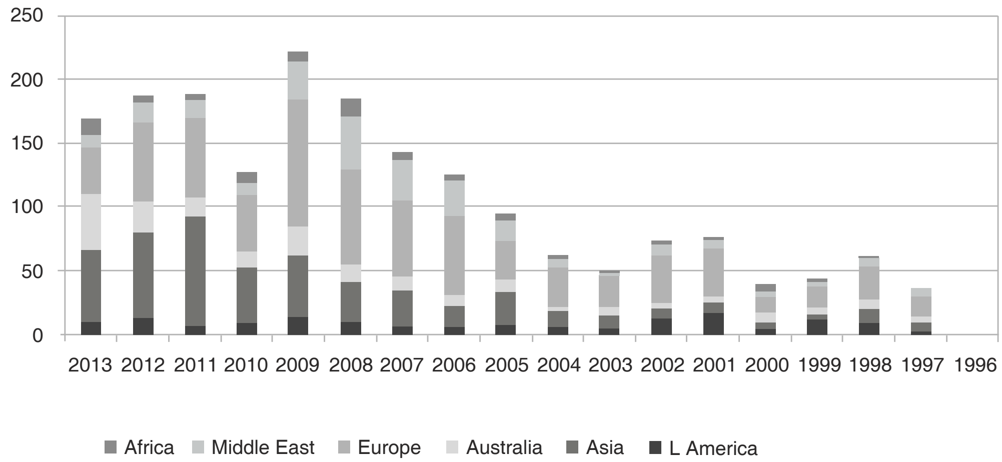
**Project finance banks and bonds, 1997–2013**




*Source:* Project Finance International

Exhibit 2.3

**Project finance banks – regions, 2013–1997**




*Source:* Project Finance International

Besides the burgeoning capacity worldwide of the institutional, pension and mutual fund investment pool (some US$11 trillion in private-placement 144A in the US alone), project finance has been swept along by the presence of closely-packaged, monolithic (easy to understand and rate) transactions yet with juicy, near-junk yields. Most project finance transactions are rated just above investment grade, a key cut-off for many fund managers (see Box 2.3). The Norwegian bond investors are an addition to the usual funding sources for Norwegian oil and gas producers and service companies.

Moody's published a very important default study of 4,067 projects in the Project bond issues that have distinct sector preferences, described further in Exhibit 7.2. Most transactions are a minimum US$100 million.

The fund managers rely on ratings (ratings from two agencies usually signals that not much further credit work is required) and, because of their portfolio approach, need to be able to grasp the deal quickly. The 'normal' complexity in a project finance progressive drawdown structure is a distinct turn off. Accordingly, many dispense with any concept of project stages and simply wait to invest post-completion when the project finance option has been exercised (if a Type 2 construction development) or for an on-going cashflow deal such as in mergers and acquisitions (M&A)/privatisations. But their key advantage is the ability to price political risk directly into the spread thereby avoiding the complexities of political risk structuring or ECA and MLA arrangements.

Other features of the capital market are:

- pension funds, in particular, have an appetite for long-term consumer price index (CPI) linkages to protect their policyholders' position in real terms; and
- where tax treatment is favourable, zero-coupon bonds may be attractive from a cashflow perspective.

Another development in recent years has been specialist fund pools established usually from institutions for portfolio investments in regions or sectors such as power, water, Asia (some of these funds are listed in Exhibit 2.4). Most of these are funding commitments, which are called when needed. With the great demand for sectors/infrastructure, these funds have proved very popular. AIG, a major player, has rolled out one US$1 billion fund three times. IFC has also helped spawn some as has the US OPIC. The target is not just direct investment but every variety of mezzanine, loans, and project finance debt.

**Box 2.3**
**Bond ratings comparison between Moody's and Standard & Poor's**[5]

This data is drawn from various editions of Standard & Poor's (S&P) and Moody's guides to bonds. At times both Moody's and S&P adjust these ratings. S&P use plus and minus signs: A+ is the strongest and A– the weakest within the A-rating range. Moody's uses a 1, 2, or 3 designation, with 1 indicating the strongest.

| Moody's | S&P | |
|---|---|---|
| Aaa | AAA | This debt has the highest rating. Capacity to pay interest and principal is extremely strong. Regarded as having maximum safety and gilt edged. |
| Aa | AA | This debt has a very strong capacity to pay interest and repay principal. Regarded as high quality. |
| A | A | This debt has a strong capacity to pay interest and repay principal. However, it is somewhat more susceptible to adverse changes in circumstances and economic conditions. Regarded as upper-medium grade in terms of creditworthiness. |
| Baa | BBB | This debt is regarded as having an adequate capacity to pay interest and repay principal. Whereas it normally exhibits adequate protection parameters, adverse economic conditions or changing circumstances may lead to a weakened capacity to pay interest and repay principal for debt. These are lower medium grade in terms of creditworthiness. *Investment grade cutoff* |
| Ba | BB | Debt rated in these categories is regarded as low grade and predominantly speculative. |
| B | B | Ba and BB indicate the lowest degree of speculation and Ca and CC the highest (degree). |

*Continued*

Box 2.3 *continued*

| | | |
|---|---|---|
| Caa<br>Ca | CCC<br>CC | Although such debt is likely to have some quality and protective characteristics, these are outweighed by large uncertainties or major risk exposures to adverse conditions. |
| C | C | This rating shows that there may be: (i) substantial risk; (ii) default; or (iii) extremely speculative. |
| D | D | Debt rated D is in default and payment of interest and/or repayment of principal is in arrears. |

Exhibit 2.4

**Infrastructure funds, 2001–2013**

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2001* | | |
| Global Infrastructure Fund | A$300 | 25% in Australia; 75% overseas |
| Carlyle/Riverstone Fund I | 1,100 | Global energy and power |
| Macquarie Airports Group | A$1,000 | Per name |
| Central African Growth (Proparco) | €30 | CEMAC privatisations |
| Phoenix Investment Fund | 50 | Russia, 12 CIS countries |
| Caribbean Basin Power Fund | 200 | Per name* |
| | | |
| *2002* | | |
| Islamic Development Bank | 1,500 | Petrochem; power; water; telecoms; transport |
| Wind Power Investment Trust | A$500 | Per name* |
| | | |
| *2003* | | |
| Infrastructure Investors (II) | £450 | UK PFI |
| Accession Mezzanine Capital | €15 | Eastern Europe |
| Infrastructure Equity Fund | 250 | IDFC, India |
| Energy Infrastructure Trust (ANZ) | A$750 | Australia and New Zealand |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2004* | | |
| Infrastructure Fund of India | 1,100 | Per name* |
| IFM Australian Private Equity 3 | A$425 | Australia |
| Canada Investment Fund for Africa (CDC) | C$200 | Per name (and NEPAD) |
| Carlyle/Riverstone Fund II | 222 | Global energy and power |
| Innisfree | £360 | Europe PPP/UK PFI |
| Secondary Market Infrastructure Fund | £500 | Per name* |
| HSBC Infrastructure Co. | £450 | UK PFI Portfolio |
| Macquarie European Infrastructure Fund I | €1,500 | Per name* |
| Reliance India Power Fund | 200 | India, Power |
| Noble | £100 | UK PFI |
| Santander Infrastructure Fund 1 | €180 | 20-year lifespan |
| | | |
| *2005* | | |
| Macquarie International Infrastructure Fund | S$730 | Per name* |
| Climate Change Capital | $100 | Carbon fund |
| Private Energy Market Fund | €50 | ASEAN, India, China – renewable energy |
| Primary Energy Ventures | 237 | Energy recycling/co-generation |
| Secondary Market Investment Fund | £500 | UK PFI |
| Challenger Infrastructure Fund | A$630 | Per name, World |
| New Energy Fund | €125 | European renewable energy |
| Greenhouse Gas Aggregation Pool | €455 | EU carbon emissions |
| Darby Overseas Investment | €100 | EU (and 'emerging' EU) mezzanine |
| Mid Europa Partners | €650 | Buyout fund (EBRD, IFC, EIB) |
| IFM International Private Equity Fund II | 517 | World |
| DIF PPP | €150 | Mainly European |
| Macquarie European Infrastructure | €1,500 | Per name* |
| Essential Public Infrastructure Capital | £356 | UK PFI CDO (Depfa) |
| Impax Capital | €60 | renewable energy |
| United States Power Fund II | 750 | Per name* |
| Diversified Infrastructure Trust (ANZ) | A$220 | Australia and New Zealand |
| | | |
| *2006* | | |
| ABN Amro Infrastructure | €1,500 | PPP worldwide |
| SMIF-GSL Investment Partnership | £115 | UK PFI portfolio securitisation |
| Deutsche Infrastructure | €800 | European infrastructure |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2006* | | |
| Emerging Markets Partnership Africa II | 500 | Africa (and African banking) |
| EU-Africa Infrastructure Partnership Fund | €260 | African cross-border infrastructure |
| Indian Infrastructure Fund | 500 | Per name* |
| First Reserve | 3,000 | Upstream and downstream petroleum and services |
| Carlyle Group | 1,000 | US infrastructure |
| Macquarie Korea Infrastructure Fund I | 972 | Per name* (with Shinhan) |
| PFI Infrastructure Company | £30 | Per name* UK PFI |
| Middle East Infrastructure Fund | 500 | ME/N. Africa infrastructure, IPPs, oil and gas |
| DEPFA-Bouygues Brownfield PFI | €150 | Captive French accommodation PFIs |
| HSBC Infrastructure Company | £250 | London listing of HSBC's UK PFI portfolio |
| DIF PPP | €150 | Dutch. W. European infrastructure and PPP |
| South East Asian Strategic Assets Fund | 250 | Primarily Malaysia and Indonesia |
| South Europe Infrastructure Equity Finance | €80 | Per name* |
| Bovis Lend Lease/Bank of Scotland | A$124 | UK PFI + Existing portfolio |
| Perpetual Diversified Infrastructure Fund | A$130 | Australian infrastructure |
| Infrastructure and Growth Capital Fund | 2,000 | Shariah-compliant; Middle-East infrastructure |
| Central American Mezzanine Infrastructure Fund | 150 | Energy; infrastructure; telecoms |
| Infrastructure Project Preparation Facility | 100 | NEPAD (Africa) |
| EU Africa Transportation Fund | €60 | Lower EIB interest rates |
| Renewable Energy & Energy Efficiency | €70 | Brazil |
| Impax Capital | €65 | Western Europe alternative energy; water; waste |
| European Carbon Fund (CdD, Fortis; Ixis) | €143 | Regional focus |
| Babcock & Brown Public Partnerships | £300 | Europe and Australia |
| Babcock & Brown Power | A$466 | Australian IPPs |
| Central American Mezz. Infrastructure Fund | 150 | Inter-American Development Bank (US$60 million) |
| Global Infrastructure Partners | 1,000 | GE and Credit Suisse; per name* |
| Africa Fund 2 | 330 | CDC; seed capital |
| New Africa Mining Fund | R565 | Mining M&A |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2006* | | |
| Botswana Africa Mining Fund | 40 | Junior mining companies |
| Allco Transport Fund (unlisted) | A$200 | Per name* |
| Blackfish-Investec Resources Special Situations | 300 | Mining mezzanine |
| Stichting Profile Securitisation 1 | £345 | UK POFI CDO (Sumitomo and NIBC) |
| Latin Power III | 393 | OPIC, Central America; mid-sized IPPs |
| Asia Pacific Carbon Fund | 152 | ADB; per name* |
| | | |
| *2007* | | |
| Infrastructure Investment Fund | 6,500 | Goldman Sachs |
| IFM Australian Private Equity 4 | A$665 | World |
| GuarantCo | 200+ | Partial risk/credit; not upstream resources |
| Japan Carbon Finance (JBIC/DBJ) | 142 | Finance carbon credits for Japan |
| CVCI Africa Fund (Citigroup/CDC) | 200 | Infrastructure; energy/resources; telecoms |
| Brisas Auto-Estrades de Portugal | €500 | Transport projects |
| Lakeside Energy | 1,000 | North American power and biofuel |
| South East Asia Strategic Assets Fund | 250 | Per name* (CIMB and Standard Bank) |
| Colonial First State | A$1,330 | European infrastructure |
| Impax New Energy Investors | €125 | Renewables |
| Multilateral Carbon Credit Fund | €165 | EIB and EBRD |
| Macquarie European Infrastructure Fund II | €4,600 | per name* |
| Citi Infrastructure Investors | 3,000 | North America, western Europe first |
| AMP Capital Investors | 500 | India, China infrastructure |
| Pan-African Infrastructure Development Fund | 625 | Per name* |
| India Infrastructure Initiative | 5,275 | Equity and debt |
| Larsen & Toubro Infrastructure Fund | 1,000 | Indian PPP |
| IFM International Private Equity III | 545 | World |
| Alinda Infrastructure Fund 1 | 3,000 | North America and Europe |
| United States Power Fund III | 1,350 | Per name* |
| Vietnam Infrastructure Fund | 200 | Vietnamese energy, water, transport |
| SBI Infrastructure Fund 1 | 1,000 | Indian infrastructure |
| Syndicatum Carbon Capture | €300 | Emerging markets projects |
| Macquarie Infrastructure Partners | 4,000 | North American projects |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2007* | | |
| Transfield Infrastructure Fund | A$560 | Captive, mainly Australian power, water |
| Russia Infrastructure Equities Fund | 200 | Per name (renaissance) |
| Sanad Sukuk Fund | 100 | Mainly GCC, shariah-compliant |
| DIF Renewable Energy | €150 | Dutch |
| MMA Renewable Ventures | 300 | Tax-advantaged solar photovoltaic projects |
| EnerCap Power Fund | €75 | Central and Eastern European renewables |
| Infrastructure and Growth Capital Fund | 1,700 | Abraaj Capital, Dubai |
| New and Renewable Energy Fund | 360 | Kookmin Bank, Korea. Solar, wind |
| 3i India Infrastructure Fund | 1,200 | Power, ports/airports, roads (+IIFC) |
| Bunyah GCC Infrastructure Fund | 400 | Kuwait Investment Company |
| PME African Infrastructure Opportunities | 180 | Early-stage infrastructure; AIM listed |
| Pan African Infrastructure Development Fund I | 630 | telecoms, transport, energy, water |
| Babcock & Brown Asia Infrastructure Fund | 400 | Per name*; with BTMU |
| Origa Sino-India | 100 | Natural resources: China and India |
| Trilllium | £568 | 81 UK PFI projects from SMIF |
| 3i Infrastructure Fund | £426 | UK PFI secondary market |
| Millennium Global Africa Opportunities | 300 | East and West Africa (OPIC) |
| New Star Heart-of-Africa Fund | 215 | Sub-Sahara but not South Africa |
| Africa Catalyst Fund | 300 | Sub-Saharan Africa (OPIC) |
| Atlantic Coast Regional Fund | 150 | Western Africa |
| Japan Asian Green Fund | 1,830 | Air, water, sulphur pollution in Asia |
| Odebrecht Surety Bonds | 400 | AIG/IADB; captive Latin American/ Caribbean projects |
| Babcock & Brown North American Infrastructure Fund | 1,000 | Per name* |
| Babcock & Brown European Infrastructure Fund | €2,170 | Per name* |
| | | |
| *2008* | | |
| Global Transport & Infrastructure Fund | (A$450) | Allco; Abandoned due to 'volatile markets' |
| AIM Infrastructure Fund | 2,900 | Western Europe infrastructure |
| DG Infra+ | 150 | Western Europe renewables, waste, water |
| Foresight Environmental Infrastructure Fund | 300 | Western Europe renewables |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2008* | | |
| Foresight Solar Fund 2 | 365 | Western Europe solar energy |
| CVC European Infrastructure Fund | 2,590 | European infrastructure |
| Transport Infrastructure Investment Co Fund | 679 | Western Europe transport |
| Innisfree Secondary Fund III | 991 | Western Europe social infrastructure |
| Valiance Infrastructure Fund I | 1,000 | Continental EU energy; telecoms |
| ADCB Macquarie Infrastructure Fund | 630 | Energy, industrial, social, transport, waste |
| Macquarie European Infrastructure Fund III | €8,000 | Per name* |
| Macquarie Infrastructure Partners II | €6,000 | Per name* |
| Macquarie Infrastructure Fund of Funds I | 1,000 | Per name* |
| Macquarie Opportunistic Infrastructure | 1,000 | Per name* |
| Macquarie Renaissance Infrastructure Fund | 1,000 | Asia-Pacific and eastern Europe infrastructure |
| Istithmar Sindicatum Carbon Capture Fund | 600 | Per name* |
| Pacific Road Resources Fund 1 | 300 | Mining infrastructure, and services |
| Pan African Infrastructure Development Fund II | 875 | Per name* |
| IDFC PE Fund II & III | 927 | Indian infrastructure |
| Africa Energy Infrastructure Fund | 54 | Per name* |
| AfricInvest II | 175 | OPIC; North Africa and Sub-Saharan Africa |
| Africa Health Care Fund | 100 | OPIC; SMMEs |
| Capital Alliance Property investment | 200 | OPIC; Housing: West Africa |
| Africa Telecoms Media & Technology Fund | 100 | OPIC; Kenya + Malawi, EAU |
| Africa Debt Fund | 300 | OPIC; standard asset management |
| Raising Africa Infrastructure Fund | 500 | Per name* |
| The Evolution One Fund | 66 | Africa Energy; other; waste; water |
| India Infrastructure Fund | 1,200 | 3i; per name* |
| Partnerships for Renewables | £100 | HSBC |
| India Infrastructure Fund | 2,000 | SBI, Macquarie; per name* |
| India Infrastructure Advantage Fund (ICICI) | 1,000 | Per name* |
| India Infrastructure Development Fund (UTI) | 500 | Per name* |
| India Enterprise Fund (2i Capital) | 60 | Indian infrastructure |
| Q India PE Fund | 500 | Indian infrastructure |
| HgCapital Renewable Power Partners | €300 | UK wind |
| Larsen & Toubro Infrastructure Fund | 1,000 | Indian projects |
| China AME Energy Fund | 500 | Asia-Pacific, Middle East energy |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2008* | | |
| MAP Clean Energy Fund | 500 | Asia-Pacific per name* |
| Meridiam Infrastructure | €600 | OECD PPP Projects (Calyon and Aecom) |
| EPIC (Depfa) | €666 | Securitisation |
| Adriana CLO (NIBC) | €963 | Mostly UK infrastructure loans |
| Global Infrastructure Partners (CS & GE) | 5,400 | Infrastructure and energy |
| Alterna Core Capital Asset Fund | 1,000 | North America energy, industrial, transport |
| Foundation Energy Fund III | 200 | North America oil and gas, energy |
| GS Infrastructure Partners II (GS) | 7,500 | North America and Europe infrastructure |
| Table Rock Partners Fund | 2,000 | North America energy; social; telecoms; transport; waste/water |
| KKR Infrastructure Fund | 4,000 | Global diversified; energy |
| Morgan Stanley Infrastructure Fund | 4,000 | Global; per name* |
| Millennium Private Equity Infrastructure Fund | 500 | Global infrastructure |
| Yucaipa Grand Fund | 5,000 | Global infrastructure; real estate |
| Carlyle Riverstone Renewables Infrastructure II | 4,000 | North America, European energy, renewables |
| LambdaStar Infrastructure Partners | 1,500 | North America and western Europe transport; energy; water |
| Triodus Renewable Energy Fund | £10 | Wind and hydroelectricity |
| First State | A$500 | Australian infrastructure |
| AMP Capital Asian Giants Infrastructure | 750 | AP energy, industrial, social, telecoms |
| First State Diversified Infrastructure | €500 | European infrastructure |
| Saudi-Spanish Infrastructure Fund | 1,000 | MENA infrastructure |
| Amplio Partners Fund | 71 | European energy, other renewables |
| Mubadala Infrastructure Partners Fund | 425 | UAE projects |
| Antin Infrastructure Fund | 1,100 | 80% European transport; energy |
| Rabo Bouwfonds Dutch Infrastructure Fund | 750 | Western Europe telecoms |
| Rising Africa Infrastructure Fund | 500 | African PPP |
| Africa Lion II | 79 | African energy, mining |
| Emergent African Agricultural Land Fund | 4,260 | Africa other; social infrastructure; transport |
| Manara Wartsila Power | 200 | 50-200MW IPPs |
| Manara Infrastructure Fund | 1,000 | Infrastructure in Islamic countries |
| GCC Energy Fund II | 300 | MENA infrastructure, energy |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2008* | | |
| Carlyle MENA Partners | 500 | MENA energy, transport |
| Bioethanol Partners | 100 | Western Europe per name* |
| Taiga Mistral Fund | 300 | Central/eastern Europe renewables |
| Troika Infrastructure Fund | 1,000 | Central/eastern Europe infrastructure |
| Eurofideme 2 (Natixis) | 250 | European renewables |
| Leveraged Green Energy Fund | 100 | Europe and North America energy; renewables |
| Meidlinger Partners Sustainable Investments | 100 | North America water; waste; energy |
| Infracapital (Prudential) | £900 | UK |
| UBS International Infrastructure Fund | 1,500 | Per name* |
| Abdib (BNDES) | 4,400 | Brazilian infrastructure |
| Latin Power and Infrastructure IV | 800 | Latin America energy |
| Darby Mexico Infrastructure Fund | 500 | Latin America diversified |
| Qatar-UK Clean Technology Fund | £150 | Per name* (CT investment partners) |
| AmKonzen Asia Water Fund | 320 | Asia-Pacific water |
| Clear Investments Power & Infrastructure Fund | 12,000 | Asia-Pacific infrastructure |
| Palisades Regional Infrastructure Fund | 250 | Asia/Australia renewables; social infrastructure; waste; water |
| Indochina Infrastructure Holdings | 500 | Energy; renewables; social; water |
| Eredene Capital India Infrastructure Fund | 300 | Per name* |
| EQT Infrastructure Fund | €1,183 | Infrastructure investment |
| | | |
| *2009* | | |
| Capital Clean Asset Based Lending | 100 | 2nd generation bio-fuels; power |
| ADCB Macquarie Infrastructure Fund | 1,000 | GCC/MENA infrastructure |
| Islamic Infrastructure Fund (CIMB) | 500 | Asia-Pacific |
| Barclays Integrated Infrastructure Fund | £560 | Bought secondary PFI infrastructure |
| Apache Roxylight UK Infra. Opportunity Fund | £1,750 | Western Europe infrastructure |
| ArcLight Energy Partners Fund V | 3,000 | North American/western Europe energy |
| Future Carbon Fund (ADB) | 100 | Beyond expiry of Kyoto Treaty, 2012 |
| African Energy Infrastructure Fund | 100 | AfDB main investor |
| Aureos Africa Fund | 254 | Africa infrastructure |
| Beehive Water and Waste Holdings LP | 660 | Europe + MENA waste/water |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2009* | | |
| CS Real Estate Fund: Green Property | ? | Western Europe energy, other |
| Infrastructure Crisis Facility (IFC) | 1,900 | Global financial crisis (GFC) |
| Infrastructure Crisis Facility II (IFC) | 6,500 | US$5 billion debt; US$1.5 billion equity |
| HSBC Environmental Infrastructure Fund | €500 | OECD countries; proven technologies |
| Santander Infrastructure Fund II | €700 | Roads, water in UK, Chile |
| Ashmore Colombian Infrastructure Fund | 750 | Latin America |
| P3 Canada Fund | C$1,200 | Sovereign Canadian fund |
| Panda Power Generation Infrastructure Fund | 178 | North America per name* |
| Rockland Power Partners Fund | 500 | North America energy |
| White Deer Energy LP | 750 | North America oil and gas; energy |
| United States Power Fund IV | 1,750 | Per name* |
| Brookfield Colombia Infrastructure Fund | 400 | Per name* |
| Blackstone Infrastructure Partners | 2,000 | Per name* |
| Foris Clean Energy Fund | €450 | Western Europe |
| Brookfield Americas Infrastructure Fund | 1,500 | North American infrastructure |
| CC&L GVest Traditional Infrastructure LP | 50 | North America diversified |
| Invicta Biomass Fund | £390 | Western Europe renewables/biomass |
| Kayne Anderson Energy Fund V | 820 | North America energy |
| DIF Infrastructure II | €571 | Europe PPP/PFI; renewables |
| Pantheon Global Investment Fund | 150 | Global infrastructure |
| ECP Renewable Energy Fund | 1.078 | Europe, MENA renewables |
| Ithmar Fund III | 1,000 | MENA energy; infrastructure |
| GCP Infrastructure Fund (Gravis) | £100 | UK PFI sub debt |
| UBS AFA Global Infrastructure Multi-Manager Fund | 1,400 | Mature PPP projects; utilities |
| Public Infrastructure Partnership Fund | 400 | New Zealand PPPs |
| Clean Energy Fund (Industry Funds Management) | A$1,000 | Mainly Australia, Chile (Pacific hydro) |
| IFM Global Infrastructure Fund | 3,000 | North America and western Europe infrastructure |
| Highstar Capital IV | 3,500 | Asia-Pacific and North America infrastructure |
| Aviva Investors European Renewables Trust | 625 | European infrastructure, renewable energy |
| Eland Energias Renovables III | 41 | Western Europe renewables |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2009* | | |
| New World Cleantech PE Fund | 300 | North America clean technology; renewables |
| AXA IM Infrastructure Fund III | 1,367 | Western Europe infrastructure |
| Actis Infrastructure 2 | 752 | Power generation; transportation |
| Hastings Infrastructure Debt Fund III | €1,500 | Utilities; transport; telecoms; social infrastructure |
| ND Infrastructure Fund 1 | 51 | Colombian infrastructure |
| Macquarie Korea Opportunities Fund II | 1,000 | Per name* |
| IDFC Hybrid Infrastructure Fund | 100 | AP energy; transport; telecoms; social infrastructure |
| Emerging Markets Infrastructure Fund | 650 | Challenger-Mitsui; Asia |
| South Asia Clean Energy Fund (GEF) | 200 | Asia-Pacific energy |
| EcoFin China Power & Infrastructure Fund | ? | Asia-Pacific energy |
| China Mining United Fund | 73 | Asia-Pacific mining |
| China-ASEAN Investment Cooperation Fund | 1,000 | Asia-Pacific diversified |
| CITIC-Kazyna Investment Fund I | 200 | Asia-Pacific infrastructure |
| Avigo SME Fund III | 165 | AP energy, industrial, other |
| Asia Environmental Partners LP | 250 | Asia-Pacific energy, renewables, waste |
| First Vanguard Infrastructure Fund | 500 | Asia-Pacific water, waste water |
| FISEA (AFD/Proparco) | €250 | Investment & support fund for businesses in Africa |
| | | |
| *2010* | | |
| Foresight Group II | €250 | Solar projects |
| Renewable Energy Asia Fund | 74 | India |
| African Infrastructure Investment Fund 2 | 30+ | AfDB; per name* |
| InfraMed Infrastructure Fund | €1,000 | MENA and Europe transport; energy; urban infra. |
| Pan-European Infrastructure Fund | €1,500 | Europe renewables; transport |
| Hesse Newman | €23 | Green buildings/PV in Europe |
| Macquarie Mexico Infrastructure Fund | 408 | Per name*; 5.2b Mexican pesos |
| Asian Infrastructure & Related Opportunities | 859 | JPMorgan, 10-year, closed-end; per name* |
| Global Maritime Investment Fund | 545 | Per name* |
| Alinda Infrastructure Fund II | 4,000 | US, Europe |
| DB Masdar Clean Tech Fund | 265 | Per name*; mainly Asia |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2010* | | |
| Renewable Energy Fund I | €750 | EMEA solar; waste to energy |
| Renewable Energy Trust Asia (RETA) | 250 | India, ASEAN, South Korea, Australia |
| Dutch Infrastructure Fund (DIF) | €500 | Per name* and UK PFI |
| Northzone | 150 | Clean technology; Scandinavia; venture capital |
| Henderson PFI Secondary Fund II LP | £574 | Per name* |
| Slovakia Sustainable Energy Finance Facility | €90 | Per name* |
| Asian Infrastructure & Related Res. Opportunity | 850 | Per name* (including cement) |
| Second India Infrastructure Project Financing Facility (ADB) | 700 | Lending facility |
| Renewable Energy Fund (Rabobank) | £1,300 | European project finance; per name* |
| Global Infrastructure Partners | 5,000 | Per name* |
| P3 Canada Fund | C$1,200 | Canadian PPP infrastructure |
| Ashmore PTC India Energy Infrastructure Fund | 750 | Per name* |
| Renewable Energy & Infrastructure | €1,500 | European wind; solar |
| Asian Solar Energy Initiative (ADB) | 2,500 | 3,000MW in Asia Pacific |
| KITMC Global Infrastructure Fund 1 | W2,000,000 | Per name* |
| Indonesian Infrastructure Guarantee Fund | 250 | Indonesian political risk cover |
| Energy Capital Partners II | 4,300 | N. American energy infrastructure; renewables |
| China Mining United Fund | 442 | Mines exporting to China |
| Brookfield Americas Infrastructure Fund | 2,700 | Utilities; renewables; transport; energy |
| John Laing Infrastructure Fund | £270 | Listing 19 PFI portfolio |
| Barclays Integrated Infrastructure Fund | £645 | European PFI/PPP |
| Marguerite (EIB) | 948 | European diversified |
| Russia Infrastructure Fund | 670 | Russia infrastructure; energy |
| AMP Capital Community Infrastructure Fund | A$80 | Australian PPP |
| AMP International Capital | A$645 | Mezzanine (outside Australia) |
| Future Environment Initiative | 2,500 | JBIC: Japanese clean energy; water |
| Asian Genco | 425 | Indian power generation |
| BNY Mellon Latin America Infrastructure Fund | 1,000 | Per name* |
| John Laing Infrastructure Fund | £252 | PPP portfolio IPO |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2010* | | |
| Globalvia | €500 | US, Canada, Europe road and rail |
| Clean Resources Asia Growth Fund (ADB) | 200 | PRC and India |
| Renewable Energy Asia Fund (ADB) | €150 | India, Philippines, South-East Asia |
| Asia Water Fund (ADB) | 100 | 70% PRC; balance South-East Asia |
| VEI Capital (Intesa Sanpaolo; Generali) | €500 | European PV |
| WHEB Infrastructure Partners Fund | €200 | Europe energy, renewables |
| | | |
| *2011* | | |
| Fiera Axium Infrastructure Canada | C$460 | Brown/greenfield transport; energy; social infrastructure |
| Instrata Infrastructure Fund II (Bahrain) | 300 | Middle East-Turkey infrastructure |
| Indian Infrastructure | 300 | Per name* |
| NK Energy Real 1 | 100 | Per name* |
| Global Infrastructure Partners 2 | 5,000 | Per name* |
| Renewable Energy Fund (AfDB) | 57 | Africa per name* |
| Nature Elements Asia Renewable Energy | 200 | 80% China |
| ASEAN Infrastructure Fund (ADB) | 485 | ASEAN Infrastructure |
| Equitix Fund II | £150 | UK PFI/PPP and renewables |
| Bilfinger Berger Global Infrastructure SICAV | £245 | UK, Europe, Canada, Australia PPP |
| Capital Release Fund (IFC) | 400 | Emerging markets; SMMEs |
| London Energy Efficiency Fund | £100 | UK public sector |
| Bilfinger Berger Global Infrastructure | £212 | PPP: UK, Canada, Australia, Germany |
| Macquarie European Infrastructure Fund IV | €1,200 | Per name* |
| Macquarie Everbright Greater China Infrastructure | 1,500 | Per name* |
| Renovalia Reserve | 300 | Wind in Europe and North America |
| European Fund (Colonial First State) | €1,500 | Per name* |
| Stonebridge Infrastructure Debt Fund | C$200 | Canadian PPP/energy |
| Brookfield Renewable Energy Partners | 600 | Listed TSX vehicle |
| Solarzi | €500 | PV in Germany, Italy |
| Zimele Green Fund (Anglo American) | R100 | South African renewables |
| Infrastructure Coalition Program | C$750 | Global diversified |
| Innisfree PFI Secondary Fund 2 | 800 | UK PFI=PPP |
| Wanthorpe Water Fund | 500 | Asia-Pacific water/waste water |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2011* | | |
| Westbourne Capital Infra Debt Fund | A$2,000 | Asia-Pacific energy, telecoms, transport |
| Westly Capital Partners II | 175 | Asia Pacific/North American energy and renewables |
| Seqimco Infrastructure Debt Fund | 1,000 | Western Europe diversified |
| Scout Energy Partners | 200 | North America power, energy |
| Saigon Asset Mgt Indochina Energy Fund | 350 | Asia-Pacific energy, renewables |
| RREEF Pan-European Infrastructure Fund II | 2,000 | European transport, utility |
| | | |
| *2012* | | |
| IFM Global Infrastructure Fund | 5,000 | Per name* |
| Macquarie Infrastructure Fund III | 2,000 | USA, Canada |
| HICL Infrastructure | £250 | UK PFI transactions |
| Global Strategic Investment Alliance | C$7,500 | North American and European infrastructure |
| Ix:Africa (NextEnergy Capital/IDC) | €400 | African renewables |
| Green Energy Efficiency Fund (IFC/KfW) | R500 | SME loans for South African energy users |
| Lereko Metier Sustainable Capital Fund | R400 | SADC: renewable energy and water |
| Renewable Energy Fund (Absa/AFD) | R400 | South Africa, per name* |
| RBS Group Pension Fund | £750 | Energy, ports, airports |
| Icon Infrastructure | 500 | European brownfield infrastructure |
| New Africa Mining Fund II (NAMC II) | 120 | Gold, copper, iron-ore, coal, chrome, manganese |
| KKR Natural Resources Fund | 1,250 | *Per name |
| KKR Infrastructure Fund | 1,000 | *Per name |
| AMP Capital Debt Fund | €400 | Sub. Debt in OECD infrastructure |
| EQT Infrastructure Fund II (Swedish PE) | €1,500 | European infrastructure businesses |
| Sub-Sahara Africa (CDC, DEG) | 100 | Mezzanine |
| Renewable Energy Tax-Equity Fund | 250 | Residential/commercial solar |
| Convergence Partners Communications Infrastructure Fund | 500 | African ICT |
| Inframed | €385 | South and east European infrastructure |
| Irish Infrastructure Fund (IIF) | €1,000 | Ireland and Northern Ireland |
| International Public Partnerships (INPP) | £200 | UK PFI secondary market |

*Continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2012* | | |
| Japan Infrastructure Investment Partnership | 1,250 | Infrastructure, power |
| Global Strategic Investment Alliance (GSIA) | 20,000 | A/p, ports, roads/bridges |
| InfraVia European Fund II | €400 | European brownfield infrastructure |
| APG (Netherlands – ABP) | €9,000 | Infrastructure debt; Netherlands |
| Caliber Midstream Partners | 180 | Water and oil and gas in Northwestern US |
| AXA Infrastructure Fund III | €1,500 | Infrastructure |
| Actis Infrastructure Fund III | 750 | Energy: Africa, Asia, Latin America |
| Armstrong S. E. Asia Clean Energy Fund | 150 | Per name* |
| Aviva Investors Hadrian Capital Fund | £1,000 | Western Europe debt: energy, social infrastructure |
| Broad Street Energy Partners (Goldman Sachs) | 3,500 | Energy: global |
| Cleantech Latin America Fund II | 150 | Renewables, energy |
| DIF Infrastructure III | €600 | Western Europe |
| Eland Ernergias Renovables IV | €150 | Western Europe |
| Mezz Opportunities Fund | 800 | North American energy |
| EnerVest Energy Institutional Fund XIII | 2,000 | North American energy |
| Harbert Power Fund V | 500 | North American energy |
| Harbourmaster Infrastructure Debt Fund | €2,000 | Western Europe diversified |
| IDBI India Infrastructure Debt Fund | 5,000 | Per name* |
| India Infrastructure Debt Fund (IL&FS) | 2,000 | Per name* |
| India Infrastructure Fund II (IDFC) | 1,500 | Per name* |
| InfraCo Sub-Saharan Infrastructure Fund | 200 | Africa diversified |
| InfraVia French Infrastructure Fund | €200 | Per name* |
| Latin Renewables Infrastructure Fund | 150 | Per name* |
| Lloyds Bank UK Infrastructure Partners | £250 | Per name* |
| Nomura India Infrastructure Fund | 500 | Per name* |
| Northleaf Infrastructure Co-Investment | C$500 | Global diversified |
| Prime Renewables | €600 | Western Europe renewables |
| SREI Infrastructure Opportunities Fund | 1,000 | Asia-Pacific transportation, energy, diversified |
| SUSI Energy Efficiency Fund | €250 | Western Europe renewables |
| UBS International Infrastructure Fund II | 2,000 | Global diversified |

*Continued*

Exhibit 2.4 *continued*

| *Name* | *US$ million (except shown as other currency million)* | *Sector* |
|---|---|---|
| *2013* | | |
| Clean Energy Fund (Westmont Partners) | €437 | European renewable energy generation |
| DIF Infrastructure Fund III | €614 | PPP, renewable energy |
| Greencoat | £260 | Secondary UK wind |
| Amarenco | €130 | Solar in UK/France |
| Denham Fund IV (Endeavour Energy) | 3,000 | African gas-fired and hydro IPPs |
| Stonebridge Infrastructure Debt Fund II | C$300 | P3 Canada: social and energy infrastructure |
| 3i India Infrastructure Fund | 1,200 | Pulling out of India |
| Sodémex Développement (Caisse de dépôt) | C$250 | Quebec mining |
| India Infrastructure Finance Co Ltd | 1,000 | Indian infrastructure debt |
| Macquarie Russia & CIS Infrastructure Fund | 100 | Transport and energy in Russia/CIS |
| The Renewables Infrastructure Group | £300 | Secondary market: renewable energy |
| Renewable Assets | €100 | Per name* |
| Russia Direct Investment Fund/Mubadala | 2,000 | Per name* |
| Bilfinger Berger Global Infrastructure | £85 | Canadian assets |
| HICL Infrastructure | £86 | UK PFI: infrastructure/ReFi |
| John Laing Infrastructure Fund | £35 | Peterborough Hospital PFI |
| Aviva Investors European 2ary Infra Credit SV | €425 | CLO/revolving profit-participation notes |
| John Laing Infrastructure Fund | £123 | PFI secondary fund |
| Oxford Capital | £100 | UK roof/ground solar |

* Sector/region/activities described in fund's name.

*Source:* Author's own

## Developers

Project companies themselves can act as project financiers (no bank is involved). The turnkey contractor might do the same.

**Case study: PdVSA, Venezuela**

The Bachaquero III gas compression IPP developed for Venezuela's PdVSA, for example, was under a four-year build own operate (BOO) contract. The project sponsor, who owned 40% of the deal, provided 100% project financing.

## Mezzanine

The mezzanine players do not usually wish to invest under such a long-term tightly structured transaction as a project finance loan. Their target is a high equity return and a two to five-year exit. Therefore, this funder may be present at an early stage (to assemble the studies, lawyers/solicitors, or access the funding) or parallel to a project financing.

## Merchant financing

In return for the right to trade goods and services into and out of the project, a merchant may be willing to provide some of the project's development capital on a project finance basis – around 20% to 50% of the total. In addition, it may be able to offer preferential market pricing or offtake terms which may in themselves assist the whole project and thereby achieve a project financing.

Large trading companies have offered large project financings in the US$500 million to US$600 million area. The natural concern is the transfer pricing and profit making which the trading company is able to make off the top, perhaps from each cashflow line. This has to be balanced against their other supports of market risk and operating cost risk – all three components.

## Islamic lending

Under Islamic canonical law, *riba* (the right to charge interest on a debt) is strictly forbidden.[6] While many of the Islamic structures permit an interest-type yield, it is a mistake to consider it as quasi-interest. Quite different risks attach to this. There are a number of Islamic funding structures as listed in Box 2.4. The overall concept of sharing the benefits/profits of a stand-alone enterprise are very well suited to project finance. However, a satisfactory interbank market and the pioneering needed with various shariah committees (the canonical law) have confined growth of this source of funds – often labelled '*sukuk*' in the Persian Gulf countries. A *sukuk* is an Islamic security (piece of paper). All *sukuk* is Islamic; but not all Islamic is *sukuk*. Differences between shariah committees from one country to another makes this a problematical source of project finance funding.

**Box 2.4**
**Islamic lending facilities**

*Istinsa/wakala* (construction).

- The financier acquires equipment by progress payments under a contract:
  - *istisna* is often taken out by a *murabaha* financing.
- The financier appoints a *wakheel* (agent) to procure the project:
  - *wakala* is often taken out by *ijara*.
- It is akin to a supplier's credit; pre-production facility; or procurement under a contract.

*Murabaha* (repayment).

- The bank purchases an asset (up to 90% of the total value of the project).
- The repayments are in deferred payments for a specific period or in instalments.
- The repayment amount is the sum of purchase cost plus a profit margin (to the bank).
- No commitment fees/no late-payment penalties are allowed.

*Ijara* (leasing).

- The banker acquires an asset.
- Leasing for a pre-determined fee is for a fixed period.
- The title passes to the lessor upon expiry of *ijara* term.
- It is known as 'Islamic leasing'.

*Musharakah* (equity).

- The bank and the client contribute capital on a joint venture basis.
- A project may be jointly managed.
- The profits and losses are shared (*inan* if shared unequally).
- One form of project finance is called 'diminishing *musharakah*', a Type 1 variety.

*Muqurada* (bond).

- A project specific bond is issued by a company.
- The repayments commence at completion.
- There is an agreed profit split.
- This is a 'bond' version of *mudarabah*.

*Mudarabah* (trust).

- The bank accepts investment into a partnership (trust) account.
- The bank invests in the project (on behalf of the owner/investor).
- The bank is the 'manager'.
- There is a pre-determined profit sharing basis to the banker.
- The investor bears losses on a limited liability basis.
- This is commonly known as 'trust' financing.

Malaysia leads the world with US$1 billion to US$2 billion per annum of Islamic-funded project financings – and some 80% of Malaysian project finance is Islamic. Malaysia established a fully-functioning Islamic banking system in 1983. Importantly, the Sharia Council is appointed by the Malaysian government. Whereas its neighbour, Indonesia – the world's largest Muslim nation – does hardly any Islamic-based project finance! The Hubco transaction is notable with a local currency Islamic tranche (see Exhibit 1.2).

Islamic lenders are prohibited from gambling; thus they were not able to purchase sub-prime CDOs – the cause of the GFC and the collapse of Lehman Brothers. As a consequence, no Islamic lenders took any sub-prime CDO writeoffs.

## Public-private projects

Governments are keen to engage in public-private projects (PPPs) as a way to lay off its funding load onto the private sector, and is especially notable since all PPP project financings depend on the contractor's 'package' (Type 2). This can be achieved through concession-driven contracts (all the BOO, BOT, BOOT, BTO variations), joint investment or subsidy 'viability gap' arrangements.

### Case study: Public-private projects Philippines

The Philippines is the best example of this, having established a co-ordination centre in 1989 to foster build own transfer (BOT) developments for its infrastructure, including unsolicited projects.[7] Faced with crippling power shortages in 1990 to 1991, at the turn of the millennium the concern was what to do with the surplus power capacity. Almost every power development in that country in the 1990s was project financed.

### Case study: Croydon Tramlink, UK

The Croydon Tramlink, London, was project financed by way of a 50% grant from the government and a leveraged lease package, described in Chapter 1, and illustrated in Exhibit 8.17.

## Leasing

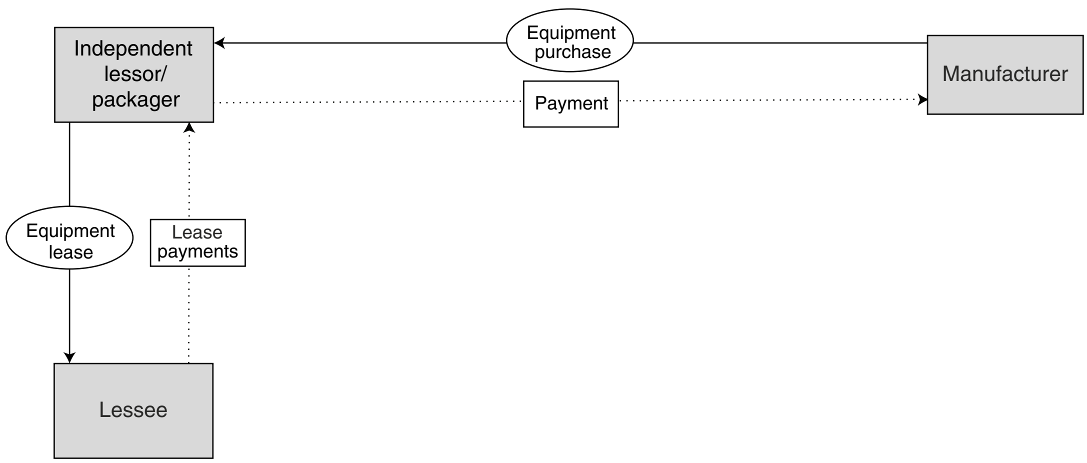
The use of a tax shelter for leasing has produced a major source of lower cost funding which is deployed in many project financings. Usually the route is by packaging a lease for an owner/investor/specialist leasing company (see Exhibit 2.5) or under a leveraged leasing where the owner borrows most of the funds needed to own the asset and on-lease. Individual leasing structures are examined in Chapter 8.

The lessor needs continuing income, say over five to 15 years, to shelter the tax. The lessor often decides to take just the tax risk and will require someone else to take the project finance suite of risks. Accordingly, most project financings will see a letter of credit (LC) or guarantee provided to the lessor to cover the lease payments. By doing this, the project financier has *de facto* granted a senior payment position to the lessor. Most such projects cannot be operated without the leased equipment anyway.

Cross-border lease transactions can get very exotic very quickly and if one throws in defeasance and wrap structures, the relationships and payment streams can get quite complex.

Exhibit 2.5

**Leasing company/packager (direct lease)**




*Source:* Author's own

## Commodity-based lending

Commodity-based lending developed originally around exchange-tradable commodities in the 1970s; first, precious metals, then quickly followed by oil and others, primary energy products, and now electricity.

There are three main forms.

1. A direct commodity loan, such as a gold loan. Principal and interest repayments are denominated physically, say in ounces of gold.
2. A commodity swap of money to commodity, commodity to commodity, and sometimes including a floating to fixed price swap as well as other derivatives.

3 Convertible structures usually where a monetary obligation can be converted into a commodity.

The many features of this type of funding are explored in Smith and Kennison's *Commodity Derivatives and Finance*, which also ventures into a popular area of controlling energy price risk such as crack spreads for refinery project finance.[8]

**Case study: Natural gas, US**

Metals Inc. purchases large quantities of natural gas. It can structure a gas-linked Libor cap (quaintly labelled a 'natural gas knockout').[9] In this cross-market derivative, as gas prices rise, the interest rate cap is triggered. At low gas prices, there is no cap on the Libor.

## Equity

The reason most people select the project finance debt route is to minimise the equity requirement. Equity is an integral part of the sponsor group's commitment and some institutions expect a reasonable percentage, say 10% to 25% of the total funding required, as hurt money (for the sponsor).

Equity can be invested in many ways such as:

- cash, either up-front, pro-rata, or after the debt has been invested (see 'Completion', 'Debt:equity subscription' in Chapter 19);
- equipment facilities or services are contributed as part of the project's development;
- subordinated debt, provided it is fully and deeply subordinated (see 'Subordinated debt' in Chapter 8); or
- convertible debt is injected, anticipating an IPO post-completion.

Most project financiers count the future funding only, although if past equity is to be refinanced, then it will be counted (see 'Debt:equity ratios' in Chapter 5).

## Summary

Banks are consistent players who can offer flexible funding. The depth of the capital markets combined with the capability to price political risk directly into the spread is a major advantage along with long-term appetite. Other funding sources such as merchants, customers, Islamic lending, and leasing can all be built into the architecture of project finance. Finally, government and equity co-investment should be able to complete the pool of funds. Natural hedges may be created to match commodity, CPI, or local currency revenues by funding accordingly.

[1] World Bank, World Development Report, Infrastructure for Development, 1994.

[2] Lister, H, 'World Bank's guarantee programme: a commercial bank's view', *International Power Finance Review*, 1997–1998, Euromoney Books.
[3] Ahmed, PA, *Project Finance in Developing Countries*, 1999, IFC, preface.
[4] Most such project finance bonds trade at a discount to net asset value (highly unpopular).
[5] Macquarie Corporate Finance Limited, *Project Finance: the guide to financing transport projects*, 1996, Euromoney Books, p. 45.
[6] Moore, P, 'Riba', in *Islamic Finance*, 1997, Euromoney Books, pp.16–19.
[7] CCPAP, Handbook on Doing BOT Business in the Philippines, 1994.
[8] Smith, KT and Kennison, P, *Commodity Derivatives and Finance*, 2nd edition, 1996, Euromoney Books.
[9] MeVay, J, 'Metals Inc's Libor cap with natural gas knockout', in *Managing Energy Price Risk*, 1998, Risk Publications, p. 154.

Chapter 3

# Cashflows

The development of the project's cashflow projections is the main tool for just about every aspect of analysing and negotiating the project finance structure. To paraphrase the recommended steps (discussed in detail in Chapter 9):

- review the project summary quickly to get a 'smell' for the deal;
- examine the project information/studies slowly to systematically identify each risk item, one by one (and hopefully find uncovered items);
- then start the modelling/projections (or scrutinising the model developed by others).

**Box 3.1**
**Four benchmark cashflow cases**

1 *Base case* or expected case from the project financier's review of the studies, proposals, and risks. The base case will set the main principal repayment regime.
2 A *downside case* is often mislabelled the 'worst' case: in the worst situation, one probably would not proceed with project development/project finance. In the downside case a selection of variables (not all cashflow lines) are changed, for example a three-month delay in completion. The downside case should help set the level of reserves, flexibility in principal repayment, cash-trap ratios, and completion coverage. A *completion case* may be established to stress test just the downside completion scenario to see that the funding structure provides an adequate (funding) amount to meet the completion test/transition through the project finance option conversion.
3 *Breakeven case(s)* focusing more on a key cashflow line that is the most likely to vary There are six of seven break evens (only): quantity; price; opex; capex; foreign exchange (FX) rate; and interest rate. Sometimes the inflation rate is also captured; however, interest and (expected) inflation rates are linked. The breakeven case will help specify the contract conditions that might need further sponsor support. If price is the parameter varied, this will be instructive on market risk and sales contract conditions.
4 *Best case* where the risks are well under control and upside assumptions are allowed to play. Alternatively, this may approximate the sponsors' case. The best case may indicate prepayment and refinancing timetables.

The cashflow modelling approach is quite simple.

1 Establish the risk and industry profile of the project. Establish the four benchmark cases (described in Box 3.1). From these, determine all the likely sensitivities to be run.
2 Design/draw up the model linkages, if any. It is preferable to have the whole model in one workbook. (Excel's between model links suffer the same weaknesses as circularity, only this time Excel gives no clue to incomplete links! Also Excel 2010 has a flaw in any model with a diagram!) Have individual menu and macros sheets.
3 Establish the Input Sheet containing the assumptions and sensitivity drivers and where sensitivity tables/charts will appear.
4 Commence the inputs for Revenue, Capex and Operating Cases (Opex) reports.
5 Start the cell logic to flow through to the main Cashflow and P&L/Tax calculations (not the other way round).
6 Establish all the loan tranches, reserve accounts (and the drawing/refilling logic), working capital report, repayment algorithms.
7 Tie them together with a balance sheet – to ensure that the model balances (maybe as the location of the reserves summary lines in current assets).
8 Report out to a summary report (preferably one page) summarising the project's physical and cashflow lines (as shown in the cashflow risk matrix in Exhibit 6.1).

An enhancement to this report is to have sensitivity sheets and simulation in another suite of sheets, which will display the differences among the key cases. Graphic sensitivity charts can help address the lack of management's involvement/interest in the cashflow model. (See Exhibit 8.2.) The content of the main report is discussed below under 'Operations summary', 'Operating cashflows', and 'Financing reports'.

The accounting firm, KPMG, examined project finance cashflow models for 18 projects. The results of this survey are shown in Exhibit 3.1. A number of issues arise from KPMG's findings.

- The lack of inclusion of assumptions sheets/backgrounds is indicative of either a gross shortcoming or pressure to complete. The inclusion of this information is mandatory in the cashflow model described above.
- The few models that allow sensitivities may result, in part, from the preponderance of Excel as the spreadsheet program; but is, nevertheless, unacceptably high. (Modelling programs are discussed later in this chapter and in particular the issue of circularity.)
- The underlying inference that all that management wants is a model to justify the deal, instead of taking a keen interest in what underlies the model is a major flaw in some of these models. Many project finance analysts will recognise this observation of management not having a clue about how hard and how long it takes to get a proper model established. Further, the work is often given to the computer expert who may have few project finance skills or little experience – the fresh MBA graduate/junior.

Little wonder, then, at KPMG's mediocre rating of project finance models.

Exhibit 3.1

**KPMG survey**

| *Model count** | *Problems* | |
|---|---|---|
| 13 | No assumptions databook | |
| 4 | No integrated cashflow, P&L, balance sheet | |
| 15 | Significant (?) tax errors | |
| 7 | Incorrect accounting assumptions | |
| 15 | No breakeven capability | |
| 10 | No interest by senior management in:<br>• scope of model;<br>• model conclusions. | |
| | | |
| *Model ratings* | | |
| | *Design* | *Sensitivity analysis* |
| Excellent | 6 | 7 |
| Average | 6 | 5 |
| Poor-bad | 6 | 6 |
| | | |
| *Out of a total of 18 project finance models | | |

*Source:* Project Finance International, issue 120

## Modelling aspects

A good knowledge of the main protocols for handling principal repayment, interest, and reserves is a natural prerequisite to structuring the optimum debt service (DS) profile. It is surprising to see how much the preference of the capital markets for simple structures and little or no flexibility in repayment where debt is concerned, has crept into project finance structuring.

The best example of this is the now standard debt service reserve (DSR) or debt service reserve account (DSRA) – which has its place in predetermined repayment profiles – usually linear amortisation for project finance bonds. If there is a problem, then the DSR may provide a cushion of so many months. (DSRs are usually expressed in months of DS.) But if the repayment regime is flexible, then so long as interest can be paid and project cashflows have not deteriorated long term, then the DSR/DSRA may be redundant. Again, this is the key advantage of bank finance over bond financing in project finance. Bank finance can be much more flexible on repayment, refinancing and, generally, resetting the deal later.

Principal repayments, as described in Box 3.2, can be made in eight other ways besides linear repayment structures. It is a good idea to build in a switch (dropdown list box) during the modelling phase to see the effect of different repayment mechanisms on the key debt service cover ratio (DSCR) ratio year in and year out. (See Exhibit 3.7.)

**Box 3.2**
**Eight principal repayment methods**

1 *Percentage of periodic available cashflow (ACF) after payment of interest (I) and taxes.*
  - A common rule is for this percentage to at least equal the percentage debt in the original debt to equity ratio. This is called: 'percentage dedication' and is very flexible.

2 *Mortgage/annuity-style.*
  - (Sometimes called 'credit foncier') where the sum of periodic principal (P) and I is constant. This calculates to low P (repayment) in early years which steadily increases.
  - Variations of this method may incorporate a cap on the interest rate or may ramp up the repayment amount.
  - It may be back-ended with a linear algorithm.

3 *Equal repayment of P in each period over the term.*
  - Often termed 'linear repayment' or 'straight line'.

4 *Structured P.*
  - Repayment schedules may comprise uneven amounts to offset years, when replacement or maintenance capex jumps up. This, many times, implies a back-ended repayment of P.
  - Regular loan life ratio (LLR), project life ratio (PLR) recalculations – such as in a borrowing-base structure – governing P per period.
  - Sufficient P is repaid in each repayment period to bring the ratios back into line.

5 *DSCR constant throughout.*
  - The amount of P repaid is matched to the DSCR.
  - Used to be used in UK PFI PPPF transactions.

6 *A one-off payment or 'bullet'.* More usually a balloon as in a mini-perm transaction.
  - This implies a refinancing of the balloon.
  - A bullet (100% of P) is unusual in project finance, but very common for classic bond issues.

7 *Per unit produced.*
  - As with a production loan.

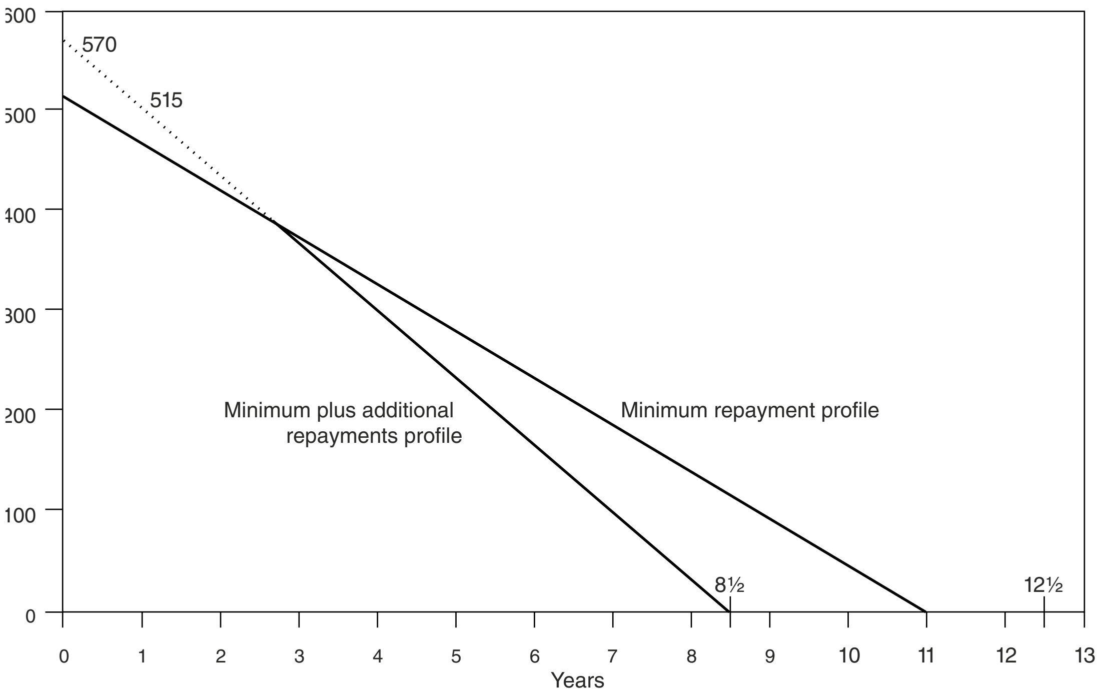
8 *Royalty basis.*
  - As a percentage of gross revenue (as in a monetisation).
  - Alternatively, *ad valorem* percentage repayment (off the top/gross revenues) of P/period.

Flexibility in principal repayments is often constrained within upper and lower bounds as illustrated in Exhibit 3.2. In that case, there is an additional repayment mechanism such as a mandatory prepayment (see Chapter 8). Its effect is limited to result in an eight-and-a-half-year repayment term, compared with a twelve-and-a-half-year term if that additional repayment mechanism does not click in. On the other hand, if any of the loan outstanding is above the minimum repayment profile (and cannot either be reduced below that minimum repayment profile line from reserves/cash-trap moneys), then a payment default has occurred.

A way around a hard default is to use a cash sweep, as was used for the Tribasa Toll Road trust bond issue for a Mexican project, shown in Exhibit 3.3. In this arrangement, when the loan outstanding is between the scheduled and contractual amortisation lines, an additional 1% margin is levied. If the principal outstanding exceeds the contractual amortisation line (akin to the minimum repayment profile in Exhibit 3.2), then all net net cashflow (NNCF) (all surplus cash after operating expenses, debt service, and taxes = 100% cash sweep) is directed to further debt service, but there is otherwise no default called. The sponsors get zero distributions while the project is in this condition – a powerful incentive to refinance it.

Exhibit 3.2

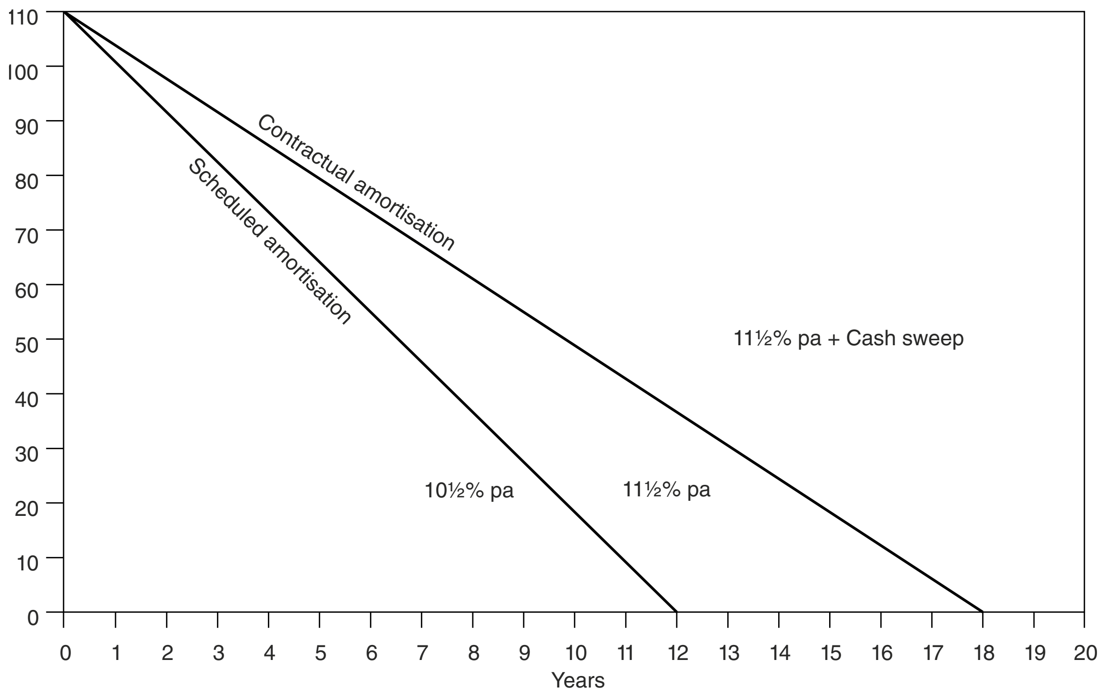
**Repayment profiles (US$ millions)**




*Source:* Author's own

Exhibit 3.3

**Tribasa cash sweep (US$ millions)**




*Source:* Author's own

### *Interest bases*

There are a number of interest rate bases for any financing, not just project finance. The London Inter-Bank Offered Rate (Libor) is the European and world benchmark. The US Treasury T-bill rate is the marker for US debt placements. Other prime rate and interbank rates can be used for local currency lending bases or for regional centre interbank pricing, for example, Bahrain, Singapore, Hong Kong, or Sydney.

Consumer price index (CPI) index-linked pricing is also seen in the institutional placement market, especially for pension and superannuation funds. The usual basis will be a government or major government agency issue acting as a marker bond for the CPI against which the project pricing/institution yield will be calculated.

Interest is most often capitalised into the loan during construction. The deal may be on an interest only basis until the end of the grace period, usually a period – six months – after start-up/after the completion test to allow working capital to build. The interest basis may be adjusted or structured to try to hold its impact down in the early years, catching up later.

## Spreads

For the risks assumed by the project financiers, project finance margins/spreads are remarkably low. This mystifies just about everyone – from practitioners to academia. Apparently it also mystifies the minister and the corporate treasurers who mistakenly think project finance is expensive! It is true that establishment costs (mostly the legals) are expensive – especially post the global financial crisis (GFC), but not for the margin. The loan life (tenor) is now much shorter because of the capital requirements of Basel III for the banks. Thus, the much greater role seen for the export credit agencies (ECAs) or multilateral agencies (MLAs), who are not so constrained (see Chapter 21) on loan life (term).

The project finance professional seeks to adjust the structure to result in an acceptable cashflow ratio profile for that risk/sector/region/ sponsor as illustrated in Exhibit 5.3. Thus the spread/ margin does not reflect the risk; the project's cashflow profile is adjusted to match the risks.

Why then do some spreads increase over time? Surely the project has less risk over time. This would seem to be the result from Moody's default study of 2013.[1] And while examining spreads/margins, why does the margin increase upon completion for Type 1 and decrease after completion for Type 2; surely there is less risk then? The Type 1 practice is easy to explain since the pre-completion supports have been removed once the sponsor has satisfied the option terms and conditions to switch off that support. For Type 2 projects, the strength of the cashflow payer – the government in many public-private partnership (PPP) project financings – clicks in after completion. And most people view the completion risk as the toughest part of a Type 2 project financing.

Also after project completion, that the project finance margin increases over time has two plausible reasons.

1 Banks price their balance sheet/commitments higher at the long end (of the yield curve). Some equity is required for any loan given by a bank under capital adequacy rules (Basel II).
2 If the margin is steadily increasing, the treasurer may be pushed/encouraged to refinance. The refinancing may either bring in a new fee or free up the investor/underwriter/banker for another deal with front-end and syndication fees. (See Chapter 24.)

One way to address this dynamically is to adjust the interest spread according to the cashflow performance. This is often done in telecoms to reflect the debt:earnings level expressed through the Debt:EBITDA ratio; but the best way is through an automatic adjustment if the DSCR is above, say, 1.50 for two quarters in a row – then the margin reduces, or increases if it is, say, below 1.50.

Another structuring tool in this genre is a cash-trap whereby cashflow is reserved/ escrowed if the project's performance is at or below a threshold (above breakeven DSCR of 1.0). In this case, the moneys cannot be distributed to equity until a release mechanism is satisfied which shows that the project will go back up above that level and stay there in the foreseeable future. Cash-trap styles are described in Box 3.3.

The cash-trap level itself is established from the downside case. Although not fail-safe, a proxy level is that shown in the 'Great' column of Exhibit 5.3. Closer to a DSCR of 1.0, this ratio is sometimes called a default ratio, which is unfortunate since it is designed precisely to prevent 'defaults'! The cash-trap/cash lock up moneys are usually in addition to the various reserved moneys.

**Box 3.3**
**Cash-trap styles**

1 *DSCR threshold:* usually 1.2 to 1.3 for four quarters in a project finance, based on: (i) an historical test; (ii) a 50:50 historical and projected basis; or (iii) projected DSCRs. It is determined from the downside case and a view on the residual amount/risk.
2 *Release:* triggered once: (i) threshold DSCR is exceeded; (ii) cumulative sum exceeds a set value; (iii) other DSR/cash accounts reach back-up levels; and/or (iv) blanket 'no default occurred/impending'.
3 *Priority:* used first in a cashflow deficiency and then the DSR account.
4 *Funding:* out of cushion/NNCF/free cash by way of letter of credit/standby funding.
5 *Other aspects which may factor in cash traps include:* fit to clawback; capex/maintenance reserves; and tax and accounting restatement/retrospectivity.

## *Reserve styles*

Various cash reserves are established to carry through the project financing as a self-sustaining repayment system. Most reserves seek to escrow moneys away from the sponsors, thereby limiting distributions to equity until the reserves are at a satisfactory level and the project's performance – as far as cashflow generation and repayment – is as expected/predicted in the original cashflow projections. This is often referred to as 'equity lockup'. The main styles are listed in Box 3.4.

**Box 3.4**
**Reserve styles**

1 *Debt service reserve:* usually three to six months of P + I established up-front/at completion (see Box 3.5).
2 *Maintenance reserve* (especially power projects): a sinking fund to avoid lumpy provisions (see Box 3.6).
3 *Capex reserve:* a given per cent in place in advance of lumpy capex (for example, re-equipping a fleet or renewing a licence). See Box 3.7.
4 *Environmental reserves:* site abandonment provision or rehabilitation (which would be progressive, for example, an ash pond for a coal-fired power plant).
5 *Tax:* provision build up from cashflow within period or in advance.
6 *Others:* including payments in advance (for fuel, shipping, or similar); transfer at the end of a concession (cost to reach transfer status); and reserves to pay political risk insurance (PRI) premiums.

The most common is a DSR of usually six months being standard – the banks can be lower, the bond market higher. The features of debt service reserves are given in Box 3.5. A DSR is usually the first to be drawn if there is a cashflow deficiency.

**Box 3.5**
**Debt service reserve**

Established from the downside case: it is usually three to six months of P + I established for banks; with capital markets it is longer at usually six to twelve months of P + I.

1 *Up-front or at completion* and, therefore, funded by the construction/pre-completion.
2 *From early residual cashflow* – in priority to equity distributions.
3 *Partially in place at completion* with the balance made up from early residual cash flow/NNCF.

Maintenance reserves are for specific project activities such as future capex or maintenance, especially of the lumpy variety seen in major power plant maintenance. The engineers usually build an overly generous estimate of maintenance costs. Inevitably the project financier is very keen to see that maintenance is done and is not a source of back-door returns to equity or to make it easy on the engineers. The ingredients to a typical power maintenance reserve are given in Box 3.6.

**Box 3.6**
**Maintenance reserve (especially power projects)**

1 *Sinking fund* made up of a mix of fixed and variable factors from a percentage of revenues and modelled to suit per period usage.
2 *Parts*.
3 *Activities*.
4 *Lumpy provisions for major overhauls* with or without a discretion to postpone. A distinction is made between maintenance to meet 'insurance' provisions versus 'regular' maintenance spares.
5 *Maintenance plan*.
6 *Fit to operations and maintenance contract* (liquidated damages, insurance).

A variant on the sinking fund, the capex reserve is built up in advance for spending expected some years hence, such as for an equipment renewal/refurbishment (see Box 3.7). The structure is needed since the recourse has been released to the former construction obligors pre-completion, so the project has to fend for its new capital from NNCF – defined in Chapter 5.

**Box 3.7**
**Capex reserve**

1 Established from a sinking fund from the project's NNCF for:
   - lumpy single (not periodic) capex; or
   - a subsequent expansion.
2 The amount in the capex reserve is set at X% in place Y months/years in advance of lumpy capex:
   - usually in the year prior to the capex or the year of the capex, for example, 80% of the capex required is in place in the year prior to the capex spend;
   - linkage to sponsor recourse/support if insufficient amounts are not yet in this capex reserve;
   - second completion may mean a spring back to sponsor support; and
   - clawback to prior distributions of NNCF if insufficient amounts in the capex reserve.
3 Subordination is usual for any sponsor amounts subsequently added to the capex reserve.
4 Deferral/discretions on the capex itself may influence capex reserve mechanisms.
5 Capex reserve is not needed if the decision is to refinance an expansion:
   - say, within two to three years; or
   - sometimes as a separate/additional stand-alone expansion project-finance tranche.
6 It is customary to limit the special purpose vehicle's (SPV) capability for other borrowings during the period of assembly of a capex reserve.

Other reserves are used, for example, to build up an impending tax payment in advance or during a period of cash generation. If equity or quasi-equity is also being drawn in at this (post-capex) stage, then the logic of filling the capex reserve or topping it up needs close negotiation in case it springs back to recourse for the sponsor group.

## Cashflow controls

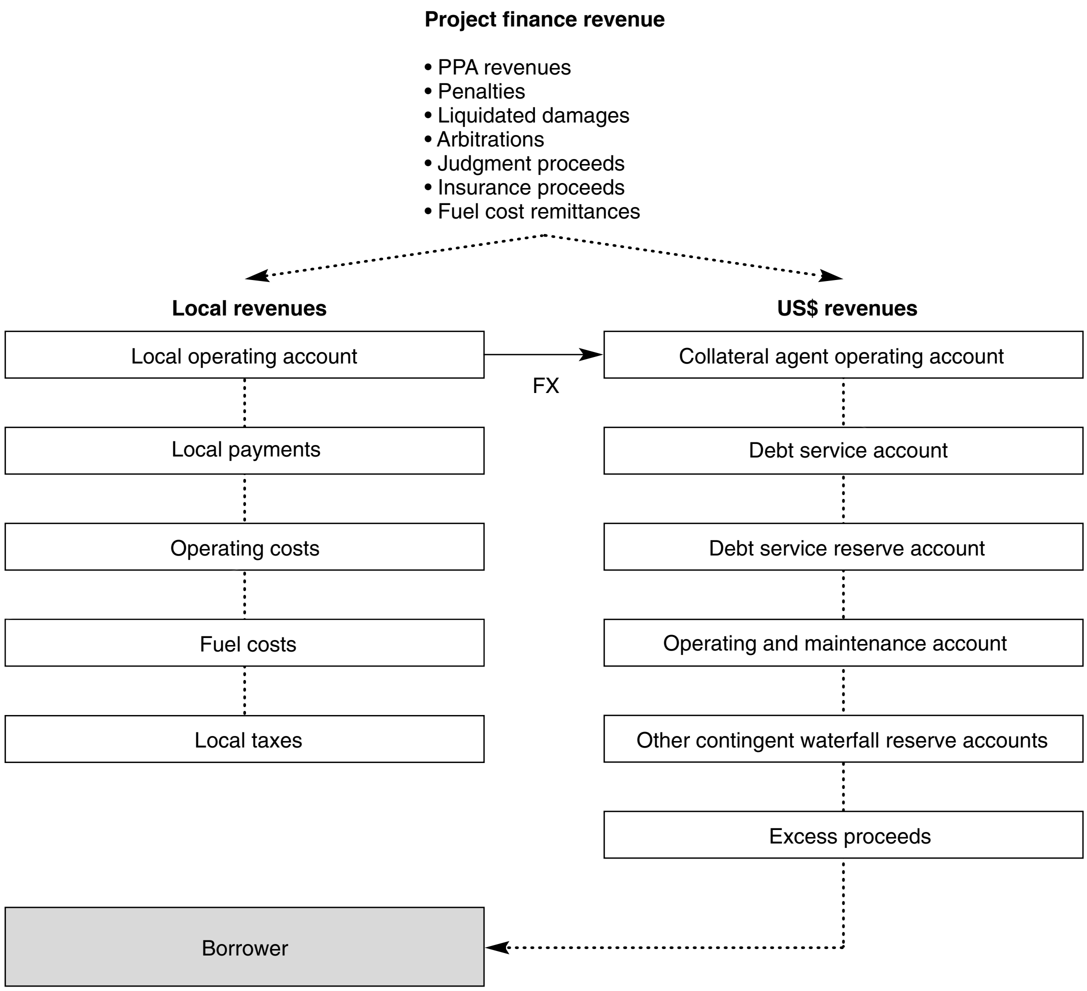
As discussed in Chapter 22, one of the features of US project finance deals (and by extension for rating a project financing) is the requirement of a bankruptcy remote SPV as the project borrowing entity. This stems from a desire to take control of the cash in the cashflow away from the bankruptcy courts (Chapter 11 provisions of the US Bankruptcy Code) as soon as possible, to direct the project moneys into special accounts the court cannot touch. This can be very formal such as in the 'waterfall of (separate) accounts' shown on the Bank One diagram in Exhibit 3.4 (Bank One is a subsidiary of JPMorganChase). Note that taxes are handled 'above' the deal in this US style of waterfall, indicating a partnership SPV.

This grab of the cashflows reaches right back to the partners' cash inflows by placing moneys in quarantine though lockbox accounts, shown in Exhibit 3.5. When the lockbox cashflows are removed, the deal diagram is considerably simpler, as shown in Exhibit 3.6.

This can equally be achieved by a good two-page letter to a responsible bank manager in a crown law (English Law) set of documents since the trustee aspects are not needed.

Exhibit 3.4

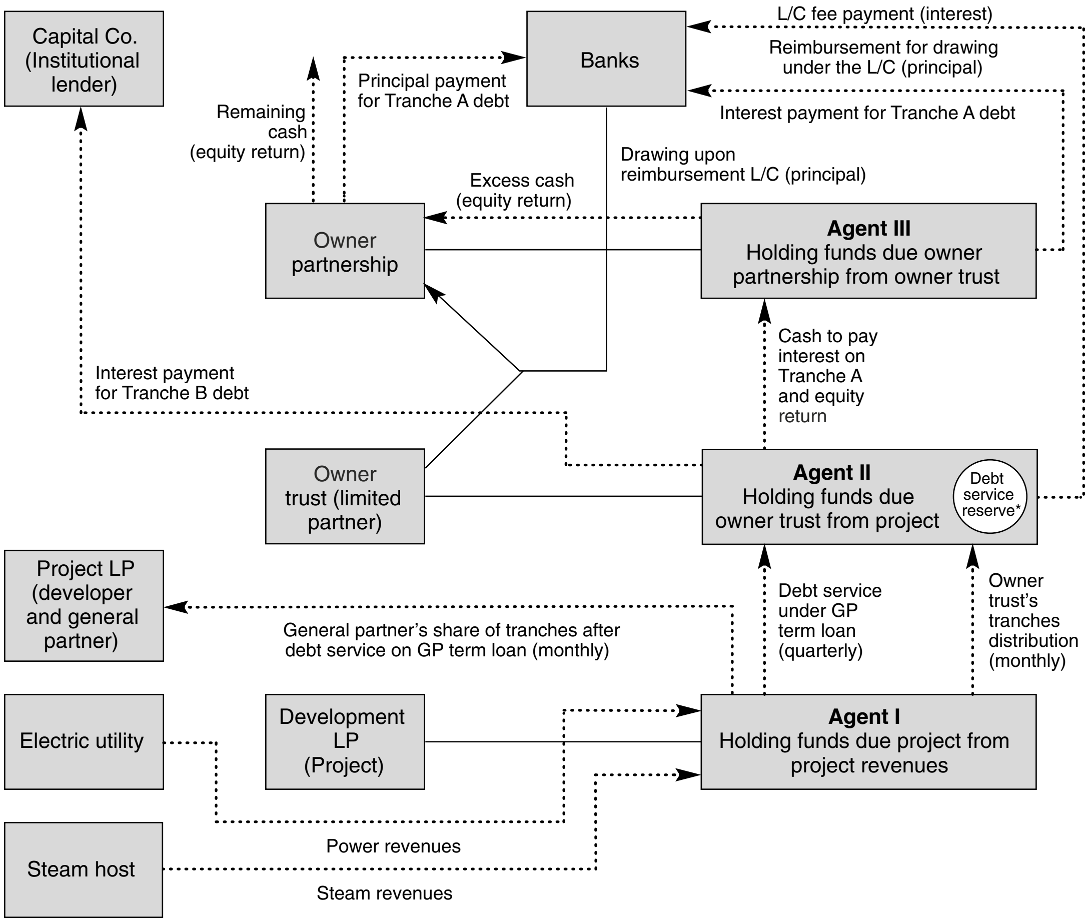
## US international waterfall model




*Source:* Bank One

Exhibit 3.5

**Funds flow through lockbox accounts (US)**

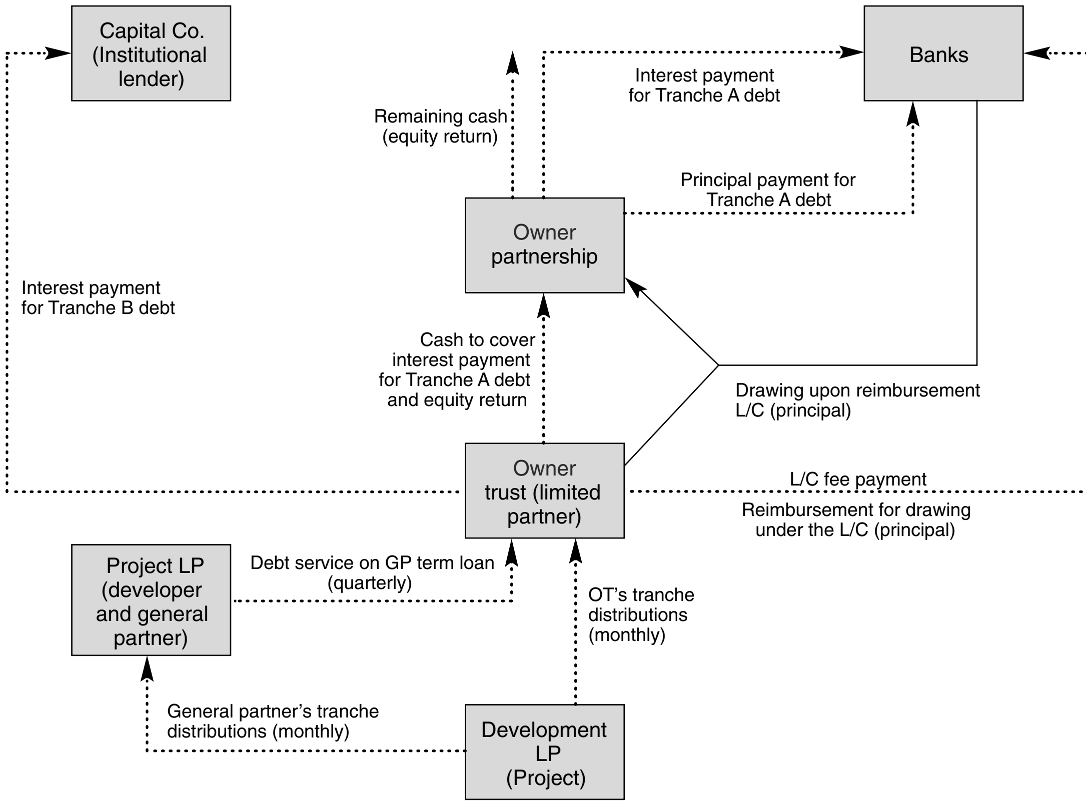



* Debt service reserve account equals three months debt service (interest + principal).

*Source:* Author's own

Exhibit 3.6

**Funds flow without lockbox accounts (US)**




*Source:* Author's own

## *Operations summary*

The operations summary report should give all the physical flows – inputs and output categories – in sufficient, but not overwhelming detail. More than six or seven lines each is enough. The quantity relating to each price or tariff level is a minimum level of detail.

It is normal to have a build-up/ramp up of operations during commissioning, so that first year operations are rarely at 100% of volume/system capacity. Traffic build-up is an obvious point illustrated in Exhibit 5.1 in Chapter 5. (See also Exhibits 9.3 and 9.4.) Periodic maintenance downtime also means that most projects cannot produce at 100% of the nameplate or maximum capacity all of the time.

## *Operating cashflows*

From the operations report, the gross revenue can be readily computed and from which cash operating costs are deducted to show operating cashflows. Non-cash items such as depreciation and depletion should not be shown as these belong in the tax calculation part of the financing reports.

The main operating expenses (opex) components are raw materials, labour, energy, maintenance, freight, insurance, royalties, and so on. Spare and replacement capital/maintenance may need to be detailed with reserves built up and drawn down as needed, as is discussed above.

A report showing the annual unit operating costs is useful when cost curve and competitive measures are available to compare the operating-cost risk of all three components. Unit costs are also useful if these components are part of the operation and maintenance (O&M) contract, contract processing, or tolling agreements.

### Gross revenues

Price may be derived from a forecast of exchange-tradable commodities, the exchange providing trading liquidity. Alternately the market price may be linked to a published marker usually reported in a respected industry publication. (See under ‘Hedging’, in Chapter 11.) Hedging may be undertaken to try to lock prices in for as long a term as possible. The hedge counterparty and the nature of the hedge actually increases the financial exposure on the project (see Chapter 22). However, many hedges, often being limited to two to five years, cannot match the term of a project financing.

The quantity of offtake needs to be clearly specified over the term of the project financing and beyond.

### Opex

Some elements of Opex may be covered by long-term supply contracts. Alternatively, the engineers will have built up a detailed operating cost estimate. However, some raw material inputs may have fluctuating prices. Indeed, some inputs themselves may be exchange-tradable or based on industry marker prices. These again may require hedging if the underlying cost variations do not automatically flow through to the revenue line.

It is good discipline to re-examine which costs are fixed and which are variable. (Labour costs are mostly fixed.) This will then capture the cost response to changes in output. Royalties are usually *ad valorem* (off the gross revenue) although some royalties permit an element of opex deduction. Most royalties are deductible for corporate income tax purposes.

Transportation costs are too often lightly studied (see Chapter 17). These can be critical if transportation costs are operating expenses outside the control of the sponsors and financiers.

Maintenance is sometimes buried in the opex estimates. Care is needed when interpreting spares and replacements, which are more properly the realm of replacement capex.

Insurances, including PRI, is usually based on a percentage of the capex or equity insured. Separate estimates based on actual quotes are required for business interruption insurances. Sometimes, these PRI premiums are paid once, up-front.

Opex contingencies should be examined to see if they are 'to be spent' or are simply surplus/cushion. If they are a cushion, they should be left out of the base case (see Box 3.1).

### *Financing reports*

Starting with a summary of the operations report and the operating cashflow, the financing (debt and equity) should be added in to give a total figure for all cash inflow sources. From this 'total sources' number are deducted all financing/cash uses (besides opex) such as:

- capex/replacement capex;
- working capital increases;
- capitalised interest – interest during construction (IDC);
- interest paid;
- corporate income tax;
- principal repayment; and
- reserve top ups.

The result gives a NNCF after debt service (discussed further in Exhibit 6.1). Again, non-cash items are excluded. Note also that:

- the effect of tax depreciation and depletion on income tax is set out in a separate P&L/ income tax calculation report;
- different asset classes attract different depreciation rates;
- there are two depreciation rates: accounting and tax. It is the cash tax depreciation rate that interests the project finance cashflow modeller;
- depreciation of replacement capital, investment allowances/credits, up-front expenses, including IDC and other tax loss carry forwards, often mean that little corporate income tax is payable in the early years of a project development:
  - up-front tax loss carry forwards have the same effect; and
  - when corporate income tax commences to be paid by the project's special-purpose borrower vehicle, its impact on cashflows can be dramatic.

## Financing costs

Project financing itself brings a series of costs which need to be modelled. These are broadly:[2]

- up-front fees of 0.25% to 3.5% of the loan commitment;
- commitment fee of 0.25% to 1% per annum on the unused part of the loan during the availability period (which usually ends at completion);
- margin above interest rate basis of 1% to 3% per year;
- agent/trustee's fee from US$20,000 to US$100,000 per annum;
- independent reports from US$50,000 to US$500,000;
- independent engineer/completion engineer from US$20,000 to US$400,000;
- legal/documentation of 1% to 2% of the loan; but rarely less than US$500,000;

- account management/funding rollover fees, which are usually minimal; and
- not modelled but in evidence would be a voluntary prepayment fee of 1% to 3% of the amount prepaid and default interest which will see the margin rise by 2% to 5% per annum.

### Capex

Capex estimates are also developed in detail from the engineers' technical feasibility as well as from quotes and tender bids by prospective constructors. Engineering firms can give a bandwidth of accuracy of the estimate based on the status and depth of study/quotes. However, these are only achieved 40% of the time. Therefore, capex overruns should be regarded as the norm.[3]

Recall that IDC is capitalised into the loan. Thus an accurate estimate of the construction and commissioning timetable and the potential for delay has a direct impact on the calculation of IDC and delay overruns (see Chapter 19).

The underlying capital expenditures may also face overruns from changes in equipment and construction costs. The construction industry is very cyclical and, if conditions are tight, construction cost increases of 20% to 50% can be seen. Common causes of cost overruns come from poor estimation of local construction costs and freight/handling charges. Engineering risk from poor studies of the ground/geotechnical and access conditions can also wreak havoc on capital costs. And where the public sector is developing a project, one need to watch for optimism bias, as was proved in 2002.[4]

## Modelling cashflows

Microsoft's Excel has become the standard program for most project finance cashflows. Unfortunately Lotus, which earlier commanded the field, elected to drop the model audit routines (after the takeover by IBM) with the result that this application is now little used for project finance cashflows. However, one of the frustrating problems with Excel is that it is very poor when handling circularity. Efficient project finance models may have hundreds of circularities and Excel locks up quickly if it gets caught in these.

Modelling purists proclaim that a model must not contain circularities (for fear they will not solve entirely). Underlying this is a general fear of signing-off on the model and concerns about failing to uncover the unsolved circular reference. The vast majority of experience is that the natural solving algorithms are perfectly adequate, that unsolved circularity is readily flagged by Excel anyway, and good modellers should have validated the model with simple inputs or real-world/historical data.[5]

### *Approaches*

There are three approaches to cashflow modelling. One is driven by a quick and dirty 'screening' model which is used to develop a likely project finance structure encompassing loan amount, repayment profile, term/life of loan, and credit ratios. (See Chapter 5.) This model is then progressively refined to handle sensitivities, different funding tranches, taxes, and reserves.

A second approach is to adapt a detailed template or standard model to the project in question. Some special project finance models and templates have been developed. These are usually a large spreadsheet with many features and options to be selected.

A third approach is to locate a model of a done deal as close as possible to the one under review and retro-fit/adapt that model to suit.

There are pros and cons to each approach.

- A screening model may start to show the project financing structure and sensitivities in 10 to 15 minutes, but does not have sufficient detail to drive development of the term sheet.
- A standard model, the third approach, never seems to be able to cope with the different facets of each project and the template may be very inflexible, irritatingly so. At the other extreme is the approach that results in building the biggest model imaginable and a display of prowess by the engineers, analysts and unfortunately also the traffic study players – as illustrated in the computer heritage in this field in Chapter 9. This can also result from a model tying inputs together from different aspects of the study process: supplier performance estimates/guarantee model; engineers' feasibility models; tax-adviser's overlay; financial feasibility model; and the O&M model. The size can be daunting, of course, but it is the different modelling techniques employed that can make tracking the logic and auditing the model(s) a nightmare.
- For new models, there is an added problem of syndication risk. No one else may be able to understand and track through and, therefore, audit the model. Model complexity may make it difficult to detect programming and logic errors.
- An old/existing model, the second approach, may not have kept up with tax changes and may not allow alternative financial structures to be inserted easily. It is often worth starting over rather than trying to renovate someone else's model. (The same comment applies to a set of project finance documents.)

## *Typical sensitivities*

By now the project financier should have a feel for the sensitivities manifesting themselves in the model from the suite of underlying risks. From the model design work, key factors have already been entered on the Input Sheet. A simple list of common sensitivity items is given in Box 3.8.[6] It is useful to build in dummy factors and redundancies for the main variables such as output/quantity, price, capex, FX, and opex.

**Box 3.8**
**Model design**

1 Principal repayments as 'clickable options' among:
   - a percentage of available cashflow or net net cashflow minus interest (NNCF–I) in each period;

*Continued*

Box 3.8 *continued*

- on a mortgage-style basis where the debt service (principal plus interest) is the same each period; or
- on a linear or structured/defined amount each period.

2 Changes in:
- output/throughput;
- price;
- opex (fixed and variable);
- debt:equity; and
- capex.

3 Unit changes in:
- interest rate;
- escalation rates for price, opex, capex – foreign and domestic;
- months delay in completion; and
- FX rates – including purchasing power parity.

4 Cover ratios, such as:
- DSCR, per period;
- interest cover;
- principal cover;
- loan life ratio (LLR); and
- project life ratio (PLR).

5 Reserves status such as:
- debt service reserve;
- maintenance reserve; and
- capital reserves.

There is no such thing as typical sensitivities because each project is different. However, a summary of typical sensitivities is given in Box 3.9.

**Box 3.9**
**Typical sensitivities**

1 Price:
- escalated;
- real price increase;
- cycles/backcasting; and
- break even.

2 Volume:
- ± 20%; and
- break even.

3 Opex:

*Continued*

- ±20%;
- specific costs, such as for fuel/energy; and
- break even.

4 Interest:
- ±5%:
- interest rates are linked/ratcheted to cost/price; and
- escalation changes.

5 Capex:
- + 1 year delay; and
- + 25% to 30% (optimism bias).

6 Environmental:
- ± increased tax (costs).

7 FX:
- ± 5/20%; and
- differential inflation (purchasing power parity).

8 Reserves:
- depletion/production rates; and
- tail/residual.

It is a common statement that 'we typically do six to eight sensitivities', when in reality, this is saying 'we narrowed the cases down to six to eight permutations'. A typical modeller will undertake hundreds of sensitivities. A test of a good project finance model is how flexible it is. If it is a monster and takes a long time to solve, then it is seriously cutting into this critical sensitivity testing (stress testing) of the cashflows.

### *Liquidated damages*

Once the model has been built, it is ideal to double check on the agreed level of liquidated damages (LDs) (see Chapter 19). LDs are split into delay and (permanent) underperformance, which any model should be able to reflect. The modelling factors that have to be included are shown in Box 3.10. Since the delay figure may be large – daily or weekly payments – they are often modelled separately.

**Box 3.10**
**Bases for liquidated damages**

1 Delay LDs:
- interest (capitalising);
- running/standing costs;
- permanent loss of revenue;
- deferral (time value) of delay;

*Continued*

Box 3.10 *continued*

- start-up 'penalty';
- supply commitment (costs/penalties); and
- insurable events (not otherwise covered).

2 Underperformance:
- reduction in revenues long term; and
- 'penalties' for lower than contracted.

3 Bases:
- estimate actual costs/damages/mitigate the extent of damages;
- sub-limits for key items/ceiling;
- present value/net present value (PV/NPV) loss (use project finance cashflow model); and
- never to 'make' money.

### *Model periodicity*

There are three periods selected for project finance models.

1. Annual or semi-annual during the repayment period.
2. Quarterly during construction. Monthly during construction is too noisy and any project should not rise or fall on whether something is delivered in October rather than September. An experienced modeller can sometimes be able to have the model on an annual basis pre-completion. Alternatively, the model is built on a monthly or quarterly basis and aggregated into an annual figure to keep the summary simple.
3. Daily or weekly for delay LDs. Monthly does not usually work for delay LDs due to the variance in the number of days in any month. The LDs total from this report is sometimes added back to the main cashflow calculations.

### *Input Sheet*

As already stated, the key cashflow sheet is the Input Sheet which contains the main assumptions, but also the sensitivity factors and 'drivers'. This should be designed like a 'control panel' from which anyone can alter the model. It is also the place where the sensitivity tables are done. An example is shown in Exhibit 3.7 for a loan-sizing model – trying to determine the size of the project finance and the repayment term.

Some of the key provisions built into the Input Sheet include:

- delay of anywhere up to one year (or more?);
- three repayment methods to select from;
- five escalation factors;
- six main sensitivity factors (one click change);
- DSR/DSRA can be set in months;
- production and prices can be varied (ramp-up cell logic during delay); and
- key measures reported such as average DSCR, minimum DSCR (in any one period); leveraged internal rate of return (IRR), LLR.

Exhibit 3.7

## Input sheet

**RATES:**

| | |
|---|---|
| Interest Rate Basis | 4.00% |
| Margin | **1.75%** |
| Debt Funding as % of total | **75%** |
| Cashflow Dedication (Option) | **60%** |
| Linear – Equal Principal (Option) | **10 yrs** |
| Annuity/Mortgage (Option) | **10 yrs** |
| Loan Commitment, US$m | **$130m** |
| Project Delay (% Yr; Range 0–100) | **0** |
| Grace Principal (% Yr; Range 0–100) | **0** |
| Political Risk Insurance | **2.5%** |
| Corporate Income Tax – Ania | **35%** |
| Dividend Payout Rate | **0.0%** |
| Front-End Fee – Financier | **1.50%** |
| Commitment Fee – Unused Finance | **0.50%** |

**LOAN REPAYMENT OPTIONS:** LINEAR

| | | |
|---|---|---|
| % Cashflow Dedication | = | CASH |
| Number of Years | = | LINEAR |
| Annuity / Mortgage | = | ANNUITY |

**Average DSCR = 2.09**

**Loan Drawndown** **$126.6**

| **ESCALATORS** | **% pa** |
|---|---|
| Local Costs (Anian CPI) | **7.5** |
| Material Costs (US CPI) | **4.5** |
| Capex % | **5.0** |
| Product Prices % | **4.0** |
| AB Market Price US$/unit | **$ 1.00** |

**SENSITIVITIES**

| | |
|---|---|
| Capex Factor | **100** |
| Price Factor | **100** |
| Opex Factor | **100** |
| Output Factor | **100** |
| Interest Basis Scrollbar | **400** |

**TAX METHODOLOGY**

Balance Sheet Liability Method

**RESERVES**

| | |
|---|---|
| Debt service | **3 mths** |
| Debt Reserve Interest | 1.75% |
| Cash Trap Interest | 1.75% |
| Cash Trap Trigger where DSCR before DSRA drawdown > 1.0 and | **< 1.30** |

**EQUITY NPV after TAX**

| | |
|---|---|
| @ 10% | US $57m |
| @ 20% | (US $19m) |
| @ 25% | (US $37m) |

| **LEVERAGED yield** | **IRR** | **MIRR** |
|---|---|---|
| Project IRR before Tax | 19.9% | 10.8% |
| Project IRR after Tax | 16.4% | 9.1% |
| Equity IRR before Tax | 39.0% | 18.1% |
| Equity IRR after Tax | 32.7% | 15.5% |

*Source:* International Advisory & Finance 2014; www.iaf.biz

### *Model shortcomings*

No chapter would be complete without a review of common modelling shortcomings. The five main problem areas are listed in Box 3.11.

**Box 3.11**
**Common shortcomings in modelling cashflow projections**

1 *Unescalated models:* SPV income/corporate income tax will always be underestimated. Income tax payments are always senior to project finance debt service.
2 *Working capital* in place prior to commissioning/completion is of insufficient amount. Built from the bottom up – spares, supplies, wages versus top down with a consequent mismatch between receivables and payables.
3 *Replacement capex* or ongoing capex. If this figure is zero, then audit.
4 Over *reliance on accounting definitions*. Cashflow definitions are required.
5 *Unwieldy models* with so many reports that it becomes very frustrating to search for inputs and cross relationships. *How do you audit for errors? Is the model hiding something?*

## Summary

As a reflection of the project's risk, a good model is a fundamental tool in analysing and suggesting the structural aspects with regard to drawdown, repayment, corralling reserves and cash, and even to indicate the interest rate basis for the deal. Cashflow models need to be able to run sensitivities (hundreds of them) before the terms and conditions can be finalised.

[1] Moody's, 'Default and recovery rates for project finance bank loans', 2012–2013.
[2] Graham, RE, 'Testing the model, model design, and structure', in *Financial Modelling*, 1998, Euromoney Books, pp. 19–21.
[3] Gypton, C, 'How have we done', *E/MJ*, January 2002.
[4] Flybverg, B, et al, 'Underestimating cost estimates in public works projects', *APA Journal 68(3)*, 2002, p. 287.
[5] See endnote 2.
[6] Tinsley, CR, 'Project feasibility and credit factors', in *Practical Introduction to Project Finance*, 2000, Euromoney Books.

Chapter 4

# Financial advisers

Faced with a daunting suite of project risks and the many possible structures, the treasury staff have to contend with internal corporate processes plus the pressure of selecting an efficient funding route and, hopefully, enhancing their image with some cutting-edge deal – which means in the mind of a treasurer 'cut-price'. As seen in the discussion on stages in Chapter 1, the treasury staff usually has six to nine months to fine-tune the engineered figures from the feasibility or business plan process.

Almost all companies will develop an in-house estimate of the size of project funding, early on. The treasury analysts next refine the financial projections often targeting balance sheet or taxation considerations. Once approved by the board, they move towards preparing the deal for the project finance market. Does any company or sponsor group need a financial adviser?

Large corporations spawn treasury staff with large egos, well battle-worn and weary in their fighting and cunning politicking in the funding markets to 'shave basis points'. Bankers are derided as cheap money-sellers. The idea of paying anything extra to shed risk is also frowned upon in the executive committee's agenda. Accordingly, some large corporations and some governments delight in packaging the whole transaction even to the point of syndicating the deal themselves – no financial adviser, no leader arranger, no fees.

Multi-project developers can readily come to the view that they know more about their own company's needs and often more about their position in the local environment than any banker/adviser. Thus, an internal financial-advisory team is formed.[1] Perhaps Van Oech's Law is in mind – '*an expert really does not know any more than you do. He/she is merely better organised and has slides.*'

## Advantages and disadvantages

There are dangers in the financial advisory process. In order to be sure a project finance deal will get done, an adviser may say that more recourse/more equity is required to achieve financial close (and collect the 'success' element of the advisory fee).

An advantage is time savings. A good project finance adviser can avoid blind alleys and can also tailor the exact package to suit the sponsor and each financial sector. Aware of the different appetites for information and timing of approvals, the whole approach can be smoother, with the attendant time savings.

- Care is needed where financial advisers try to dominate proceedings through controlling the negotiation process.
- Clear instructions of the sponsors objectives and limitations (the 'deal breakers') need to be established up-front with any adviser.

> **Case study: Hubco, Pakistan**
>
> In developing the Hubco project financing (see Exhibit 1.2), National Power, the main sponsor, had great difficulty co-ordinating meetings of 30 to 40 people, many of them advisers – including four for the Pakistani government.[2]

## Need for an adviser

The reasons to choose a financial adviser are many.

1. The multi-faceted nature of the business requires skills and experience often not all resident within a company. A company knows everything about its own projects, whereas an experienced project financier will have seen dozens, in some instances, hundreds of projects.
2. Someone is needed to develop and refine the project information; to repackage the project. The Information Memorandum job has to be done. (See Chapter 24.)
3. A co-ordination skill is required. The negotiations and documentation can be mind boggling. An adviser may be needed to keep all the other advisers at bay.
4. A strategist is needed to consider project finance options and alternatives based on the feedback from various funding entities or attempts at different structuring routes.
5. Financial market savvy is needed to approach the right market in the right manner at the optimum time and to get the most efficient pricing. In the capital markets, timing and sentiment may have more to do with getting the deal done than all the structuring and modelling put together.
6. Another 'authority' is needed to interpose itself, say, between the company and the government.
7. The advisory job is given as a *quid pro quo* to underwriting and providing the needed funds. It is all a part of the lead arranger's fee.
8. The adviser's name or reputation is rented to impress everyone or add legitimacy.
9. An audit is required of the financial plan. Have all the options been considered and is the chosen route workable, flexible and efficient? The reason to choose big accounting companies to audit the project model is to draw on this experience and the safety net of recourse, if the audit is done incorrectly.
10. A knowledge of whom to approach may be required, not just how to re-package the data.
11. An acknowledged leader – based on their track record in this industry sector, region, financial market, or funding structure – is required to 'sell' the deal to other project financiers.
12. The treasurer/board can shift the blame if the financing package collapses.
13. A second opinion of the treasury staff's work may be needed as an endorsement to the company's board or for the minister's brief.

## Advisory costs

Financial advisory services are charged on any variation of:

- *day-rate*, professional charges only (usually high per-hour pricing);
- *retainer* (per month, possibly with thresholds of hours spent/billed); or
- *success fee* (no or low payment until the deal is signed or sometimes even waiting until financial close).

Each fee structure has its supporters, but the cliché 'pay peanuts and get monkeys' applies to any of these advisory variations and should be resisted where it leads to junior staff crammed onto the deal as much as possible, while the partner's talents and brains are engaged in chasing other billings/deal mandates.

The success fee route has its own problems. Once the notional amount of work has been done to earn that fee, the adviser 'tunes out' when, inevitably in a project finance, further work is required. This trap equally applies where fixed fees or fee caps are negotiated on, say, legal fees. Just at the time when the (senior) adviser is needed, they have turned off because their opportunity cost has become too great or they feel they have invested sufficient effort already.

Financial advisory professionals expect upwards of US$1,000 per diem, and four times that or more for prestige 'names'. Monthly retainers vary the most and can range from US$10,000 to US$150,000 per month depending on the work and sometimes simply the capability to pay. Success fees range from 0.25% (introduction-style) to 2% to 5% of the amount funded, with pure debt usually 1% to 3% and with pure equity from 5% to 10%.

It should be noted that other advisory professionals may be paid in addition to project finance advisers – such as taxation specialists, at an hourly rate – sometimes a flat fee of between US$100,000 and US$500,000 is payable for use of a 'proprietary' tax structure.

**Case study: Collie, Western Australia**

In the 600MW, US$1.5 billion power project at Collie in Western Australia, an Australian commercial bank, Westpac, was appointed lead bank, lead adviser and lead arranger of equity. The project was a greenfield mine-mouth coal-fired power development. That the capex per unit installed was about twice that of any similar project anywhere and the previous 10 attempts to project finance such greenfield coal-fired power projects around the world had failed (all were outside Australia) was not, apparently, realised. Westpac put 23 person-years into the (failed) advisory effort. Eventually, the state government proceeded on its own to fund 300MW on a build to order (BTO) basis, having achieved its political end of lower-priced coal all round (from the bidding frenzy).

**Case study: Independent advice**

For example, Credit Suisse First Boston dominates the project bond business. Their ability to package and underwrite a project bond deal is well-proven.

## Who are the financial advisers?

There are 10 varieties of financial advisers holding up this shingle.

1 *Investment/merchant banks* with experience in project finance rank at the top. The purest view of merchant banking is that it puts no money at risk in the deal. It is purely advisory, with no funds committed attached or promised. This means the adviser will not 'angle' the deal in the hope of getting additional funding fees at a later stage.
2 *Commercial banks* with expertise in project finance are also popular; but inevitably the catch is that the advisory bank itself is then expected to put substantial dollars into underwriting the deal. This represents a style of conflict of interest, as a banker will tend to favour a bank-funded deal and indeed may be unaware of alternately funded structures or possibilities. The investment bankers will be sure to mention this whenever they are competing against bank advisers. Many commercial banks, stung with project finance workouts, decided to move into the much more lucrative advisory business, but failed to recognise that their prior project finance lending and advisory work had been little more than 'rent a balance sheet' or 'get in a big name bank'.
3 *Investment banks* are seen as having special access to a particular market.
4 *Boutique advisers* may be selected for their special knowledge of:
   - a particular industry sector such as resources, power, or telecoms;
   - a region, such as is the case in Latin America or West Africa;
   - a funding technique, such as leveraged leasing;
   - tax-advice specialism required, for example, in cross-border projects; or
   - a state/province or place, for example, Quebec, Buenos Aires.

   Here the industry or on the ground skill is used to better prepare the Information Memorandum.

   In a way, the boutique's specialty makes the dialogue either with the company or the financial markets (or maybe the government) easier. In this latter context, the government's own adviser or a recent spin-off from a major competitor's adviser is the reason to select the boutique because of the connection or inside knowledge/competitive intelligence.
5 *Country specialists* may be called upon because either they carry vast local knowledge within them or they are experts at packaging political risk. The latter would be well experienced in export credit agency/multilateral agency (ECA/MLA) transactions and all the vagaries of political risk insurance (PRI) and political risk structuring. (These issues are further discussed in Chapter 21.)

   For example, to deal with ECAs in some countries like Japan, it would be highly desirable to have a Japanese bank with good connections to JBIC (formerly Japan Exim). Washington, DC, advisers are likely to be experienced in dealing with US Exim, OPIC, IFC, World Bank, IADB, and so on.
6 *Project modelling:* some financial analysts have developed a financial advisory skill stemming from their intricate modelling work. The danger is that the answer is always felt to be in some modelling twist – unfortunately somewhere buried among countless reports and 'modules'. Some financial advisers, incidentally, seem to feel their advisory job is finished when a 'hot' project model has been built.

7 *Accounting and insurance companies* have set up project finance advisory and packaging teams, the former pooling accounting and tax specialists and the latter marrying risk packagers with, for example, financial guarantee insurances or construction insurance programs. Each has drawn in the banking expertise to provide a holistic approach to cross-border tax, corporate, accounting, and finance issues. The reach of these companies is comprehensive and can be expected to be very competitive in implementation, if expensive.

8 *Legal networks*, in a manner similar to the accounting/insurance companies, are establishing themselves as project finance advisers (and trying not to make it look like they are competing with their clients). Specialist tax counsel may develop proprietary structures and documentation which can be 'sold' into the project finance market.

9 *Stockbrokers or equity companies* often have an activity of corporate finance (which is quite a different attribution to the banking use of that term). Wall Street companies, with a foot in each camp, may provide privileged access or underwritings pivotal to a hybrid deal or simply a deal requiring more equity (where the placement fees are higher). In these circumstances, the borrower may not be so pushed to maximise the project financed debt component.

10 *One-country specialists* are usually tied with an equity or debt provider. This may be the link to arranging funding in local currency or to access the convertible debt market and the local stock exchange.

11 *Equipment suppliers or service providers* may have a project finance team, not just for in-house work but to advise clients and package/arrange access to project finance. These are inevitably directly tied to the purchase of those goods or services.

**Case study: Accounting companies**

Within two years of accounting major PricewaterhouseCoopers setting up their worldwide project finance advisory network, it shot to Number 1 of the global project finance advisory league tables.

**Case study: Siemens' financial advice**

Siemens established a financial advisory group, Siemens Financial Services Group. It works closely with an equity arm of Siemens with a suitable acronym of SPV (Siemens Power Ventures). It uses that investment arm in amounts up to US$60 million per project to clinch 'over US$3 billion in additional sales for Siemens' power generation group KWU alone.[3]

## Summary

Many companies hold themselves out to be financial advisers. The independence of companies from the source of funds needs special care. The advisers look expensive, but save time and money if wisely selected and carefully directed. The complexity of the project finance business makes some sort of financial advice inevitable.

---

[1] Warran, A, 'National Power cultivates its own view', *Project Finance International 68*, 1995.

[2] Smith, P, 'Project development; the realisation', in Crisell, *Hub Power: an innovative approach to project financing*, 1996, Euromoney Books.

[3] Hesse, J, 'The financing of private infrastructure projects through a highly competitive in-house bank', *Siemens Power Journal*, pp. 18–22.

Chapter 5

# Credit ratios

The financial/credit analysis proceeds from the cashflows derived from the study and identification of the risk profile of the project as discussed in Chapter 3. By now all the sensitivity testing and stress testing under different benchmark cases (discussed in Box 3.1) have resulted in a workable structure as far as construction/completion, cashflow generation, and loan repayment.

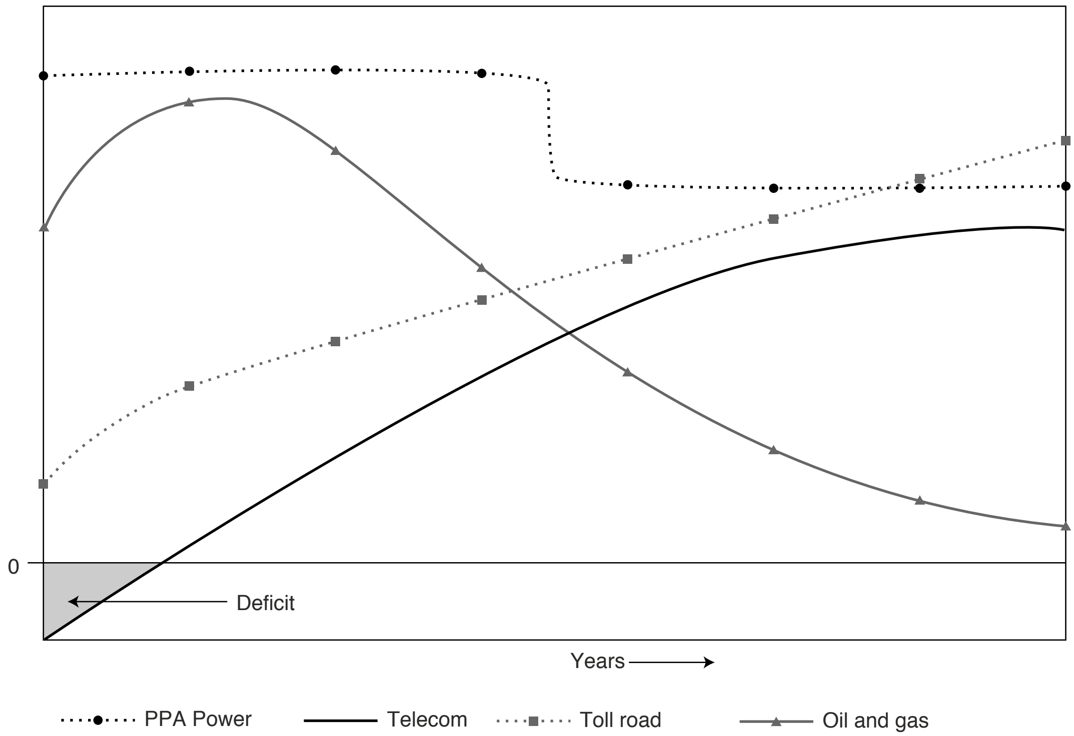
Project finance focuses on three sets of primary ratios.

1 Periodic/annual cover ratios are established for: debt service (DS), interest (I), and principal (P) in each period.
2 Present value (PV) cover ratios are calculated for the loan life ratio (LLR) and project life ratio (PLR).
3 Overall ratios are calculated for: debt to equity (D:E) and the residual/tail.

The main measures are, naturally, cashflow measures, primarily the debt service cover ratio (DSCR) in each period (of debt service/repayment). *If this measure is the sole measure utilised, then one will not go wrong.*

Exhibit 5.1

**Sector cashflow profiles (US$ million per annum)**




*Source:* Author's own

A sponsor is vitally interested in returns on equity and hurdle rate internal rate of return (IRR) and net present value (NPV) thresholds. However, these measures introduce discounting to account for the time value of money. A great deal of business literature is devoted to considerations of investment and earnings/earnings before interest, tax (EBIT). They are not really relevant to the senior lender's analysis in a project financing which uses total funding required (to completion) and after-tax cashflows, respectively. To quote Standard & Poor's:[1]

> Interest or principal cannot be serviced out of earnings which is an accounting concept – payment has to be made in cash. Many transactions and accounting entries can affect earnings, but not cash and vice versa.

Put simply, is there enough cash to repay debt service in each period? – and equity can wait!

PV ratios have crept into project financings, almost by accident and perhaps ignorance. When the North Sea mega-deals were initiated in the UK in the late 1970s, many of these were put together by American project financiers who use the LLR cover ratio and reserve life ratios (RLR) for an upstream oil and gas deal. One look at Exhibit 5.1 will show why.

A typical North Sea production profile follows the shape of the oil and gas line. If PV/ discounting are applied to it, the cashflows are close to start-up and the tail exponentially fades away (known as the 'percentage per annum decline rate' in the petroleum/reservoir engineer's jargon). A PV measure is quite good in that sector.

However, in most infrastructure projects, there is plenty of cashflow in the later years as the system traffic builds or under a long-term power purchase agreement (PPA). Anyone with any understanding of time value of money knows that everything beyond, say, year 15 is about worthless – the result of the year in year out discounting effect. So a PV measure will over-discount significant quantities of cash generation in later years. It becomes a 'game' of escalation/discounting which reduces the cashflow projection model to a reflection of inflation and interest rate differentials. This is often the way real estate models are designed, reflecting a rental yield – surveyed or assumed. This reaches the 'dangerous to your health' stage when the deal has long-term consumer price index (CPI) linked debt. Minor changes in the CPI or interest rate assumptions can swing the ratios substantially. This hazard will be discussed further once the measures themselves have been introduced and defined.

## Debt service cover ratio

This cash on cash ratio drives the project finance business. The simple calculation is:

$$\frac{\text{ACF}}{\text{DS}}$$

*where:*

Available cashflow (ACF) = NNCF + P + I
Debt service (DS) = P + I
NNCF = Total sources – Total uses (from the cashflow proforma modelling).
Net net cashflow (NNCF) is after DS.

In the summary report, Exhibit 5.2, the figure in each year can be easily checked, for example, for year 4 the calculation of the debt service cover ratio (DSCR) is (25.8+14.7+24.4)/(14.7+24.4) = 1.66.

Another ratio of note is the project DSCR or project cash ratio, here 2.85 – the result of (807.5+334+103)/(334+103) from the Total column in Exhibit 5.2. This is the ratio that Indian bankers prefer to any PV ratio.

Unfortunately, the author can identify more than 26 different versions to calculate DSCR! Some of these have simply outrageous assumptions such as tax adjusted principal, while others include subordinated debt. No self-respecting project finance structure should be vulnerable to attack from subordinated debt – see the discussion of subordinated debt in Chapter 8.

Another problem in the US is either ignoring tax in the DSCR calculation[2] or tax adjusting interest (I) or even principal (P).[3] Tax payments are senior to DS and this exclusion is tolerable only if the special purpose vehicle (SPV) structure passes that tax obligation straight through to the project finance lenders. Note the absence of tax in the US revenues side of the waterfall of accounts (see Exhibit 3.4), again reflecting this US attitude to tax. Outside the US, tax is always considered in the DSCR/cashflow calculations.

With more than 26 different versions of DSCRs evident, one must, therefore, check each and every calculation that is presented. This is given in Box 5.1. The exclusions merit comment.

- Subordinated debt/subordinated bonds should be able to be excluded. The project finance debt should have clear priority in repayment.
- Best practice is to leave mandatory prepayments out since their inclusion would depress the period's DSCR calculation on the occasion when the project financier has benefited. (See the discussion under 'Mandatory prepayments' in Chapter 8.) The reduced interest will be automatically reflected in subsequent DSCR figures.
- Mezzanine fees are usually subordinated to the senior project finance lender.
- Moneys in reserves are usually not ACF generated in that period. This is a (most?) common error (even by the biggest banks and underwriters) to wrap this reserve into available cashflows, thereby overstating the cash generation by the number of times DSCR is calculated! If one wants to see the effect on DSCR if the reserve is counted, then a reporting line can be added with the caveat that the number in each year is a once only 'reported' item, and not the DSCR. Maintenance reserves are not available – they are to be used for maintenance (reduce maintenance and starve the project of cashflow generating capability in the future). And so on for the other reserves and cash traps. (See Chapter 3.)
- The items at the end of the model may be beyond the term of the loan. Nevertheless, a knowledge of the residual/tail is crucial to project finance structuring, because that is the safety of the deal and where recoveries of loan defaults comes.

The reader is directed to the Moody's default study of 4,067 project financings from 1983 to 2011 (54% of the project finance deals done in that period) which shows recoveries of 100% on 65% of the projects defaulted. There is little doubt that the structuring which pervades project finance has underpinned these excellent results.

**Box 5.1**
**DSCR calculation**

On a formula basis:

$$DSCR = \frac{NNCF+P+I}{P+I} \text{ or } \frac{ACF}{P+I}$$

*where:*

DSCR is calculated for each period (of debt service)
NNCF = net cashflow after debt service (ACF – P – I) to distinguish it from multiple definitions of 'free cash', net net cash (flow).

Interest may be tax adjusted (but really only in the US/partnership deals) by either the actual/statutory income tax rate or, the effective tax rate – thus when income tax = 0, there is no tax hedge from interest.

*Continued*

The author can identify 26 different methods of calculating ACF using different inputs and exclusions in the calculations. To find the ACF for payment of principal and interest, the calculation is:

| | |
|---|---|
| Operating cashflow (project revenues minus cash costs): | |
| *less* tax | ✓ |
| *less* working capital increase | ✓ |
| *less* capex/replacement capex | ✓ |
| *less* subordinated debt/bond repayment | ✗ |
| *less* mandatory prepayments | ✗ |
| *less* mezzanine fees | ✗ |
| *plus* cumulative cash reserves (one-off/annually) | ✗ |
| *less* moneys to/add moneys from reserves | ✓ |
| *plus* callable capital/option (equity) conversions | ✓ |
| And, at the *end of the model*: | |
| *less* abandonment/clean-up costs (reserves) | ✓ |
| *plus* residual value/salvage value (sale guesstimate) | ✓ |
| *plus* sale/transfer value (cost to reinstate/hand-over) | ✓ |

*equals* available cashflow (ACF) before repayment of senior project finance interest (I) and principal (P) in that period.

There may be (deliberate) inclusions and exclusions such as replacement capex, reserves, bonus accounts, interest on surplus funds, residual value, revalued inventory/site/concession values, abandonment/site rehabilitation costs, accounting provisions and sinking funds, each of which can affect the ACF.

Each industry sector has a target DSCR ratio as shown in the key ratio targets table, Exhibit 5.3. This table changes as sectors come in and out of vogue. But hidden here is the risk adjustment made in a project financing. The seasoned project financier will adjust the deal structure to generate this DSCR (target) result, knowing that this must be stacked up in syndication with others (Chapter 24) given recent deals and market sentiment towards this deal/sponsor group/country, market risk and so on.

Thus the overall project finance pricing will not reflect the risk – much to the chagrin of the derivatives ‘desk’. The project financier will adjust the cashflows – and, by extension, these ratios – to accommodate the risks.

Much of the difference in the targets can be explained by a perception of the market risk and traffic/subscriber risk, especially cyclical pricing. The minimum ratio in any year may dip to 1.15 or so with a cash-trap ratio sometimes set just above 1.0, at say, 1.05. So-called ‘default ratios’ – set just above 1.00 are supposed to be for the benefit of the project finance lender(s); however, they really are just an excuse for pressuring a borrower near to default.

Exhibit 5.2

## Summary cashflow report

**SUMMARY REPORT-USD $million** **Ania Run-of-the-River**

**Completion On-Time/Base Case**

**17-YEAR PROFORMA** **Escalated**

| Financial Year | Info | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | TOTAL / |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Year** | **Source** | -2 | -1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | AVG |
| Output Gwh | Tech. Feas. | | | 520 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 8,360 |
| Price Per Unit | Contract | $0.07 | $0.07 | $0.08 | $0.08 | $0.08 | $0.09 | $0.09 | $0.09 | $0.10 | $0.10 | $0.10 | $0.11 | $0.11 | $0.12 | $0.12 | $0.13 | $0.13 | |
| **Generation Revenues** | Feas Study | **0.0** | **0.0** | **45.9** | **51.4** | **53.5** | **55.6** | **57.9** | **60.2** | **62.6** | **65.1** | **67.7** | **70.4** | **73.2** | **76.1** | **79.2** | **82.4** | **85.7** | 987 |
| **Renewables Credits** | Ania Law | **0.0** | **0.0** | **32.8** | **36.7** | **38.2** | **39.7** | **41.3** | **43.0** | **44.7** | **46.5** | **48.4** | **50.3** | **52.3** | **54.4** | **56.6** | **58.8** | **61.2** | |
| Less: CASH OPERATING COSTS | Fin'l Feas | (2.1) | (6.2) | (21.5) | (19.7) | (17.5) | (15.3) | (12.9) | (10.5) | (8.1) | (5.5) | (4.7) | (4.0) | (3.1) | (2.5) | (2.4) | (2.4) | (2.5) | (141) |
| **OPERATING CASHFLOW** | | **(2.1)** | **(6.2)** | **57.3** | **68.5** | **74.2** | **80.1** | **86.3** | **92.7** | **99.2** | **106.1** | **111.3** | **116.7** | **122.4** | **128.1** | **133.4** | **138.8** | **144.3** | **1,551** |
| PROJECT FINANCE LOAN | 70.0% | 171.0 | 151.5 | 11.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 334 |
| EQUITY | 30.0% | 73.3 | 64.9 | 4.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 143 |
| EXTRA DEBIT | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| INTEREST INCOME | | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 2 |
| **TOTAL SOURCES** | | **242.1** | **210.2** | **73.4** | **68.7** | **74.4** | **80.3** | **86.4** | **92.8** | **99.4** | **106.2** | **111.5** | **116.8** | **122.6** | **128.1** | **133.4** | **138.8** | **144.3** | **2,029** |
| CAPITAL EXPENDITURE | Tenders/Est | (231.5) | (198.0) | 0.0 | (1.2) | (2.4) | (3.8) | (1.3) | (2.8) | (4.4) | (1.6) | (3.3) | (5.1) | (1.8) | (3.8) | (5.9) | (2.1) | (4.4) | (473) |
| CAPITALISED INTEREST | Term Sheet | (4.1) | (11.7) | 0.0 | | | | | | | | | | | | | | | (16) |
| WORKING CAPITAL | Report | 0.0 | 0.0 | (16.1) | (2.7) | (1.2) | (1.3) | (1.3) | (1.4) | (1.4) | (1.5) | (1.2) | (1.3) | (1.4) | (1.4) | (1.3) | (1.4) | 34.9 | 0 |
| CORPORATE TAXATION PAID | Statutory | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | (2.1) | (8.8) | (11.4) | (14.3) | (36.3) | (38.6) | (41.2) | (43.6) | (45.4) | (47.4) | (289) |
| FRONT-END/COMMITMENT FEES | Term Sheet | (6.6) | (0.5) | 0.0 | | | | | | | | | | | | | | | (7) |
| RESERVES (IN)/OUT** | Schedule | 0.0 | 0.0 | (19.5) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 9.7 | 9.7 | 0.0 | 0.0 | 0.0 | 0 |
| PF LOAN INTEREST PAYMENTS | Term Sheet | 0.0 | 0.0 | (15.9) | (14.7) | (13.5) | (12.3) | (11.0) | (9.6) | (8.2) | (6.7) | (5.1) | (3.5) | (1.8) | (0.4) | 0.0 | 0.0 | 0.0 | (103) |
| PF LOAN PRINCIPAL REPAYMENTS | Routine | 0.0 | 0.0 | (11.9) | (24.4) | (25.5) | (26.7) | (28.0) | (29.3) | (30.7) | (32.2) | (33.7) | (35.3) | (37.0) | (18.9) | 0.0 | 0.0 | 0.0 | (334) |
| **TOTAL USES** | | **(242.1)** | **(210.2)** | **(63.4)** | **(42.9)** | **(42.7)** | **(44.1)** | **(41.7)** | **(45.3)** | **(53.6)** | **(53.3)** | **(57.6)** | **(81.5)** | **(70.8)** | **(56.0)** | **(50.9)** | **(48.9)** | **(16.8)** | **(1,222)** |
| *NNCF-PERIOD* | | **0.0** | **0.0** | **10.0** | **25.8** | **31.7** | **36.1** | **44.8** | **47.5** | **45.8** | **52.9** | **53.8** | **35.3** | **51.8** | **72.1** | **82.5** | **89.9** | **127.5** | **808** |
| *CUMULATIVE CASH* | | 0.0 | 0.0 | 10.0 | 35.8 | 67.4 | 103.6 | 148.4 | 195.9 | 241.7 | 294.6 | 348.4 | 383.7 | 435.5 | 507.6 | 590.1 | 680.0 | 807.5 | |
| INTEREST COVER RATIO | | | | 2.38 | 4.41 | 5.23 | 6.12 | 7.63 | 8.99 | 10.34 | 13.70 | 18.05 | 21.22 | 50.93 | 203.50 | -- | -- | -- | 12.11 |
| PRINCIPAL COVER RATIO | | | | 1.84 | 2.06 | 2.24 | 2.35 | 2.60 | 2.62 | 2.49 | 2.64 | 2.60 | 2.00 | 2.40 | 4.81 | -- | -- | -- | 3.42 |
| DEBT SERVICE < Reserves D/down | **2.25** | | | 1.36 | 1.66 | 1.81 | 1.93 | 2.15 | 2.22 | 2.18 | 2.36 | 2.39 | 1.91 | 2.33 | 4.72 | -- | -- | -- | 2.85 |
| DEBT SERVICE > Reserves D/down | **2.25** | | | 1.36 | 1.66 | 1.81 | 1.93 | 2.15 | 2.22 | 2.18 | 2.36 | 2.39 | 1.91 | 2.33 | 4.72 | -- | -- | -- | 2.85 |
| PV (Available Cashflows) | | | | 0.16 | 0.34 | 0.53 | 0.71 | 0.91 | 1.11 | 1.29 | 1.48 | 1.66 | 1.80 | 1.97 | 2.12 | 2.26 | 2.40 | 2.59 | 2.59 |

*Source:* Author's own

Exhibit 5.3

**Key bank DSCR targets**

| *Project* | *Great* | *Target* | *'Risky'* | *Other factors* |
|---|---|---|---|---|
| *Average bank debt service cover ratio* | | | | |
| Infrastructure | 1.15 | 1.5 | 1.8 | Cash trap down to 1.05; small tails – PPP |
| Power | 1.2 | 1.3 | 1.6 | PPA life; merchant ↑ |
| LNG | 1.25 | 1.4–1.7 | 2.0 | Offtaker (or pay); Henry Hub (US gas) |
| Oil and gas | 1.5 | 1.7 | 2.0 | Reserve tail; borrowing base |
| Mining | 1.4 | 1.6 | 2.0 | Residual covers |
| Telecoms | 1.7 | 2.0 | 2.8 | Deficiency; corporate ratios |

*Source:* International Advisory & Finance 2014

## Residual/tail

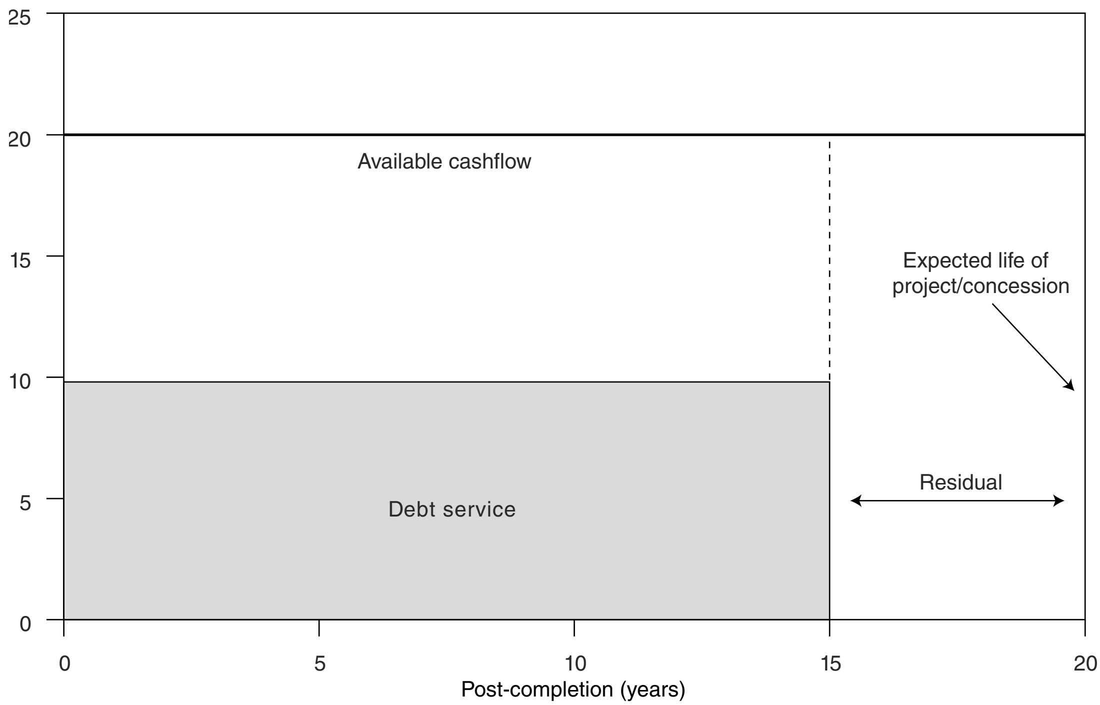
The cashflow remaining to be generated beyond the loan life is very important in developing any alternative strategy in the event of a problem in the project (cashflows).[4] The diagrams in Exhibits 5.4, 5.5, and 5.6 are an extremely simplified expression of a base case and two downside benchmark cases. In Exhibit 5.4, the residual is the last five years' cashflows, or US$100 million, a comfortable margin above that required for debt service (in that case having a DSCR of 2.0 for the 'base case').

However, in the first downside case (Exhibit 5.5) it is all downhill, including a drastic reduction in the residual, now about US$12 million. There is another problem, derived from a DS/cashflow deficit (default) in the last few years of this highly simplified loan. But because the residual is slightly larger than the deficit, then the project may just be able to pay out the project financing by year end 19, including the 'delay' interest on the deficit amounts. The solution is a cash trap – as can be seen in Exhibit 5.5. Modelling and negotiations would set the cash trap, say, whenever the DSCR is less than 1.3 (ACF is below US$13 million). The amount of trapped cash, hopefully, is sufficient to cover the later deficit and this time (with the cash trap structure) the loan may be able to be paid out on its scheduled maturity.

In a different downside case (Exhibit 5.6), although there is still a deficit at the end of the loan repayment period, the scale of the residual is much larger, around US$50 million. The project financier may simply wait to be repaid in year 16. Alternately, the cash trap level can be set lower than was the case in the severe example in Exhibit 5.5. Obviously rescheduling the loan to pay DS later achieves the same thing.

Exhibit 5.4

**Base case cashflow (US$ million per annum)**



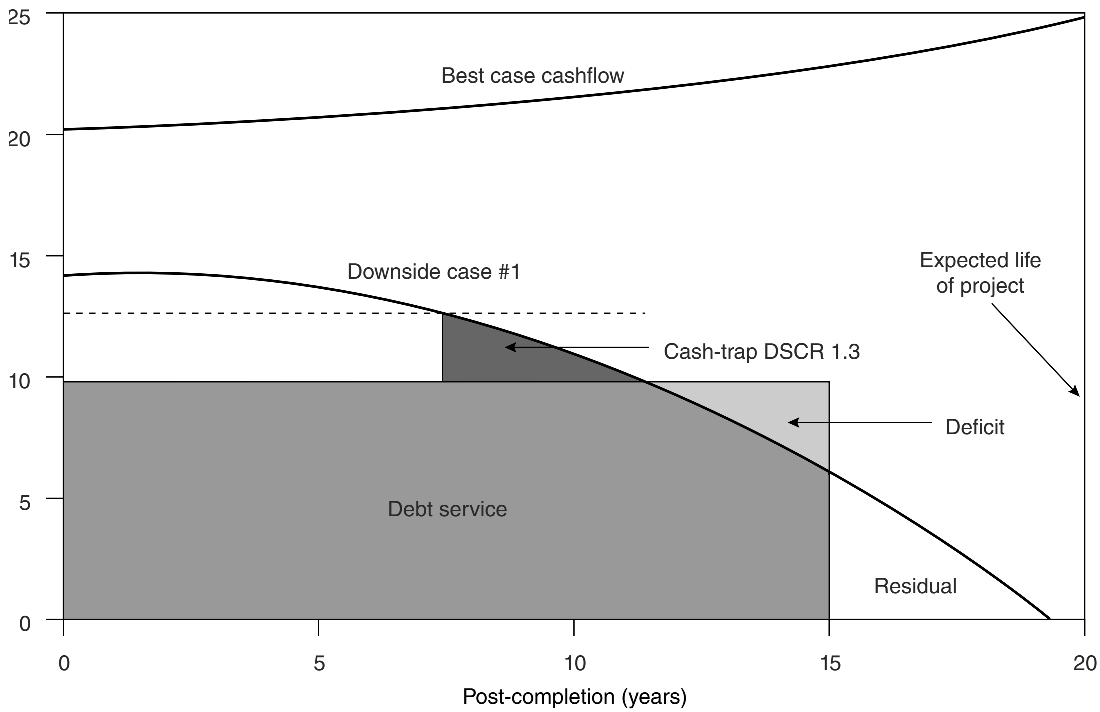

*Source:* Author's own

A knowledge of the residual, therefore, is just as important as a detailed examination of the project's performance during the life of the project finance loan/bond. (Note that to simplify this cash trap illustration, the mechanisms of other cash reserves such as DSR, have been ignored. Cash trap styles are listed in Box 3.3.) In Exhibit 5.2, the residual is US$299.9 million (807.5–507.6), which is quite healthy compared with the total US$437 million for DS during the loan life (334+103=437).

A residual cash ratio is always worth calculating. The measure is the undiscounted sum of post-loan maturity cashflows divided by the total cash required for debt service, also undiscounted. The residual, as before, is calculated by subtracting the cumulative cashflow to the end of the loan from the cumulative cashflow until the end of the project/deal (807.5–507.6 = 299.9). When divided by the amount of money required for debt service (all the Ps and Is – 334+103=437), then the result is a residual cash ratio (undiscounted) of 0.67 (299.9/437 in Exhibit 5.2).

Exhibit 5.5

**Downside case 1 cash trap (US$ million per annum)**

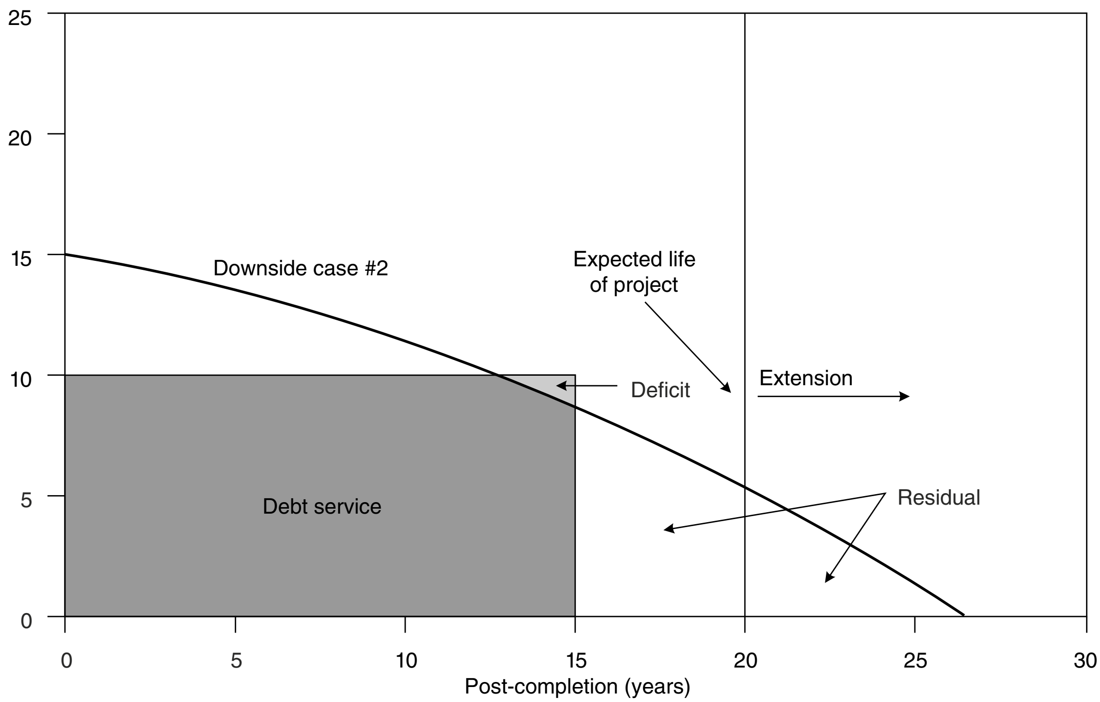



*Source:* Author's own

In many resources transactions – where the cashflow is based on proven, producible/recoverable reserves in the ground – loan maturity must occur with the condition/test that, say, 25% to 30% of this (physical) reserve remains to be produced. Thus – from experience – this sector requires a physical residual, the 'tail'.

Exhibit 5.6

**Downside case 2 cash trap (US$ million per annum)**




*Source:* Author's own

## Interest cover ratio

Periodic interest cover can be defined as:

$$\frac{\text{ACF}}{\text{I}}$$

In Exhibit 5.2, this calculates in Year 4 (25.8+24.4+14.7)/14.7 =4.41(rounded).

Some analysts view interest as a tax hedge. (In the US, tax may be handled at the partnership/corporate level.) Interest is, therefore, sometimes adjusted downward by the effective or statutory income tax percentage (see Box 5.1). This will improve the NNCF and raise the ratio number.

In merger and acquisition (M&A) deals or projects where the cashflow build-up may be slow, as in toll roads or telecoms, the interest cover ratio (ICR) will be closely watched. If it falls below 1.0, then even interest cannot be paid. Equity and bond investors are more familiar with this ratio and a ratio above 1.5 to 2.0 is expected, especially in high leverage situations, including management buyouts (MBOs) and leveraged buyouts (LBOs).

## Principal cover ratio

The periodic cover ratio is calculated as:

$$either\ \frac{ACF}{\mathrm{P}}\ or\ \frac{\mathrm{ACF - I}}{\mathrm{P}}\ or\ \frac{\mathrm{(NNCF + P)}}{\mathrm{P}}$$

For the summary cashflow report in year 4, in Exhibit 5.2, this is (25.8+24.4)/24.4 = 2.06. The second/latter one is the preferred one: 'Pay interest to any banker; then discuss the payment of principal.' It gives a better measure of the surplus that may be available for prepayment (of further principal above that scheduled) or to pay out to equity.

A principal cover ratio (PCR) close to 2.0 is very strong. In the case of a production loan or cashflow dedication repayment, an 85% repayment arithmetically defines the principal cover ratio as 1.18 (100 divided by 85), so this low ratio may not necessarily mean a weak(er) position or structure.

## Present value ratios

The PV ratios discount the annual ACF by the interest rate plus margin/spread and then divides that sum by the total amount of the project financing. The PV ratio to the end of the loan is the LLR and until the end of the project/proforma, the PLR.

There are many other variations on this theme such as using the PV of the remaining cashflows (to maturity) divided by the loan outstanding, a sort of remaining life ratio (RLR). But it is not very instructive, since it is obvious that if the loan is being repaid (the denominator is going down), then the ratio will mathematically head upwards. Just as it is necessary to check the ingredients of the DSCR calculation, it is very worthwhile to check how each bank/underwriter is calculating the PV ratio numbers. (Moody's and Standard & Poor's have not joined in to this PV 'trend' understanding completely that cashflow rules the ratios.)[5] Unfortunately, Fitch has started to use this ratio.

The PV ratios expressed as formulae are given in Box 5.2. If calculated in a cumulative manner, it is sometimes referred to as the PV global cover ratio – the PV of all the annual ACFs to that date divided by the (maximum) loan amount. The common criticisms of PV ratios are listed in Box 5.3.

**Box 5.2**
**PV ratios**

Loan life ratio (LLR)
Project or reserve life ratio (PLR)
Residual life ratio (RLR = PLR – LLR)

$$\frac{\text{Present value of ACF during applicable period}}{\text{(maximum) amount of loan}}$$

$$\sum \mathrm{PV}_{@(i\,+\,m)\%}(\mathrm{ACF})_{0\,\rightarrow\,n\ yrs}$$

*Continued*

Box 5.2 *continued*

Maximum loan outstanding

where:
i = interest rate basis
m = margin
n = number of years

Available cashflow for DS (ACF) = net net cashflow (NNCF) + P + I

When built up progressively per summation formula, it is sometimes called the PV 'global' cover ratio.

$$\text{Alternatively: } \frac{\text{Cumulative undiscounted ACF}}{\text{Total cash amount for principal and interest}}$$

Conventions: Bankers discount at interest rate + margin

**Box 5.3**
**Common criticisms of PV ratios**

- At high discount rates, the cashflow beyond year 15+ is ignored.
- Cashflow after the loan is repaid is still discounted on a project finance interest rate basis.
- It is possible to massage/fiddle the ratio by:
  - changing the start period of PV;
  - changing the interest rate assumption;
  - changing the escalation rates; or
  - altering/extending the loan repayment profile.
- It does not give a measure of the project's robustness in any year.
- There is a dichotomy of different interest rates/margins before/after completion.

## Loan life ratio

The LLR (sometimes referred to as the loan life cover ratio (LLCR)) has become a benchmark to some with the target in a similar band as the annual DSCR. In Exhibit 5.2, the bottom line is the global (cumulative) PV ratio which can easily be read off for the end of the loan as 1.70 (LLR) in year 12 and for the end of the project as 2.11 (PLR) in year 17. The LLR does not give any measure of robustness in any year since a negative annual cashflow can still be counted. Further, this ratio generally improves by lengthening the repayment period, which is sending the reverse signal on the term risk. Like any IRR calculation, the PV calculation can be manipulated, for example by choosing a lower long-term interest rate as the discount rate. (The numerator PV will rise with a lower discount rate.)

In deals with a mix of offtake contracts and spot sales, two or more LLRs might be calculated. The first arises from firm contracts (and should be greater than 1.0) and the second from all sales. Spot sales may be included at a further discount to contract prices.

An LLR is sometimes (incorrectly) used to set the amount of the financing. Loan amounts above the amount calculated by the agreed ratio are either repaid or continue to have the benefit of sponsor support, perhaps later released when the LLR recalculation permits. The danger for long-dated infrastructure deals has already been foreshadowed.

## Project life ratio

The PLR should be considerably better than the LLR, say by 0.5 or more. It is the PV of the ACFs to the end of the project (or reserve in the case of a resources project) divided by the amount of the project financing (maximum). The denominator does not change.

## Residual life ratio

The difference between the PLR and the LLR is a PV measure of the residual life (the residual life ratio or RLR). If the difference between the PLR and LLR is small, then the residual cashflow (beyond the loan term) is providing little residual cover. In Exhibit 5.2, the RLR is 0.41 which is calculated as 2.11 - 1.70 (PLR in year 17 minus LLR in year 12).

## Debt:equity ratio

No more than 75:25 debt:equity (D:E) ratio is commonly set for export credit agency (ECA) and multilateral agency (MLA) financings. Projects with low market risk, such as a PPA, can attract a debt level of 90% even up to 100% while high market risk, such as mobile phones, merchant power, or volatile commodities, may see a D:E ratio closer to 50:50 or 60:40. It is unusual to see a D:E ratio lower than 50:50 in a project financing.

The D:E ratio may be specified or – more usually – it can be calculated. For the overall ratios, most financiers count the future funding only in the D:E ratio. Sunk equity may or may not be counted. However, if past equity is to be refinanced, then it will be counted into the D:E ratio.

A common mistake is to believe that there is a 100% ceiling on the D:E ratio. The amount of project financing is not determined by the D:E ratios, it is derived from the future cashflows. What can the cashflows support? The author has structured and financed three project finance deals in different sectors at above 140% D:E ratio. In one case, the extra was a financed structure for completion risk (see the discussion on overrun-standby facilities in Chapter 19). For the other two, when the option condition was satisfied – a Type 1 project financing where the option is to remove balance sheet support or government support upon Completion (that is, had passed the completion test) – the company was able to use the extra 40% to develop other projects.

## Payback

Equity/sponsors often like to sell the fast payback for the deal. However, in most cases this is simple arithmetic of the date when cumulative earnings equal the required investment.

This is very frequently done on an unleveraged and, worse, unescalated basis. Inexplicably, the number seems to always be somewhere between four years and nine months and six years and three months! These are listed in Box 5.4.

**Box 5.4**
**Payback calculation bases**

| | |
|---|---|
| Equity: | Unleveraged (very common) |
| | Leveraged |
| Project: | Discounted |
| | Undiscounted (also common) |
| Debt: | 'Average' life |

Note: most of these are not suited to project finance. If a choice is required, leveraged, discounted, which can be read off the Global Cover PV ratio series (= 1.00).

## Discount rate

From the sponsors' point of view, the world (and the spreadsheet) lives and dies by the IRR/NPV measures set by the board/investment committee/executive committee. However, these are not instructive for project finance as far as helping to determine the structure.

Obviously given the corporate concentration on these numbers, one would always question why a deal is proposed where this ratio is low. Alternatively, a low ratio may simply mean that the sponsor/constructor/operator is removing a return, through 'mark ups or fees', long before any number arrives in the project accounts or appears in the cashflow proforma projections.

## Leveraged internal rate of return

One useful measure is the leveraged IRR, which takes two forms. The cash inflows for both is the project NNCF. The outflow for the leveraged project IRR is the cash required to fund it to completion, regardless of the form the funding takes. The outflow of cash to calculate the leveraged equity IRR is the amount of cash equity injected to fund the project (to completion). With the high leverage – a major reason to choose project finance in the first place – the leveraged equity IRR should be quite high, well above 20%.

The leveraged project IRR, if low, will reflect the amount being 'removed'. If this number is, say, 3% and the project finance still works, then the sponsors/equity are probably getting an extra return. This is perfectly acceptable, and the project financier now has a measure of that extra return and can toughen up the loan conditions accordingly. In Exhibit 3.7, these ratios are reported out for the same case as in Exhibit 5.2. The project figure is, say, low, at 6% (one would expect a corporate/sponsor hurdle rate of 19% to 20% in this sector/industry) while the return to equity is handsome indeed at, say, 25% after tax.

## Choice of discount rate

The project finance community is fortunate since:

- IRR is not needed;
- the balance sheet is not mandatory – except to judge that the SPV is solvent; and now
- the discount rate does not have to consider all the weighted average cost of capital (WACC) and capital assets pricing model (CAPM) theories.

The discount rate is a simple financial discount rate: the interest rate plus margin, often levelised to a single number by using the mid-point swap rate as the discount rate. The other measures are summarised in Box 5.5. A more conservative approach is to adopt the all-in interest rate (wrapping in up-front fees).

**Box 5.5**
**Other discount rates**

- *WACC:* this is not relevant, since project financing is intended to bias the weighting (it is a 'high leverage tool'). It can be used, but what would it be an instructive measure for? The whole idea of project finance is to cut the nexus of the project's performance from the (underlying) corporate.
- *CAPM:* there are no betas for project financings yet, although some players are preparing their project finance portfolios to this end. Some ratings get close on the basis of a risked default rate.
- *Opportunity cost of capital:* perhaps an appropriate measure since project finance is often a means to get capital in the first place, since the 'opportunity' may not otherwise be available.
- *Hurdle rates:* unfortunately corporations often use undiscounted all-equity cases to present to the board (to clear the hurdle rate) or else used a fixed gearing/leverage level, say 75%. This is in fact mis-informing the board, who may not appreciate the varying degrees of leverage that each project can attract through project financing. (Each project finance has its own leverage level, adjusted to the risks.) As soon as a hurdle rate is set (and the calculation methodology is known), project cashflows may mysteriously seem to be now able to just clear the hurdle (without too much leeway to lead to examination as to why the level was set there).

The underlying interest basis is the average life rate (from a yield curve); the long-term swap rate (floating to fixed) again for the half or whole life; or whatever the bank's economist says it is going to be. There is a subtle syndication risk in the choice of a number, since the interest-rate assumption needs to be 'on market'.

## Multi-tranche ratios

Where a financing has multi-tranches (layers of debt), one needs to establish exactly the priority of payments. If there is *pari passu* debt, then obviously the debt is the pooled figure.

For subordinated debt, one can either add in the senior debt to the total,[6] or remove the DS on senior debt from the ACF which is now all available for the lower classes of debt. Some features of multi-tranche ratios are shown in Box 5.6.

**Box 5.6**
**Multi-tranche ratios**

*Financial ratios*
- Composite arithmetic.
  - Cover ratios.
  - Overlapping PV ratios.
- Priorities.
  - Actual subordination.
  - Cumulative.
  - Limits/pools/banks.
- Mezzanine fees.
  - Equity kicker.

*Reserves algorithms*
- Cash traps/release.
- Clawback.

*Trustee/bank?*

## Accounting ratios

Five sets of accounting ratios[7] are used for financial covenants for the sponsors (participant risk) in a project financing:

1 profitability – net margin, EBIT;
2 leverage – D:E ratio;
3 coverage – days of inventory;
4 liquidity – current ratio (not useful); quick ratio, acid test; cash; and
5 efficiency – return on assets (RoA); return on equity (RoE), internal rate of return (IRR) (on investment – IRR).

Accounting profit and loss, balance sheet, and sources and applications/funds flow statements will generally be reported in project financing spreadsheets since investors and sponsors are attuned to these measures, especially earnings per share. As mentioned, they are used rarely to directly structure the project finance deal.

- Liquidity is handled increasingly through reserves and cash/escrow accounts as outlined above.

- Project financiers prefer to see the cashflow running through an identifiable account, rather than waiting for accounting measures and to avoid the 'wide' interpretations arising from accounting treatments.

### *Telecoms*

It has been referenced on a number of occasions in this book that telecoms' credit ratios are handled more like corporate deals. The behaviour of telecoms is notably different from the other sectors as is evident in Box 5.7. The cashflow deficit at start-up (see Exhibit 5.1) also highlights the difficulties in structuring anything like a familiar completion test. Accordingly, accounting ratios – corporate finance in style – are seen more frequently in this sector.

Unfortunately, earnings before interest tax depreciation and amortisation (EBITDA) is often seen in the cashflows. However, EBITDA does not accommodate maintenance reserves or working capital.[8] For these two reasons alone, EBITDA is of little use in project finance – except for telecoms as shown in Box 5.7.

**Box 5.7**
**Telecoms ratios**

| *Style* | *Ratio* | *Typical covenant level* |
|---|---|---|
| Leverage | Total debt/EBITDA | 4.25–3 |
| 'Payment' cover | EBITDA/(P + I) | 2 |
| Fixed charge | EBITDA/(P + I + T + Dividends) | 1 |

where:
EBITDA = earnings before interest (I), tax (T), depreciation (D), and amortisation (A).
P = principal repayment (per period).

## Summary

Cash ratios are the keys to successful project financings. Present value ratios have all sorts of limitations and are usually not instructive; indeed often counter-instructive. The way the project's structure accommodates the risks will be adjusted, a process honed by experience, so that the ratio outcome from the project's cashflows meets the 'targets' accepted by the market.

---

1 Standard & Poor's, 'Rating methodology for global power utilities', *Infrastructure Finance*, 1999, p. 87.
2 Standard & Poor's, 'IPP debt coverage analysis explained', *Creditweek*, 1995, p. 24.
3 Finnerty, JD, *Project Financing: asset-based financial engineering*, 2013, Wiley, p. 203.
4 Fabozzi, FJ and de Nahlik, CF, *Project Financing*, 8th edition, 2012, Euromoney Books, p. 73.
5 Brearley, RA, Myers, SC and Marcus, AJ, *Fundamentals of Corporate Finance*, 1995, McGraw-Hill, pp. 438–54.
6 See endnote 2.
7 See endnote 5.
8 Stump, PM, et al, 'Putting EBITDA in perspective', June 2000, Moody's Investor Services.

Chapter 6

# Risk systems

As we will see in this chapter, there are seven main risk systems. Risk identification will be readily seen as the first step in a project financing and leads the way to suitable structuring. A systematic approach to risk classification greatly aids identification itself. By refining an approach to risk identification and quantification, one can progress to assessment of risk trade off and risk structuring.

The idea for some that '*risk is best borne by the party best able to bear it*' is a great nonsense as risk is best negotiated as far away from oneself as possible. Extra caution is needed when one hears the phrases 'risk allocation' or 'risk mitigation' as these give the false impression that the risk in question has been settled, as though from that moment forward one does not need to worry further about it.

Unfortunately, there is no common language that we can use to describe and define risk.[1] In the English language, risk is a widely used word having many meanings; indeed its usage may be affected by the speaker's tone of voice. Some of the many and varied meanings are:

- chance of loss, damage, or injury;
- uncertainty;
- uncertainty of loss;
- statistical chance;
- probability of loss;
- chance of bad consequences;
- exposure to mischance;
- exposed to danger;
- exposed to loss;
- the amount of loss;
- hazard (+ outrage);
- regret minus lambda times the upside;
- volatility/beta;
- the amount of insurance;
- the amount staked;
- exposed to chance of injury;
- possibility of not achieving the expected financial return; and/or
- probability of a (cashflow) outcome different from the one forecasted/modelled/expected.

What then is the definition appropriate for project finance? Either of the last two will suffice – the last one best defines a project financing – but a more comprehensive definition would be that: risk is any factor which will change the expected/projected/forecasted project cashflow.

Therefore, risk in the context of project finance may be positive or negative. If there is any doubt about this, the focus is always on the cashflows – the driver of the project finance

Exhibit 6.1

**Cashflow 16 risks matrix**

| | *Supply/ traffic/ reserve* | *Market* | *Foreign exchange* | *Operating: technical* | *Operating: cost* | *Operating: management* | *Environmental* | *Infrastructure* | *Force majeure* | *Completion* | *Engineering* | *Political* | *Participant* | *Funding/ interest* | *Syndication* | *Legal* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output number/ quantity | ● | ● | | | | | ● | ● | ● | | ● | | | | | |
| *times:* Price | | ● | ● | | | | | ● | | | | | ● | | | |
| *equals:* Revenue | | | | | | | | | | | | | | | | |
| *less:* Cash costs | | | ● | ● | ● | ● | ● | ● | | | ● | | | | | |
| *less:* Royalties | | | | | | | | ● | | | | ● | | | | |
| *less:* Overheads | | | | | | ● | | | | | | | ● | | | ● |
| *equals:* Net operating cashflow | | | | | | | | | | | | | | | | |
| *plus:* Project loan | | | | | | | | | | | | | | ● | ● | |
| *plus:* Equity | | | | | | | | | | | | | ● | | | |

*Continued*

Exhibit 6.1 *continued*

| | *Supply/ traffic/ reserve* | *Market* | *Foreign exchange* | *Operating: technical* | *Operating: cost* | *Operating: management* | *Environmental* | *Infrastructure* | *Force majeure* | *Completion* | *Engineering* | *Political* | *Participant* | *Funding/ interest* | *Syndication* | *Legal* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *equals:* Total sources | | | | | | | | | | | | | | | | |
| *less:* Capex | | | | | | | | | | ● | ● | | | ● | | |
| *less:* Working capital↑ | | ● | | | ● | | | | | | | | | | | |
| *less:* ± Δ Reserves | | ● | | | ● | | ● | | | | | ● | ● | ● | | |
| *less:* Interest (I) | | | ● | | | | | | | ● | | | | ● | ● | |
| *less:* Income tax | | | | | | | | | | | | ● | | | | ● |
| *less:* Principle (P) | | | ● | | | | | | ● | | | | | | | |
| *equals:* Total uses | | | | | | | | | | | | | | | | |

*Source:* International Advisory & Finance 2014

business. Project finance lenders spotted this very early on with multiple risk classifications emerging in the 1970s.

The seven risk systems or frameworks are:

1 insurance;
2 statistical;
3 risk modellers;
4 benchmark;
5 checklist;
6 contractual linkage/jigsaw puzzle; and
7 project finance.

## Insurance

Insurance comes to the fore when anyone thinks of risk.[2] Indeed, the industry has tried to corral risks into a formal profession of 'risk management'. However, the function of risk management is still dominated by the physical or financial effects of some physical disaster or action due to say a fire in a Montreal factory which supplies parts to a Quebec project or a breakdown in the electricity transmission grid in Cordoba or Aconcagua. This – as we shall see later – is really 'catastrophic risk'. '*When will the project blow up/catch fire?*'

The conventional insurance route comprises the standard contractors' all risks (CAR) or builder's all risks (BAR) to cover loss or damage to physical property, a liabilities policy to cover physical loss or damage to another person or property, and even consequential losses, again following physical damage. The myriad of non-physical risks remains in a project financing and there is no expectation of an insurance solution to, say, a revenue shortfall.[3,4]

It does not take much delving to find that the insurance industry is dominated by the analysis of pools/portfolios of losses – the actuarial world – and further it is no coincidence that a 'pure' risk in their mind is a loss. Any chance of a gain is labelled a 'speculative' risk.

The insurance dictum is that a risk should be handled within a portfolio which should comprise a relatively large number of independent (pure) risks.[5] But like the risk modellers, the insurers run foul of the overlap of risks. A classic example is the highly specialised arena of delay in start-up (DIS/DSU) or advanced business interruption (ABI) insurances. (This is fully dealt with under 'Completion risk' in Chapter 19 and expanded in Appendix 2.)

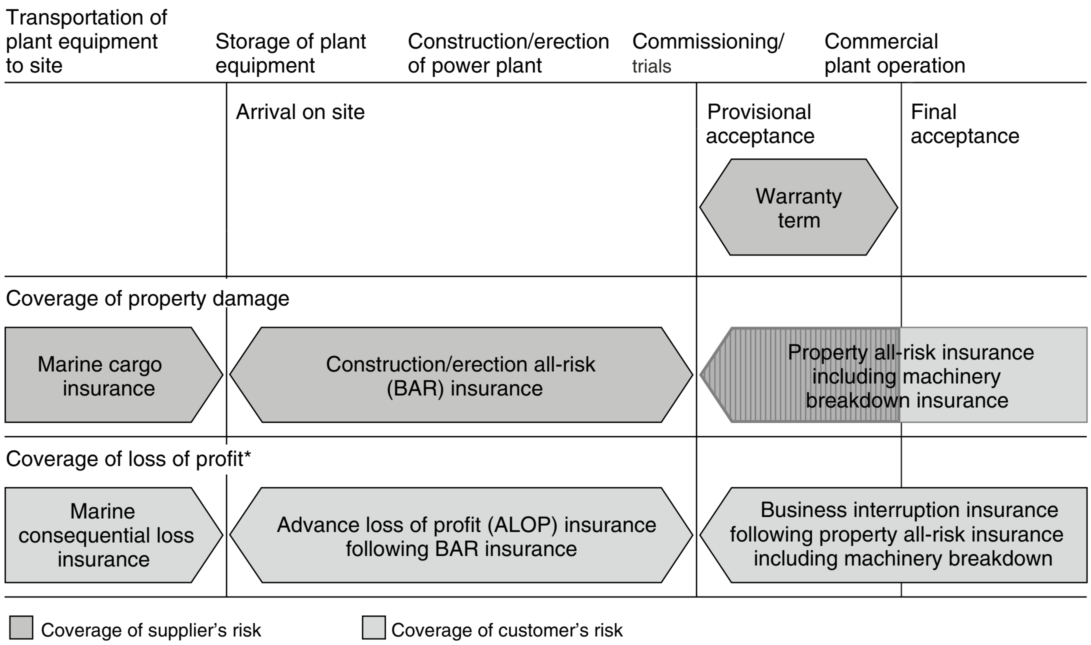
DIS/DSU is very project specific, albeit with some sector similarities. The complexities of the contractor's technical/contractual performance is married with coverage for *force majeure* risks (all non-site strikes) and political risk (change in 'existing' laws). This is all directed at extra surety cover of contractual liquidated damages (LDs) payments in case of delay or project under-performance. Most construction contractors today are required to provide LDs. The insurance industry has re-examined the overlaps and trade-off in risks so familiar in project financing, and is now offering a suite of insurance coverages.

There are three points to remember for any insurance cover for project finance:

1 The insurance premium for a specific project may not get any portfolio benefit. It may be expensive. Every project has a unique bundle of risks.

Exhibit 6.2

**Risk insurances for power plant construction and operation**




* Due to lost revenues, caused by delay or start-up or business interruption.

*Source:* Siemens Power Journal

2 The language and documentation of insurances is highly specialised and full of profession-specific terminology. In general, project finance lawyers do not have an adequate specialty background. The consequence has been a great deal of poor integration of insurance and project finance documentation. (It is almost as if insurance is an after-thought among the conditions for financial close with everyone satisfied by a mere insurance cover note on the date of signing.) The risk that the documents do not link properly is a legal risk (covered in Chapter 25).
3 The claims performance of the insurers is important (amount paid, delay in settlement, or cost to settle/sue). How will the project's cashflow deficit be covered while the claims assessment and claims payment mechanism is under way? Added to this is the participant risk of the insurance company itself. What if the insurer goes broke? After all, it is in the pure risk/loss business.

The move towards assessing project finance risks has drawn the insurers into a much more systematic approach to marketing. Now cashflows and risks across the whole project will be examined, indeed mapped. For example, a list of risks in the risk mapping process of

AON Risk Services (Box 6.1) will illustrate this point. '*The resulting risk map will help in the development of the available risk mitigation and financing strategies*'. AON then goes on to give a risk list![6]

**Box 6.1**
**Risk mapping – insurance industry**

- *Natural risks:* earthquake, fire, contingent business interruption.
- *Financial risks:* exchange rate, interest rate, non-payment.
- *Operational risks:* product tampering, information security, theft.
- *Employment risks:* benefits, workers compensation/insurance, employer's liability.
- *Liability risks:* product liability, errors and omissions, auto liability, directors and officers.

**Box 6.2**
**Key risks facing the company**

- Foreign currency.
- Distribution.
- Liability.
- Interest rates.
- Manufacturing.
- Revenue.
- Human capital.
- Regulatory.
- Credit.
- Intellectual property.
- Commodity.
- Assets.
- Geographical/political.
- Weather.
- Crime.
- Tax.

As with the risk mapping, these listed items have a distinctly insurance product ring to them; nonetheless, they point to a safer and more efficient funding structure. The trend is towards project finance style financial engineering where the insurance underwriters have admitted 'they're acting as investment bankers and venture capitalists, dealing with risks the [insurance] industry consider uninsurable'.[7] One can extend that observation to say that by wrapping in insurance products one can expand the structured finance options for a project financing, especially securitisation and new varieties of capital market or quasi-equity funding. Even still, the project finance lender's rights and interests in the insurances need to be structured (as seen in Box 6.3).[8]

**Box 6.3**
**Lenders' rights in insurances**

1 *Loss payee clauses*, which nominate the project finance lender as the recipient of any claims moneys (perhaps above a certain limit).
2 *Assignment of policies*, where the lenders are assigned the rights of the policy, as opposed to merely the proceeds.
3 *Joint insureds*, where the lenders become joint policy holders.
4 *Warranty waivers*, which allow for payments of claims to the lenders in certain circumstances, despite the fact that the insurers could deny liability to the owners as policy holders because of a breach of condition on warranty in the policy.
5 *Lender's interest policy* to circumvent a legitimate denial of a claim due to the policy holder's breach of policy conditions.

In public-private projects (PPPs) it should also be noted that the insurance schedules are now 20 to 40 pages. Much more coverage is expected via the insurance route. It should be added that insurance may simply re-allocate the categories in a public sector comparator (PSC).[9]

## Statistical

Probability functions can be used to set percentage acceptance thresholds of an individual sample group versus the global population (of samples). In a popular book, *Against the Gods*,[10] the development of probability theory and statistics features prominently. Any mathematics or engineering graduate will recall (not always with favour) the grind to get behind Bayes and normal distributions, t-tests, standard deviations, and so on.

Many of these statistics were derived from gambling analyses, such as coin toss (normal distribution), gambler's ruin, zero-sum game, random walks, vega risk – volatility change, with refinements from the fields of economics or sociology, such as Delphi (oracle) techniques.[11] But once outside the straight and narrow of linearity and independence (from each other sample), statistics starts to break down. Indeed capturing the sample information correctly – random, independent, identically distributed, but no correlation – and then discovering its distribution characteristics is quite a risk itself. The statisticians have thought of everything. There is even statistically non-verifiable risks (limited data sets) which can be compared, but not with statistically verifiable risks![12]

The analysis of errors (statistics) seems as woeful a platform to establish what a risk is as is a portfolio of losses (insurance). These techniques inadequately represent the judgements necessary in an increasingly complicated and interrelated world.[13]

## Risk modellers

To get around the limitations of statistics, the risk modellers have developed a series of tools. Multiple regression was an early runner, then much boosted by the advent of the computer in the early 1970s. Indeed, computer programming was specifically developed to examine risk with the most dramatic being system dynamics (SD) developed in the UK. This clever program is capable of handling feedback loops, seemingly the perfect answer to correlation/ covariance problems in classical statistics. In 1972, a learned group, The Club of Rome, produced an analysis,[14] using a version of SD which the author has used, showed that the world would collapse in 1995 essentially because of an environmental/resources implosion! What they (The Club of Rome) did not factor is that the world's resources continue to get larger by a combination of discoveries (fracking in the US – shale oil and shale gas – comes to mind) and new technologies, even new project financings!

The risk modellers have also extended their reach to econometrics (China's power industry is about 600 equations). Anyone familiar with econometrics knows of the precarious factors of lagged endogenous variables (what happens tomorrow relates to what happened today) as well as covariance (one thing depends on another). The assumptions of data independence '*all other things remaining equal*' is destroyed in a modern, complex, interrelated world. It is notable that econometric forecasting is rarely still relied upon in project finance credit or corporate decision making.

What Bernstein calls 'side bets'[15] – derivatives, futures, or options – is also a computer modeller's paradise, this time relying on the analysis of volatility rather than sample errors. Just as when econometric forecasting failed to find the turning points caused by the first and second oil shocks of the 1970s, so have derivatives suffered when volatility ceases or shifts one way (downwards) due to a derivatives crash or the emergence of highly-rated collateralised debt obligations (CDOs) on US real estate portfolios backed by a series of credit default swaps (CDSs) with the likes of AIG – the downfall of both AIG and Lehman Brothers in 2008. Project finance has seen modelling techniques come and go and thus rarely rely on any one tool for risk structuring. Derivatives are a valuable tool to control interest, foreign exchange and hedge exposures after the project finance structure has been set in place.

The emergence of value at risk (VaR) has meant that computer modelling has now extended to simulation – most usually by Monte Carlo/random number generator techniques – spurred on as a benchmark for controlling derivatives risk.[16] It has not been much applied to project finance since it too is focused on portfolio theory and is similarly troubled by covariance. Perhaps the greatest weakness to all these modelling efforts as far as project financing is concerned is the absence of the volatility measure, beta, so readily derived from equity (share price) data. At best VaR may capture a probability measure of the econometrics embedded in a project finance spreadsheet.

## Benchmark

Capital adequacy requirements for banks (Basel II) is established by the Bank for International Settlements (BIS), headquartered in Basel Switzerland. Project finance equity capital can be estimated under an internal rate based (IRB) system. Otherwise the capital is estimated from 'slot' quotas. The result of 'slotting' is usually higher capital requirements (for the project finance bank). Basel II has resulted in the banks benchmarking their project finance performances.

Benchmarking is rather backward portfolio looking; and if one benchmarks against garbage/rubbish, then all one has established is that this (project) is better garbage/rubbish. It has a very hard time looking forward adequately for the time scales necessary in project finance analyses or to judge the interrelationships (correlation) prevalent in any project finance transaction.

## Checklist

Proponents of the checklist system rely on as detailed a list as possible of observations/factors/benchmarks and a litany of questions to see if the risk packaging can comply.[17] Some of these verge on a 'stream of consciousness' listing.[18]

Checklists are much loved by lawyers where there are some parallels with legal answers to precedent judgements on a mass of questions resolved by lawyers in court.[19] It is also a favourite of engineers in the feasibility study phase of a project. Neither lawyers nor engineers are trained in risk assessment.

Checklists are also championed at banks.

### Case study: Loan application

One leading European bank has a project finance credit committee loan application table of contents of 13 pages, single spaced – a type of checklist. (However, it was the same bank which took a lead role in the Eurotunnel financing.)

### Case study: Checklists

The world's largest developer in a major project finance industry sector has a feasibility study checklist manual of 154 pages, again single line spaced. So long as everything can be marked off against the list, then the risks 'must' be acceptable/acceptably studied. This developer spent US$148 million on the feasibility study for a US$800 million development. The checklist checkers were surely running hot! The project subsequently ran into difficulties on technical grounds – with project financiers facing a 'rescheduling'.

The popularity of checklists springs from the overspecialisation of the study team members.[20] At least the insurance industry recognises: 'It is impossible to [develop] a complete [check] list,' but then goes on to note 'in any case, it is far better for a responsible official to prepare their own questionnaire' – another checklist![21]

Checklists are useful after the project financing has been structured. As with the previous risk systems examined so far, the question/list approach is essentially linear in character and does not catch the inter-relationships well. It tends to rivet attention to past practices and experiences. As an (unintended) consequence, this dulls the long-term forward thinking so fundamental to successful project financing.

## Contractual linkage/jigsaw puzzle

An extension of the checklist is the approach, contractual linkage/jigsaw puzzle, usually centred on legal practitioners, where the project financing is seen as an assembly of documents with little or no discussion of its risk genesis. *Fit all the bits into the documents and the deal is done*. This extends to risk allocation tables for this and that factor at various stages and, QED, the risks have been mitigated successfully[22,23] and distilled into a stack of paper.[24]

One often hears the phrase '*risk is best absorbed by the party best able to bear it*'[25] as if one could allocate risks on a 'one-for-me' and 'one-for-you' basis! The London-based project finance solicitor, Graham Vintner, had no such delusions as he recognised that each party tries to shift as much risk away from itself as possible, yet reverts to 'the underlying contracts for a project will determine the allocation of risks between the various parties'.[26]

The theory seems to go that if each box in the project finance diagram is properly linked to the others with the relevant contract or documentation, then the risk allocation is complete, in jigsaw puzzle style. Indeed, within each document – and there are many in a project financing – is a highly structured risk trade-off. Thus the actual risk matrix is three dimensional down through all the documents. By its very long-term nature, the fourth dimension, time, is also built in as the various option modes inherent in the original project finance commitment are played out in American (continuous) or European (at maturity only, for example, completion) styles. (This is further explored in Chapter 25.)

Another problem is the advent of word processing. Documentary pieces can now be assembled jigsaw style without drafting a (new) word. This is very evident in Asia where arcane government step-in rights are advocated as (historically) normal – particularly prevalent in some states – but they are anathema to good project finance structuring.[27]

## Project finance

Although there are differing components to the risk classifications, the project finance bankers concentrated on how risk could affect the cashflow profile of any project. These risk categories have been refined under some 12 to 20 headings. However, the focus on cashflow rules the day.[28] Risk descriptions which are too general, such as economic, cross-border, commercial, financial, business and project, should be rejected since they are too difficult to define or discern where the cashflow impact is. They give no guide to structuring.

The risk systems for project finance have 16 risk categories or 14 if three overlapping operating risks are counted as one (see Box 6.4).

The importance of ratings for project finance has surged with the advent in the 1990s of 144A and other capital markets structures picking up project finance exposure. The ratings agencies have been publicising their approach to all sorts of risks from new toll roads[29] to merchant power plants.[30,31] But the focus, thankfully, is on robust debt service coverage ratios, year in and year out, and tight contract and support structuring. This risk 'model' adopted is the very one being described in this book.

**Box 6.4**
**Project finance's 16 risks system**

- Supply/reserve/inputs.
- Market/traffic.
- Foreign exchange.
- Operating risk:
  - cost;
  - technical; and
  - management.
- Environmental.
- Infrastructure.
- *Force majeure*.
- Completion.
- Engineering.
- Political.
- Participant.
- Interest.
- Syndication.
- Legal.

## Summary

The cashflow mantra applies again as ever in any project financing. The project financiers have developed an excellent approach which revolves around this thought:

> In order to find a suitable structure (to structure/mitigate a risk) one must first be able to understand the risk (to be structured/mitigated).

[1] Dewey, ER, 'Isness vs Whyness', in *Cycles*, Foundation for the Study of Cycles, 1996, pp. 204–5.
[2] Tinsley, CR, 'Risk trade off', at Second Mineral Economics Symposium, CIM, 1982.
[3] Berry, C, 'Conventional and non-conventional risks insurance for the mining industry', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration.
[4] Battifarano, LJ, 'Revenue insurance', *Infrastructure Finance*, 1985.
[5] Le Roux, M, 'Speciality risk: insurance for the future', *Institutional Investor* (special advertising section).
[6] AON Risk Services, 'Making the transition to enterprise risk management', *Insights 3*, 1999.
[7] See endnote 5.
[8] See endnote 3.
[9] Partnerships Victoria, Public Sector Comparator, Technical Note, 2001, p. 60.
[10] Bernstein, PL, *Against the Gods: the remarkable story of risk*, 1996, Wiley.
[11] Popular in PPPs for the establishment of PSC.
[12] Hammonds, JS, et al, 'Background risk information to assist in risk management decision making', Martin Marietta Energy Systems, 1992.
[13] Tinsley, CR, *Practical Introduction to Project Finance*, 2000, Euromoney Books.

[14] Meadows, DH, et al, *The Limits to Growth*, 1972, Potomac Associates.
[15] See endnote 10.
[16] Jorion, P, *Value at Risk*, 1997, McGraw Hill.
[17] Freshfields, 'Appendix 2, legal checklist', *Project Finance*, 4th edition, 1996, pp. 98–103.
[18] Pyle, TH, et al, *The Life and Death of an Infrastructure Project [in China]*, 1995, Euromoney/Asia Law and Practice.
[19] Skadden, Arps, Slate, Meagher & Flom, *Project Finance, Selected Issues in Choice of Law*, 1996, Euromoney Books.
[20] See endnote 13.
[21] Carter, RL and Crockford, GN (eds), *Handbook of Risk Management*, Kluwer-Harrap Handbooks, updated looseleaf.
[22] Sullivan, RF, *International Project Financing*, 3rd edition, 1999, Juris Publishing.
[23] Baker and McKenzie, *Project Finance: the guide to financing telecommunications projects*, 1997, Euromoney Books, pp. 62–68.
[24] Hoffman, SL, *The Law and Business of International Project Finance*, 3rd edition, 2008, Cambridge University Press, pp. 30–32.
[25] [26] IFC, 'Environmental, Health, and Safety (EHS) Guidelines', 2012.
[27] Sonnenberg, M, 'A cautionary tale', *Infrastructure*, 1995.
[28] Tinsley, CR, 'Analysis of risk sharing', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration, pp. 419–26.
[29] Standard & Poor's, 'Assessing start-up toll road construction risk', *Infrastructure Finance*, 1998.
[30] Standard & Poor's 'Merchant power plants: project finance debt criteria revised', *Infrastructure Finance*, 1998.
[31] Moody's, 'Credit risks of US merchant power plants', Project Finance Sourcebook, 1999.

Chapter 7

# Sector profiles

The suitability of project financing to an industry sector is a direct function of the predictability of the future cashflows, either from the economics of the industry or the commercial relationships customary to that sector. Most good project developers have access to high-quality project analysis, construction management, and operation skills. Control of capital expenditures (capex) and operating costs (opex) is their speciality. Therefore, the certainty of revenue and costs (= cashflows) are the most important features of sectors best fitted for project finance. That the project finance industry has sector appetites sometimes perplexes people from outside the field who seem to take the view that funding any and every project is what project financing is all about. *It is not*.

Project Finance International uses the definition of project finance as a business established on its own feet and not the beneficiary of parent/sponsor or government guarantees for debt service post-completion. It has been surveying the amount of project finance raised globally and the amount is around US$200 billion for the banks and some US$20 billion from the capital markets, primarily via project bonds. The various sources of funding are further discussed in Chapter 2. The sector league tables for banks and bonds are given in Exhibits 7.1 and 7.2. (The 'leisure' sector is casinos, theme parks, and sports/stadiums; 'industrial' includes steel, pulp and paper, and cement.)

Exhibit 7.1

**Bank project financing by sector, 1997–2013**

| Sector (US$ billion) | *2013* | *2012* | *2011* | *2010* | *2009* | *2008* | *2007* | *2006* | *2005* | *2004* | *2003* | *2002* | *2001* | *2000* | *1999* | *1998* | *1997* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Power* | 69.4 | 66.3 | 80.6 | 73.3 | 56.3 | 89.9 | 76.5 | 57.1 | 44.4 | 35.3 | 24.1 | 20.2 | 47.3 | 44.6 | 30.0 | 17.2 | 16.8 |
| *Telecoms* | 4.3 | 1.5 | 5.3 | 13.4 | 8.1 | 6.3 | 5.6 | 3.1 | 10.2 | 7.3 | 5.0 | 7.3 | 24.0 | 34.7 | 19.7 | 14.1 | 18.6 |
| *Oil and gas/ petrochemicals* | 50.3 | 64.7 | 43.4 | 37.3 | 28.4 | 51.8 | 42.7 | 46.6 | 31.0 | 31.3 | 14.9 | 12.1 | 12.8 | 12.6 | 9.6 | 12.5 | 19.0 |
| *Infrastructure* | 55.7 | 54.9 | 45.8 | 55.2 | 38.8 | 58.3 | 51.6 | 48.9 | 33.2 | 26.7 | 16.5 | 15.7 | 11.8 | 13.4 | 9.0 | 7.7 | 5.0 |
| *Industrial* | 16.8 | 6.80 | 12.2 | 6.3 | 3.5 | 12.0 | 17.5 | 4.2 | 4.1 | 5.2 | 3.2 | 1.1 | 3.6 | 3.4 | 1.4 | 2.6 | 2.1 |
| *Mining* | 5.7 | 4.60 | 10.8 | 8.9 | 4.1 | 11.5 | 4.6 | 3.3 | 2.5 | 3.6 | 1.1 | 1.0 | 2.3 | 0.6 | 1.4 | 2.2 | 5.4 |
| *Leisure* | ? | – | 15.4 | 13.8 | – | 20.8 | 21.5 | 17.3 | 14.9 | 7.0 | 4.4 | 4.8 | 6.5 | 1.6 | 1.3 | 0.4 | 0.5 |
| *Total world* | 204.0 | 198.8 | 213.5 | 208.2 | 139.2 | 250.6 | 220.0 | 180.6 | 140.3 | 116.4 | 69.2 | 62.2 | 108.5 | 110.9 | 72.4 | 56.7 | 67.4 |

*Source:* Project Finance International

Exhibit 7.2

**Bonds project financing by sector, 1997–2013**

| Sector (US$ billion) | *2013* | *2012* | *2011* | *2010* | *2009* | *2008* | *2007* | *2006* | *2005* | *2004* | *2003* | *2002* | *2001* | *2000* | *1999* | *1998* | *1997* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Power* | 9.1 | 7.1 | 5.4 | 4.9 | 1.4 | 0.4 | 7 | 2.5 | 7.3 | 11.4 | 12.3 | 4.3 | 17.3 | 11.9 | 7.3 | 4.5 | 1.9 |
| *Telecoms* | 0.1 | – | – | – | – | – | – | – | – | – | 0.9 | – | 1.5 | 2.0 | 5.2 | 2.2 | 1.2 |
| *Oil and gas/ petrochemicals* | 18.6 | 6.1 | 5.2 | 2.5 | 5.5 | 4.5 | 2.1 | 9.7 | 10.1 | 5.9 | 7.0 | 2.6 | 3.8 | 3.3 | 3.5 | 1.3 | 1.0 |
| *Infrastructure* | 21.5 | 10.8 | 11.3 | 9.8 | 1.4 | 6.9 | 16.1 | 15.4 | 8.6 | 11.1 | 11.9 | 6.5 | 2.4 | 3.4 | 3.7 | 1.3 | 2.4 |
| *Industrial* | – | – | – | – | – | – | – | – | – | 0.1 | – | 0.3 | – | 0.2 | – | – | – |
| *Mining* | – | 0.2 | 0.3 | 2.0 | – | – | – | 2.8 | 0.7 | 0.2 | – | – | – | – | – | 0.5 | 0.9 |
| *Leisure* | – | – | – | 0.6 | – | – | 1.3 | 0.5 | – | – | – | 0.1 | – | – | 0.3 | – | – |
| *Total world* | 49.3 | 24.2 | 22.3 | 19.8 | 8.3 | 11.9 | 26.5 | 30.9 | 26.7 | 28.6 | 32.2 | 13.8 | 25.0 | 20.8 | 20.0 | 9.8 | 7.4 |

*Source:* Project Finance International

## Sector features

Project financiers seek insulation from market or supply risks – discussed further in Chapters 10 and 11. These 'protections' may take the form of:

- long-term solid offtake contracts (common to power and water projects);
- monopoly/concessionaire status (found in some telecom, transportation, infrastructure/ public-private partnership (PPP), and pipeline projects);
- opex competitiveness (as seen in gas-fired power projects and some mining, oil and gas extraction projects); and
- tolling margin (common in some power generating, refineries, and ports projects).

Some sectors such as resources (bank project financed) and power (US ratings) are well-understood and have been the subject of project financing or ratings for decades. The inclusion of telecoms in this list is problematic as many telecoms deals are disguised corporate/supplier bridging transactions; the much higher equity in telecoms is a leading indicator of this attribute. The cashflow profile of the different sectors is shown in Exhibit 5.1. From Exhibit 5.1, the problem with telecoms at completion is strikingly evident. Box 7.1 summarises the preferred sectors for project finance.

**Box 7.1**
**Good project finance sectors**

*Power Generation*

- Opex from any fuel efficiencies, that is, co-generation/combined cycle power plants, especially from gas-fuelled generation plants, also have low completion risk:
  - renewable energy where the fuel costs are usually free (hydro, wind, solar).
- Repowering existing plants by adding gas turbines are also favoured project finance targets.

*Transportation infrastructure*

- Particularly inter-city rail; dedicated bus routes, and airports.

*Telecommunications*

- Satellite/broadcast, where pre-leased transponder commitments ensure cashflow.
- Fixed line telephones, although foreign exchange (FX) risk may apply.
- Fibre optic cable services with pre-committed revenues/club usage and with high capacity (for example, trans-ocean).
- Cellular (with the proviso that not more than three concessions will exist in the market).

*Continued*

Box 7.1 *continued*

*Oil and gas*

- Upstream (production from the ground) where income is US dollar denominated:
  - no project finance has been done (yet) for fracking shale gas/oil.
- Pipelines (especially a pipeline's monopoly status).

*Mining*

- Export-based (where income is US dollar denominated).
- Gold.

*Water/treatment*

- Supply (with monopoly status).
- Contract supply of sewage treatment.

The characteristics of sectors difficult for project financing can be summarised as those based around or dependent upon:

- quality specific product (as is the case with some industrial minerals and pulp/paper);
- low barrier to entry (as is the case in some pharmaceutical, manufacturing, and, for example, cement);
- technology dependent or projects using pioneering technology (such as tertiary petroleum production/fracking and computers);
- short effective product 'life' (such as software, electronics, or internet businesses);
- too wide or too local a market (such as housing, retail, domestic products);
- environmental risk (second-hand plants);
- sales uncertainty (ports, 'merchant' plants, tourism, land);
- asset-driven projects (such as aircraft, shipping, property/real estate); and
- where structural/access limitations will apply (as with remote oil ventures).

Project financings in each of these sectors require other sorts of support such as preferential contracts, market guarantees/buy backs, or high equity to compensate for the increased risk profile. In recent times, for example, one of the largest project finance banks simply stopped doing any toll road deals. Another bank cut back its focus to agribusiness, which it dominates and shed the participations in other people's power, oil and gas, and telecoms deals. So each player refines its marketing for sectors as well as considering a regional overlay and country by country limits. Banks and bond underwriters also have budget/resource allocation decisions and market sector/yield targets.

One discipline, then, is to determine what not to do. The most expensive part of the project finance/advisory business is chasing phantom deals: deals and sectors that are not viable or just too difficult to pull off; or deals which should not be done or are not suitable for project financing. This list is rather long – given in Box 7.2. It illustrates deals that, while not impossible, extra structures are required to get a project financing done.

**Box 7.2**
**Difficult project finance targets**

*Manufacturing*
- Where products are for the domestic market only.
- Multiple competitors and ease of entry into the market exists.

*Real estate/property*
- Tourism resorts projects.
- Hotels in central business district (CBD).
- Theme parks.
- Residential housing.
- Land/services (the provision of sewerage, drainage, paving, and so on, prior to a real estate/housing development).

*Mining*
- Industrial minerals (where market price = quality).
- Fertiliser minerals (where market cycles are long).
- Where environmental issues exist (such as hazardous co-products).

*Oil and gas*
- Tertiary recovery/fracking (changes reservoir).
- Heavy oil (where energy and technology issues will arise).

*Petrochemicals*
- Where the product name ends in 'lene'.
- Bulk chemicals which have long, low periods during price cycles.
- Refineries; since tolling margins are squeezed by oil majors from time to time, who want to control supply.

*Pharmaceuticals*
- Low barrier to entry and difficult to retain market share without heavy marketing expenses.

*Rehabilitation/refurbishment*
- Environmental site contamination (superfund – US legislation to clean up contaminated sites).
- Second hand plant relocation.

*Consumer products*
- For the retail market and particularly computer/software/internet related.
- Merchant developments.

*Continued*

Box 7.2 *continued*

- Such as some ports and airports.
- Power plants without power purchase agreements (PPAs) (which will require supply, cost and market risks repackaging).

*Traffic/subscribers*
- Urban mass transportation and toll roads (dependent upon traffic studies, the willingness to pay and diversion).
- Telecoms projects which are vulnerable to dynamic completion, technology and competitiveness issues.

*General*
- Businesses that are reliant on quality of product/service (not fungible).
- Retail; no certainty of cashflow.
- Concession/build own operate (BOO)/build own transfer (BOT) too easily available to anyone; no barrier to entry.

## Analysis by sector

### *Power*

Fuel efficiency is much loved by project financiers. Financial subsidies and incentives for renewable energy – where most of the fuel is 'free' – is actually a political risk (see Chapter 21).

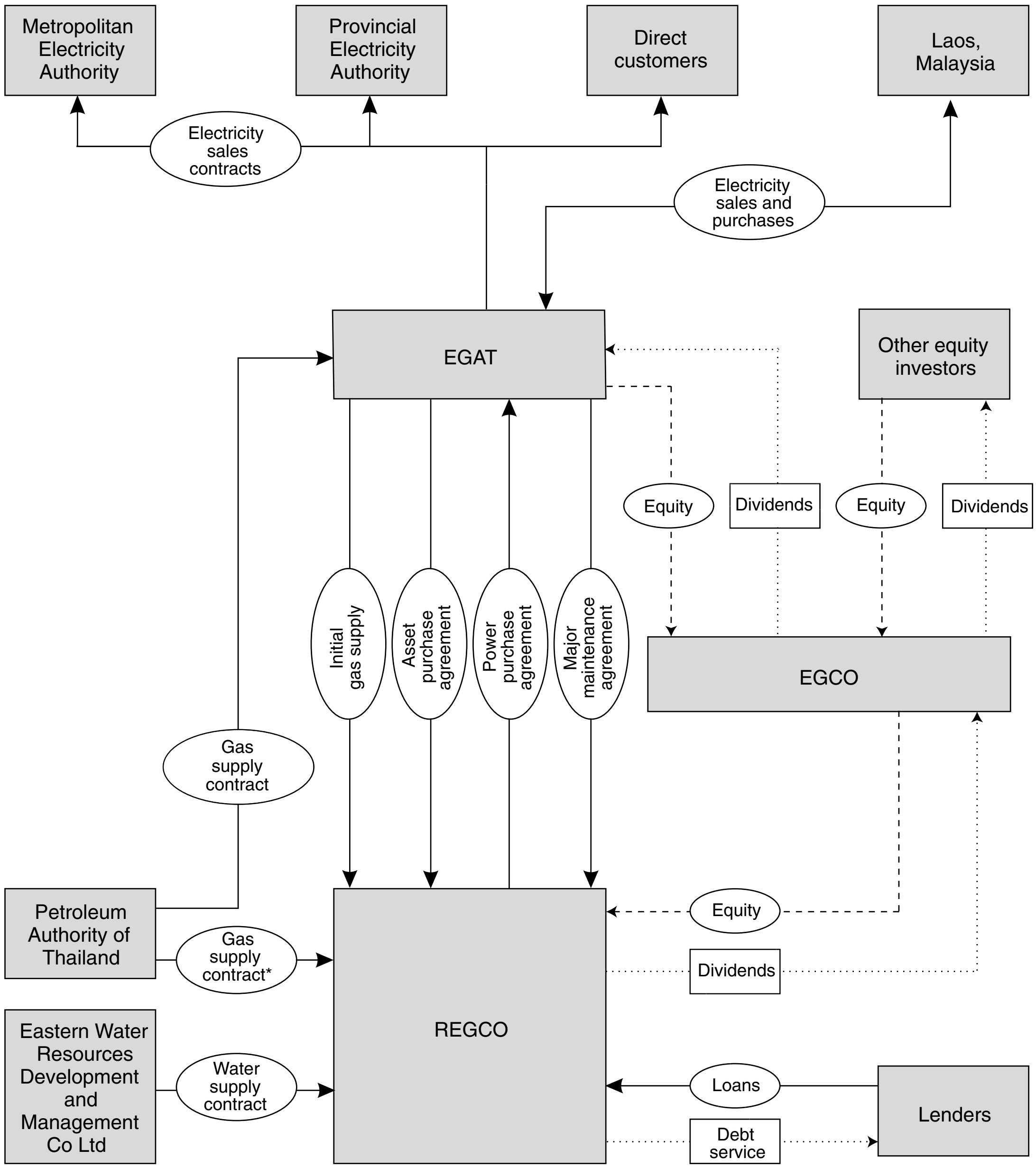
A power generation plant is, at heart, a tolling plant. Fuel is converted into electricity by various configurations of boilers and engines driving a generator. The key components of the tolling are the fuel cost and the conversion efficiency into electricity. An excellent heat rate of 6,000 kJ/kwh could be achieved by a combined-cycle power plant, whereas an open-cycle gas turbine might have a heat rate of 11,000 kJ/kwh – almost twice as much fuel is required per kwh – because a lot of heat is lost through the exhausted hot air.

The capital cost of a power plant is high, around US$1 million per MW for a complete plant and up to US$2 million per MW installed for coal-fired plants (with flue gas desulfurisation (FGD)). Accordingly, project finance for a power plant requires long, flat repayment profiles of the order of 12 to 18 years. The market risk coverage through a PPA needs to see a term longer than the repayment period. The tariff (which may be susceptible to political risk) will be structured to have a capacity charge to cover capital, debt, return on equity, and taxes, and an energy/operating and maintenance (O&M) charge to pass through these operating cost risk components; all three components (see Chapter 11). The driver of many merchant power plants is a quick construction, low capex natural gas fuelled turbine. The capex can be as low as US$300,000 per MW installed. Quick returns from peaking and other services is the target – some machines may be able to be repaid after only a few days of 'super peak' pricing in the deregulated power grids/power pools.

Operating risks need careful attention and the high-quality maintenance and performance warranties are often built into the O&M contract, even to the extent of liquidated damages (LDs).

Exhibit 7.3

**Rayong**




* Future gas supply agreement.

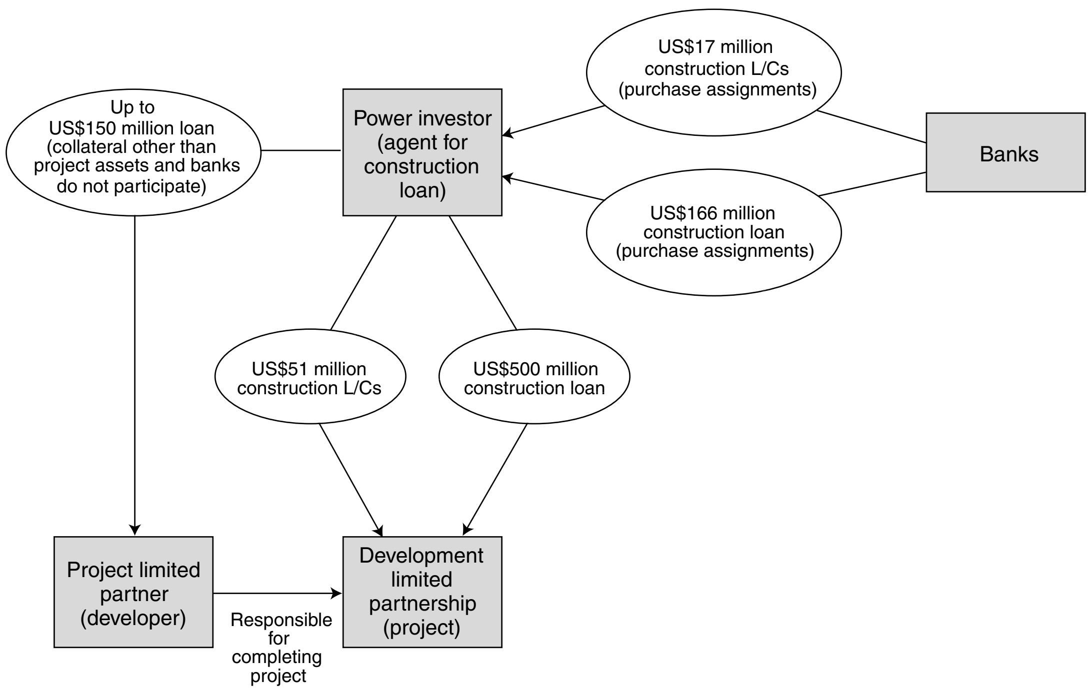
*Source:* Author's own

An independent engineering review is a precursor to most power project financings and the engineer is often engaged to monitor completion risk through to the commissioning stage (see Chapter 20).

Completion risk (discussed in Chapter 19) is strongly mitigated in the power sector. Equipment accounts for 60% to 70% of the total funding amount. Turnkey contracts have 15% to 25% LDs (delay and sustained underperformance – see Box 19.3) and delay in start-up (DIS/DSU) insurances can be 10% to 20% of the project financing. Conventional project finance packages can achieve 80% debt quite readily. A few power deals have been structured at 95% to 100% debt.

Exhibit 7.4

**Construction financing structure**




*Source:* Author's own

## Power cashflows

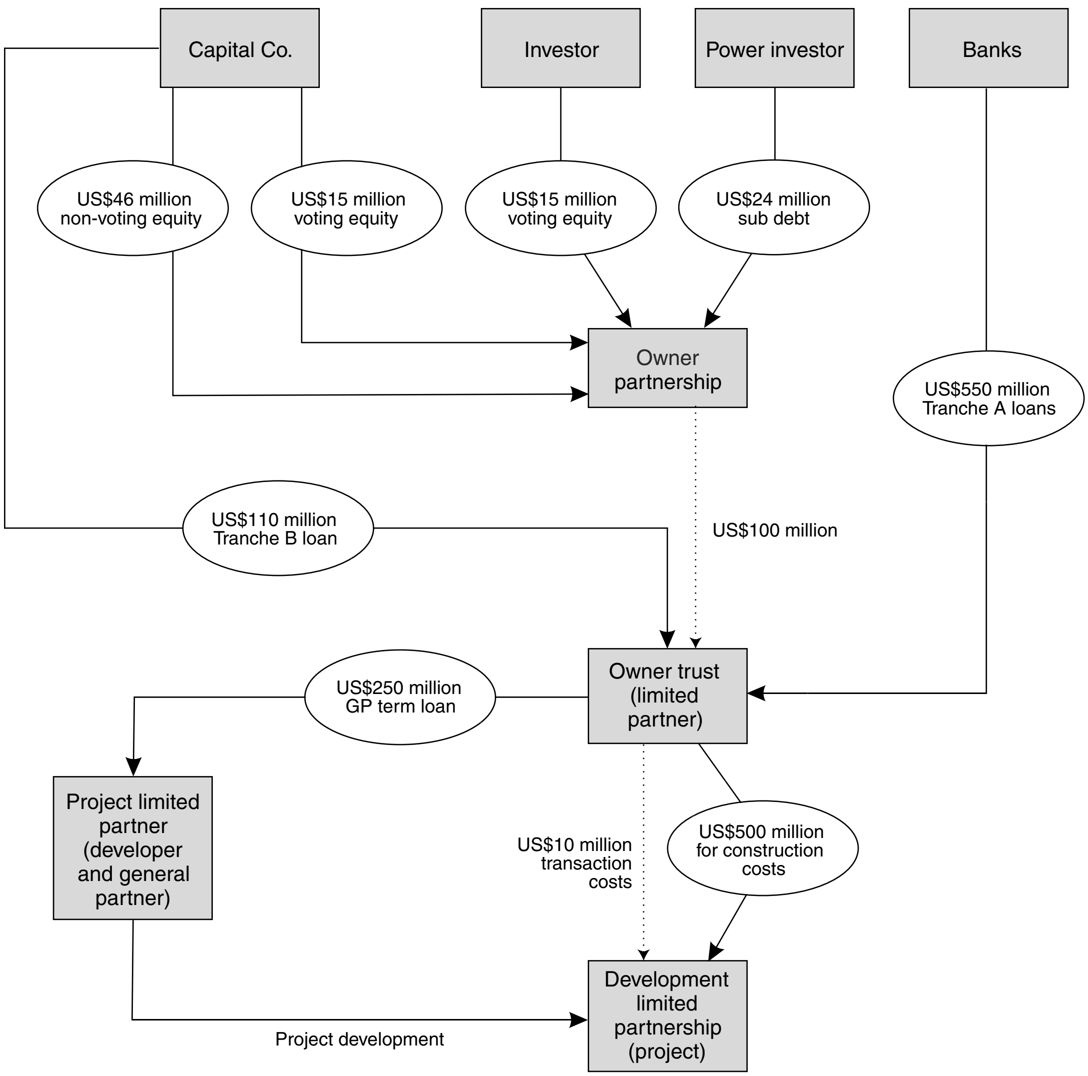
Factors impacting upon cashflow in power projects include:

- careful review of the maintenance sheets to uncover hidden 'reserves';
- degradation of power and heat rate over time. Will maintenance 'recover' this degradation?

- PPA capacity charge is often unescalated and may drop down once debt service has ended;
- completion tests (Type 1) have two or three sequential layers. Energy payments only are made during trialling (to pay for the fuel costs alone). Strongest of all sectors for LDs and DIS/DSU;

Exhibit 7.5

**Term financing structure**




*Source:* Author's own

- LDs in the O&M contract – usually limited to the operator's fee (insufficient for DS) – this represents operating costs: management risk; see Chapter 15;
- fuel regime to include fuel transportation therefore adding infrastructure/cost risks;
- seasonal heat-rate/fuel efficiency calculations (temperature profiles);
- partial load operations causes a decline in the heat rate, an operating-cost risk;
- levelised tariff is single number tariff to give the same net present value (NPV) of cashflows from those derived from the fixed and variable PPA components built in to the projections;
- there are many definitions of 'availability' and 'dependable' capacity, therefore attention must be given to an exact breakdown of causes for the plant to be 'not available' – including forced or planned shutdowns and *force majeure*; and
- merchant plants have 10 structural/cashflow solutions (see Exhibit 7.6) – usually a fuel or offtake 'deal' is needed such as subordination/mark-to-market (an operating cost risk; see Chapter 14) or swaps/trading (part of market risk; see Chapter 11). Debt service cover ratios (DSCRs) on offer are (more than?) double that for the traditional PPA approach – somewhere between 2.00 and 3.00.

Exhibit 7.6

**Merchant power structures**

| *Style* | *Examples* |
|---|---|
| Price fuel = f(Price e) | Enfield, Salt End (UK) |
| Price gas=f(market)/reset | Dam Head |
| Fuel subordination | Dighton, Tiverton, Gregory, Rumford (USA) Milford (25%) |
| Anchor tenant/host | Calpine(TX); Ingleside(TX); Salt End (UK) |
| Tolling/ECA ? | Navotas, Subic? (Phils); Batesville (USA) 90% Rocksavage, Sutton Bridge, Eggsborough (UK); Topaz (TX) |
| Lender friendly* | El Dorado (NV) |
| Cost curve | Victoria/NSW, Australia |
| Other services | Indian Queens(UK); Barcaldine (Australia) |
| Portfolio | Salton Sea |
| Traders | PECO (USA); Sutton Bridge (UK) |
| Synthetic PPA (hedge/spread) | Champion; Scurry County (USA) |

*Low debt: 50% to 70%.
High DSCR: 2–3 (5!).
Cash trap/cash sweep: DSCR <1.5.

The four study requirements:
1 cost curve (and projected curves);
2 load-duration curve;
3 duty (base load; intermediate load; peaker); and
4 market study.

*Source:* International Advisory & Finance 2014

### *Tollways*

Tollway financings benefit from a very low level of operating cost: technology risk. It is essentially a civil-construction exercise. However, the estimation of traffic risk is full of difficulties – see Chapter 11, and the techniques listed in Box 9.2. There are many types of traffic studies, but as yet no one technique has been proven reliable.

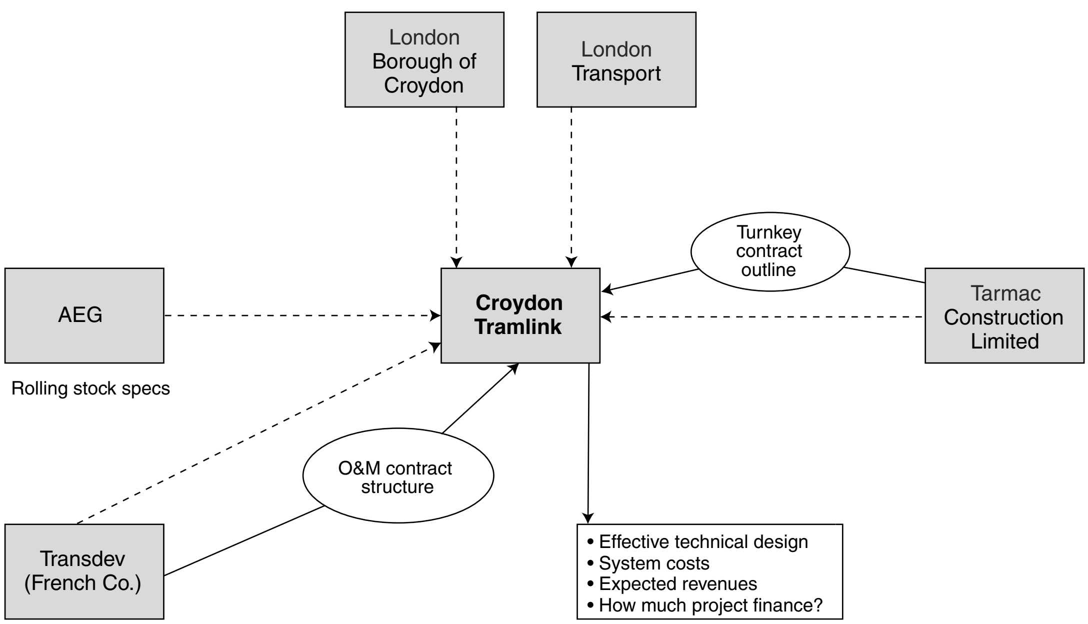
Engineering risk can be high as a result of poor ground conditions. Good geotechnical studies are essential.

Because toll fees are very visible, inevitably governments will wish to regulate the tolls – which introduces political risk (see Chapter 21). For toll roads through cities or environmentally sensitive areas, getting the approval is best done by government to cover the environmental risk.

Another factor that needs to be examined in toll road projects – and this includes bridges, tunnels, and people mover systems – is the real estate or property development content of the proposal (an infrastructure risk). Housing or office/shopping/industrial complex developments at interchanges and entry points may be the ultimate motive of the developer, such that the toll income alone will be insufficient for the project financing sought. (See Exhibit 7.7.)

Exhibit 7.7

**Croydon Tramlink**




*Source:* International Advisory & Finance 2014

### Tollway cashflows

Factors impacting upon cashflow in tollway projects include:

- ramp-up period of 12 to 60 months (and therefore completion risk; see Chapter 19);
- traffic mix – and different growth algorithms (market risk; see Chapter 11);
- traffic studies in urban areas have proved overly optimistic – particularly underestimating the percentage diverting to get around paying toll;
- population growth studies (after ramp-up period);
- real-estate linkage – absorption rates;
- growth of automatic vehicle identification – transponders/readers/prepaid/credit card (market risk; see Chapter 11);
- tariff increase mechanism (a political risk; see Chapter 21);
- comparative tariff analysis;
- full FX risk exposure for foreign currency loans; and
- internal funding from early/existing traffic (market and sometimes completion risks; see Chapters 11 and 19).

## *Railways*

Railway project finance is relatively new, since most rail systems have been in the hands of government. Leasing transactions for new rolling stock and locomotives have been common in recent years and privatisations are generating project finance opportunities.

Competition from truck and even air transportation has seriously eroded railway cashflows over the past decades, not just for freight but for passengers, who find transportation by car convenient for trips up to two to three hours.

Because of its government heritage, many railways are grossly overstaffed and so operating risk: cost and management components are important to gauge. The skill of the sponsor is a key to maintaining cost competitiveness.

Some new rail projects entail technology advances such as very fast trains or magnetic levitation. These require support from the technology provider/constructor in a project financing (and represent operating: technology risk).

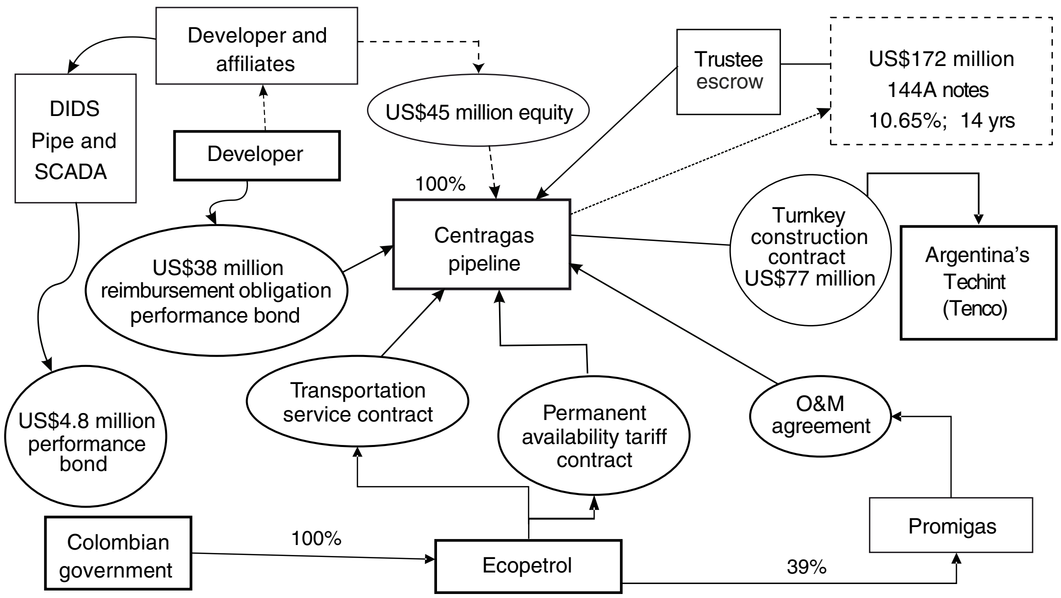
### Railways cashflows

Factors impacting upon cashflow in railway projects include:

- intermodal (truck/rail/ship) issues and estimates of commercial usage;
- integration/interconnect with the existing system;
- regular track maintenance expenses; and
- demographic studies.

Exhibit 7.8

**Centragas, Colombia**




*Source:* International Advisory & Finance 2014

## *Resources*

The key factor in resource based projects is the reserve estimation and therefore continuity of supply. For mining this relies on a large number of drill holes, sampling, and geological interpretation before the mine design is optimised. For oil and gas, usually seismic surveys have suggested a reservoir 'closure' or trap. Based on the drilling and production testing of a small number of wells (2,000 to 3,000 metres deep), a reservoir engineer estimates the quality and amount of the oil that can be recovered and produced economically.

Completion risk is small for onshore oil and gas, but it may be a substantial risk offshore due to the lack of infrastructure, logistics, and technology employed. Completion risk (see Chapter 19) for mining should generally be manageable, but time delays are prevalent usually because of remoteness – an infrastructure risk (see Chapter 17).

Price fluctuations present considerable market risk in the resources sectors. It is usually difficult to get long-term price hedging mechanisms.

**Box 7.3**
**Centragas' 16 risks profile**

| | |
|---|---|
| Project: | Build-operate-maintain gas pipeline |
| Amount: | US$172 million notes |
| Capital markets: | 16-years 144A secured notes |
| Supply/reserves: | Ecopetrol (owned by Colombia) supplies all the gas |
| Operating: | |
| • technical: | Low; no compressors |
| • cost: | Low |
| • management: | Promigas O&M contract; cost + with caps; LDs; Promigas call option on 25% Centragas equity |
| Infrastructure: | Right-of-way by Ecopetrol |
| Environment: | US$4 million 'community awareness' – Ecopetrol |
| Market: | Developer; capacity-based tariff |
| Political: | Colombia BBB–; army; Colombia's first capital markets project finance |
| FM: | Includes political risk (army failure; terrorism) |
| FX: | Ecopetrol indemnity; US$-based tariff |
| Funding: | Standard; Centragas rating = Ecopetrol's rating |
| Participant: | US$45 million developer's equity; developer not < 25% equity; Developer can borrow Centragas' surplus cash; 6-month DSR |
| Engineering: | Low; Stone & Webster due diligence (DD) |
| Completion: | Turnkey contract: Tenco (not pipe; not SCADA); Colombian army receives payment of US$9 million! |
| Syndication: | Standard/emerging market |
| Legal: | Ecopetrol to purchase pipeline if default during construction; comprehensive Colombian legal opinion |

## Resources cashflows

Factors impacting upon cashflow in resources projects include:

- the physical tail/residual of 20% to 30% of proven reserves is required. Need physical production counter. Reserve estimates are regarded as crucial;
- proven versus probable reserves are required – reserve/supply risk; see Chapter 10;
- upstream production of oil and gas has an exponential 'decline curve' (constant percentage per annum) after the field reaches maturity or plateaus from initial, natural ramp up;
- price forecast input requires close attention. Cyclical price modelling/simulation is required. Nevertheless many bankers will take the oil price risk entirely;
- capex reserves for major maintenance/replacement of truck fleet/major equipment in mining; and

- long-term and direct commodity lending can provide a natural hedge – best example of which is gold.

## *Telecoms*

The provision of telephones and data communications is an area of much interest to government and accordingly is a heavily regulated business sector with regard to ownership, services, and tariffs. International telecoms relationships are often the subject of treaties and multi-country services arrangements.

The telecoms sector has traditionally been financed either on a corporate basis or under the government's budget. Privatisations/mergers and acquisitions (M&A) transactions have become popular since the existing business has cashflow already.

However, the risks of the business are substantial and project financing is a very new tool being applied to this sector. Chief among the risks is market risk and the rate at which subscribers take up a system (such as mobile/cellular phones) or can be connected (as in fixed wire/wireline roll outs). This is the subject of intense study and estimating. In a situation where competition is being introduced, say after privatisation, then new subscribers shop around new service providers and switching can seriously affect cashflow (known as 'churn').

Technology risk is also high, especially in the digital, cable, and cellular/mobile arenas. The issue is the speed at which new technologies could be introduced, making the present system no longer cost competitive.

Because of the governments' involvement, political risk can be high. Phone call charges are highly visible and subsidised services to rural users through universal or community service obligations are volatile issues in many democracies.

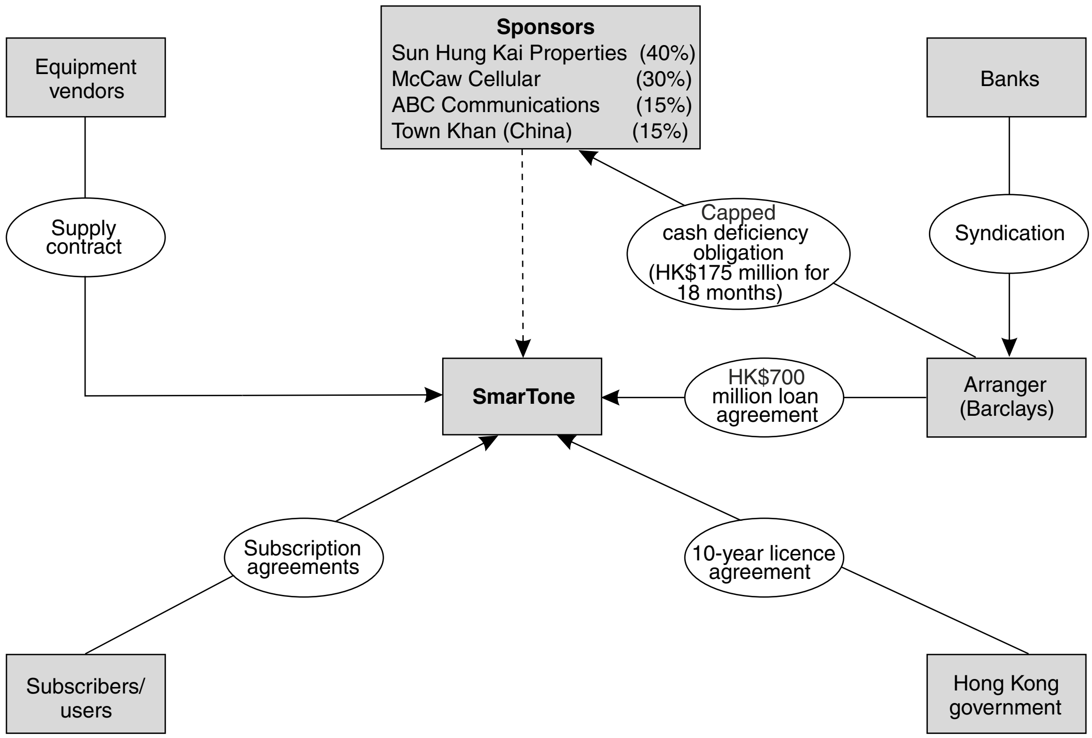
### Telecoms cashflows

Factors impacting upon cashflow in telecoms projects include:

- numerous revenue reports and multiple growth rates/market-share assumptions are made;
- completion risk is by far the most difficult to model among the sectors as system capex may be slowed down if the market is not developing as quickly as expected;
- cashflows move from negative during rollout (completion risk; see Chapter 19) to positive – similar to the ramp-up aspect of tollways. Average DSCRs are almost meaningless; usually high 'target' DSCRs and more corporate financial ratios such as debt:EBITDA and interest cover are seen, depending on the lenders' style;
- penetration (telephones per 100 population) reaches plateaus;
- total FX exposure – except for international call balance, which are usually settled in US dollars;
- real price declines are in evidence almost everywhere with some remarkable breakthroughs in the cable/digital areas which will strongly depress industry pricing; and
- the move to digital/internet is stressing the future cashflow/capital estimation of many companies, not just project finance deals.

Exhibit 7.9

**SmarTone, Hong Kong**




*Source:* Author's own

## *Satellites*

Satellite financing has a number of important risks from a project financing perspective. Obviously, *force majeure* risk of a launch failure is catastrophic and, even if launched successfully, getting the satellite into the correct orbit is still quite risky – completion risk. Insurance premiums for launch are high – in the order of 15% to 25%. A typical rocket launch costs US$20 million to US$40 million while a geostationary satellite can cost US$250 million or more.

However, there are other risk factors such as operating risk: management component and supply risk in the form of onboard fuel. Orbit maintenance consumes fuel and satellite life is quite short. Onboard power from large, delicate solar panels arrays are subject to damage on deployment (additional completion risk) and from micrometeorites in space – *force majeure*.

Before launch, a satellite usually has pre-committed revenues from the advanced sale of transponder capacity either to broadcast television or transmit telephone or data signals. Sometimes these service revenues are paid in advance which helps support the market risk.

Most satellites are technologically advanced and the risk of premature failure is high (technology risk).

### Satellites cashflows

Factors impacting upon cashflow in satellite projects include:

- pre-committed revenues before launch which may include prepayments;
- market risk and participant risk/FX risk arising from the offtaker;
- insurance cover costs are very large giving rise to issue around how they are financed;
- free or extra relaunch costs upon launch failure (*force majeure* risk; see Chapter 18); and
- orbit management costs and operational life (operating risk: management; see Chapter 15).

## *Prisons/hospitals*

Hospitals and prisons share the cashflow characteristics of cost per bed per night together with high-technology equipment cost – albeit for very different reasons. Project finance works in this sector because the private sector can deliver such services at a fraction of public departments and ministries. The major thrust in the field was the UK Private Finance Initiative (PFI) and has spawned a great deal of project finance innovation in the UK, and in fixed-income/gilt and indexed debt funding.

The advantage with prisons is that there is very little danger of an undersupply (market risk)! However, there may be a very high standard of services, besides security, such as prisoner rehabilitation, forming part of the service contract.

### Prisons/hospitals cashflows

Factors impacting upon cashflow (mostly done on a PPP basis) in prisons/hospital projects include:

- concession conditions (PPP) are paramount. Many high-performance criteria provide opportunities for fee/payment reductions;
- little real-estate uplift exists;
- prison operators may have to bear the costs of recapturing escapees!
- liability issues in anything medical are expensive, especially in the US; and
- payment is usually on a capacity-contract basis (see Chapter 11).

## *Airports/ports*

Ports and airports are essentially merchant operations anchored by a host, usually closely connected to the developer/operator. That party's commitment is usually pivotal – a major airline commitment to utilise the facility as a hub or similarly a major shipping company. Occasionally, a government commitment is made for high-speed/convenient airport access (infrastructure risk). However, this linkage may be late (completion risk) and airport-city links are notorious for the over-promises with regard to cost and service/convenience.

Another concern is the failure of many second airports partly due to political will and partly due to the fact that the options for siting new airports inevitably detract from their use. Some airside concessions, such as fuel servicing and aircraft maintenance, have been project financed as have some harbour services – fuel and tugs.

With ports, an anchor tenant such as a steel mill, grain terminal, or liquefied natural gas (LNG) regasification plant may provide the source of same cashflow comfort. The participant risk attached to a captive/tied deal is obvious.

Transhipment ports are considerably less attractive and the usual formula here is to start small and then develop as traffic builds. The difficulties with multi-stage developments will be discussed in Chapter 19. Thus, terminal ports are more desirable and attract project financings. Government commitments for rail to port tie-ins may then be significant (infrastructure risk).

### Airport/port cashflows

Factors impacting upon cashflow in airport/port projects include:

- traffic figures may be available for long periods, however, competitive aspects need care;
- concession income can be large – storage, airport hotel, parking. For ports, these are more in the nature of throughput commitments;
- landside revenues are much more important in private airports; and
- airside revenues can provide US dollar incomes from landing rights payments.

## *Water/waste water*

Water projects have two ingredients for good project financings – low market risk from the natural monopoly and consistent demand. Most water concessions are long term in character.

Supply risk requires good hydrology studies for the supply projects. For the water treatment projects, waste water contracts need to be sound. For many waste projects, the project company's main income is the payments to take away the waste water. The waste itself may have environmental risk.

In some projects, new technology is being used which will require independent certification/checking (engineering risk).

Political risk arises because water charges are highly visible and the tariffs are held relatively low. Accordingly, with a long-term, low margin business, the operating:management needs to be of good quality and experience.

### Water/waste water cashflows

Factors impacting upon cashflow in water projects include:

- seasonality: there are many water cycles in evidence, not just El Niño Southern Oscillation (ENSO) index;
- substantial additional capex throughout many concessions in developing countries;

- cyclical aspects of hydrological studies (supply risk; see Chapter 10);
- the costs/capex of environmental compliance;
- operator's track record in controlling operating costs;
- demographic study assumptions;
- demand side management requirements; and
- participant risk in municipalities/host government/retail distribution.

### *Stadiums/theme parks*

Just prior to the global financial crisis (GFC) there was a big increase in casinos with a wave of project financings for casinos in Macau and football stadiums in the US – besides the franchise fee and TV rights for the latter there are many other incomes to count.

Theme parks have had mixed fortunes – particularly after the Euro Disney debacle. As a rule having an existing grouping of theme parks at the location benefits from existing traffic being already 'on its way'. This principle also applies if there is accommodation and highway infrastructure nearby (which is not a project finance risk).

#### Stadiums/theme parks cashflows

Factors impacting upon cashflow in theme park/stadium projects include:

- the commitments of particular sporting codes (TV rights) and events promoters (profit-share opportunities); and
- concession income is pivotal: parking, corporate boxes, food and beverage sales, advertising, gold pass/membership seating/boxes, entertainment, restaurants, and gift shops.

## Summary

Predictable/forecasted cashflows are the common thread among the popular sectors. The breadth of sectors and projects being undertaken by project finance is expanding as governments establish a better basis for private sector involvement in many arenas. Power, oil and gas, and infrastructure/PPPs are perennial favourites followed by mining, industrial, telecoms and leisure.

Chapter 8

# Structures

## Risk

Risk identification and definition are at the core of risk structuring.[1] Project finance practitioners have been at the forefront of risk classification and linking categories of risk to the methods of analysis applied to structuring a deal. Besides the five mechanisms for risk structuring discussed below, project financiers have sought to gauge the impact of risk on the pivotal cashflow projections which underpin the quantification of the project finance loan amount, repayment term, interest rate, and margin for the project financing.

The five mechanisms are:

1 contract;
2 trigger;
3 financed;
4 study; and
5 avoided.

### *Contract*

Each party agrees to provide or take the project's goods or services. This may be:

- the turnkey construction contract (TCC);
- a fuel supply agreement (FSA); or
- an off-take contract such as a power purchase agreement (PPA). The project financier focuses on the length and strength of the arrangement, the benefits to both parties in a good deal – there is something of benefit for each side – and the risk of termination or cancellation. These contract levels will be patrolled by breakeven case sensitivities.

**Case study: Navotas, Philippines**

The US$30 million Navotas, second-hand power plant project financing was done by Hopewell in the Philippines. The government power utility, Napocor, supplied the fuel (supply and operating cost risks) as well as purchasing all the power from these gas turbines under a 12-year energy conversion agreement (ECA) (market risk).[2] These tolling-contract arrangements 'underwrote' the project's cashflow.

### *Trigger*

In addition to contracts and agreements, certain risks are structured by way of a trigger or event. Put another way, if the trigger point is never reached, then nothing will happen. The most effective trigger point in project financing is the debt service cover ratio (DSCR).

The cash-trap/cash sweeps are good examples of trigger structures used to shorten maturity/tenor/term of the project financing. (See also Box 3.3.)

**Case study: Pego, Portugal**

The €1.14 billion Pego project financing was for two to be completed coal-fired power plants in Portugal. If the bank project finance deal is not refinanced by year end six, all surplus project cashflow will be subjected to a 100% cash sweep (all surplus cashflow paid against interest and the loan principal outstanding, repaid in inverse order of maturity). The interest margin will ratchet up by 0.5% in each year following the first six year margin of 1.5% above the Libor.[3]

**Case study: Entergy, US**

In a merchant power plant financing for Entergy of the US, when the DSCR falls below 2.0, then surplus project cashflow (above debt service) is trapped/locked up such that Entergy cannot extract dividends.[4]

### *Financed*

Standby debt/equity and cashflow deficiency arrangements can be used to tide over a particular risk, the two most usual being completion risk and market risk. (However, if this extends to corporate or sovereign guarantees, then this is an indirect route to trigger repayment from that entity's financial resources, which is not a project financing.)

**Case study: Iduapriem, Ghana**

The Iduapriem US$38.4 million cofinancing was arranged by IFC in its classic A/B loan structure. (See Exhibit 8.6.) In addition, US$17 million was structured as subordinated, income – sharing standby loans – mezzanine debt, for completion, as well as US$5 million as standby shareholder loans subordinated below the US$17 million of mezzanine debt.[5]

**Case study: Bullmoose, Canada**

For Teck's C$158 million Bullmoose project in British Columbia, C$20 million was surplus to the amount required for project completion. The C$20 million Overrun Facility was initially supported by a parent company guarantee (Type 1); once the completion test was satisfied the C$20 million could be rolled into the main project financing.

Banks have overtly provided overrun tranches, inevitably at a higher cost and with tougher loan conditions. To provide coverage of market risk, say when a cyclical commodity price is at a low point, then recourse to a financing tranche – usually limited to an amount, or time, or both – is a way to help structure market risk.

**Case study: Ras Laffan, Qatar**

In the US$2.55 billion Ras Laffan, Qatar, liquefied natural gas (LNG) project financing, ExxonMobil, a 30% shareholder in the special purpose vehicle (SPV), provides a US$200 million revolving, subordinated (corporate) guarantee which is targeted at maintaining a floor price for the gas sales to Korea.[6] (See Exhibit 11.4.) This is limited, therefore, to amount, but not to time.

### *Study*

Where market risk cannot be contracted readily, such as for telecoms, toll roads, or quality specific production, then all the project financier can do is to rely on studies and market projections.

**Case study: Argyle, Western Australia**

The Argyle diamond mine development in Western Australia, project financed to the tune of US$500 million, added 60 million carats of diamonds annually to the world's 120 million carats per annum production of natural diamonds. Besides close price and marketing control of the diamond market by the De Beers' Central Selling Organisation, the demand for diamonds is not a function of the price of diamonds. The only way the project financiers could obtain some measure of reassurance with the diamond price outlook (market risk; see Chapter 11) was through a US$1 million market study by the Boston Consulting Group.[7]

**Case study: Murrin Murrin, Western Australia**

For the US$420 million Murrin Murrin Holdings 144A bond issue, a new processing technology presented operating: technology and operating: cost risks. The cost curve for nickel and cobalt, as projected by industry consultant CRU, featured heavily in the acceptance of these risks by showing an analysis of the operating cost for each of all the world's producers of both metals.[8]

Any experienced project practitioner has a story to relate about some methodological failure in the study(ies) used for a project. Often the study's shortcoming is simple common sense. (Discussed in the latter part of Chapter 9.)

Most project financiers steer well clear of urban infrastructure 'mass-transit' schemes which are notorious for failing to meet traffic projections. The 'study' structure is insufficient. As a consequence, underground railway systems and city monorails are in the realm of government financings or grant/subsidy-based financings.

### *Avoided*

Action to complete is taken in advance of a particular risk aspect, for example, transfer of a concession to the bankers' benefit upon a default. The usual mechanism is to fulfil some obligation – financial, physical, or contractual – or to double up a risk coverage by way, for example, through a guarantee, indemnity or in some instances, insurances.

**Case study: Hopewell, Navotas, Philippines**

The operating cost risk for fuel – the main operating cost component for a power station – was taken by Napocor in the US$30 million Hopewell, Navotas, power plant referenced earlier in the Philippines.

**Case study: TelecomAsia, Thailand**

Just in case there was any Thai legal or political risk with regard to the TelecomAsia two million fixed lines build transfer order (BTO) transaction in the capital, Bangkok, the 25-year concession was transferred before closing to a company controlled by the banks.[9] (This is described in Exhibit 25.1.)

## Risk division

Every expert says he or she understands what risk means, yet there has never been a mutually satisfactory definition. Six ways of looking at risk are examined in Chapter 6. Another view can be to categorise risk from a financier's point of view as being one of:[10]

- horizontal division whereby several participants share the funding burden and the outcome;
- vertical division in which the investment and funding is divided one way and the outcomes the other. This lowers the risk for some; or
- temporal division which enables each investor/funder to take part in an investment for a short time that is suitable for his or her needs/objectives.

The main thrust of project financing is a vertical division of risk – in last, but repaid first, in priority. This helps to explain in part why project finance margins remain comparatively low.

## Document matrix

Besides the cashflow matrix outlined in Chapter 6, any project financier recognises that risk is not an allocation issue but a trade-off skill. The final expression of the risk systems, risk divisions and risk structuring is in the documents. With a large set of participants to structure, it is no wonder that the documentation matrix shows many levels of trade-off, in fact a three-dimensional trade-off which can be seen in Exhibit 8.1. The fourth dimension, time, also introduces a temporal addition to the risk matrix.

Exhibit 8.1

**Risk trade-off documentation matrix**

| 16 risks | Supply/traffic/ reserve | Market | Foreign exchange | Operating: technology | Operating: cost | Operating: management | Environmental | Infrastructure | Force majeure | Completion | Engineering | Political | Participant | Interest | Syndication | Legal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Concession* | | | | | | | | ● | | ● | | ● | | | | ● |
| *Government support* | | | ● | | | | | ● | | | | ● | | | | |
| *Implementation agreement* | | | | | | | | | | ● | | ● | ● | | | ● |
| *Comfort letter (government)* | | | | | | | | | | | | ● | | | | ● |
| *SPV/JVA* | | | | ● | ● | ● | | | | ● | | ● | ● | | | |
| *Completion support* | | | | | | | | | | ● | | | ● | | | |
| *Turnkey contract* | | | | | | | | | | ● | ● | | | | | |
| *Performance bonds* | | | | | | | | | | ● | | | | | | |
| *Maintenance bond* | | | | ● | | | | | | | | | | | | |
| *BAR/LDs/DIS* | | | | | | | | | ● | ● | | ● | ● | | | |
| *PPA/sales contract* | | ● | ● | | ● | | | | | | | | ● | | | |
| *Fuel supply agreement* | ● | | | | ● | | | | | | | | | | | |
| *O&M agreement* | | | | ● | | ● | ● | | | | | | | | | |
| *Environmental warranties* | | | | | | | ● | | | | | | | | | |
| *Environmental permits* | | | | | | | ● | | | | | ● | | | | |

*Continued*

Exhibit 8.1 *continued*

| *16 risks* | *Supply/traffic/ reserve* | *Market* | *Foreign exchange* | *Operating: technology* | *Operating: cost* | *Operating: management* | *Environmental* | *Infrastructure* | *Force majeure* | *Completion* | *Engineering* | *Political* | *Participant* | *Interest* | *Syndication* | *Legal* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Information memorandum* | | ● | | | | | | | | | ● | ● | ● | | ● | |
| *Loan agreement/bond documents* | | | | | | | | | ● | ● | | | | ● | ● | ● |
| *PRI/cofinancing* | | | | | | | | | | | | ● | | | | |
| *Intercreditor agreement* | | | | | | | | | | | | | | | ● | ● |
| *FX hedging/ swaps* | | | ● | | | | | | | | | | ● | | | |
| *Offshore proceeds account* | | | | | | | | | | | | ● | | | | ● |
| *Reports:* | | | | | | | | | | | | | | | | |
| *Insurance* | | | | | | | | | ● | | | | | | | |
| *Traffic/reserves* | ● | | | | | | | | | | | | | | | |
| *Engineering* | | | | | | | | | | ● | ● | | | | | |
| *Environmental* | | | | | | | ● | | | | | | | | | |
| *Tax* | | | | | | | | | | | | ● | | ● | | |
| *Accounting* | | | | | | | | | | | | | ● | | | |
| *Mortgages/ charges* | | | | | | | | | | | | | | | | ● |
| *Trustee agreement* | | | | | | | | | | | | ● | ● | | | |
| *Cross charge* | | ● | | | ● | | | | | | | ● | ● | | | |
| *Chargee/direct agreement* | | | | | | | | | | | | ● | ● | | | |
| *Legal opinion* | | | | | | | ● | | | | | ● | | | | ● |

*Source:* International Advisory & Finance 2014

## Interest

Interest can be structured in five ways.

1 Standard in almost every project financing is to capitalise interest during construction (IDC) into the loan. However, a contrary rule of thumb would suggest otherwise – take all the soft costs (fees, IDC, and so on) as a percentage of the funding requirement as a starting indicator of the percentage equity required in the deal.
2 Interest can be back-ended whereby the early interest basis is lower than towards the end of the loan (back-ended interest is discussed in Chapter 23).
3 The interest payments may be delayed or deferred which will require either capitalisation or another funding substitute/recourse.
4 Interest rate caps can be developed either as a result of capitalisation or another funding substitute/recourse or through derivative/hedging structures.
5 Interest may be paid out of reserves. In most project financings, interest comes ahead of principal repayments (see Exhibit 3.4) in the hierarchy of cashflow dedication of cascading payments (the 'waterfall of accounts') or from the various reserve structures. The usual architecture is a debt service reserve. (See Box 3.5.) Occasionally, an interest reserve will be structured instead.

## Principal

The eight main structures for principal repayments are given in Chapter 3 (see Box 3.2). There are some generic structures besides these from which principal is paid or otherwise structured.

1 Deferral could be automatic in the case of *force majeure* risk (see Chapter 18).
2 Loan extension options (besides the implicit one in a borrowing base transaction) which can be automatic, earned, or triggered based on a tested condition or the cashflow status of the project.
3 Sinking fund variations to create a defeasance/offset against a bullet or balloon payment. This is back-door loan amortisation with a negative arbitrage/negative carry on the moneys in the sinking fund.
4 Grace on principal is very common practice just after the completion test (Type 1 project financing). Typical periods are from six months to a year; sometimes out to three years.

**Case study: NCA, Australia**

The maximum grace seen by the author is eight years with a default in year nine – interest paid to gain the tax deduction; principal not paid, followed two years later by a US$500 million writedown of the loan by the banks. The project was MIM's NCA project which, when syndicated, was the largest project finance at that date in Australia. MIM is now owned by GlencoreXstrata.

## Drawdown styles

Whether to inject equity first is debated when determining the debt:equity (D:E) subscription (discussed in Chapter 19) since equity injected first can induce a *de facto*/latent completion risk. Other structures can be identified as shown below.

### Certification

All moneys spent to date on the project are certified as appropriate (always by an independent 'checker', never by a corporate officer or an officer of the bank/bond trustee). It is progressively refinanced by drawdowns in minimum amounts – US$5 million is typical – IDC thereafter is automatically capitalised into the loan.

### Benchmarks

When identifiable construction benchmarks are achieved, the project financing can be drawn down in whatever sequence has been agreed on a benchmark schedule/testing routine.

### Anticipated cost to complete

Each drawdown has a re-estimate of final project capex (and timetable) which may constrain drawdowns *pro tem* while the drawdown tranches comply with pre-agreed amounts or D:E ratios. This is expanded in Box 19.4.

### Up-front – banks

All the facility (less the IDC tranche) is drawn and placed into an escrow account which is released according to certification and or benchmarks. The negative carry (the borrowing rate is always higher that the deposit rate) is always a concern on cash deposits.

### Up-front – bonds

Bond investors like single drawdowns for the whole issue. In essence, the bond proceeds will be capital stripped to pay bond interest pre-completion; the bondholders have financed their own coupons (as IDC).

## Special purpose vehicle

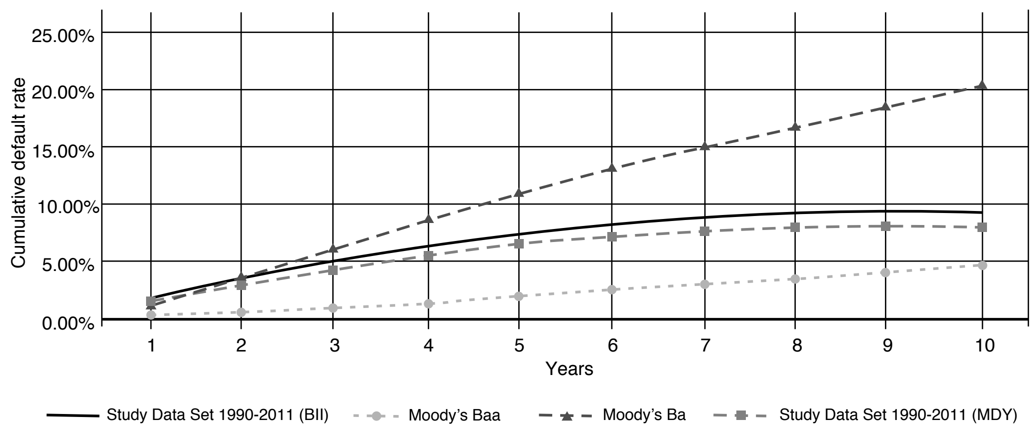
The main SPV choices are given in Chapter 22. Other structuring features for each can be illustrated in some case examples. The special-purpose company (SPC) route needs no further review.

## *Unincorporated joint venture*

The structuring reasons to select the unincorporated joint venture (UJV) route are expressed diagrammatically in Exhibit 8.2. 'Progression through [the maze of] different corporate vehicles ends when all fails, in a joint venture.'[11] This works well in crown-law jurisdiction (English law) where the tenant in common status of the concession/asset can be readily secured by a legal charge (fixed and floating and usually registered to gain priority). The result is a several project finance, fully secured. It is the structure of choice for a minority borrower.

Exhibit 8.2

**Moody's project finance ratings, 1990–2011**



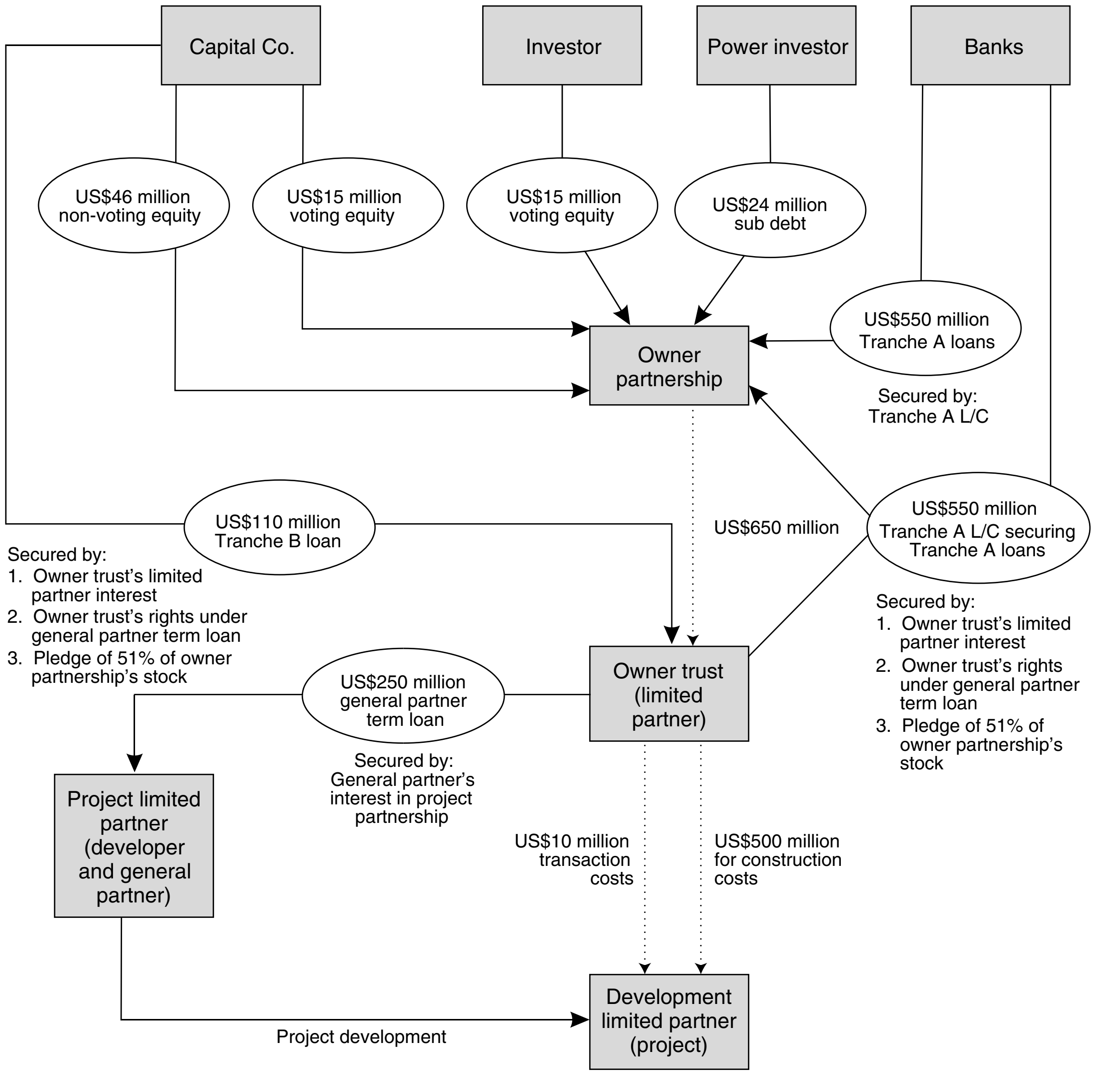

*Source:* Moody's

## *Partnership*

Partnership security structures are more pointedly through the equity. The partners' interests collectively are secured as in a US-style structure shown in Exhibit 8.3.

Exhibit 8.3

**Partnership security structure**




*Source:* Author's own

## *Trusts*

Either the trust itself can be the project entity (not just a special borrowing vehicle) or it can act at an intermediate level as part of tax-neutral structuring. (See Case study: Train F.)

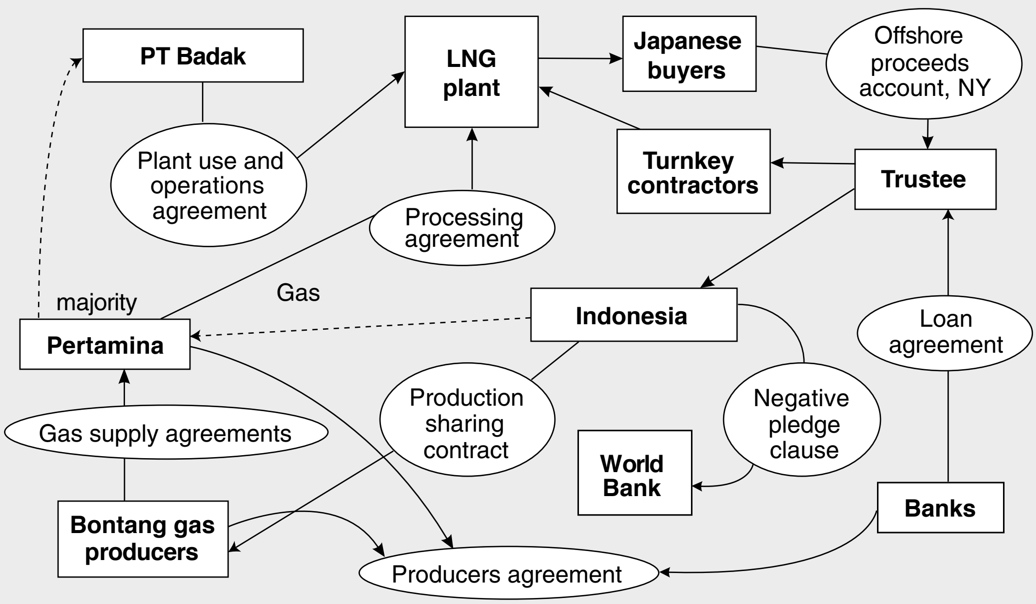
### Case study: Train F, Indonesia

In the 6th LNG train financing for Bontang in Kalimantan, Indonesia – labelled 'Train F' – the New York trustee manages a trust account which:

- borrows the development debt on a project finance basis from the banks;
- gathers in the proceeds of the take or pay LNG sales to Japan (thus acting also as a 'smart' offshore proceeds account); and
- pays the turnkey construction contractors (TCC), while being unable to take security over the reservoir (due to, as it turns out, a negative pledge clause by the Indonesian government and its state petroleum company, Pertamina, to the World Bank).

Exhibit 8.4

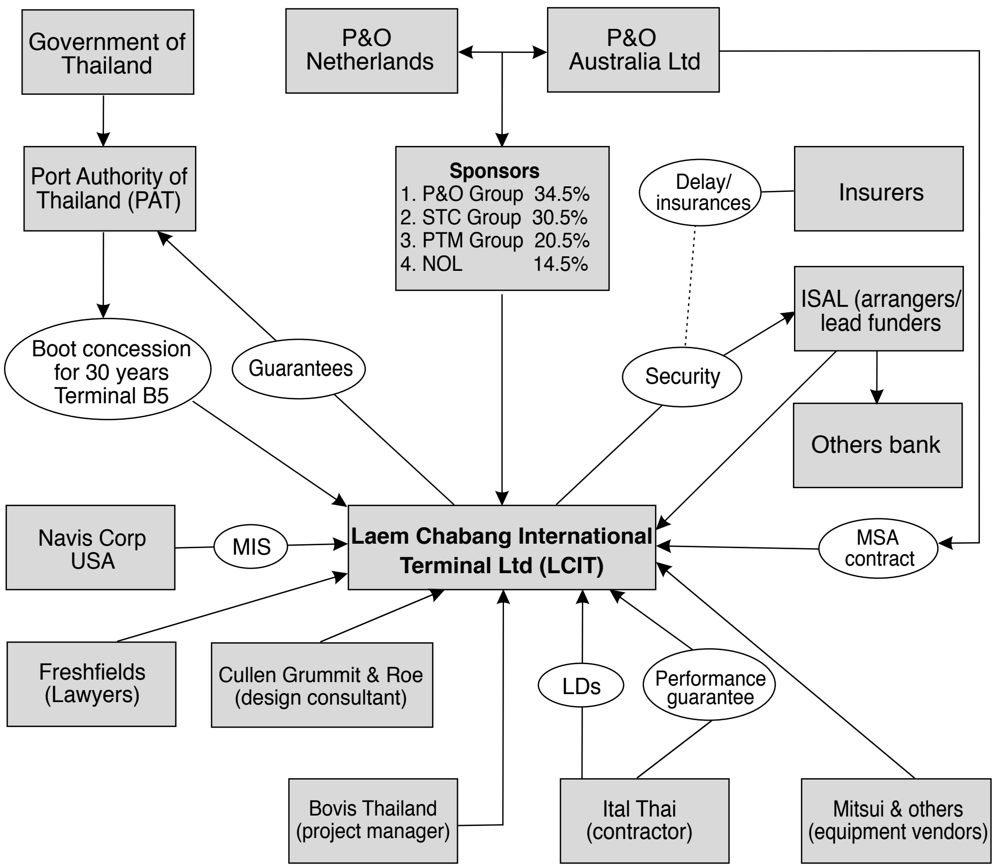
**Train F**




*Source:* International Advisory & Finance 2014

Exhibit 8.5

**Laem Chabang – structure of the project**




*Source:* Tinsley CR, *Project Finance in Asia Pacific: practical case studies*, Euromoney, London 2002

## Mezzanine

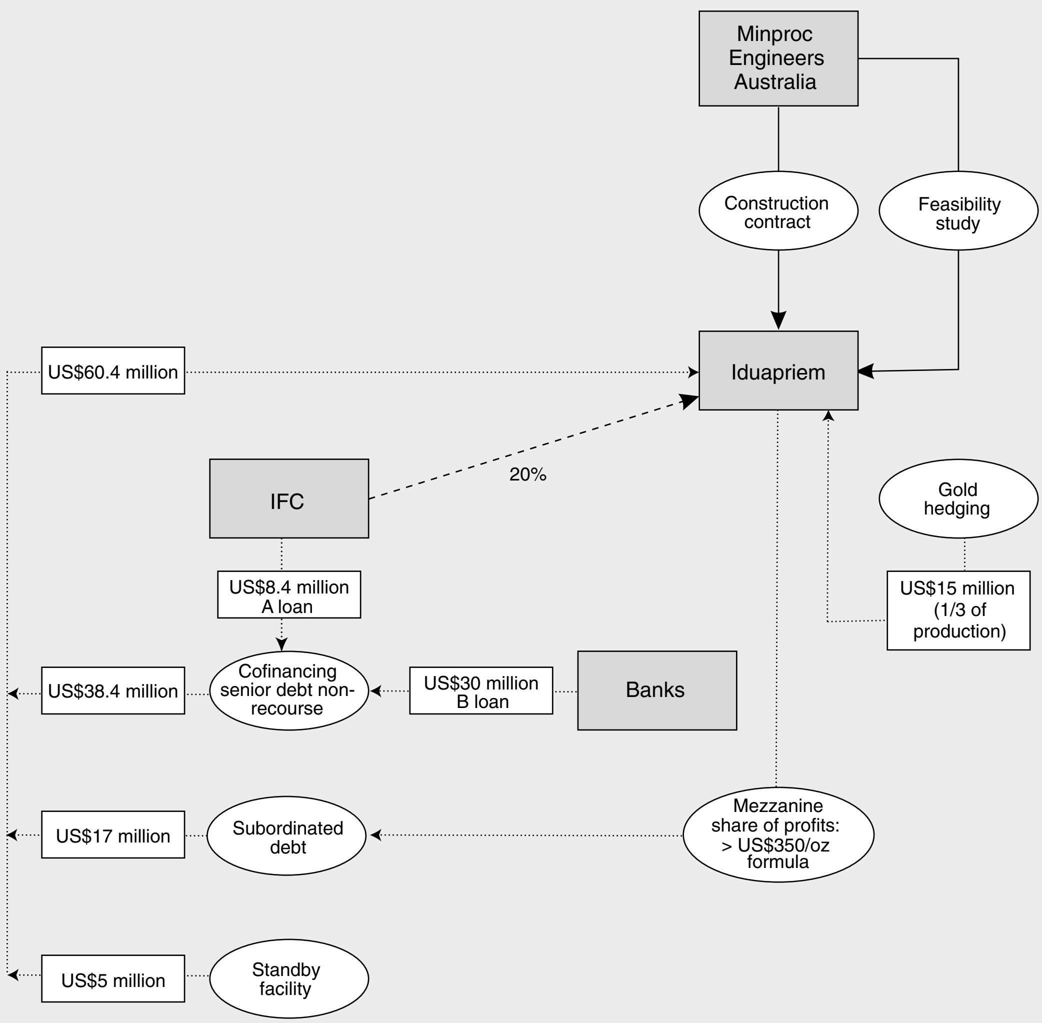
The mezzanine lender is a short-term bridging financier looking for a high yield. In certain cases, a mezzanine tranche may be issued instead of a subordinated debt or parallel to it. (See Exhibit 8.6.)

### Case study: Iduapriem, Ghana

The Iduapriem cofinancing saw IFC as the A-tranche lender, mezzanine lender, equity investor, and standby debt facility banker. The mezzanine structure was subordinated, but kicked in at a royalty on gold revenues above US$350 per ounce rising to 8% off the top when gold is US$450 per ounce or more.

Exhibit 8.6

**Iduapriem cofinancing/mezzanine**




*Source:* International Advisory & Finance 2014

## Subordinated debt

The key is to ensure three levels of subordination (below the senior project finance debt).

1 Payment priority (in money and time).
2 Security priority (in ranking).
3 Seniority in enforcement/action (blocking of subordinated-debt action). Structured subordination, that is, for example, subordinated-debt maturity after year 31, could also be structured as an alternative to this third subordination level.

This is briefly addressed in multi-tranche styles in Box 5.6. Caution is always advised on the statutory preferences for taxes and often labour obligations. As pointed out under 'Enforcement' in Chapter 25, unsecured, trade, and workman's/mechanics liens can all spring into priority in liquidation/bankruptcy situations.

- It is an excellent practice to have all parties enter into a deed of priority and subordination to set in place all three subordination levels above.

## Working capital

High on the list of common shortcomings in project finance is insufficient working capital. (See Box 3.11.)

- If this is underestimated it can cause/compound completion risk – there is nothing worse than trying to commission a project starved of working capital.
- If in doubt about the adequacy of working capital, double it, and be sure it is adequately funded pre-completion as well as post-completion. (See Chapter 2.)
- To an extent, early year grace on principal is one way to allow working capital to build directly after the project finance option has been satisfied (after completion). This is a classic Type 1 structure.
- Working capital lenders should always be wrapped inside the project finance security package to ensure not just a common interest in the project, but also to avoid working capital having a priority position, say, in the project's receivables.

## Bridge loans

1 The practice of providing bridge loans (in a hurry) and then refinancing that loan around a project finance structure has the obvious danger of being trapped in the interregnum since all sorts of structuring to implement the project financing is not yet in place.
2 The second is becoming all too common and is labelled 'equity bridging' where the sponsor's equity is loaned on a corporate finance/guarantee basis and then refinanced after completion.

Mezzanine debt, often called 'bridging,' is not a bridge loan.

**Case study: Light Serviços de Electricidade, Brazil**

In the rush to acquire privatising Brazilian electricity distribution companies, many large US dollar-denominated bridge loans (12 to 18 months) were granted with the intention to reset and refinance the overall structure as a project financing later. A devaluation of the Brazilian real in the interim not only devalued the project cashflows, but they quadrupled the acquisition premiums paid (in local currency, real, terms).

## Multi-tranche

When multiple funding sources are joining together, then often different tranches will be structured rather than everyone joining one project finance lending facility. Two good examples, given in this book, are those of Hubco, described in Exhibit 1.2 and the Ok Tedi example described in Exhibit 21.7.

Each of these was tightly structuring political risk and offtake contracts (market risk).

- A common agreement could be drawn to roll in covenants, legal positions, and security.
- An intercreditor agreement could be essentially several in nature – each party's funding, support and repayment structure is different. This might also extend to uneven allocation of security. In such a potentially messy circumstance, it is strongly advised to have priority/subordination documents signed by all the parties – the same concern as with subordinated debt.

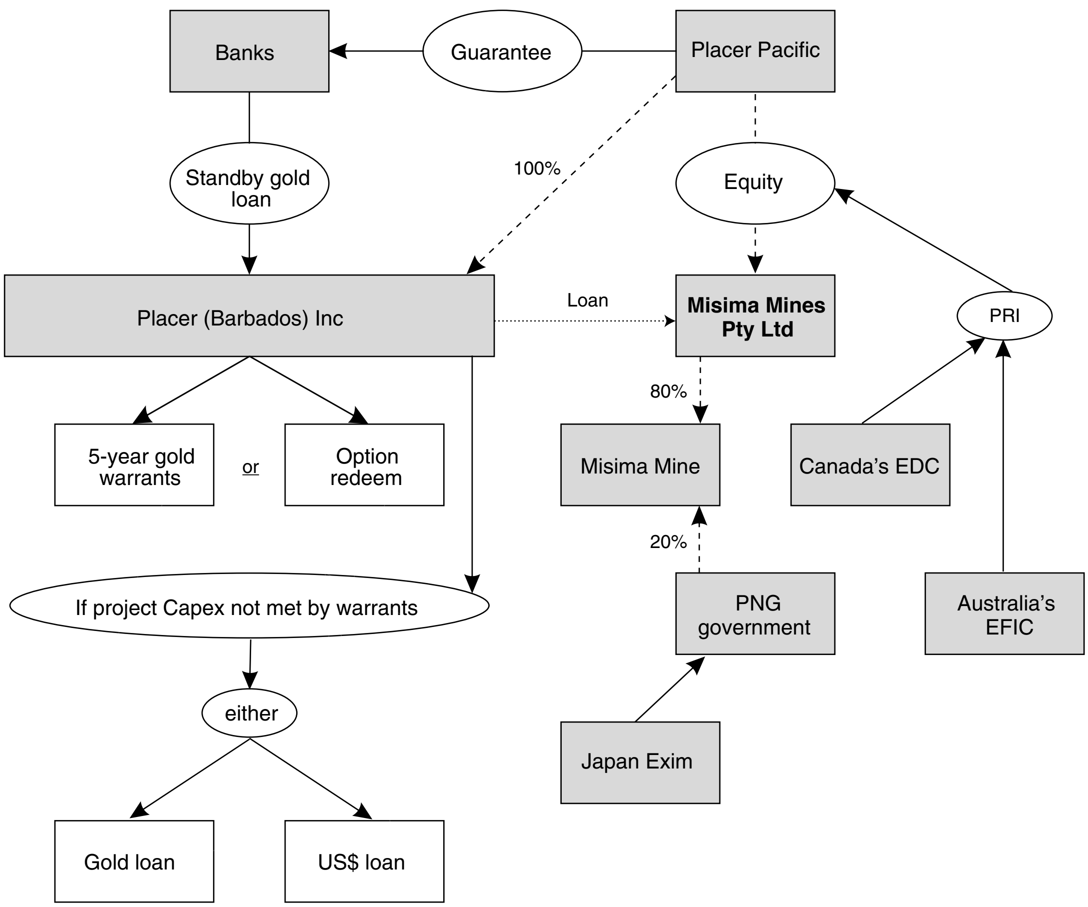
## Commodity funding

Besides the three main forms of commodity lending outlined in Chapter 2, other structural extensions can be entertained.

1 *Warrants:* the formal use of gold warrants and options can stand behind a completion structure. This is shown for the Misima case in Exhibit 8.7. There is significant political risk cover laid in on the equity which backstops the development loan and warrant issuer. (The Misima completion test also warrants attention, see Box 19.2)
2 *Production payments:* gold is a good example of this where gold is funded by way of leases from central banks. A bullion banker then uses the leased gold to purchase a production payment. (See Exhibit 11.3.)

Exhibit 8.7

**Misima gold warrants**




*Source:* International Advisory & Finance 2014

## Contract structures

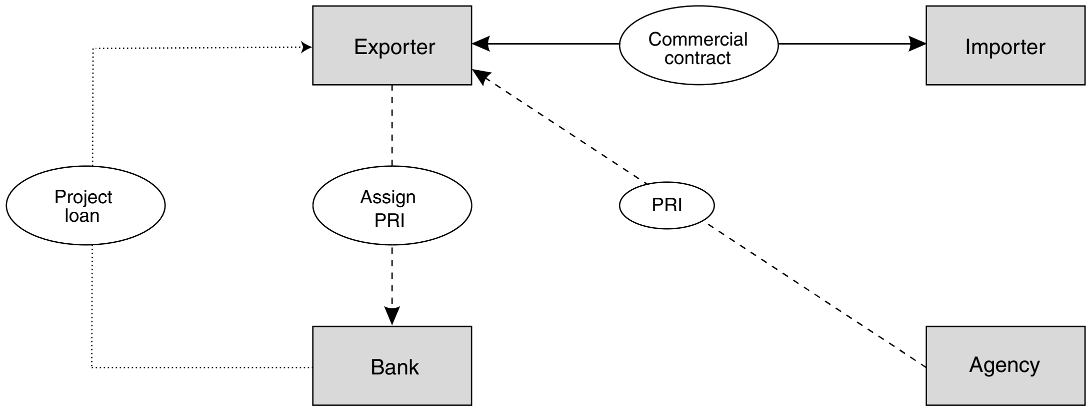
Generic contract structures include supplier/buyer credits and all the varied forms of leasing. The classic forms can all see tax enhancements.

### *Supplier credits*

As mentioned in Chapter 23, suppliers can offer project finance on a concessionary fixed interest basis. Often these are tied in with political risk insurance (PRI)[12] or as part of an export credit agency (ECA) transaction. This is simply diagrammed in Exhibit 8.8.

Exhibit 8.8

**Supplier credit**



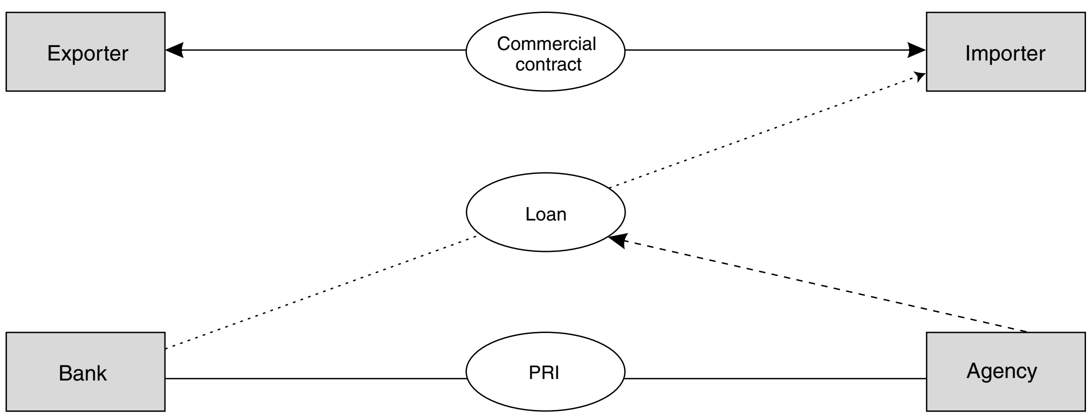

*Source:* Author's own

### *Buyer credits*

In this structure, the project finance lender is financing an importer, again often with ECA and PRI cover. This structure is shown in Exhibit 8.9.

Exhibit 8.9

**Buyer credit**




*Source:* Author's own

## *Pre-export financing*

Projects with high-value exports may be able to arrange financing which bears some of the project finance suite of risks. The oil industry has to date seen the preponderance of these financings.

### Prepayment

A steady export stream can achieve a financing of 'to be delivered' product by way of a prepayment.

> **Case study: Sonangol, Angola**
>
> Sonangol exports oil from politically sensitive Angola, in fact from Cabinda, a military enclave north of Angola proper. Over many years, oil company majors – anxious to control oil supply – have backed these pre-export financings.

### Advanced payment

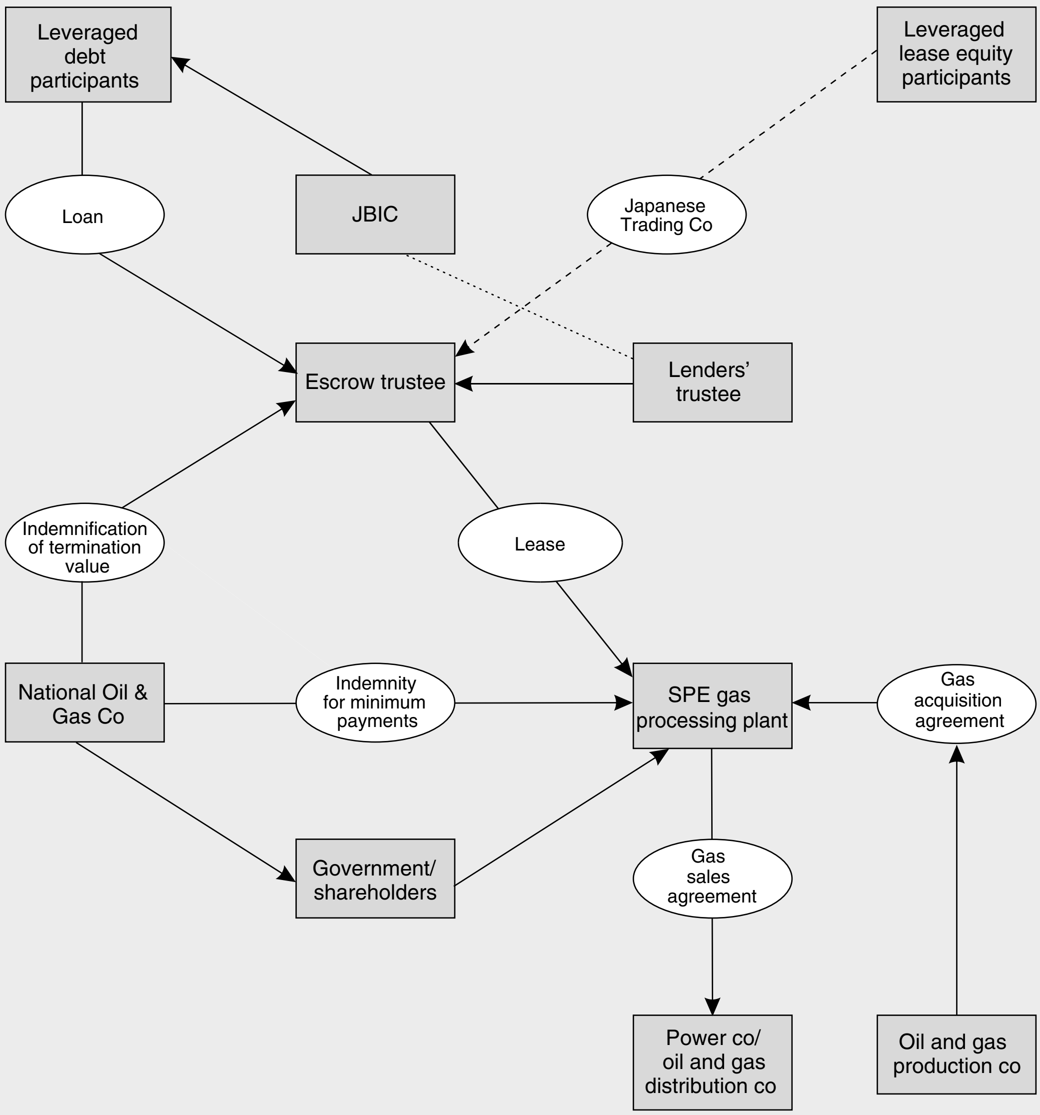
Refineries, nuclear fuel payments, and so on have been project financed using advanced sales. (See Chapter 11.) The advance is set off against the price as output is delivered to the advanced payer/offtaker.

> **Case study: Pipeline lease**
>
> Exhibit 8.10 shows how an ECA loan could be wrapped into a leveraged lease where the equity is a Japanese trading company (or perhaps its local subsidiary).[13] The pipeline/gas processing plant is owned by the equity player. A key point to note is the high termination premium which can occur if a leveraged lease is terminated (voluntarily or upon a default) in the first few years. The extra exposure can amount to 20% of the original lease value or more. Thus an indemnification structure is extracted from a national oil and gas company for this premium (only).

*Continued*

Exhibit 8.10

**Pipeline/gas processing plant**




*Source:* International Advisory & Finance 2014

## *Leasing*

Another party may elect to own the asset or development and structure a lease. (See Exhibit 2.5). If the lessor has to bear the risk on the asset (degradation, loss, maintenance) it is an operating lease. Otherwise, the lease is called a finance lease.[14] Very often the lessor rests with the balance sheet and tax shelter risk alone and the project finance suite of risks is covered by a bank letter of credit, the lessor acting simply as a lower-cost funding source.[15]

### Leveraged leasing

By borrowing to own the asset, the lessor gets two tax deductions: interest and depreciation. However, tax authorities clamp down on too much leverage for fear of losing too much tax revenue. Therefore, the efficacy of leveraged leasing is highly country specific.

### Wrap lease

As the name suggests, a wrap lease is a repackaging of a lease structure, in particular the equity portion or by way of synthesising a (re)sale and lease back (see Exhibit 8.14). The tax timing and the switching of longer-term notes for the original loan are key ingredients to making a wrap lease of benefit. There are legal and tax risks (disallowance of tax shelter) that need extra tax due diligence.

### Captives

A captive lessor is straightforward in concept as may be evident in Exhibit 8.15. However the establishment, funding, and tax treatment of the captive requires specialist advice. A favourite domicile for captives is Bermuda.

### Double-dip

The structure of a double-dip lease is designed to claim the same tax benefit (usually depreciation) twice in two separate jurisdictions as well as any interest deductions for tax purposes. The second deduction often revolves around the framing of the equity and quasi-equity which may be layered in to support the redesignation of ownership 'calling apples and oranges' as the basis for interest deduction. These only work once or twice as tax authorities do not want such loopholes exploited.

### Hire purchase

A variation of leasing is hire purchase where the hiring party has a stated right to purchase the asset at maturity. (This is sometimes called 'lease purchase'.) Some tax treatments may make this attractive.

### Lease tranches

Leasing as a foundation tranche for a project financing may still require other loans in parallel. One would expect these to be either over-arching (granting a letter of credit to the lessor) or else a collection of subordinated, mezzanine, and convertible debt, even venture capital and bridging loans.

### Case study: Defeasance

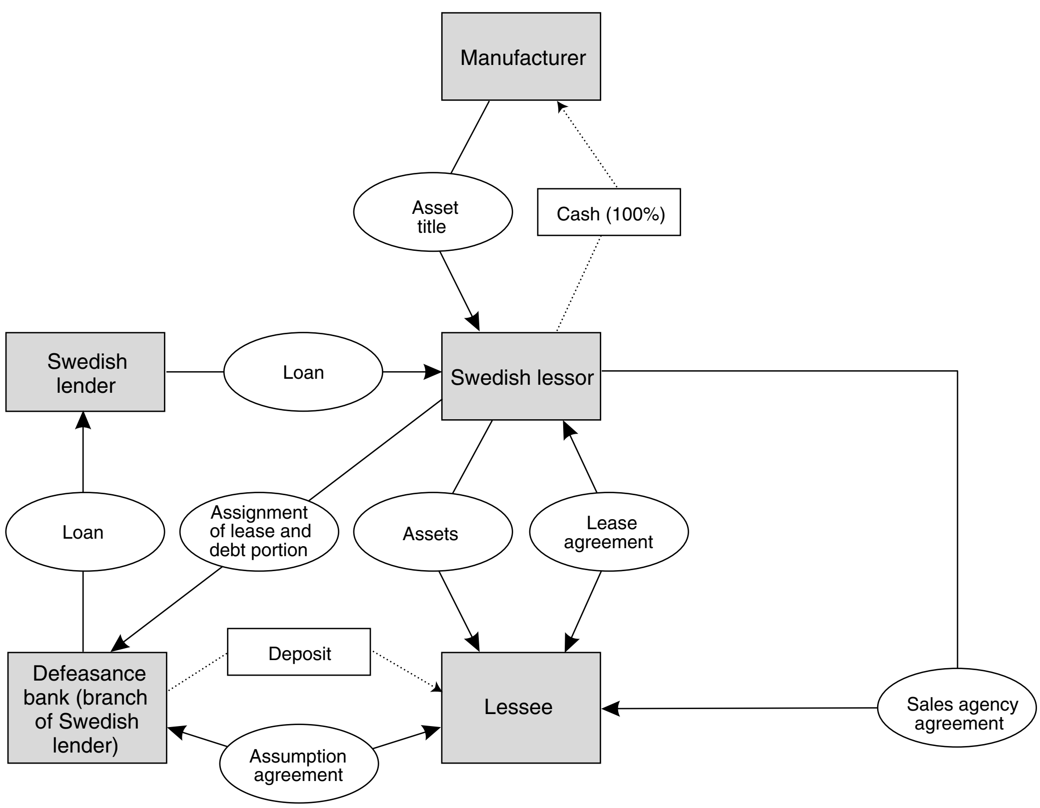
The Scandinavian exporters are active worldwide on many different types of equipment, including telecoms. By structuring a loan with its own branch holding some of the loan proceeds as defeasance (cash collateral), the lease structure is wrapped around the equipment sale and on-lease.

To extend the Swedish leveraged lease just described, defeasance can be structured in to accommodate a defeasance banker to cash collateralise the lease rentals to the project finance, the 'non-recourse lender' – in Exhibit 8.12.

To complete the Swedish troika, an export financial lease is shown in Exhibit 8.13. Here the ECA export credit support from Italy's SACE and Sweden's EKN is woven into a Jersey SPC which will act as the lessor. This is a leasing variety of buyer credit, with separate lease payments streamed to repay a specific loan tranche.[16]

Exhibit 8.11

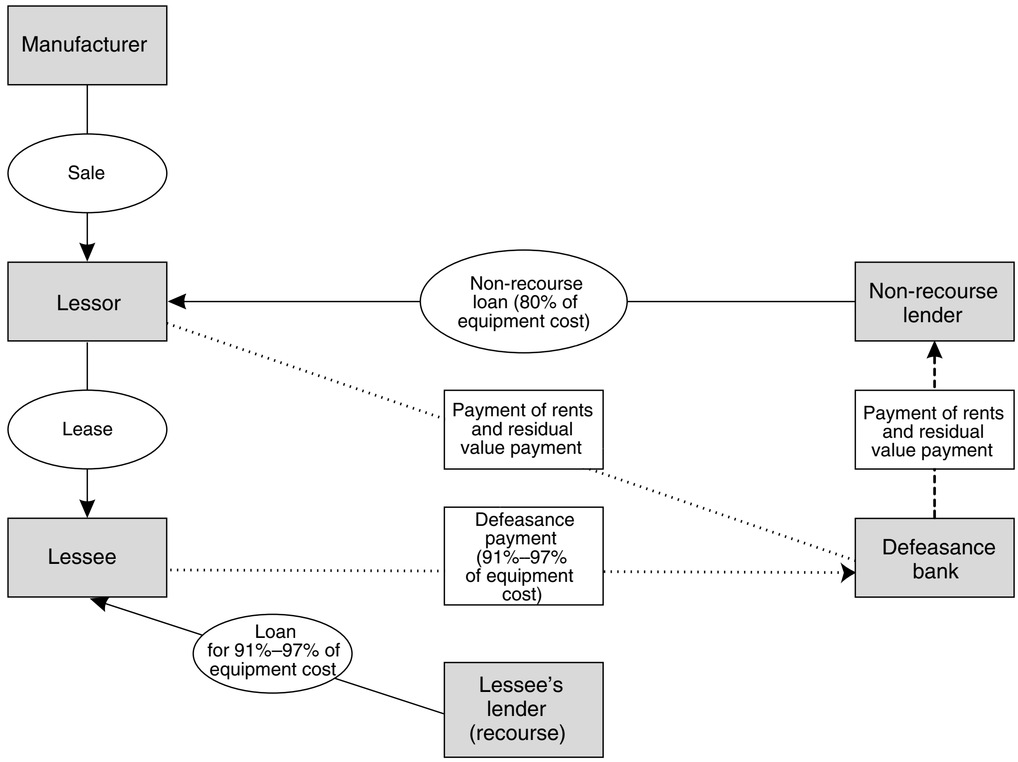
**Swedish leveraged lease**




*Source:* Author's own

Exhibit 8.12

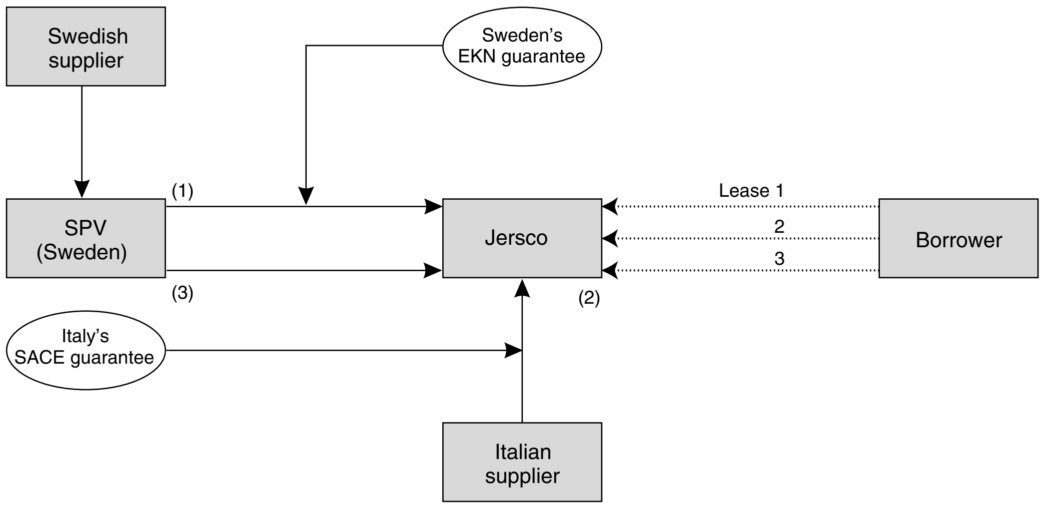
**Cross-border lease and defeasance**




*Source:* Author's own

Exhibit 8.13

**Export financial lease**

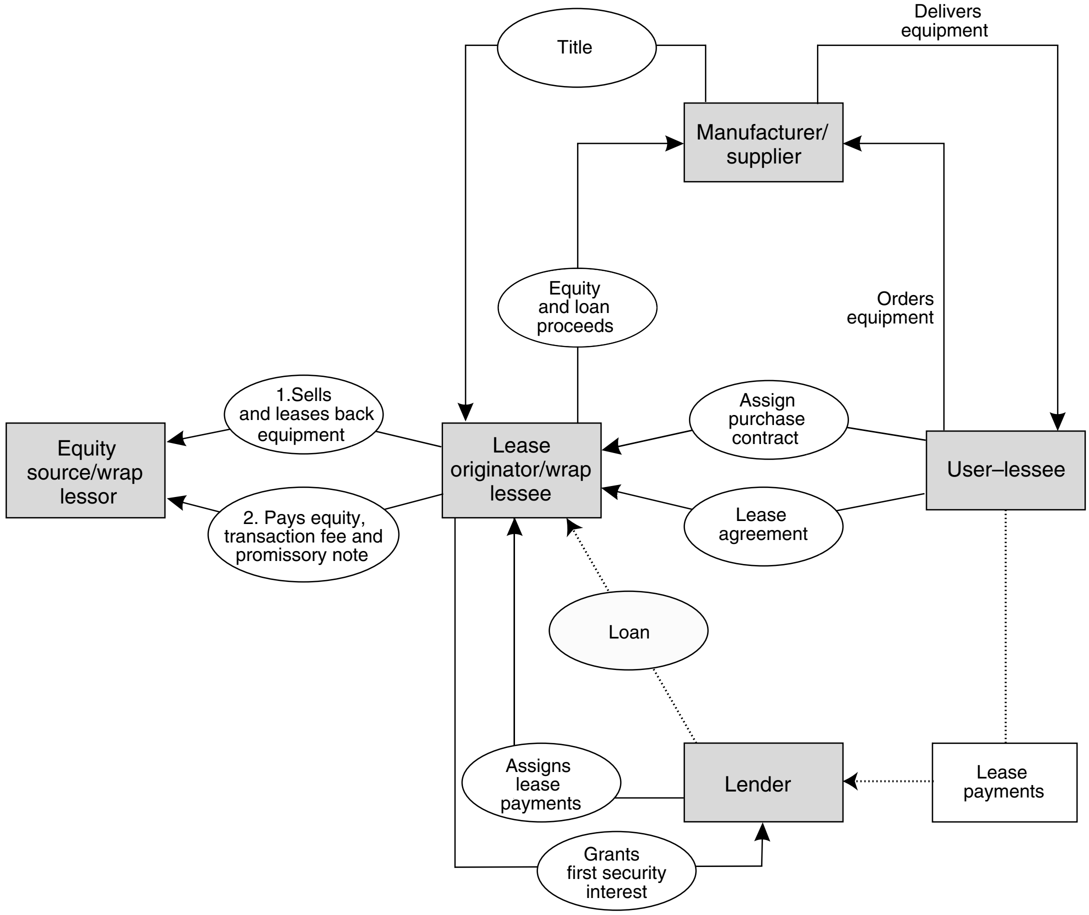



Lease 1 covers rentals qualifying for EKN cover.
Lease 2 covers rentals qualifying for SACE cover.
Lease 3 covers rentals representing essentially a down payment portion for both credits.

*Source:* Author's own

Exhibit 8.14

**Wrap lease**

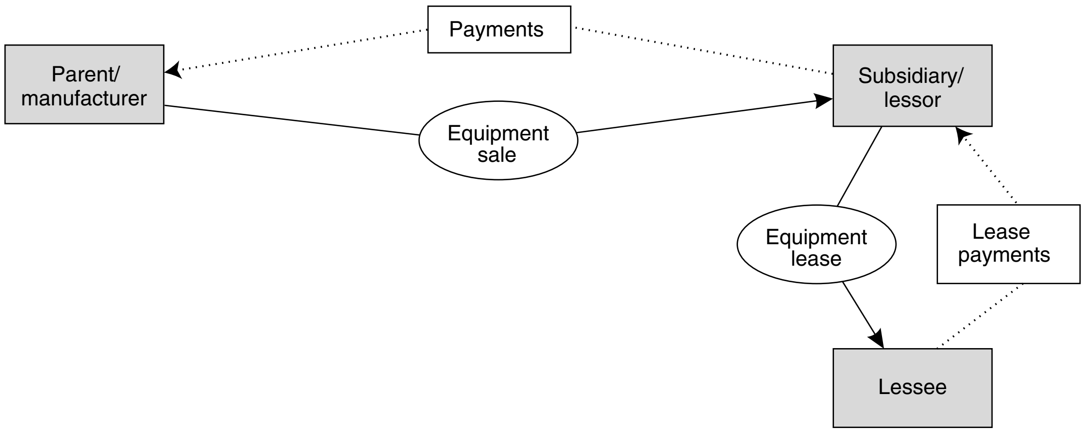



1 The wrap lease term is generally 1 to 3 years longer than the user lease term.
2 The payments due under the note generally equal the wrap lease payments; therefore, actual cash payments are not made by either party.

*Source:* Author's own

Exhibit 8.15

**Captive lessor**




*Source:* Author's own

**Case study: FPSO**

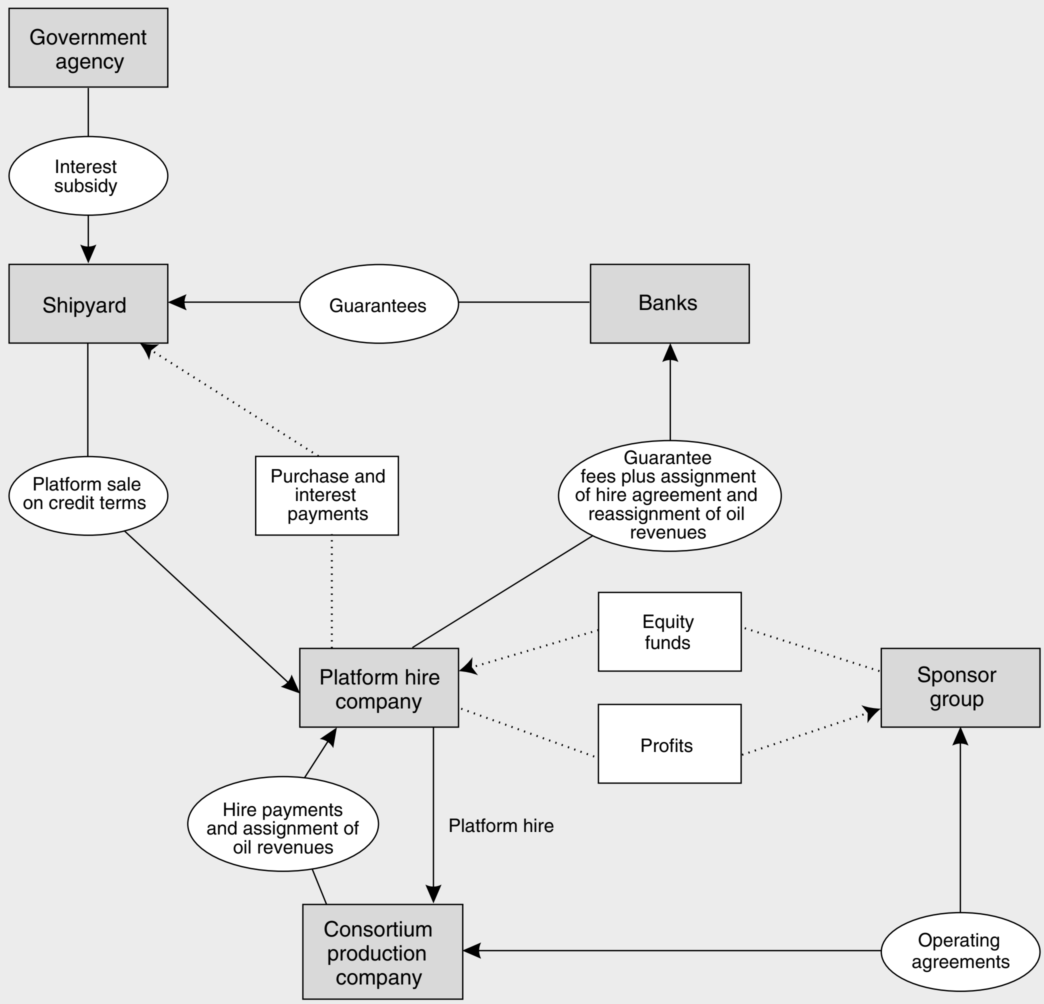
Concessional shipyard finance is outside the realm of the World Trade Organisation (WTO) as each country tries to protect its own shipbuilding capability. Shipyards can build many things besides ships. Exhibit 8.16 illustrates the mobilisation of an interest subsidy through an offshore oil platform project finance structured as a hire purchase. This style of structure would readily suit floating production storage offloading (FPSO) vessels used as moveable oilfield production units.[17]

*Continued*

Case study *continued*

Exhibit 8.16

**Platform hire with shipyard finance**




*Source:* Author's own

## Trigger structures

Other generic structures can be packaged into trigger structures. These include shifts in payment, prepayment, prior distributions and equity kickers.

### *Deferral*

One of the key structures in *force majeure* risk, Chapter 18, is the deferral of principal repayments. Banks can do this easily, less so bondholders. There are a number of deferral possibilities.

#### Inverse order of maturity

The deferred principal is added to the end of the scheduled principal which likely means a loan extension. Alternatively the words 'inverse order of maturity' imply that the last principal (P) outstanding is the first to be repaid/prepaid.

#### Current order of maturity

This is never allowed in a project finance. No 'holiday' can be earned by early repayment of principal (P).

#### Banked deferral

All manner of full or partial deferral may be directed to a notional account so that deferred principal can be recaptured fully or partially out of future net net cashflow (NNCF).

**Case study: Croydon Tramlink, UK**

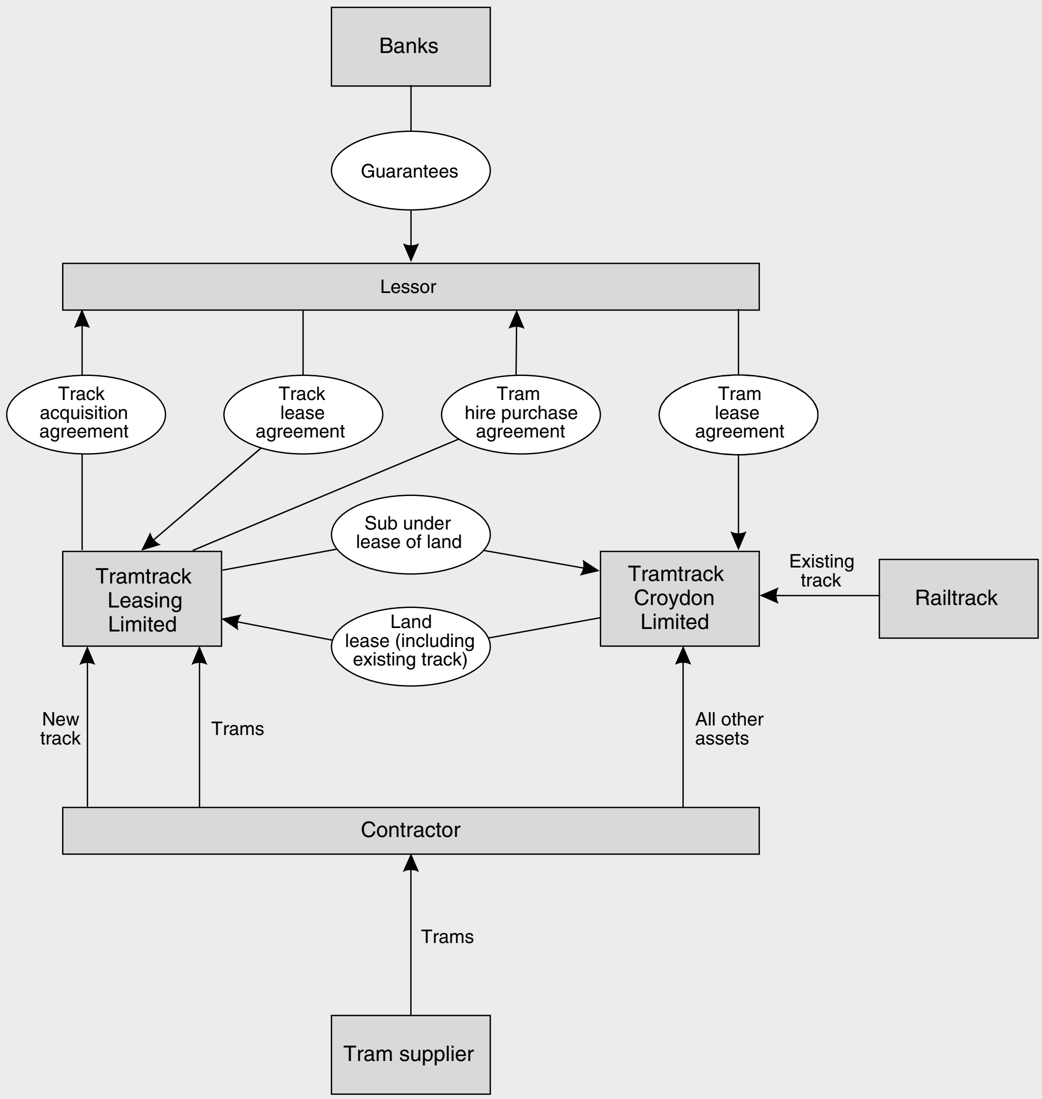
The winning bidder of Croydon Tramlink financially engineered quite a complicated structure by combining tram track leasing with conventional rolling-stock leasing, all under a project-finance guarantee and funded by way of leveraged leasing.

*Continued*

Case study *continued*

Exhibit 8.17

**Croydon Tramlink leases**



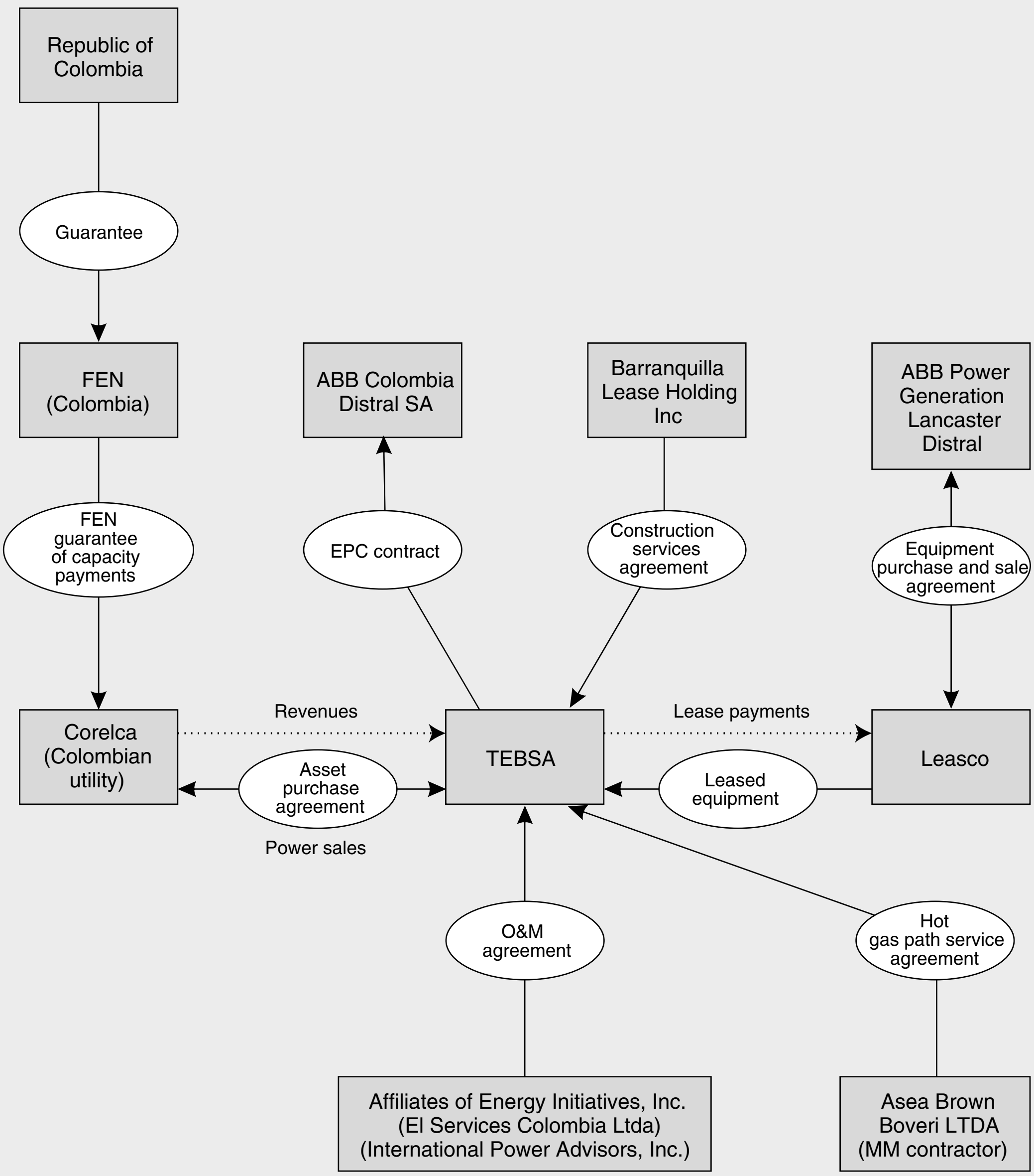

*Source:* Price Waterhouse

**Case study: Termobarranquilla, Colombia**

The US$575 million Termobarranquilla project in Colombia project financed the rehabilitation of an existing 350MW plant (contributed as equity) plus a new 750MW combined-cycle gas-fired set. The overall deal structure is shown in Exhibit 8.18. At the time, it was Latin America's largest ever power project financing.[18] A comprehensive Political-Risk structure protected the debt via US Eximbank and OPIC by using direct loans and OPIC-insured notes (see Exhibit 18.18). The offshore lease structure is shown in Exhibit 8.19. The leasing terms and conditions are listed in Exhibit 8.20.

Exhibit 8.18

**Termobaranquilla structure**

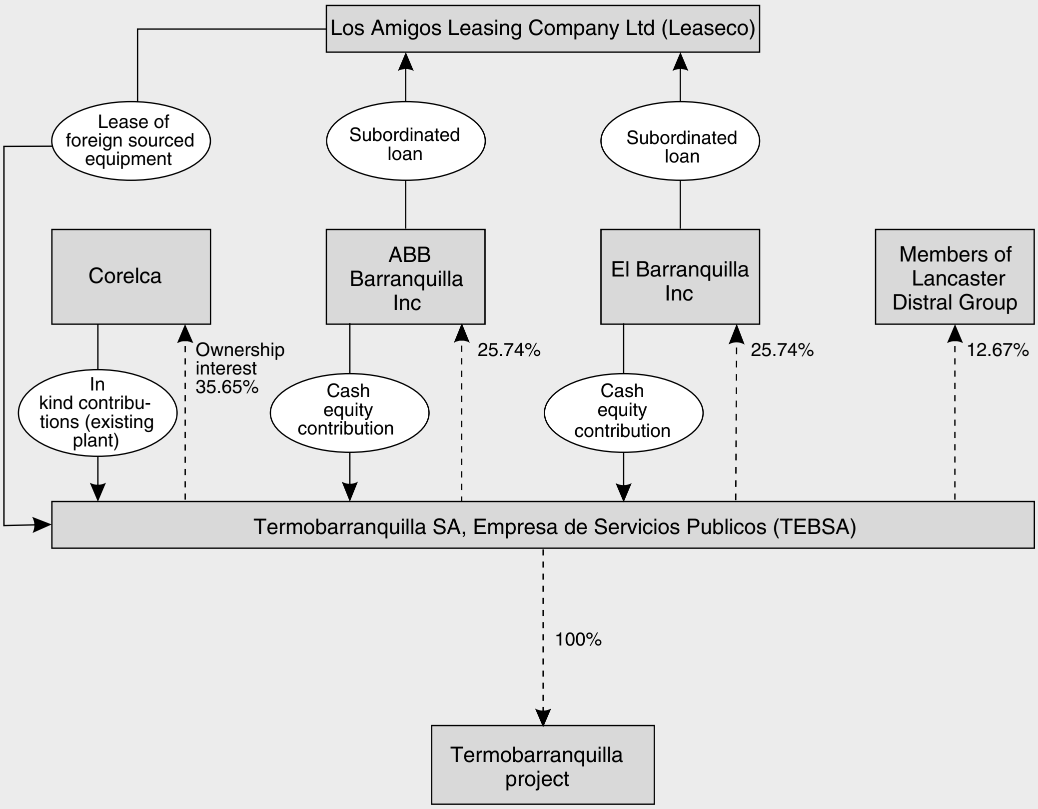



*Source:* Author's own

*Continued*

Exhibit 8.19

**Termobaranquilla leasing**




*Source:* Author's own

Exhibit 8.20

**Termobaranquilla lease terms**

| | |
|---|---|
| *Benefits* | Deferral of custom duties and VAT over five years. |
| *Interim term* | Closing date until the earlier of substantial completion or date certain. |
| *Base term* | 12 years after US Exim conversion date. |
| *Rent* | Covers:<br>• principal, interest, fees, and other obligations payable by Leaseco under financing documents;<br>• payments to project sponsors payable under Leaseco subordinated notes and other equity returns (as permitted under financing documents);<br>• Leaseco administrative expenses; and<br>• all other project costs payable by Leaseco not otherwise payable utilising Leaseco's credit facilities. |
| *Purchase option* | The price is the higher of: (i) US$1.00; or (ii) outstanding debt. |

*Source:* Author's own

### *Clawback*

In the event of a shortfall of cashflow for debt service, that is, when ACF < (P + I) or DSCR < 1.00, then any prior surplus cashflow that has been distributed by whatever means from the SPV to the sponsors must be returned ('clawed back'), but only to a limit of those cumulative distributions. Treasurers naturally hate this concept and will negotiate hard to avoid it. There are dangers too.

- The distributed moneys may have been dividended away further along the ownership track.
- Clawback may cause all manner of tax and accounting headaches.
- The contingent call may have to be noted in the sponsor's accounts.
- The money may simply have gone.
- The total of prior surplus for distributions could be small anyway.

It is a flexible structure used for cyclical projects where big swings generate big surpluses (and big shortfalls).

### *Mandatory prepayments*

Additional principal repayments may be structured to help shorten a project's loan life in the event of windfall cashflows. The same three options can apply as in deferral, discussed above.

**Case study: Iduapriem, Ghana**

In the Iduapriem project (see Exhibit 8.6) 50% of excess cashflow above US$2 million per annum was structured as a mandatory prepayment in inverse order of maturity.[19]

### *Equity kickers*

Many mezzanine structures include a royalty kicker or other version of an equity kicker. To protect a project financing yield and to better reflect the risk, a reverse equity kicker has been structured by the author on a number of occasions. As the debt service cover ratio (DSCR) cascades downwards towards 1.00, the bank receives an increasing kicker, triggered for example if DSCR is higher – the bank receives a low/no share of revenues, or triggered by NNCF or another defined stream.

## Financed structures

### *Equity*

Many forms of direct and indirect, non-recourse and limited-recourse alternatives are interlaced throughout the risk structuring in this book. The key to structuring is to determine the event, its cashflow impact, and the tolerance for time and amount (limited recourse), which is all a matter for financial modelling and negotiation.

There are some equity specific structures to note.

### Dividend reserve

Moneys are built up to pay this once the central bank and company regulatory authorities sanction the distribution.

### Subordinated debt

All shapes and sizes of subordinated debt are structured in to help the sponsor remove surplus cashflows in the early, otherwise unprofitable years.

### Convertible debt/initial public offering

By structuring a takeout by way of conversion/initial public offering (IPO), allows the project to enjoy the high leverage that can be attained with project finance with lower interest costs.

## *Securitisation*

The classic arrangements to securitise receivables (for a large portfolio of rateable assets, plus cash/collateral to cover an anticipated default rate) can be applied to project financings.

### Collateralised loan obligations

Collateralised loan obligations (CLOs) are a balance sheet management tool whereby banks/ institutions/developers package up a portfolio (usually of similar projects) for securitisation.

### Revenues

Export proceeds, monetisations, and escrow accounts all work to pool receivables into an ascertainable cashflow line (usually gross revenues) against which a rating or digestible pool can achieve financing, usually on a fairly short-term and rollover basis and not always suited to project financing a new development. This variant of asset-backed securitisation has not yet made much of an impression on the cashflow driven project finance business.

**Case study: IFC, Argentina**

An IFC loan to an Argentine company was assigned to a US trust as a 'single asset securitisation'. The IFC deal was rated at the time higher than Argentine sovereign debt. The analysts could rightly state that this saved 100 bp off the pricing for a comparable IFC A-B loan structure with a shorter term.[20]

## *Joint financing*

The tendency in project financing is to isolate and quarantine the unit/SPV into a tight package. However, where a series of developments are interlinked or mutually dependent, a project structure can be developed to use the contracted flows of cash as the loan and repayment routes.

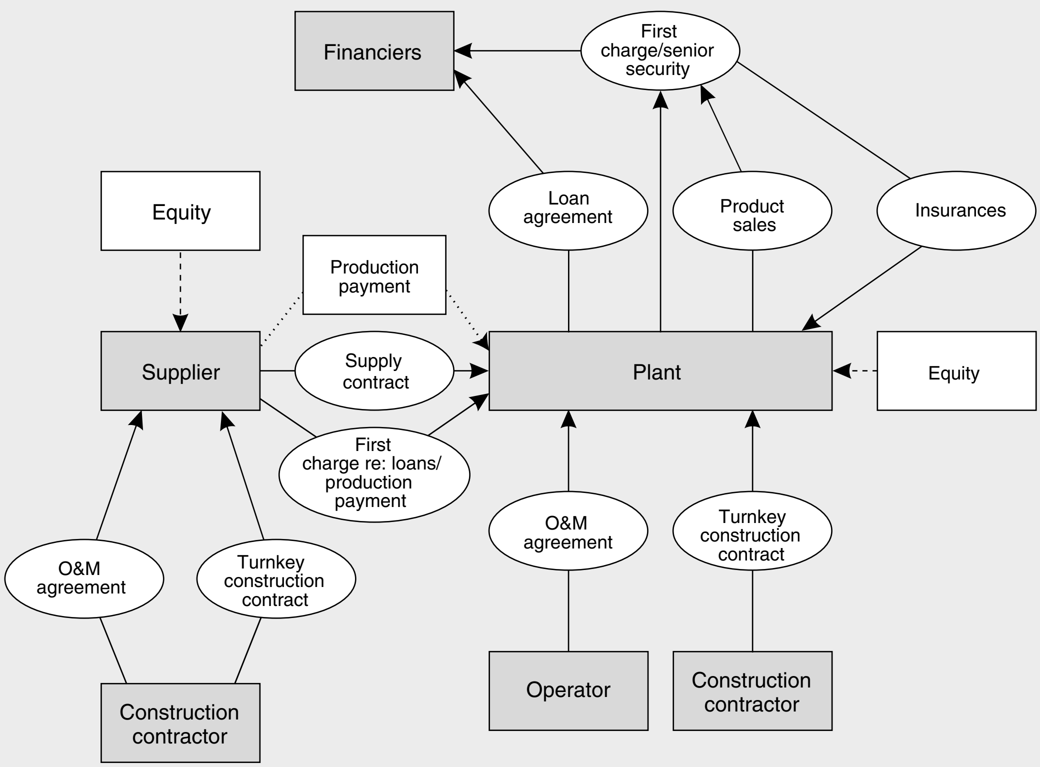
A joint financing is another route to preserve the banker's step-in rights[21] against pressure from a sovereign entity to have priority step in rights – who may be citing 'national strategic' interests.

### Case study: Production payment

In Exhibit 8.21, where a supplier is dedicated to a new plant, a production payment has been used to make the advance (of debt) for the supplier which will be repaid out of the supply agreements.

Exhibit 8.21

**Joint financing**




*Source:* International Advisory & Finance 2014

## Study structure

Besides the due diligence, which is inherent in any project financing, the ratings agencies exemplify the study acceptance route. The main international agencies are (alphabetically):

- Fitch;
- Moody's; and
- Standard & Poor's (S&P).

Local ratings agencies lag behind the standard of the big three. The upsurge in the capital markets/project bonds and notes is a direct result of the highly directed and organised effort by all the agencies to tap into this new line of ratings business. The Moody's/S&P bond rankings are given in Box 2.3.

### *Ratings*

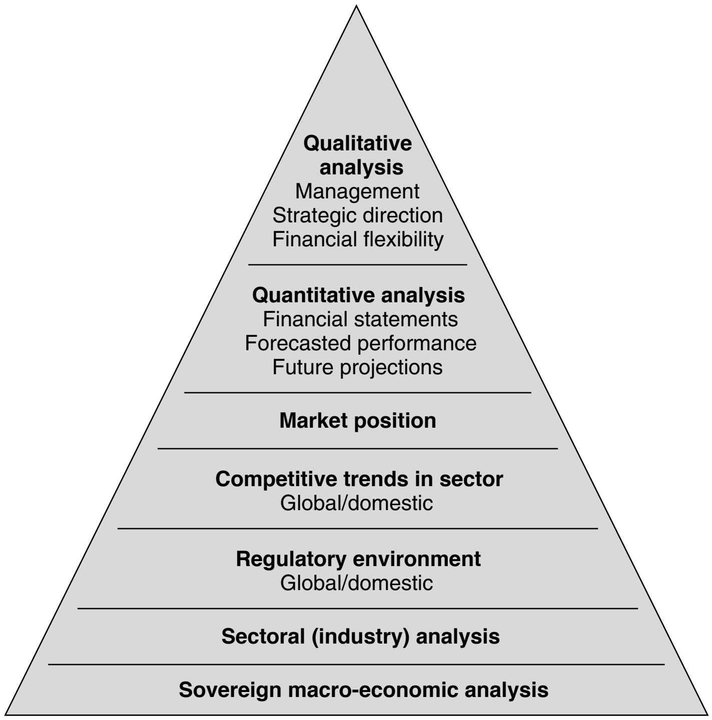
The ratings agencies follow very similar paths to those of the banks in assessing project finance risks and structures. However, there are six key differences to the ratings agency approaches compared with the banks.

#### Methodology

A ratings agency starts at the sovereign rating at the base of its 'pyramid' of risks as shown in Exhibit 8.22. The key difference to the 16 risks considered throughout this book is in the qualitative area, especially strategic direction. Moody's could expect to interview the chair of the sponsor's board and quiz him or her on strategy, succession planning, relationship with the president/managing director, and so on. A banker would have that door firmly shut by the treasurer/finance director. Not that banks do not consider strategic direction. It is because their credit appraisals tend to be highly numerate and not as qualitative.

Exhibit 8.22

**Moody's rating analysis pyramid**




*Source:* Moody's Investors Service

## Default

A rating is a default expectation level.[22] Exhibit 8.23 illustrates default at various sector levels. However, it is loss-given default (LGD) which is the operative credit committee number (which, as already noted, is very good in a project financing).

Exhibit 8.23

**Average default rates by sector**

| | | Basel II definition of default | | Moody's definition of default | |
|---|---|---|---|---|---|
| *Industry* | *Projects (1)* | *Defaults (2)* | *Average default rate percentage* | *Defaults (3)* | *Average default rate percentage* |
| *Chemicals production* | 119 | 12 | 10.1 | 12 | 10.1 |
| *Infrastructure* | 1,260 | 49 | 3.9 | 40 | 3.2 |
| *Leisure and recreation* | 102 | 9 | 8.8 | 9 | 8.8 |
| *Manufacturing* | 53 | 9 | 17.0 | 9 | 17.0 |
| *Media and telecom* | 35.4 | 43 | 12.1 | 40 | 11.3 |
| *Metals and mining* | 195 | 24 | 12.3 | 23 | 11.8 |
| *Oil and gas* | 486 | 38 | 7.8 | 36 | 7.4 |
| *Other* | 43 | 4 | 9.3 | 4 | 9.3 |
| *Power* | 1,455 | 114 | 7.8 | 102 | 7.0 |
| *Total* | 4,067 | 302 | n/a | 275 | n/a |
| *Average* | n/a | n/a | 7.4 | n/a | 6.8 |

(1) Based on 4,067 projects.
(2) Based on 302 defaults (Basel II definition).
(3) Based on 275 defaults (Moody's definition).

*Source:* Moody's

## Deal pricing

High-yield/junk bond pricing can start off at 500bp to 600 bp above the equivalent Treasuries. A banker presenting a mandate at Libor + 6% to a credit committee would be met by the reaction: '*Something's wrong. Too risky. No one offers to pay us that sort of margin*.' But the capital market's depth and portfolio appetite can take an exposure sweetened by overall yield.

## Covenants

Project finance covenants are very extensive for a bank deal. More than 50 covenants, positive and negative, are often seen. Many bond deals have very light and short covenants preferring to structure off robust, that is 'high' DSCRs and large debt-service reserves (6 to 12 months) to try to protect against a money default.

## Terms

Bonds and notes can extend by double the term available in banking transactions. A term of 20 to 25 years, is available in mature markets and 33 to 35 year bonds have already tested this limit. Post global financial crisis (GFC), and under Basel III term commitments for everyone are much reduced.

## Pricing

Fixed-rate and consumer price index (CPI)-based pricing are commonplace for project bonds. Banks usually have a hard time matching either but can get there with advanced swap floating to fixed or floating to CPI structures.

One other matter needs to be restated. Banks can be very flexible in funding and covenant resetting. This is anathema to bondholders, if one can find them to ask. Therefore, any refinancing route is usually bank to bond and not bond to bank.

### Case study: Long Yuan Group, China

China's Long Yuan Group was essentially an arm of the then Ministry of Electric Power (see Exhibit 8.24). The Minister's support letter was stated to be non-enforceable. The 144A project-finance bond was for two undeveloped 250MW power stations using local coal.

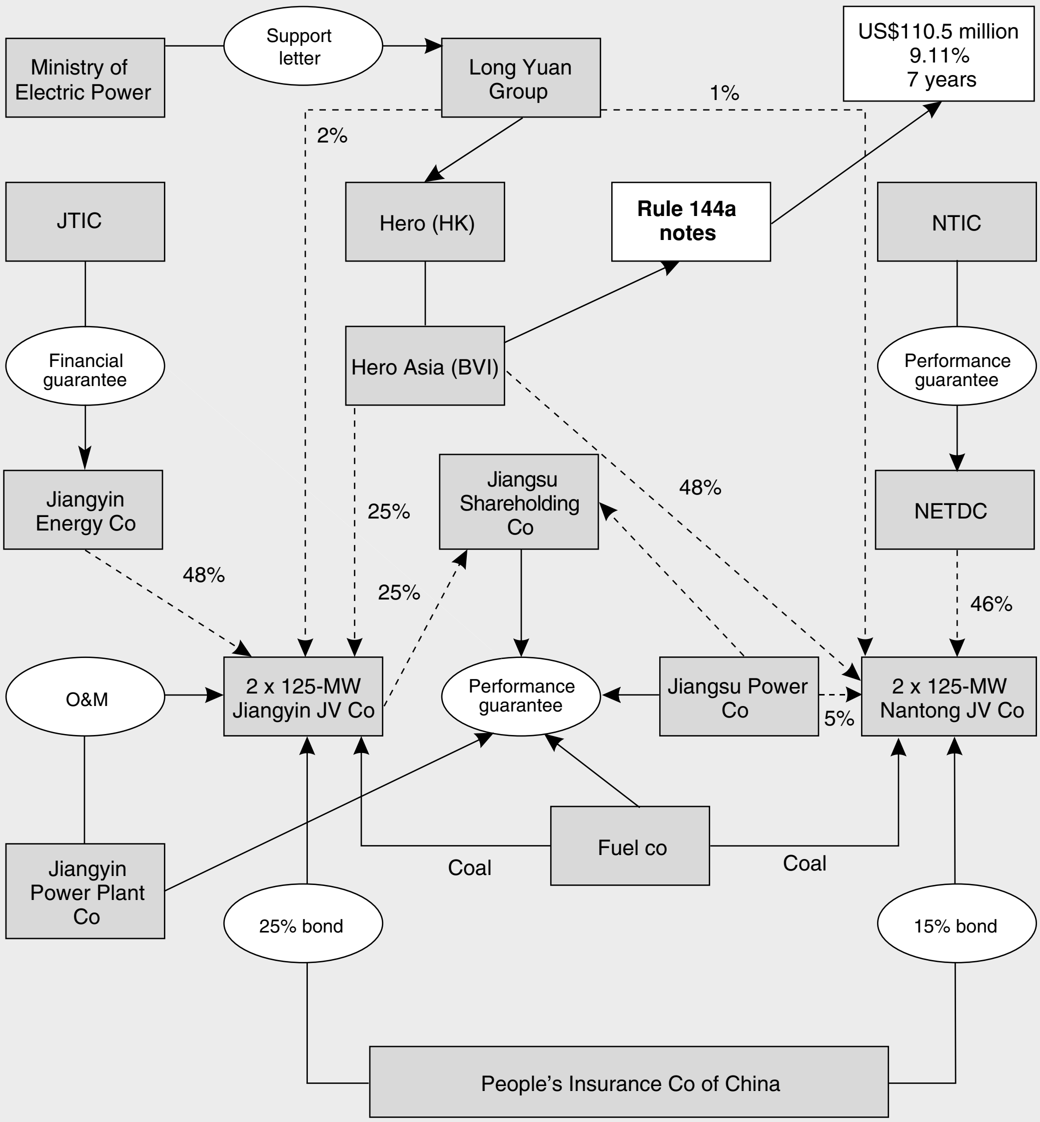
When Moody's rated the deal, it was rated equal to the sovereign of China. Moody's accepted the close linkage of Long Yuan to the Ministry and the importance of these power stations to nearby Shanghai/Jiangsu. A banker could not accept the support letter whereas Moody's can 'value' a deal with zero political risk cover, no offtake contracts, serious environmental risk as well as unknown or uncontracted completion risk. The legal risk of China is also regarded as very serious – and in effect, a banker could not do such a deal.

*Continued*

Case study *continued*

Exhibit 8.24

**Hero Asia**



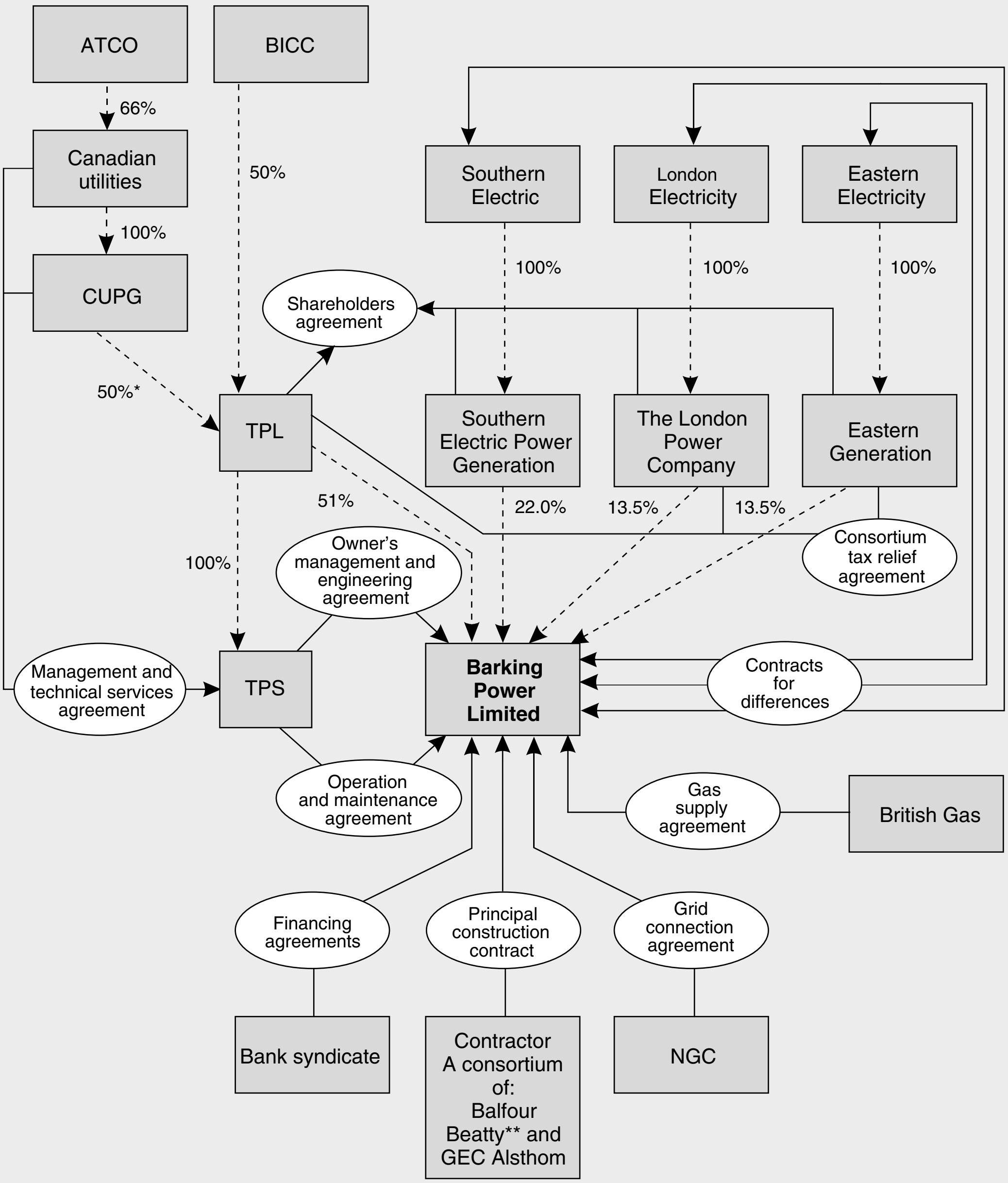

*Source:* Tinsley, CR, *Project Finance in Asia Pacific: practical case studies*, Euromoney, London, 2002

### Case study: Barking Power, UK

In the Barking Power transaction in Exhibit 8.25, Thames Power Limited (TPL) owns 51% of the incorporated SPV, Barking Power Limited. However, TPL itself is owned 50:50 by Canada's CUPG and Britain's BICC, thereby deconsolidating one layer back from the project SPV. TPL was also the operations and maintenance (O&M) contractor as well as the owner's engineer to monitor the turnkey construction contract (TCC).

Exhibit 8.25

**Barking**




* CUPG will have voting control of TPS until the end of the defects liability period.

**Balfour Beatty is a subsidiary of BICC.

*Source:* © International Advisory & Finance, 2014

## Avoided

The use of structures to avoid risk implies matters must be completed in advance or are structured to reduce the loan's exposure on the balance sheet.

### *Off balance sheet*

One of the objectives of project finance is to establish the debt as an off balance sheet obligation according to accounting practices. Under International Financial Reporting Standards (IFRS) all (accounting) intangibles and contingencies must be noted or else put onto the balance sheet. There are six main balance sheet tools available:

1 deconsolidation;
2 diamond deconsolidation;
3 defeasance;
4 derivatives/options;
5 puts/calls/indemnities; and
6 comfort letters.

#### Deconsolidation

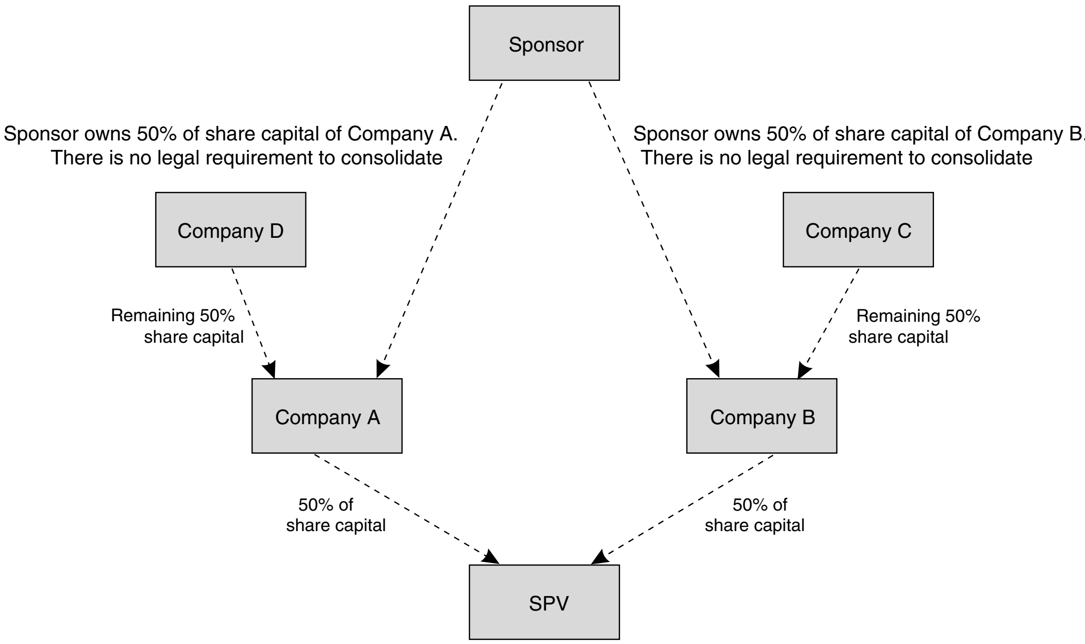
As outlined in the Introduction, with ownership below 50% coupled with acceptable risk and control percentages, the sponsor can simply book the investment in the SPV, but not consolidate its percentage of the high level of project finance debt. Another variation is to park 1% to control, yet use the same 1% to get below 50%.

#### Diamond deconsolidation

In this structure illustrated in Exhibit 8.26, a cascading deconsolidation chain is established. A double diamond route may seek to gain 100% of the SPC. A company is the mandatory SPV choice for a deconsolidation/diamond route.

Exhibit 8.26

**Diamond structure flows**




The sponsor's shareholding in Company A and Company B is only 50% in each case. However, the shares it holds will have greater voting rights than the shares held by Company D and Company C. The sponsor therefore has effective control of SPV but has no legal requirement to consolidate.

*Source:* Author's own

## Defeasance

By cash collateralising some or all of the project finance, its balance sheet effect from the SPV can be made to appear neutral, even better zero. If a sufficiently complex cross-border structure is implemented, as in some cross-border leasing deals (see Exhibits 8.11 and 8.12), then interposed defeasance entities can lower/eliminate the project debt.

## Derivatives

Structured finance tools, especially credit derivatives, can yield off balance sheet results with the caution that 'the off balance sheet appeal of a credit derivative to a particular investor is far from intuitive'.[23] Most of the recent tools are essentially trying to stay one step ahead of the last FASB Exposure Draft.

## Puts/calls/indemnities

Off balance sheet status can be achieved by structuring 'not quite obvious' recourse documentation, the effort here again is to sidestep FASB/accounting rules. Debt buy-back structures are framed essentially as options or springing guarantees and indemnities may be mobilised.

## Comfort letters

Exactly the opposite of what is discussed in the previous point, the main rationale with a comfort letter is to keep the corporate support off balance sheet through vague language which is not the same as a financial guarantee. The wording can represent all varieties of 'support', such as:

- a letter of awareness/consent;
- a letter stating policy;
- a letter of practice; and
- a letter recognising compliance.

Note that this is not to be confused with the letter of comfort/support which is granted by governments and which states 'unenforceable' on the cover. This is really an approval chop/stamp. If this letter is not signed, it signals that the project has not yet been approved, a political risk (see 'Government supports' in Chapter 21).

### Case study: Letters of comfort

An examination of letters of comfort language in Box 8.1 shows how subtle the language can be.[24] The enforceable 'choice' is the BBL 'practice' statement. The MMC 'policy' is not binding. Some courts are moving in the direction that these letters were written to give positive comfort, not lay down an escape route. Therefore, it might be possible to jurisdiction 'shop' a binding letter which an accountant would still say represents no balance sheet hook.

### Box 8.1

### Letters of comfort

Kleinwort Benson Limited vs Malaysian Mining Corporation Bhd (MMC) (English Court of Appeal):

> It is our policy to ensure that the business of MMC Metals Limited is at all times in a position to meet its liabilities to you under the above arrangements.

*Continued*

**Banque Brussels Lambert SA (BBL) vs Australian National Industries Limited (Supreme Court of New South Wales):**

> We… confirm that it is our practice to ensure that our affiliate… will at all times be in a position to meet its financial obligations as they fall due.

**Which one is binding? The second one.**

## Summary

There are numerous basic and sub-structures which can be used to amplify and dampen the responses of the many structures laid out later in this book. Many of these are standard financial arrangements onto which project finance risk structuring has been added. For others, project finance has developed its own strongly packaged approach to find the risk structuring solution. Hopefully, it will not then be subject to Severe ID's Law – the chief cause of problems is solutions.

---

1 Tinsley, CR, 'Risk trade off', at 2nd Mineral Economic Symposium, CIM, 1982.
2 Consolidated Electric Power Asia, 'Prospectus', 1993.
3 Morrison, R, 'Pego makes it through the hoops', *Project Finance International 42*, 1994.
4 Morrison, R, 'Entergy funds its first market deal', *Project Finance International 145*, 1998.
5 IFC, 'Ghanaian Australian Goldfields Limited', term sheet, 1992.
6 Standard & Poor's, 'Ras Laffan Liquified Natural Gas Co Ltd.', Global Project Finance, 1997.
7 Boston Consulting Group, 'Revenue projections for the Argyle Diamond Mine', 1982.
8 CRU International Ltd, 'The outlook for nickel and cobalt', 1997.
9 TelecomAsia, Prospectus, 1993.
10 Carrington, J, *Risk Taking in Canadian Mining*, Pitt Publishing, p. 18.
11 Reynolds, GC, 'Unincorporated joint ventures', Project Development Symposium, Australia, 1983.
12, 13 Kayaloff, IJ, *Export and Project Finance*, 1998, Euromoney Books.
14 Tinsley, CR, 'Risk analysis and allocation', in *Practical Introduction to Project Finance*, 2000, Euromoney Books.
15 Fabozzi, FJ and de Nahlik, CF, *Project Financing*, 8th edition, 2012, Euromoney Books.
16 See endnote 12.
17 Prins, JJ, 'Financing FPSOs', in *Project Finance Yearbook 1996/97*, 1998, Euromoney Books.
18 Laurie, RJ and Scholtz, RE, 'Project finance perspectives in emerging markets: the Colombian experience', *The Journal of Project Finance*, Institutional Investor, 1996.
19, 20 Ahmed, PA, *Project Finance in Developing Countries*, 1999, International Finance Corporation, p. 52 and p. 22.
21 Tinsley, CR, 'How to finance a mine mouth coal project', *Project Finance International 73*, 1995, p. 35–9.
22 Moody's, 'Default and recovery rates for project finance loans', 1983–2011.
23 Reach, R, 'The market for credit derivatives', in Das (ed), *Credit Derivatives*, 1998, Wiley, pp. 392–3.
24 McCormick, R, 'Project finance: legal aspects, Part 2', *Journal of International Banking and Finance Law*, 1992.

Chapter 9

# Due diligence

By any measure, the credit intensity of project financing is enormous. Either we have to do the investigations and analysis ourselves, rely on others to make the assessment – such as a ratings agency or the lead arrangers/underwriters – or engage specialist companies to conduct the effort piecemeal. The costs of a full-blown assessment can be staggering – figures of between US$5 million and US$50 million are known; in one case the figure went to US$150 million for feasibility work. All of this is inevitably paid for by the sponsors because project financiers are usually only willing to 'risk' their success fee once most of the other due diligence has already been done – and paid for.

As seen in Chapter 1, it is common practice to approach banks once the technical and financial feasibility studies are completed and board/government approvals are in hand. However, much earlier contact with the project financier may change the scope of some of these studies. Study work can be trimmed with the resulting time and money savings. The project scope may have to be changed to suit the way the moneys are raised – rather than the usual financial engineering practice of tailoring the financing to fit the corpus of the project.

The level of due diligence may vary remarkably.

1 A scoping view is sought about what level of project financing is prospective. Rules of thumb and back of the envelope calculations and factored comparisons may be the only figures available. A quick and dirty guesstimate will be made, drawing on sector constraints, funders' appetites and location aspects. This may take only several days.
2 Engineered cost estimates are at the ±15% level (before any detailed design work has commenced). The usual task is to examine the upper band of funding requirements and advise/judge what will be asked for in the contracts and other documents/supports. By now a reasonable set of benchmark cases (see Chapter 3) have been developed. This process can take a couple of weeks or months.
3 Full information memorandum/offering circular documents have to be worked up and signed off (with the attendant liabilities attached to disclosure, accuracy and forecasts). By now some detailed design estimates are on the table at the ±10% or closer level of accuracy and almost all the documents for signature are negotiated and drafted. Conditions precedent to financial closure will be fully listed, but have not yet been satisfied. All of this has taken months of work.
4 Due diligence is required of an existing cashflow generator in a merger and acquisition (M&A)/privatisation transaction which is more in the nature of an audit. The credit skills of bankers producing detailed financial analysis and track-record review work are brought into play here as well as expert benchmarking skills. This effort would be expected to take a month or more in a project finance style of funding.

## Systematic review

For the second and third due diligence layers, a systematic view of risk – a major theme of this book – will not just speed up the due diligence process but add great comfort through determining which risk aspects have neither been identified nor structured appropriately/optimally. What is missing and what has not been covered?

The best way to approach a project finance deal is as shown below.

1 Scan the information quickly to get a 'smell' of the deal and a feel for the quality of the information.
   - It may be necessary to sight all the relevant feasibility filing cabinets. Flip through these to see the level of work done – and see if it is possible to spot development options that were rejected. Though daunting, a quick data room visit can give great confidence when a particular risk aspect has to be chased down; one knows where to go.
   - Look for fatal flaws/no-go aspects right away. Fully explore any 'hunches' about the project so far.

2 Go through the main information very purposefully (and slowly) annotating each risk aspect, that query, another tick (of approval/concurrence), and so on.
   - This process should be detailed enough to catch any inconsistencies, contradictions, or items assumed as 'given' but never analysed.
   - The main target is to spot any errors, omissions, or overly optimistic views.
   - It is worth asking to sight the original study scopes of work to see if any slant or omission (deliberate or otherwise) has been embedded into the study or data gathering process.
   - Filter the main sector risks first in accordance with the 80:20 rule. Eighty per cent of the key items can be identified in 20% of the time with 80% of the time spent tracking down the remaining 20% of the factors being examined. The top four or five risks for each sector are given in Chapter 7.
   - Consider the state of studies, their credibility, thoroughness, the quality of the study professionals, and – most importantly – their independence.
   - Towards the end of this detailed review some items may need to be re-examined, expanded, or re-visited to determine the impact of the particular risk factor.

3 Then start the financial analysis/modelling.

**Case study: Price forecasting, US**

For an acquisition study of a US project in a cyclical industry, the company's president, an engineer, insisted in using a linear-regression price forecast. Given that the operation was at the upper end of the cost curve, it would inevitably operate at a loss for a period in each business cycle. Market risk (see Chapter 11) is immediately identified as a fatal flaw – or risk perhaps emanating from the engineer?

It is quite important to resist the natural temptation to explore the financial model prior to this stage. Financial models may themselves hide factors that have failed to be examined. Given a list of sensitivities and a model input sheet with hot buttons for those sensitivities, it is surprising to note how few people will add in further sensitivities, preferring to tweak the existing 'buttons'.

The risks and their influence on the cashflows will now be reasonably clear. A definite perspective will have developed with a list of positives and negatives or challenges that should be worked through the data, input assumptions, the model or the modelling technique. This is the time to check the sensitivities. Certainly the input parameters for the downside case and breakeven stress testing and breakeven scenarios should now be evident. Chapter 3 discusses various modelling approaches and the structuring applications for the four benchmark cashflow cases.

Imagine a 13MB financial mega-model for a toll road driven by four modules: construction, revenues by toll plaza, traffic, and financing. Besides the sheer size, the model could also handle a dozen sensitivities, automatically adjust the project finance, and calculate all the cover ratios, dividends, and so on. Nowhere could one change the starting traffic levels; these were locked in. The model would be so large as to be so daunting that no one would have the energy to redo the primary cashflows in this model.

## The feasibility process

At the time a project financier first connects with project studies, the process is often dominated by engineers. Perhaps this has been their sole endeavour for the last few years, certainly the last 12 to 15 months and is reflected in the paper mountain of reports, analyses, and drawings in their feasibility report(s). Some projects have been under study for a decade (or more) and have built up a room full of filing cabinets, binders, and storage boxes.

There are two problems with this.

1 The engineers have 'fallen in love with their deal' and their future depends on it.
2 Most engineers are not primarily trained in risk analysis or optimisation. They tend to rely on cruder financial models and measures (net present value (NPV) – discounted cashflow (DCF)) when selecting alternatives. Further, they may resent any intrusion to change their view; and may have to be pushed to do so.

Many sponsors are keen to cut through this lengthy process to get at the money and have developed approaches, listed in Box 9.1, all of which have been experienced to circumvent lengthening the feasibility process. A good adviser can help sponsors through this process.

**Box 9.1**
**Feasibility study types**

1 'Here's what's in the files. You figure it out.'
2 The Historical Novel.
   - 'The old operators weren't very good.'
      - 'What we'll do will be just the trick.'
      - 'Therefore what remains is excellent.'
   - 'My grandfather worked here and he always said that they operated very inefficiently.'
   - 'Our family always did it right. The new blokes have ruined everything. We'd like to get it back' – using your project finance money, since we have none left.
   - 'The price was only five cents when this old study was done. They never developed it.'
      - 'They abandoned this old system when the price dropped to five cents. It's still in perfect working order.'
      - 'They changed operating methods when the price dropped to five cents. It is now economic.'
      - 'It was shut down on environmental grounds, but we'll fix it/move it to regain compliance.'
3 'A little bit of this and a little bit of that.'
   - Usually on the back of the envelope and by the operating companies.
4 An equipment list.
5 The bare minimum.
   - 'You mean there are alternatives that should be considered?'
6 'This consultant says it's excellent. But we don't know.'
   - 'Tell us what consulting reports the bank wants to see, because we would like some money.'
   - 'Say it looks good so we can promote it better using your Name.'
   - 'We bought the rights based on this study. Therefore it ought to be good enough for you.'
7 'Here's a summary. Neither we nor you need a feasibility study because our Great Company (or the Chairman) says it's ok and wants to do it.'
   - 'We're a big company. We can do anything.'
   - 'You're just a banker. You will do anything we say.'
   - 'Our operating expert has started numerous projects (and left them). No high priced study needed.'
   - 'We can design and build it for 30% of what big engineers would cost.'
   - 'The Prime Minister wants to do it. We must do it.'
   - 'It's a priority for my government.'
   - 'In our country, we can build it for one third the cost of building it anywhere else.'
8 'Everything we could possibly dream up to spend money on' (usually by a Namebrand EDC Co).

*Continued*

Box 9.1 *continued*

- 'With multiple computer runs' (usually for an oil company).
- 'With so much work overestimating, over designing and over analysing, it must be ok.'
- 'The Good Housekeeping Seal of Approval' (definitely by Namebrand).
- 'This is an expensive study. Therefore it must be ok.'
- 'We've been studying it for years. Here are the reports. It'll be great to do.'

9 'We think it's a project. We think it'll work.' 'Let's get in there and see what we do/have.'
- 'We're not sure it's there. We're not sure it'll work. But anyway, it's a great proposition.' 'These traffic studies show it will work famously – a much needed project.'

10 'Everything is there. Therefore we have a project.' 'There are plenty of projects in the area.'
- 'We've found the one everyone else missed.'
- 'The area is favourable.'
- 'Seeing is believing. Here is what the area is like. Let's arrange a visit.'
- 'You write the report.'
- 'We've been operating on a two-years' life/concession for the last 10 years. This will continue for at least for another 15 years.'
- 'How about financing the to be found project now?'
- 'The quality of opportunity/supply in the province is better than anywhere else in the world.'
    - 'The government of this province supports this project.'
    - 'This province needs this development.'
    - 'My brother-in-law is the minister. Since we're kicking out foreigners, here are their necessary reports.'
    - 'They're going to change the law/import restrictions to make this project work.'
    - 'We're the only locals who can do this project. We have the Minister in our pocket.'
    - 'This project is one of a kind and can only be done in this province.'

11 'It's technically feasible. Economics to come.'
- 'This new and unproved technology will make us a mint.'
- 'Trials look good. Commercial scale? No problem.'
    - 'No need for a pilot plant or further studies on this standard operation.'
- 'Fantastic value added from further integration/processing.'

12 'The market is definitely there. Even you can see it. Therefore any old project will do.' 'Here's what it will take to supply the contract' (likely a letter of intent).
- 'The Japanese will take all we can produce.'
- 'It's a great product/system.' (Let us ignore the past and present depressed markets.)
- 'We have a/the concession. Therefore we have a bankable project financing.' (We will not spoil it by talking about the other 204 MOU's/15 concessions.)
- 'Economics are great' (at the peak of the business cycle).
    - 'Prices/demand can only go up.'
    - 'This is a hot new area. Let's find a project.'

13 'It only works till payback. Thereafter, who knows?'

*Continued*

14 'Banks only need a financial analysis.'
15 The 'bankable' document.
- 'We'll only let you see what we want you to see.'
- 'Here is a discussion of the risks banks need to assess in this project.'

16 The commissioned document.
- 'Here are the answers to your questions.'
- 'Please give us your questions.'
- 'Preferably give us the answers you want to see.'
  - 'Thanks for telling us your hurdle ratios. We've adjusted everything to suit.'

17 'They've called for tenders. It must be ok.'
- 'Everyone else is bidding/competing. It must be ok.'
  - 'If we don't get it, someone else will/we'll lose market share.'
  - 'This is a landmark deal, the first of its kind. How prestigious!'
  - 'This is a blockbuster deal. The sheer size means it must work.'

18 'There must be a dumb bank or multilateral agency out there somewhere.'
- 'Let's solicit bids to make it look good by way of competition/greed.'
- 'This is much better than the last deal those other banks just did/just got rated.'
- 'We have access to a guarantee that will solve the risks (from a top 50 bank).'
- 'The guarantee is coming next week. Quick, approve the deal.'
- 'Due diligence is unnecessary' (and costs money which we do not have).

## Selection of experts/engineers

The stock of experience, capability, depth and vigour of professionals is standard stuff. However, it is the quality of the individual rather than the aura of the company that is the most important. In the author's experience:

- it is possible for companies to be too committed to their industry sector or beholden to large sponsors in that sector – with a reluctance to criticise because they cannot afford to alienate them;
- some engineers only know (and love only) their sector with a consequent bias to it;
- some consultants are for hire (unfortunately they spell that word 'h-i-g-h-e-r'). The more they are paid, the more favourable the result;
- some experts carefully shape their scope of work and 'write their report' before doing any work. The areas omitted can be stunning;
- the in-house engineers of the banks cannot be independent. Their career depends on continued approvals; they cannot reject everything that comes across their desk (see also Chapter 20);
- some engineers, like some lawyers, will simply cut and paste the report from earlier studies. This is especially true of environmental due diligence;

- some companies rest on their name and earn money for their Seal of Approval without doing much work;
- some consultants are too busy and cannot really focus on the detail required;
- other consultants find anything outside their years of career experience simply cannot be done;
- engineers may seem reluctant to come to a judgement, always asking for more information. Others can focus (again like some lawyers) only on the problems and shortcomings and not balance these against any positive factors;
- some consultants are simply not up to date. Senior staff from large enterprises or government, who hold protected positions, do not understand what it takes to develop, fund, build, and operate a stand-alone project;
- some professionals are committed to any project development in their country. It will be good for the country – the country needs it; and
- some engineers will promote any project using a piece of equipment which they either sold or purchased. Others try to promote a project after having failed to get it approved in a prior job.

One conclusion is evident from this list. It is imperative to know the background of the individual engineer who will do the work, not the director or partner making the pitch for the work. If the individual has never actually worked in that industry sector, has never built or operated a project, has only ever analysed projects, then watch out. *Good judgement comes from experiences; experience comes from bad judgements (by others).*

- Check with the consultant's prior clients. Identify any that have been somehow dropped from the list of references or previous projects.
- Ask the engineers to identify/discuss what development options were considered and dropped. The rejection rationale may help frame the selected option better.
- Remember Davidson's Law of Enquiry: *people ask stupid questions for a reason.*

## Customary reviews

There are seven independent reviews that are 'standard' for just about every project finance.

1 *Legal review* of the documentary basis, individual documents (see Exhibit 8.1) and all acts, regulations, permissions, not forgetting how the risks and trade-offs are documented.[1] This is discussed in detail in Chapter 25.

   To summarise, know the individual lawyer/solicitor and be aware that they should know cashflows and structural trade-offs while keeping the documents simple. Choose someone who can manage and enhance negotiations.

2 *Taxation review*, especially if there are mixed facilities and cross-border impacts. Tax advisers may relish waving their arms around in aerial diagrammatics. Ask them to simplify it and sign off on it.

   The old saw applies: '*never do a deal just for the tax benefit*.' The deal should still work without the tax shuffle. The tax should enhance the deal. Watch for legal risk in what would be a new structure scenario.

It is important to separate the audit from the taxation review.

3 *Accounting reviews* are done in two forms. Firstly, the financial statements on a then and now basis, are investigated. The financial structure's effect is also factored in.

Secondly, the financial model is *audited* for computational accuracy and, as much as they can be assessed, for the appropriateness of the input-sheet variables, the model concept and, most importantly, the model result(s). Some companies refuse to sign off on models with circularity in the internal calculations. This is a pity since circularity is a feature of project finance structuring.

4 An *insurance review* is undertaken of all the policies in force, issued with cover notes or with full-blown insurance offers. Insurance brokers are hardly independent as they make a living with the large underwriters whom they cannot afford to offend.

A different strategy is to white out the pricing and give the policy to the underwriter's competitor for review. The review can be (competitively) stinging, which needs to be sifted to get at any holes. This route can also be considerably cheaper.

5 Every project today will have an *environmental review*. A large focus, stemming from the US's Superfund/CERCLA legislation, is pre-existing site contamination (contamination risk).[2] Governments have shifted the site remediation to any deep pocket that steps onto the site, which may include a project finance bank. Environmental risk *per se* is the subject of Chapter 16.

- The permit trail needs to be certified satisfactorily.
- Environmental standards will be tightened over time. Can the project cope? (Environmental obsolescence).
- What rehabilitation measures have been assumed in the cashflows? Is a sinking fund required for restoration works at the end of the concession/project?

6 Many projects will have a *market study*, especially if the price is not part of the contractual structure, as in a power-purchase agreement (PPA). In order to do merchant power deals (see Exhibit 7.6), four study structures are required, of which one is an overt plant by plant capacity projection for the relevant market.

7 There is one risk that most project financiers will review early and that is *management*. Has the project got the right people and vice versa? This aspect is expanded upon in Chapter 15, but it applies at this due diligence phase too.

Individual sector reviews need discussion as there are different advantages and flaws in each. However, one note of caution: if a credit approval memorandum or information uses the phrase 'highly-reputable consultant' more than three times, then the bankers probably have not done enough due diligence themselves!

In addition to the above seven 'standard reviews', we will examine traffic studies (which have many similarities to subscriber studies/market risk in the telecoms field) and construction cost audits below.

## Traffic studies

This highly numerate activity is far from reliable given the major failures almost everywhere. Mass transit studies, in particular, seem to be compiled in dreamland. One look at Boxes

9.2 and 9.3 will underscore the many techniques that can be used. The build-up of traffic revenue forecasts is shown in Exhibits 9.3 and 9.4. How can a project financier gauge the traffic certainty?

One first has to go back beyond the mathematics and computations to see through to the original information and technique. As discussed in Chapter 6, statisticians and modellers consistently trip over covariance and lagged endogenous variables – the premise that all other things do not remain equal – and what happens today influences what happens tomorrow (see ‘Statistical’, in Chapter 6).

1 It is important to separate the audit from the taxation review.
2 Examine all the traffic studies to date (see Box 9.2) and try to specify another quick and clean study by a different technique (which means one has understood the techniques thus far used). This is preferable to an audit (of an existing study) which may be mechanically perfect but does not check the methodology. It is always best to try to check the traffic studies by using a different study route (see Box 9.3 and Exhibit 9.1 for a South African toll optimisation route).
3 Examine the scope of work for the traffic study and who set the scope, the banks or the government/sponsor? The difference is ably illustrated in a Standard & Poor’s (S&P) study now applying to 106 start-up toll roads. (See Exhibit 9.2). A start-up toll road is a new connection between two places/cities. It is not the multi-laning of an existing road.
4 Ask how long the ramp-up is of the traffic forecasts in the forecasted cashflow revenues (Exhibits 9.3 and 9.4). It takes years, not months, to get to ‘trend’.
5 What is the year one ‘start’ traffic and what is the discount from the traffic consultant’s long-term traffic estimate?
6 It is also worthwhile to examine the underlying growth assumptions and to check these against reality. A handy way to check these is the attraction and diversion estimates used.
7 Be sure to talk to the person who did the work and ask for an honest confidence level. One will be surprised at how far below 90% confidence the ‘real’ feel is.
8 Go to that place and ‘walk the ground’ (preferably in a helicopter). Travel the area yourself at different times of the week.

**Box 9.2**
**Traffic study techniques**

- Population modelling.
  - Considering the growth trends; the ratio (to other areas) and the components; including demographic, migration, and so on.
- Trip generation.
  - Survey of where trips begin and end.
  - Willingness to pay for the tollway.
- Trip distribution.
  - Origin-destination studies and matrices.

*Continued*

  - Trip surveys (rational actor).
  - Growth (Fratar, gravity models).
  - Simulation of the traffic network.
- Econometrics.
  - Trend (jobs).
  - Step-down from other projections.
  - Input-output economic analysis.
  - Base multiplier adjustments to other traffic figures.
  - Sector (component).
- Other cashflows.
  - Advertising.
- Toll diversion.
  - Throttle/traffic calming.
  - Alternative routes and methods.
- Land use.
  - Accessibility of the tollway.
  - Multiple and linear regression studies of the traffic histories.
  - Top-down/bottom-up analysis of traffic histories.
  - Inventory of information on the various routes.
- Toll-booth.
  - Site selection and access.
  - Toll optimisation strategies.
- Modal split.
  - Public transport.
  - Cars.
  - Trucks.
  - Other methods of travel.
- Traffic assignment.
  - Counts (physically obtained).
  - Screenline studies of traffic in the corridor concerned.
  - Matrix analysis.
  - Preferences (surveys, satisfying, incrementalist).
  - Time (value of time, convenience of use of the system).
- Hassle factor.
  - Ease of use.
  - Park and ride.
- Comparisons.
  - Nearby similar tollways.
  - Similar environments elsewhere in the world.
  - Relative fares.

**Box 9.3**
**Forecasting toll road traffic**

The level of demand of a toll road is determined by a combination of complex factors. These will include the overall level and pattern of trips in the area, the time and cost savings that the toll road provides compared with alternative routes, the price of using the road and the willingness and ability of people to pay that price. Steer Davies Cleave has developed an approach to auditing the demand and revenue forecasts for a toll road scheme that examines each of these features within a rigorous and well-understood modelling methodology.

The key features of this approach are shown in Exhibit 9.1 and fall broadly into three main areas:

- defining the current traffic demand that could use the scheme (in-scope market);
- estimating the proportion of the 'in-scope' traffic that will use the toll road (traffic capture); and
- forecasting future year traffic growth in order to estimate demand and revenue during the toll road concession (traffic forecasting).

**In-scope traffic**

It is essential that a full understanding of the trip movements using the existing road and an assessment of route choice options is undertaken at the outset of a traffic study. The 'in-scope' traffic – traffic which could potentially use the proposed toll road – is equivalent to the existing travel demand. Current traffic levels and trip patterns are observed by traffic surveys and a computer-based traffic model is generally built to act as a platform for the base year traffic analyses.

**Traffic capture**

The proportion of 'in-scope' traffic likely to be captured by the toll road will depend on two principal factors:

- the advantages of the toll road; and
- the willingness of drivers to pay for those advantages.

If these can be quantified for each section of the toll road or origin-destination pair in the study area, a capture model can be developed to predict the level of traffic that will choose to use the road. Total journey costs for vehicles using the toll road are compared with the cost of using an alternative route.

Various techniques have been developed to compare these journey costs and determine the level of traffic capture predicted for the road. A method which is currently used by consultants worldwide, applies an exponential formulation (called the 'logit' equation) to the

*Continued*

difference in journey costs between the toll road and an alternative route. The logit equation which is used to assess driver route choice under varying toll strategies takes the form:

Percentage capture = 1 / [1 + expense( − a (cost of alternative road − cost of toll road))]

Where 'a' is a scaling parameter which governs the rate of shift of traffic from either road as the overall journey costs increase or decrease. This scaling parameter is calibrated using the existing traffic capture rates on any existing tolled sections.

The exponential function is used to allocate traffic flows to the alternative routes according to the difference in total costs of each option. This approach to modelling traffic capture is extremely flexible and transparent. The construction of a linked-spreadsheet model enables the consultant to undertake sensitivity tests instantly in order to test the influence that each model assumption has on the traffic flow and revenue stream.

### Traffic forecasting

Development of traffic in future years will itself depend on a number of key factors:

- recent traffic growth in the transport corridor;
- growth in the wealth and level of economic activity, which in turn will lead to a higher level of car ownership and to a higher rate of trip making within each household;
- growth in employment and population in the transport corridor; and
- growth in the volume of freight carried between factories, ports and from plants/factories to distribution and retail centres.

Information relating to recent traffic growth in the study area generally forms the basis of future year forecasts. These data are supplemented with economic development data and population data. Forecasts of future traffic levels are subsequently passed through the three-stage modelling approach in order to estimate future year revenues during the concession.

### Steer Davies Cleave capture model

Traffic capture by toll plazas is estimated by comparing the total journey generalised costs for each trip by the toll road and an alternative route. The costs of each journey via the toll road are calculated as follows:

Cost = (distance travelled x VOC) + (journey time × VOT) − Motorway bonus

Where VOC represents the perceived vehicle operating costs per km, VOT represents the value of time of the driver and the motorway bonus represents the attraction of high standard highways in terms of safety, convenience, and services.

*Continued*

Box 9.3 *continued*

The value of time of a driver can be considered as the amount of money a driver will pay to reduce his/her journey time. Consequently, the VOT parameter is an important element of the traffic capture model.

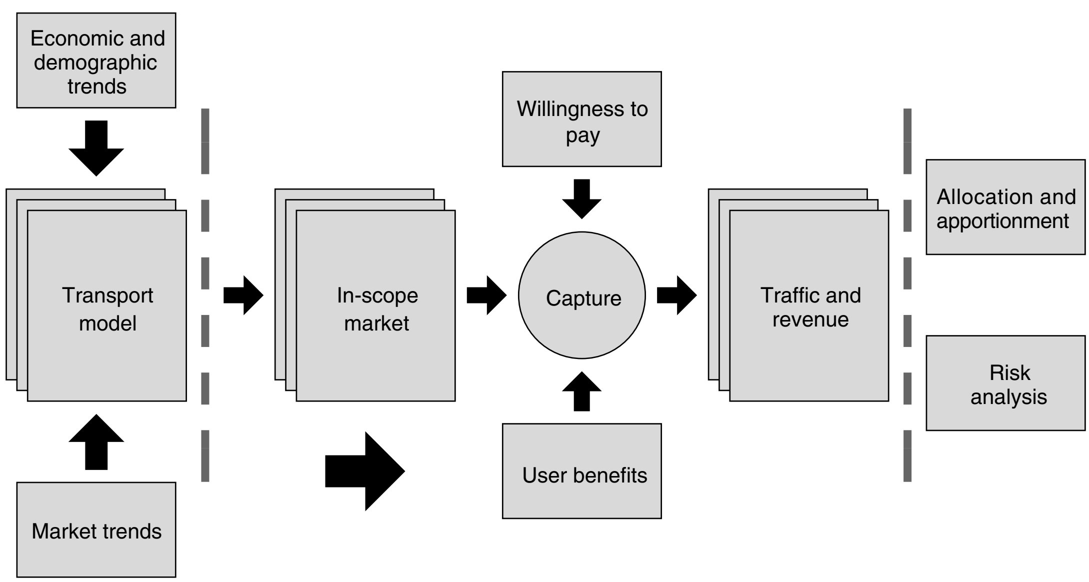
Toll road and alternative road costs are also defined by the difference in journey length between the two or more route options. The journey distances are factored by the VOC of the vehicle to produce a journey cost attributable to the distance travelled. VOC values for cars/autos are defined as the 'perceived' cost of using the road per kilometre travelled. It can be assumed that this parameter is equivalent to the cost of petrol per kilometre as few drivers appreciate the full cost of using their vehicles when determining route choice.

Hauliers/trucking companies are more likely to be aware of the real value of VOCs when determining route choice. The motorway bonus represents the attraction of the toll road in terms of safety, navigation, services, and road standard, and can be an important element of the through traffic total journey costs.

*Source:* A Mauchan, Steer Davies Cleave: www.sdg.eo.uk

Exhibit 9.1

**SDG traffic and revenue forecasting approach**




*Source:* A Mauchan, Steer Davies Gleave

Exhibit 9.2

**S&P start-up toll road ratings scope**

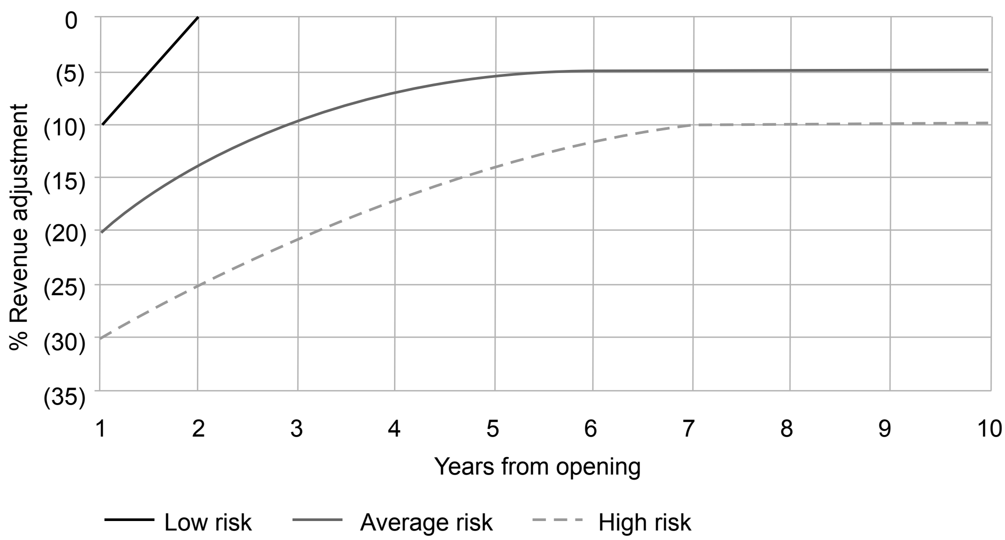
| S&P study | Scope by: banks | Scope by: others |
|---|---|---|
| Minimum | 45% | 31% |
| Average | 82% | 66% |
| Maximum | 108% | 119% |

106 toll roads surveyed.
Year 1 traffic volumes = 73% forecast average.

*Source:* S&P

Exhibit 9.3

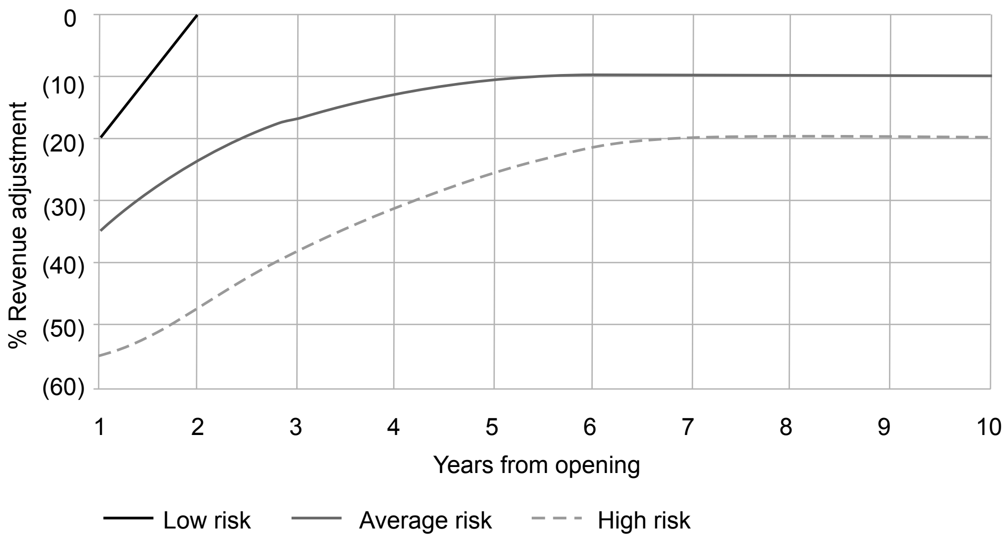
**S&P start-up – banks scope**




*Source:* S&P

Exhibit 9.4

**S&P start-up toll road – others scope**




*Source:* S&P

## *Construction cost audit*

Where completion risk is a concern or the sponsor group is also the constructor (Type 2 project finance), then this audit can check for padding of the estimates – that would result in an 'early' return on equity, overstatement of timetables and, therefore, the entitlement/expectation to collect the early completion bonus too, or, gold plating, where the sponsor is the operator.

The best companies to conduct construction cost audits are usually specialists who normally act as owner-engineers, only in these circumstances they are working for the project financier (to audit an owner). The most efficient way to check for this is to audit, say, three typical construction packages out of the project's, say, 20 packages. But bear in mind that this can mean missing on those not checked.

With the completion risk structure of a debt:equity subscription (see Chapter 19), the engineer is likely to have to issue an anticipated cost to complete report at regular/specified intervals. In such a case, the engineer will have to be fully conversant with the project's construction phases anyway. This equally applies if this engineer is to sign off on the completion test.

Before launching into a sector review, again, it is worth noting that sector profiles and cashflows have already been discussed in Chapter 7. What follows is targeted specifically at the 'special' areas of due diligence.

### Power

There is no doubting the continued popularity of the power sector for project financing (see Exhibits 2.2 and 2.3) even with the trend towards merchant power (no PPA) and pool/market electricity pricing and bidding. The success of these is in no small part the result of the excellence of the due diligence work done by the independent engineers. What these companies realised long ago is that they needed to move away from the slide rule and provide an analysis of the whole power plant system which includes the PPA, turnkey construction contract (TCC), fuel supply agreements (FSAs), the interconnect/infrastructure risk, the cashflow model, and the adequacy/suitability of the completion test.[3] (See Box 9.4.)

The intensity of this effort makes it expensive. A fairly straightforward study would be expected to cost US$250,000 to US$300,000. There is some debate about when to initiate such a study with the banks fearing that the sponsor would steer the study.

The independent power engineers also have 'captive' consulting companies to do the due diligence on the fuel/supply risk.

**Box 9.4**
**Power due diligence review**

1 Obtain project documentation and undertake an initial project scope meeting and site visit.
2 Evaluate overall consistency of project.
3 Review conceptual design including the project design requirements and design of project facilities.
4 Review construction services including an engineering, procurement and construction (EPC) review and the construction management approach. Services include: completion and performance guarantee; guarantees and liquidated damages; EPC construction schedule; cost estimate; and drawdown schedule.
5 Review performance guarantees and tests. Assess potential compliance to project's contracts, permits, and performance expectations.
6 Review commercial operation – operations and maintenance agreement and the non-fuel operating and maintenance cost estimate.
7 Either banks provide technical input to project pro forma or bonds develop operating results pro forma.
8 Review off-site supply and transport agreements.
9 Either conduct an environmental site assessment (ESA) or review ESA.
10 Review environmental and regulatory issues by either: performing power market assessment, which includes project definition, load and resource forecast, future capacity payments, energy price projection/production cost modelling and sensitivity analysis; or verify power market assessment's modelling inputs.

*Source:* J Brack, RW Beck, Denver, Colorado, US

### *Resources*

The prime focus is on the reserve/reservoir engineering estimates. If the reserves run out, the project financier may have nowhere to go but to write off the project.

Oil and gas reserves have high science measurement from the likes of Schlumberger and 3D-seismic computer enhancements, but the field has actually few parameters to gauge. Perhaps Wingfield's probability holds – accuracy is the sum total of compensating errors.

A production test over a period from 30 to 90 days would be expected, as well as proper correlation of the drilling/well data and the geology and production/well completion design.

Infrastructure also needs very substantial validation as this is a huge component of remote resources – often up to half (or more?) of the capex.

**Case study: FMG, Western Australia**

The largest project finance bond to date (US$2.05 billion) was for the Fortescue Metals Group (FMG) who sought to develop iron ore mine exporting from the Pilbara region of Western Australia. The rail and port infrastructure was US$1.1 billion, whereas the mine cost US$408 million.

For oil and gas, Exxon Valdez, Alaska, and BP's Macondo oil-spill in the Gulf of Mexico, loom large for consequential liabilities in the event of an oil spill. Mining projects have also been the focus of attention with cyanide leakage from gold processing plants in Colorado, Uzbekhistan, Romania, Papua New Guinea and Australia. Higher costs will inevitably flow from remediation costs.

**Case study: Murrin Murrin, Western Australia**

For the 144A Offering Memorandum for the Murrin Murrin project in Australia, the well-known company of Kvaerner Davy John Brown was engaged to write the independent engineer's report. Anaconda was raising US$380 million on the 144A US private-placement bond market for its 60% interest in the project. A selected extract focusing on the 16 risks highlights serious reserve/supply and completion risks.

**Box 9.5**
**Kvaerner report – Murrin Murrin, Western Australia**

The US$943 million Murrin Murrin development in Western Australia issued pioneering 144A Note and FRN Issues (US$340 million). It was deemed by the bankers as 'rock solid'* and sought to implement a [new] technology, previously proven in a plant to treat Cuban nickel

*Continued*

concentrates built in 1954. The project would produce 6.5% of the world's nickel output and 10% of the world's cobalt (currently depressed by the wars in the Democratic Republic of the Congo (DRC)) by way of a mine, leach plant, and refinery (using the Sherritt process adapted from Cuba) for its sponsors: Australian mining-junior, Anaconda Nickel and giant metals-trading company miner GlencoreXstrata of Switzerland.

An independent engineering report was included in the Offering Memorandum by Kvaerner Davy John Brown (Kvaerner). Their report is abstracted according to the risk categories reviewed.

| *Risk* | *Factor* |
|---|---|
| Completion: | • Additional 7% pump capacity is required due to viscous operations in leach plant.<br>• Sulphuric acid plant will be largest ever built to date 'recent plants of the same design have a history of problems at start up'.<br>• 'Ramp-up schedule is optimistic'.<br>• Contingency (to be spent) should be 12% (up from 9.7%).<br>• Due to long lead times, actual capex accuracy is ±15%.<br>• Current design delays are two (2) months = A$3 million capex extra. |
| Engineering: | • Chemical laboratory sampling of cobalt assays is biased low.<br>• More work is needed on magnesium content of ore (process-plant problem).<br>• Mine plan 'does not fully consider all relevant mining issues'.<br>• Mineable reserves 'have not been optimised'.<br>• Planned overall capacity utilisation will not (be) achieved. (This will lower percentage metal recovery by 1% for years 1 to 5 and 0.5% for year 6 on availability used in financial projections.) Ninety per cent of the Sponsors' Availability assumption is used in financial projections. |
| Supply/reserve: | • Higher mined ore grades (metal content) in early years is dependent on control of mining contractor; concern on dilution by waste rock.<br>• Insufficient testwork on smectite ore (if this is greater than 25% of ore to plant it will present problems). |
| Environment: | • Residue water decant system is 'old fashioned and not best practice'. |

*Continued*

Box 9.5: *continued*

| | |
|---|---|
| Operating risk: technology: | • Problems in leach plant from high operating temperatures.<br>• Titanium is unproven as a pressure leach tank (autoclave) lining at this scale. |
| Operating risk: costs: | • Mining costs A$400 million too low over 30-years' Excel model.<br>*(Financial projections so adjusted.)* |
| Operating risk – management: | • 'Anaconda's manning is insufficient to supervise the [mining] contractor'.<br>*(Financial projections adjusted.)* |

* 'Murrin Murrin a hit', *Project Finance International 128.* The deal diagram is Exhibit 13.1.

### *Telecoms subscriber studies*

Although very rich in data and information sources (many of them proprietary), the success of telecom subscriber studies has not been much better than traffic studies. The major suppliers and consultants are all swamped with business plans and call balances. The difficulty, especially for project finance deals, has been either the amount of pioneering as far as teledensity (number of phone lines per 100 people) in a region/country/district/city is concerned or the dynamic nature of the technology, especially in the cellular arena.

Many have elected to finance the services-provider route. Fibre optic cables have proven to be popular for project finance, especially since they carry pre-committed revenues.[4]

**Case study: Telcos, Australia**

When the two Australian telcos, Telstra and Optus, vied with each other to roll out cable services, Australian's readiness to be at the forefront of bringing new technologies into the home made it an ideal market share play. A year after the rollout, the combined write-off exceeded US$700 million. With good free to air TV and un-timed local telephone calls, why would anyone make the switch? Where are the subscriber studies now?

- Where telephone penetration rates are doubling or more, most developing economies experience a plateau in teledensity which may affect completion. Many telephone roll-outs have a substantial portion of internal funding from the early roll-out system income.
- Foreign exchange risk is severe, although the international call balance may be able to bring in foreign currency (usually US dollars).

- Suppliers are aggressively chasing market share as blocking manoeuvres to lock markets into systems. Ensure system flexibility; it may be more important than market share.
- Telephony is a service and the sales, service, billing and fault-correction aspects need close attention. Churn is another hazard, especially in cellular deals.
- Value-added services are persistently oversold or anticipated too early.
- As in all the infrastructure sectors, care is needed to be sure that a foreign subscriber analyst has sufficient cultural skill, language, ability, and local linkages to sniff out the common sense aspects of the studies. It might still be cheaper to send someone across town on a bicycle with a note than to pick up the phone.

## Common sense

Perhaps the most important ingredient in the whole due diligence process is common sense. Some tools of that trade are shown below.

- Look around for the last 10 such projects that were project financed. If they cannot be found, then what has happened with similar deals over the last 10 years? If neither can be found, then why is this deal so special?
- Examine how the deal got to the desk of the project financier. A good project financier knows from which deals to keep away. Did the deal select the banker/underwriter or vice versa? Is this relationship pressure at work?
- If the project cannot be matched against rules of thumb, find someone else who is able to successfully apply other rules of thumb.
- If this is the first project financing either of its type or by this sponsor, then what marks the extra risk comfort one should expect?
- Management (and management).
- Cashflow (and management).

Perhaps Davidson's Law of Inquiry applies: *people ask stupid questions for a reason.*

---

[1] McCormick, R, 'Project finance risk analysis chart', Freshfields, *Infrastructure Journal*, 1999.
[2] Schilling, H, 'Environmental due diligence: an investor's perspective', *Infrastructure Journal*, 1999.
[3] Brack, J, 'Beyond the independent engineering review', Power project finance course, Euromoney, Melbourne, 1999.
[4] Tinsley, CR., *Project Finance in Asia Pacific: practical case studies*, 2002, Euromoney Books, ch. 4.

Chapter 10

# Supply/inputs risk

The project's inputs/supply requires just as much structuring as the market/offtake. The supply factors can be characterised as:

| *Sector* | *Supply risk factor* |
|---|---|
| Public tollways | Global traffic (in the context being referenced here it is total traffic supply, rather than 'traffic' to mean the market risk). |
| Telecoms/cable | Subscribers, handsets. |
| Water supply | Water. |
| Water treatment | Councils, municipalities. |
| Oil and gas | Reservoir; drill rigs (fracking). |
| Petrochemicals | Feedstock. |
| Mining | Reserves. |
| Power | Fuel. |
| Processing | Raw materials, energy. |

The first line of structure is contractual followed by trigger varieties, switched by ratios. Some financed structures are seen but the main approach is studies of the supply situation.

## Contract structures

### *Supply agreements*

The inputs can be contracted from a reliable source, itself a participant risk. Much effort will go to balancing the supply quantity obligations with the amounts the project is able to sell. There are three main types of contracts.[1]

- Requirements contracts where the project owner is normally obligated to purchase all the project's requirements from the supplier. In turn, the supplier may be obligated to supply all the project's requirements. Minimum and maximum quantities and adjustments can become elaborate.
- Take or pay contracts where the owner is required to purchase specified quantities (or make minimum periodic payments even when not taking that minimum quantity). If the supply is paid for but not taken, the project owner usually has the right to take additional supply in succeeding years (make up 'banking' and provisions) or extend the contract period proportionately. True take or pay is rare.
- Output contracts are for the delivery of the entire supplier's amount to the project owner. A dedicated supply development, such as mine-mouth coal for a power station, would be an example.

Contract clauses would expect to cover the start-up/commissioning timetable, infrastructure linkages, quantities (minimum/maximum, average), quality, price, *force majeure*, warranties, and other legal issues, especially the right to assign this supply contract to the benefit of the project finance lenders.

**Case study: Paiton contract, Indonesia**

In the US$180 million 144A bonds (part of a mega project finance package of US$1.82 billion for the 1,230MW Paiton power plant development in eastern Java, Indonesia), besides tonnage obligations, the coal supplier dedicated some of its reserves in priority to Paiton sufficient to cover 83% power plant availability for 28 years at base load. The requirements contract also specified a quarterly range of deliveries and the requirement to top up the coal stockpile (at the power station) after a defined build-up period.

**Case study: Western Australia gas pipeline**

In the A$1.2 billion project financing for the Dampier to Perth pipeline in Western Australia, the State Electricity utility contracted to take or pay for 95% of the annual contract quantity (provided the gas companies, led by Woodside Petroleum, were in a position to deliver). Any gas so paid for, but not taken, could be taken within four years without extra charge. If *force majeure* prevented taking, the utility had to pay for 50% of what it did not take. Gas reserves are dedicated in priority to subsequent sales of liquefied natural gas (LNG) by Woodside and its joint venturers. Indeed future gas discoveries/proving-up is also prioritised to the extent of an extra two thirds of the annual quantities contracted for under the electricity utility's base take or pay obligation.

### *Supply undertakings*

The supplier, or perhaps a sponsor, covenants to deliver the key inputs to a given standard for commissioning and during the operating/project finance third phase of the project. If this is not achieved, there may be physical performance requirements or the deal may allow recourse to the supplier – a type of 'supply or pay' obligation. The supplier may be able to swing in a substitute supply source on similar terms (price, quantities, quality) if it is failing to honour the original undertaking.

These structures are seen where a company is adding a new plant by way of a project financing to its existing business. The obligation is usually relatively easy to achieve in such (portfolio) circumstances.

### *Tolling contracts*

A tolling contract means that the project offtaker also agrees to supply the key project raw materials, usually for free, to the project entity. Thus, besides taking the operating-cost risk for that component of supply, it also mitigates the supply risk.

The US-style of cost corporation as a special purpose vehicle (SPV)/project finance borrower, inherently builds in this obligation where raw materials are processed at cost for the benefit of the sponsors. Naturally, tax authorities resist such a non-profit untaxed exercise!

**Case study: Hong Kong petrochemicals**

In the US$75 million project financing of a petrochemical facility in Hong Kong, the borrower had a supply contract for up to 150% of its needs from two of its sponsors (who owned 65% of the project/borrower/SPV) on a cost-plus formula. The company could also buy 30% of its needs from the spot market should this be lower than the formula price.

### *Supply assurance*

If the supply is not available from the anticipated source, then:

1 another source will be substituted;
2 other collateral provided; or
3 the project financing proportionately reduced.

If doubt exists here, then inevitably this will become a component of the completion test, especially for a Type 1 project financing.

**Case study: Colombian toll roads**

In Colombia, private toll roads do not have the burden of a mandatory competing freeway (the downfall of a suite of Mexican toll road project financings). Nevertheless the state 'decided to grant guarantees without sound traffic studies. It also guarantees minimum traffic levels, despite the lack of alternative routes, that assure debt payment even when projected traffic does not materialise.'[2]

This support under the Colombian concessions can be:

| *Remedy* | *Problem* |
|---|---|
| Extend concession | This does not solve today's illiquidity. |
| Toll increase | Has political risk element. |
| National budget | Budgetary/political process. |

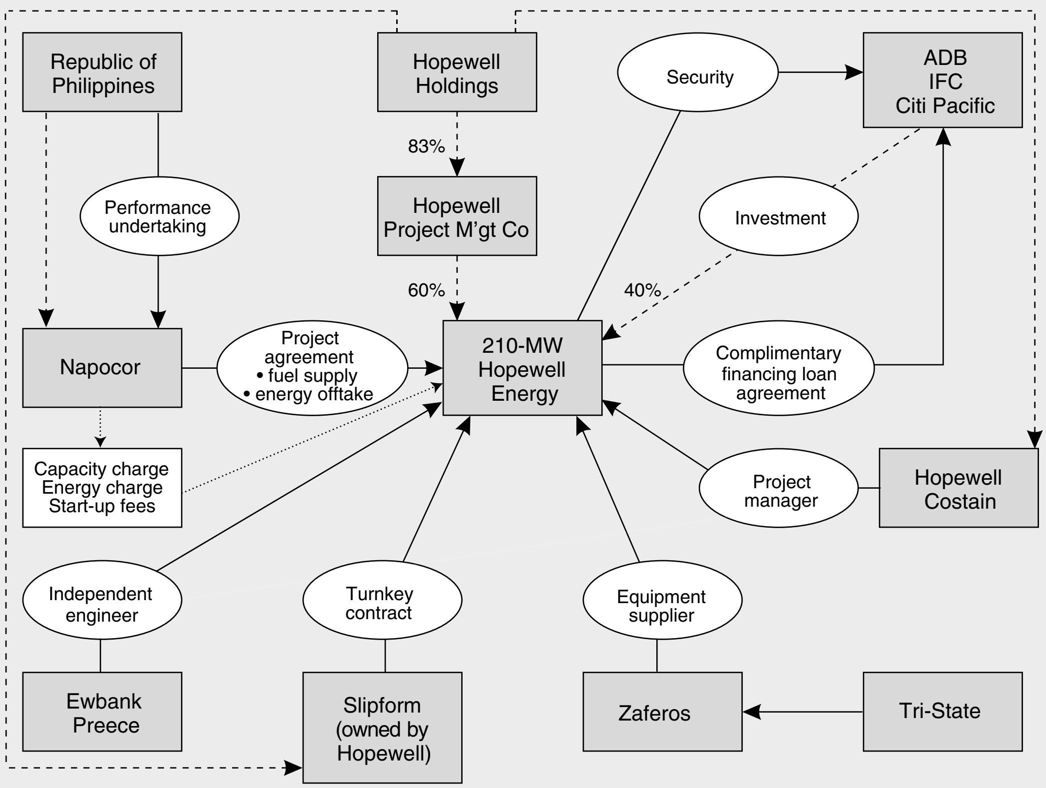
One structure calls for the borrower to convert reserves from a lower classification to a 'proven' standard each year. This usually must be certified by an independent consultant. If the proven reserves are not then large enough, an increment of recourse or collateral may be triggered.

### Case study: Navotas, Philippines

The US$30 million Hopewell complementary financing (with ADB and IFC) was to project finance the movement of second-hand gas turbines from Colorado, US, to Manila, Philippines. The Filipino state electricity utility, National Power Corporation (Napocor), contracted to supply the diesel-oil fuel at no cost.[3] It also contracted to take the power plant's electrical output on a peak load capacity charge basis. The Filipino government will financially and physically perform if Napocor fails to honour its commitments (a credit enhancement of the Participant Risk of Napocor), which includes the obligation to supply fuel of acceptable quality as required (a requirements contract).

Exhibit 10.1

**Navotas**




*Source:* Author's own

**Case study: Sithe, US**

In the Sithe/Independence deal (see Exhibit 13.2) in up-state New York,[4] the gas supplier 'is obligated to supply alternate (natural gas) fuel for the project or pay damages if it does not deliver gas to the project', a 1,000MW co-generation plant.

**Case study: CNOOC, China**

For a jack-up drilling and production platform project financing for a Chinese offshore oilfield development, China National Offshore Oil Company (CNOOC) agreed that if the oil reserves in the dedicated field were insufficient to repay the project finance loan, it would allow the project company access to other reserves. The other available reserves of CNOOC were deemed to be substantial.

## Trigger structures

### *Insurance*

In some examples of reserves risk, non-conventional insurances in London have been able to offer cover for oil reservoirs.[5] Capacity is quite limited, so it would be unreasonable to expect insurance cover for major projects.

The mining industry, which usually is a quantum leap ahead in reserve definition than oil and gas reservoirs, should also be able to obtain reserves insurance.

### *Hedging*

A number of supply inputs can be hedged either directly under forward contracts or by way of derivatives to control supply costs. This is more fully addressed in Chapter 14.

## Financed structures

### *Collateral*

In the event that supply does not reach a proven or acceptable standard, additional collateral is held by the project financier. It is progressively released as the project finance principal is repaid or output/users meet a pre-determined standard. Such collateral could include access to other projects and their cashflows, cash, shares, guarantees, or deficiency agreements.[6]

### Case study: SmarTone, Hong Kong

In the US$90 million SmarTone project financing for one of four GSM cellular-phone licences in Hong Kong, the shareholders had to have an additional US$25 million which could be drawn to meet debt service up to a limit of 18 months after the system's roll-out. In this manner, the extra cash collateral has limited recourse – a ceiling and a time limit. The banks assessed the collateral amount assuming 50% of the subscriber's forecasts of the sponsors (from a downside case).

### Case study: Sydney Harbour Tunnel, Australia

For the US$372 million, 30-year financing of the Sydney Harbour Tunnel in Australia, if the toll revenue from the tunnel and the existing bridge is insufficient for debt service, then the state government will make up for insufficient moneys for debt service.[7] In reality, then, this is not a project financing although the build own operate (BOO) concessionaires must have the tunnel in operation in order to collect on the deficiency agreement.

## Study structures

### *Supply studies*

Independent studies are the norm in structuring inputs/supply risk. The issue of how 'independent' is the independent engineer was addressed in 'Selection of experts/engineers' in Chapter 9. All of the usual concerns and approaches to selection of the appropriate consultant or company apply to the inputs studied under this risk.

Sector reviews follow but the reader will have noticed that, besides being addressed in Chapter 7, further aspects of sector due diligence are addressed at the end of Chapter 9.

## Traffic

Traffic studies were addressed more formally in due diligence, Chapter 9. Such studies by the government, in preparation for the build own transfer (BOT)/BOO concession negotiations, must be seriously questioned. Many problems have been experienced in sample gathering, differing operating objectives (private versus government), and often different design and construction approaches. In fact, most experienced project financiers discount urban mass transit traffic studies as too optimistic.

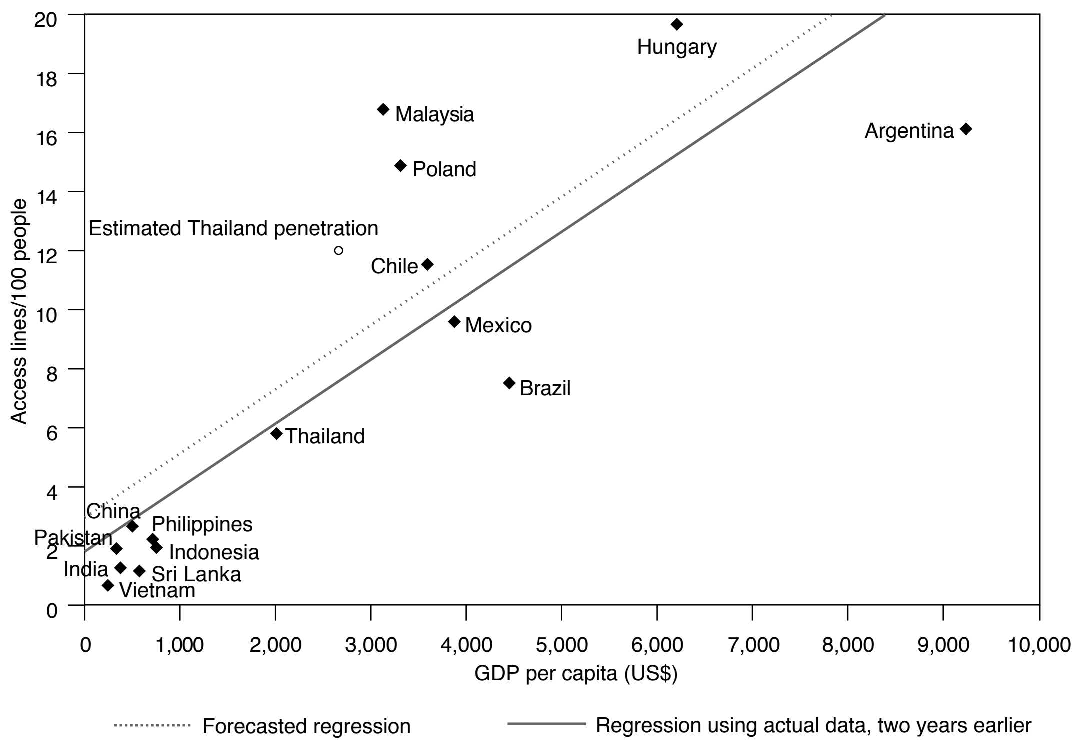
Next comes the sponsors' traffic study – clear evidence of appraisal optimism.[8] These too tend to the optimistic side, although it is always billed as 'conservative'.

## Telecoms

Subscriber studies are drawn from similar demographic, trend, and econometric information as tollway traffic studies. For telecoms, an international comparison can be derived from Telegeography or the Geneva-based International Telecommunications Union (ITU) statistics. This can be expressed as a curve plotting GNP per capita against telephone penetration (the number of phone lines per hundred population), also called a Jipp curve. An example is shown in Exhibit 10.2.[9]

Exhibit 10.2

**Telecoms Jipp curve**




*Source:* Datastream

These gross figures belie the detail needed to gauge penetration growth plateaux and the mix of local, long distance (within country), and international telephone calls. A great deal of confidential traffic data resides in the databases of the national and international carriers as well as the major suppliers such as Samsung, Ericsson, and Apple.

- Much more problematic have been subscriber studies for anything interactive such as voicemail or online shopping. These have been relegated to 2% to 6% of revenues.
- Next in line is the estimation of churn (turnover of subscribers), as subscribers move from one telecom service provider to another. A 10% to 15% churn is common in cellular deals.
- Numerous technological breakthroughs (cable in particular) coupled with the potential to use the internet for voice means the future outlook is clear: lower telephone call prices.

**Case study: Iridium**

The most infamous is the US$650 million project financing for the global satellite 'merchant' telecoms project, Iridium. A combination of super high call pricing, delays, technical glitches, and access problems on earth clipped the wings of everyone involved. Subscriber numbers, already estimated at low levels (which is surprising for such an expensive system to roll out), were less than 24% of target, the target itself being four times the subscribers obtained by an established remote-access telephone satellite system, Inmarsat, after 20 years in business.

## Water

Water supply studies rely on very long hydrological and/or dam sampling – often over many decades. Spectral analysis (pure mathematical filtering) along with El Niño Southern Oscillation (ENSO)[10] and sunspot/solar cycles[11] can track data back 12 centuries.

Water treatment services often have more to do with concession conditions rather than market forces. Yet the willingness to pay for even a connection may need to be reconsidered.

**Case study: Aguas Argentinas**

In the pioneering Aguas Argentinas water distribution/sewage treatment project, sponsored by a series of IFC-led project financings for Buenos Aires, Argentina, consumers were reluctant to pay the connection charge (*cargo de infraestructura*) and bad debts started to mount. The water billing rate had to be amended (*upwards*).[12]

## Oil and gas

Oil and gas reservoir estimation is an art, not a science. The reservoir engineer must have experience with similar geology; best, of course, if this is in nearby oilfields. The drilling information (the well data) and geological studies are reduced to a surprising small number of physical parameters.

The Society for Petroleum Engineers (SPE) classification follows protocols to determine proven, probable, and possible reserves with associated recovery and production rates. Be sure one is projecting cashflows from proven, producible reserves (1P) for a new development.

Sometimes proven and probable reserves (2P) are counted for producing oilfields, albeit with higher/better coverage ratios for the project financiers.

The advent of 3D seismic and ultra-high-speed computer processing is making the reservoir engineer's job much more soundly based. It is advisable to talk to the engineer directly, if necessary to travel to the computer graphic station, to get the right view of any production or recovery risks. (Production/recovery are more in the domain of the petroleum engineer. All geologists are optimistic – and engineers pessimistic – so one needs to sift through the fine points or else rely on the independent reservoir engineer. See Chapter 9.)

- The annual percentage decline in production, once an oil field has been fully developed, also merits examination as cashflows are a direct function of the barrels (bbl) produced. Oil is a mixture of hydrocarbons, water, 'associated' natural gas, natural gas liquids, and impurities. This may differ from the initial well sampling, a factor to test for at completion. Most oil and gas project financing is Type 1.
- Porosity (measured in percentages) and permeability (measured in millidarcies) will also be important in the estimation of production rates.
- No banker will commit on a one-well field. Usually three wells are the minimum and one to three months of skilled production testing is advisable.

**Case study: Skua oilfield, Australia**

For the $130 million Skua field offshore Western Australia, a floating production storage offloading vessel – a converted oil tanker – was used on the assumption that this relatively small oilfield (around 12 million barrels) would be produced quickly. The decline curve assumed was too steep. It proved to be zero decline. Somehow additional oil was driven into the reservoir and the vessel had to stay 'on station' longer to produce 20 million barrels.

## Mining

Mining reserves estimation is a highly quantitative 'numerate' exercise much beloved by bank geologists. Much more drill information is available compared with oil and gas, but perversely mining is much more changeable in hard rock (versus petroleum which occurs in 'soft' and porous rocks). The use of computers and statistical techniques such as logarithmic/'kriging' is widespread.

**Case study: Bre-X sampling fraud, Indonesia**

The same as in any sector, the sample itself must be properly taken. The most infamous example is the US$6 billion Bre-X fraud in Kalimantan, Indonesia.[13] The gold ore samples were 'salted' by adding ground-up high-grade native gold, even gold nuggets, something that check sampling and proper assaying (laboratory analysis) could discover.

A review of Australian gold developments in the booming 1980s (many of which were project financed with embedded gold loan or gold option/hedge structures) revealed that half of the 57 developments had ore grades around 50% of what had been predicted and that proven ore reserves were again about half the tonnage expected.[14]

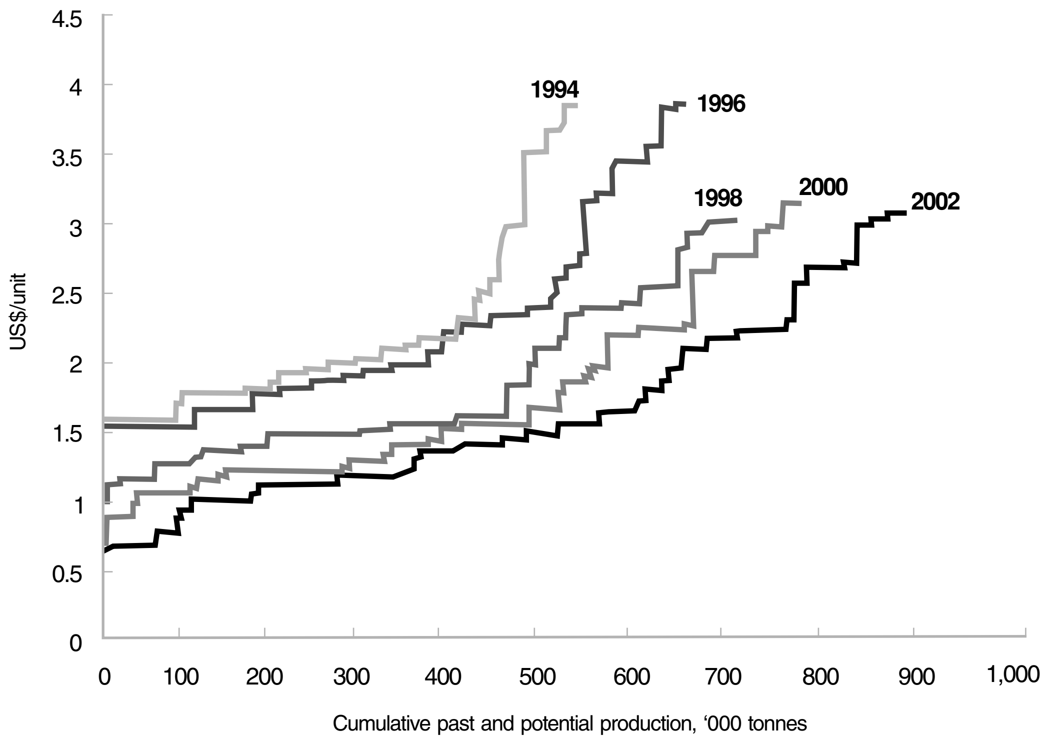
Geological interpretation (of the gap between drill hole sample intersections) has also been flawed with some monumental gaffes.

**Case study: Quintette coal, Canada**

The C$700 million project financing for the Quintette coking/metallurgical coal mine development in British Columbia, Canada, tops the list.[15] Here the C$1.3 billion mine and associated C$1.2 billion of infrastructure (funded by the Canadian and BC provincial governments) stumbled when parts of the very first coal reserve to be developed were found to be missing (based on the data from a mere 13 drill holes). In the US, where many coal reserve consultants originate, coal seams are quite continuous (and flat). This coal mine was in the Rocky Mountains and required a greater drill density (more drill holes) to validate the coal reserve estimates.

Exhibit 10.3

**FMG iron ore cost curves**




*Source:* Author's own

### Power

Fuel supply studies have been covered under the oil, gas, and mining reserve studies immediately above. Although brought under the wing of the independent power engineer's report, it is advisable to talk to the engineer directly to be sure that the correct scope of work on the reserves has been passed down the line, for example, John T Boyd does many of the coal mine evaluations for independent power engineers RW Beck and Stone & Webster. If a power plant is taking fuel from different sources, then each fuel supply and associated transportation will need to be examined. For example, a power station using imported coal in India would also have to analyse similar curves for South African, Australian, Indonesian, and Chinese coal.

**Case study: Midal Stegal, Germany**

In the €1.3 billion borrowing base project financing for the Midal Stegal gas pipeline (and associated underground storage at a former gasfield at Rehden in Germany), the independent engineer's key job was to assess the gas pipeline delivery system in Russia, the gas supplier.[16] Besides storage, the system could access North Sea gas too.[17]

**Case study: Sithe Independence, US**

For the 1,000MW Independence co-generation plant developed by Sithe at Scriba, New York, US, the gas supplier acted as the gas transportation manager.[18] Sithe entered into seven separate pipeline contracts to obviate gas supply risk. The gas supplier also constructed a version of a contract for differences, as a variation of a gas floating to fixed price swap. The full case study diagram is given in Exhibit 13.2.

### Processing

Processing projects also require supply studies for raw materials and often for energy.

- Examine the freight component and sourcing decisions. These are often captured in a linear programming transportation matrix which itself yields shadow pricing among the various choices.
- As with fuel supply studies, the long-run cost curve position of each source of supply of, say, 10 to 15 years in the future, may also need to be examined. This will again need to be linked to the freight matrix and freight outlook from source to project.

#### *Weighting*

For resources projects, some banks will allow less than proven reserves to be counted. The theory goes that lesser quality reserves do in time get converted to proven status as the operators' and geologists' knowledge of the reservoir/deposit improves from operational experience. This has certainly been the case for many resources projects and, to a great extent, counts as the main reason so few end up in trouble even with the poor early performance of many.[19]

In certain areas, it is physically impossible or economically inefficient to prove everything up before commencing operations.

**Case study: Lukoil, Russia**

With the Kogalym oilfield in Western Siberia, Russia – the 'k' in Lukoil – it was impossible not to hit oil when drilling over the 40km by 30km extent of the field. Even though less than 10% of the reservoir had reached the equivalent of 'proven' rank under the Russian classification system (reasonably close to SPE), it was easy to defend a weighting of 10% for the remaining 90% of the reservoir, thereby doubling the reservoir size.

## Structures

The three structures covered here are commonplace in resources deals.

### *Borrowing base*

A borrowing base – often referred to as part of reserve-based lending, is the sole example of valuation techniques used in project finance. A borrowing base loan picks up on this reserves weighting theme since its foundation is six-monthly or an annual assessment of the reserves and production profile. The production figures along with the bank's view on pricing are combined into a spreadsheet from which a net present value (NPV) is extracted at a discount rate decided by the bank, usually ranging between 10 and 15%. This is then divided by a cover factor, say 1.50, and the borrowing base so established. Any surplus can be automatically drawn down as a loan and any shortfall means extra repayment (of the project finance loan).

The sponsor is correspondingly at the mercy of the borrowing base banker's 'running' calculation assumptions. This only works when a bank has a full-time department staffed with knowledgeable industry personnel, especially engineers. Embedded into this structure is the fact that the borrower is taking the price (forecast) risk. But this may give the unusual result of allowing the borrower to borrow more in good/optimistic times thus repaying no principal until the next borrowing base assessment. Because of the flexibility – the borrowing base can be recalculated every six or 12 months – only banks can undertake this structure.

**Case study: Tipperary Corporation, US**

Denver's Central Bank loaned US$16 million to Tipperary Corporation under a US$40 million maximum borrowing base. Even with a higher oil price outlook, depletion of the reserves dedicated to the borrowing base meant the company either had to pay down the loan to US$14.5 million or dedicate some other producing oilfield properties to Central Bank.[20]

The bank takes full project finance exposure as it otherwise does not have recourse to Tipperary's balance sheet for repayment. Tipperary uses the borrowing base money to develop oil production, conduct exploration and acquire new production/facilities.

### *Physical tail*

A practice in the resources sector is to set the loan maturity to a date by which a cumulative amount of the proven/agreed reserves have been produced leaving the balance as a physical residual or tail. The usual size of tail is 25% to 30%, but may be hiked to 30% if the economics are felt to be 'tight'.

- It may be recalled from Exhibit 5.1 that an oil field usually expects to see a natural, exponential percentage decline curve in production once it is fully developed and 'mature'. The tail, therefore, may be at a substantially lower level of output than at completion, which will adversely affect production economics. A purely physical tail is not sufficient on its own.
- The tail in some gold loan project financings in the mining sector, besides being a physical reserve-based tail, is also expressed as an NPV tail. Gold is a sector where constant-dollar cashflow analysis and NPV tests are passable tools, especially so if the revenue and loan are gold-dominated as, naturally, is the reserve.

### *Depletion protection*

The resources sectors invokes much more flexible repayment structures than other sectors, in part as a protection against depletion of the supply basis of the project, the reserve.

One way to handle accelerated production and recovery is to make repayment a direct function of production or cashflows as in a production loan (for example, US$10 per barrel of production to repay principal) or in a percentage dedication principal repayment technique as outlined in Chapter 3 (see Box 3.2). Where the dedication is of cashflow though, the lender is also taking the price risk (market risk). A borrowing base (see earlier in this section) acts as a regular audit of reserve depletion.

### Case study: Iduapriem, Ghana

For the US$38 million IFC co-financing for the Ghanaian Australian Goldmines (GAG) development of the Iduapriem gold mine in Ghana, IFC set a senior debt – NPV – coverage ratio of 1.5 at a discount rate of 10% per annum (real) for the constant dollar cashflows. Each year this ratio is tested and, at IFC's option, GAG must pay the amount needed to bring the ratio back to 1.50. That dollar amount is a mandatory prepayment and is paid in the year following the calculation. The prepayment of the project financing is in inverse order of maturity – the last scheduled payments are prepaid first.

If the gold price forecast cannot be agreed for the cashflow projections, then it is the lower of the prior five-year average gold price or the prior 12 month average gold (morning London fix-spot) price.

## Summary

Many structures have been developed to address inputs/supply risk. The study approach is widely used across all sectors. Special reserve-based approaches only apply for resources deals. Otherwise contracted input/supply is sought.


1 Fletcher, PD and Anderson, JA, *Basic Concepts of Project Finance: risk allocation and management in the current market*, 1994, Milbank, Tweed, Hadley & McCloy.

2 Herz, R, 'Privately funded infrastructure projects: some general considerations and the Colombian experience', *The Financier 3(1)*, pp. 48–58.

3 Pyle, TH, Financing an integrated solid waste management in Manila', Conference on Private Sector Power in the Philippines, 1993.

4 Standard & Poor's, 'Sithe/Independence Funding Corp.', *Global Project Finance*, 1996.

5 Berry, C, 'Conventional and non-conventional risks insurance for mining projects', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration.

6 Tinsley, CR, *Practical Introduction to Project Finance*, 2000, Euromoney Books.

7 Harris, AC, 'Financing infrastructure: private profits from public losses', NSW Public Accounts Committee, 1996.

8 Flyvbjerg, B, Bruzelius, N and Rothengatter, W, *Megaprojects and Risk: and anatomy of ambition*, 2003, Cambridge University Press, p. 137.

9 Salomon Bros, Thailand Telecom Update, 1996.

10 Thompson, LM, 'Relationship of the El Niño cycle to droughts in the US corn belt', *Cycles*, 1990, pp. 14–16.

11 Landscheit, T, 'Relationship between rainfalls in the northern hemisphere and impulses of the torque of the sun's motion', *Cycles*, 1990, pp. 128–33.

12 Cassou, M, 'Aguas Argentinas', *Infrastructure Journal*, 1998.

13 Danielson, V and Whyte, J, *Bre-X, Gold Today, Gone Tomorrow*, 1997, The Northern Miner Press.

14 Burmeister, B, 'From resources to reality', Macquarie University Dissertation, 1989.

15 Tinsley, CR, 'Coal financings: the good, the bad and the ugly', at the Ninth Pacific Rim Coal Conference, 1994.

16 Carr, J, 'Midal/Stegal pipeline, Germany', *Project Finance International*, 1995.

17 *Project Finance International 70*, 1995, p. 26.

18 See endnote 3.

19 See endnote 13.

20 Tipperary Corporation, 'Annual Report/10K', pp. F-12, F-14.

Chapter 11

# Market risk

The revenue line is the first line in the cashflows. Market risk (also called 'revenue risk') is quantity (Q) times price (P). The two aspects need review.

- First, the amounts that can be sold (Q) can be influenced by other risks as Exhibit 11.1 shows.
- The factors affecting price (P) are listed in Exhibit 11.2.

Exhibit 11.1

**Market risk – quantities**

| *Risk* | *Factor* |
|---|---|
| Market | • Demand reduces/ceases.<br>• Competitors emerge (labelled by some as competition risk).<br>• Market share drops. |
| Participant | • Offtaker reduces purchases.<br>• Offtaker goes broke.<br>• Offtaker cannot/will not pay. |
| Operating | • Quality of service/product declines.<br>• Quantity of output/delivery drops. |
| Supply | • Inputs reduced in quantity.<br>• Supplier bankruptcy.<br>• Study expectations not realised (for example, traffic). |
| Completion | • System is late.<br>• System capacity is not achieved (also attributable to engineering risk). |
| Force majeure | • Affects system output. |
| Legal | • Penalty clauses on delay, quality, quantities.<br>• Concession compliance. |

*Source:* Author's own

Exhibit 11.2

**Market risk – prices**

| *Risk* | *Factor* |
|---|---|
| Market | • Pricing is cyclical.<br>• Competitors lower prices.<br>• Dumping commences.<br>• Prices decline. |
| Participant | • Offtaker squeezes prices. |
| Operating | • Lower price due to quality. |
| Political | • Tariffs are strangled.<br>• Royalties on gross revenues.<br>• Deregulation alters contract structures. |

*Source:* Author's own

## Market quantity

As already stated, most of the approaches in project finance structuring seek a contractual basis to the revenues. Often these efforts are directed at gathering minimum quantities and floor-price arrangements to result in revenues at or above the levels indicated by the down-side case cashflow.

### *Sales contracts*

There are many variations on the theme of bankable offtake contracts, but these main versions are seen repeatedly. More on the various pricing formulae is given later in this chapter.

### Take or pay

In take or pay contracts even if the good or service is not required/taken, payment must still be made (unconditionally). This is very rare – certainly not as prevalent as the use of the term might suggest.[1] Availability (public-private project (PPP)) or capacity payment (power purchase agreement (PPA)) revenues are not 'take or pay' since no payment is due if the project cannot perform. This is the project finance aspect behind these arrangements: 'Take or pay if deliverable.' Sometimes this is extended to: 'Take or pay if deliverable and acceptable.'

Most take or pay structures allow for quantity variations within an agreed band. If payment is made (when not taking), then usually the obligation to supply that amount later is 'banked' for a short period or sometimes is reflected in an automatic contract extension. The contractual 'pay' on the bank is usually relieved if the project cannot deliver at the time the offtaker is not in a position to 'take'. Take and pay or 'take if delivered' contracts mean that the offtake is only relieved of its 'take' aspect if the project is incapable of delivery.

## Capacity contracts

Capacity contracts have also been developed where a payment is made (usually of a highly fixed-charge character) if the purchaser elects not to take. *(This payment/charge is labelled a 'capacity charge' in the power sector.)* It is only payable while the project is on standby, available to deliver at short notice. When the service/product is being delivered, extra payments are made to cover costs of a variable character, as well as some contribution to operating/ maintenance charges.

An example of this is in a PPA, a capacity contract; there are three key revenue components.

| *Charge* | *Pricing basis* | *Covers* |
|---|---|---|
| Capacity | $/MW/month | Debt service; taxes; profit; amortisation of development costs; (fixed maintenance). |
| Energy | ¢/kwh | Fuel costs (usually on a pass-through, no-profit basis). |
| Operation and maintenance (O&M) | ¢/kwh or $/period | Variable maintenance; sometimes with the fixed maintenance. |

In contrast, for an open market (no PPA) electricity pool, the pricing may be only a variable 'all-in' price; thus there may be no recognition of/payment for capacity installed or on standby (and not generating).

**Case study: Sutton Bridge, UK**

In the 790MW Sutton Bridge US dollar/pound sterling project finance bond in the UK, a capacity and tolling agreement (CTA) lies at the heart of the support structures for this part-merchant deal. The CTA acts as a natural-gas fuel 'put'[2] and in return for electricity pool prices received, the sponsor pays the project monthly fixed payments to cover fixed opex, debt service, and a return on equity. Variable payments cover fluctuating opex.[3]

## Throughput agreements

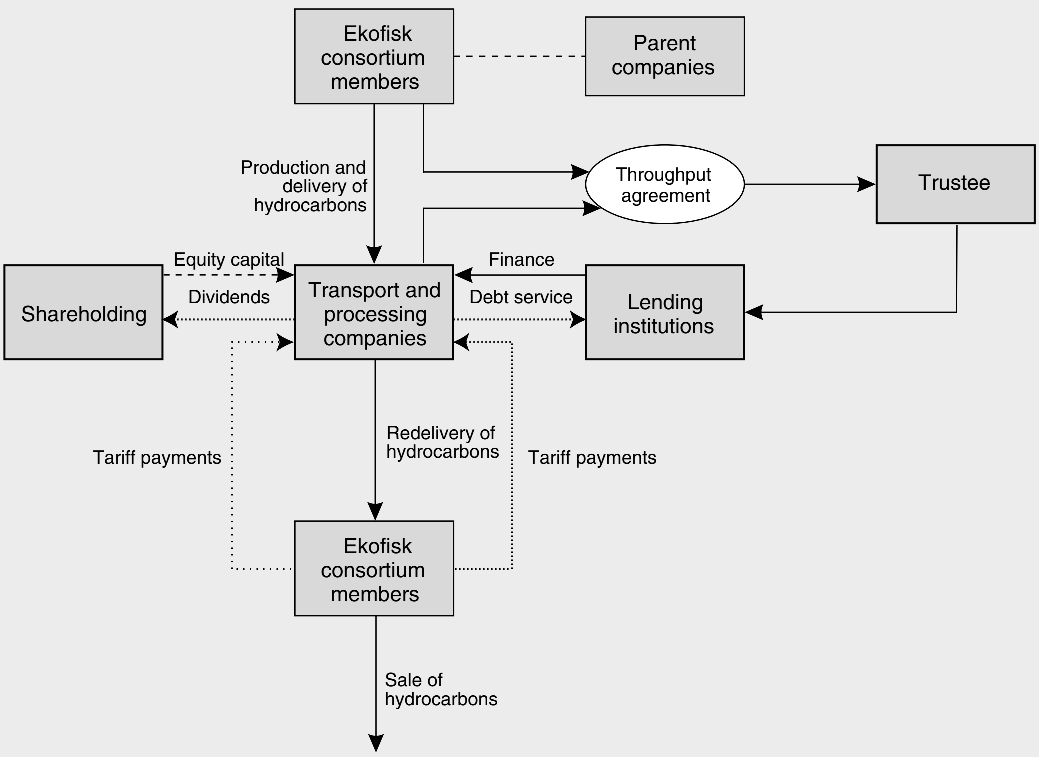
Throughput agreements are hell or high water obligations and are not true project financings! They are short documents – five to seven pages – most of the agreement is to write out relief from *force majeure*. The language goes like this: '*We, Big Company, will put (product) through the project financed facility at a given tariff (at least sufficient for debt service) no matter what*.' This is getting close to full recourse, but has the huge benefit of legal and credit simplicity. Its main application has been for pipeline projects and the simplicity is attractive to the bond markets. (See Exhibit 11.3.)

**Case study: Ekofisk, North Sea**

The most famous example of throughput agreements is the Ekofisk North Sea gas gathering and pipeline project financing which was undertaken almost entirely on this basis. (See Exhibit 11.3.) With a total project cost of US$6.7 billion, the project raised financing from banks and export credit agencies (ECAs). The throughput agreement (seven pages) covered interest, depreciation (principal and capital return), opex, and profit for the six consortium members.[4]

Exhibit 11.3

**Ekofisk**




*Source: Energy Finance*, Euromoney

## Buy-back contracts

Buy-back contracts work to cover whatever is not sold by the project, say 30% of that period's output. This will be purchased by one of the sponsors, inevitably a sponsor who is already a serious trader/marketer in that business. It looks like sound support for Market

Risk, but rarely provides a guarantee on the (minimum) price for the buy-back. Perhaps the reason the 30% remains unsold is a flat/poor period in the business cycle, therefore, the buy-back is only 'working' at times of price weaknesses.

**Case study: Murrin Murrin, Western Australia**

In the Murrin Murrin 144A project finance bond deal (see Exhibit 13.1), one of the sponsors is GlencoreXtrata, a large Swiss-based commodity trader and miner, who then owned 40% of the unincorporated joint venture (UJV) – now owned 100% by GlencoreXstrata. To quote the Anaconda Offering Memorandum: 'Under the Offtake Agreement, Glencore has agreed that whenever there is mineral product of the project that has not been sold by Glencore under the Marketing Agreement, Glencore will purchase such unsold mineral product for its own account at published spot-market prices.'

## Minimum quantity contracts

Minimum quantity contracts act to assure the project financier of traffic levels or offtakes. A variety of the take or pay structure, the structure provides a floor to the volume line of the project's cashflows. In contrast to the pure take or pay, there is no 'banking' concept if the floor commitment is exercised.

The fine points of this floor arrangement will be negotiated very closely. Sometimes it could be back-door recourse, and therefore has converted the project financing to a guaranteed one (indirectly by the government or the purchaser).

**Case study: Aeropuerto Eldorado, Colombia**

For Aeropuerto Eldorado, a second runway for the airport in Bogota, Colombia, the aircraft landing level was set as a minimum by the concession grantor, the government's civil aviation authority, Aerocivil.[5]

## Market preference contract

A market preference contract gives the new project's output preference in sales ahead of the company's existing sales and production volumes. Put differently, the sponsor will back off its existing marketing quantity to sell whatever the project can produce. From the company's (portfolio) point of view, this can be quite palatable as the new plant/system should be the most efficient and produce the best quality and should, therefore, fit very well into its sales pool.

**Case study: Grefco, US**

For the US$7.5 million Grefco project financing in California, US, the company sought to develop a new processing line for a product superior in characteristic to its own suite of filter aids. Since the main market for the new material was to filter beer, the end demand at the retail outlet is actually underpinning the Market Risk!

## Requirement contract

In a requirement contract, of which there are two forms:

1 the project system must sell all of its output services to the purchaser; or
2 the project/system must buy all of the input/services it needs from the supplier.

From this definition, the participant risk of the other project is inexorably linked through this contract to the project itself. This style of contract is seen in captive inside the fence or dedicated over the fence transactions. The requirements contract is usually designed as an anchor contract with all the surplus being sold elsewhere, that is, where the infrastructure or regulatory environment permit it. The surplus is often not on a contract basis, certainly not on the more firm ground of the requirements offtake arrangements.

A sector example of this is co-generation (power and steam) projects, which are full of these arrangements where the steam host – such as a large chemical complex or a pulp and paper mill – provides a double anchor taking steam and a big block of power, which makes the energy conversion (heat rate) much more efficient. The balance of the electricity can then be sold to the grid or under the PPA.[6]

Another style of requirements contract is a life of unit which means that if the unit's life is extended, the offtake is automatically extended.

## Tolling agreements

Tolling agreements are being refined as a contractual structure in project finance. In the power sector, these are sometimes called energy conversion agreements (ECAs). (Note that, in this book, the abbreviation ECA refers to export credit agencies.)

**Case study: Navotas, Philippines**

The government power utility of the Philippines, Napocor, has been a proponent of liquid fuels gas-turbine power generation, whereby it supplies the fuel for free yet is the offtaker of the electricity. This tolling commitment is the main support for market risk (as well as controlling the operating-cost and supply risks of the fuel) as is seen in Navotas (see Exhibit 10.1). Note that for Navotas, the peaking plant project internal rate of return (IRR) actually slightly increases when there is no generation! The PPA payments do not completely cover the maintenance expense of stopping and starting the turbines.

## Advanced sales contracts

Advanced sales contracts have been used with some degree of success for energy projects. The difficulty is to avoid any character of these revenue obligations looking like income, since governments have a propensity to tax income as soon as it can. This can be lethal since there are no depreciation, finance, or operating costs yet which can be used as income tax deductions.

The oil majors have been able to develop pre-export financings which achieve the same end but are, in reality, contract monetisations, a securitisation structure. However, when one digs behind many of these deals, there is heavy quasi-guarantee or full-guarantee corporate support.

### Case study: Sonangol, Angola

The Sonangol offshore oil operation is off the Cabinda military enclave of Angola. For many years it has been able to raise finance over future oil deliveries even with the attendant Political Risk. The deals carry an Angolan central bank guarantee.[7]

### Case study: Oil Purchase Co., Cayman Islands

Oil Purchase Co, a Cayman Islands subsidiary of Colombia's state-owned oil company, Ecopetrol, persuaded investors to take project finance risk (on specific oilfield production) as part of their US$290 million, four-year deal marketed as an 'asset-backed securitisation'.[8]

## Production payments

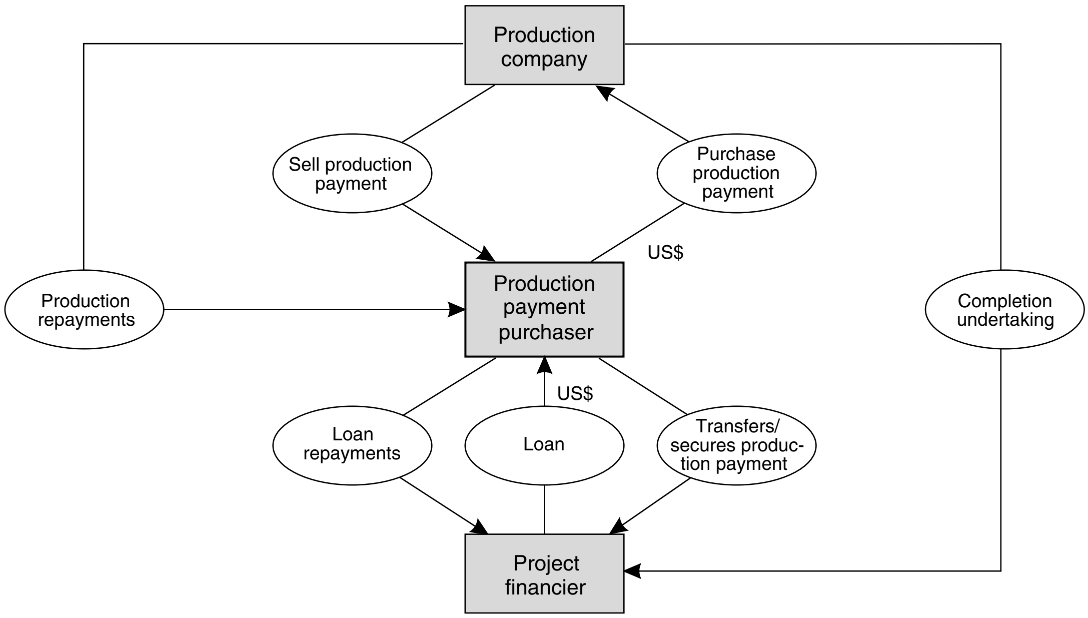
Production payments are a more tailored variation of advanced sales. The simple definition is: '*A defined interest in the proceeds of the system/production up to a given monetary amount (debt service (DS)).*' This is a style of 'smart' loan.

The 'interest in the proceeds' can be defined in any way: physically (in kind); off the top (gross revenue – monetisation); off the middle (profits); or from available cashflow (see Chapter 5). The system/production referenced may also be specially determined/defined. The given monetary amount is the sum total of DS if it is a debt production payment.

This structure was referenced in the discussion on the origins of project finance in the Introduction, and reached an apogee in 1969, with an advanced-depreciation tax structure – quickly killed off by the Internal Revenue Service (IRS) in the US. However, it is widely recognised by accounting bodies and government tax authorities as a loan variant. In Exhibit 11.4, the presence of a middle company as the production payment purchaser has to do with US banking law. This is technically not needed in crown law (English Law) jurisdictions, but it is nevertheless advisable to leave it in to inherit/grandfather these tax and accounting clearances.

Exhibit 11.4

**Production payment**




*Source:* International Advisory & Finance 2014

Production payments are also called carve-out structures with acronyms such as ABC, or ACBD depending on who granted what to whom and whether cashflow lines could be split. A good discussion of these is seen in Chapter 28 of *Project Financing*.[9] For present day practitioners, it should be added that many mega mergers and acquisitions (M&A) transactions have been structured as variations on this theme.

The earliest reference is in 1932 to a Texan reserved oil payment which included a cash bonus and an overriding royalty.[10]

> It is an incorporeal hereditament in the nature of an overriding royalty creating a present interest in land in the payee.

These descriptions were directed at claiming the US tax break, the depletion allowance, and to escape the connotation of capital gain. Production payments have since been carried across the Atlantic for some of the pioneering North Sea oil project financing deals and for such exotica as executive jets.

### Case study: Elura, Australia

The author introduced a production payment for the US$130 million Elura project finance in New South Wales, Australia. The middle company, Nedals Finance No. One, was established in a jurisdiction which levied no stamp duty on ownership. (A huge US$7 million legal risk was always lurking if anyone mistakenly took the documents into any jurisdiction that did levy stamp duty!) The unliquidated basic sum (the loan) was repaid from the project's available cashflows. The security in the property, offtake, contracts, and so on, was transferred (charged/mortgaged) to Nedals to the benefit of the lenders. Nedals, through a purchase agreement, had borrowed the money to buy the production payment. The sponsor, EZ, was also able to book this as middle-line debt as a way to navigate around its other borrowing covenants/security constraints. The loan agreement was essentially a contract for costs (essentially debt service and foreign exchange (FX) adjustments).

## Contract monetisation

A type of securitisation, a contract monetisation is a dedication of gross revenue to repay the project finance debt. By slicing repayment off the top, the sponsor is taking the opex, taxes and other risks. Accordingly, the establishment of the size of the 'slice' requires great care. Project financiers much prefer options since they do not carry the hidden margin-call attribute of any price hedge/forward contracting.

### Case study: IAF monetisation

In the IAF monetisation shown in Box 11.1, the treasurer had two choices between a bank deal and a bond project finance, both structured as contract monetisations. The only choice is the bank deal (pricing was essentially the same) due to the flexibility banks could offer to adapt the deal to future (expected) contract changes. One of the prior contract revisions was to revise the offtake quantity upwards; another was a 'give' on the price formula.

**Box 11.1**
**Monetisation – IAF client (private company)**

*Monetisation of a contract*

During the first 14 years there have been four major contract revisions – including a contract extension by nine years. In total, 16 years have been added to the contract.

Two alternative financings with no (net) price difference.

1. US$180 million –12 years – Bank.
2. US$210 million – 13 years – US private placement.

Monetisation = securitisation of the gross proceeds (of a contract).

### Market price hedging

The main structuring route as mentioned at the beginning of this chapter is through sales contracts. Besides this, project financiers can implement hedging, where possible, or accept the price forecast studies. There is further discussion of hedging below.

## *Market price*

The many ways the price line of a project finance cashflow is supported is summarised here.

### Base pricing

Base price structures against which a number of rises and falls may apply, as follows.

1 *Escalation* with reference to some published national cost basis such as the Consumer Price Index/Retail Price Index (CPI/RPI) or Wholesale Price Index (WPI).
2 *Costs based* where the main ingredients for the plant's operating costs are aggregated, for example, 25% energy, 25% labour, 50% materials (inputs) into a basket.
3 Published *indexes or prices* which are generally available and thought to be representative of market conditions and independent of market players: buyers, sellers or traders.
4 *Benchmarked* against other prices for similar projects or in that sector.
5 *Comparison* with the cheapest alternative so that the project must always match the competition.
6 Paid at the *purchaser's marginal price* for the most expensive/next block of purchases.
7 *Voided cost pricing* in which the purchaser's cost ('price' in the other direction) to pay for what it did not have to make or get elsewhere is the price that is paid. Besides this fuzzy 'alternative what?' language, this is nightmarish to define. An outgrowth of US utility pricing 'rate-case battles', *one must at all costs avoid voided cost*.
8 Subject to *floors, caps and collars*, and every variation in between, including synthetic option-based price participation structures with a given percentage of the market price above the call-price level.
9 *Front-loaded, back-ended and levelised price systems* to respectively, service debt early, give an early-year price break and have a single price yielding the same net present value (NPV) at an agreed discount rate.
10 Zero in any terms which means a *fixed-price* contract with the price, therefore, declining in real terms.
11 *Declining in real terms* at some level below GNP deflator or some economic indicator. Many regulators are seeking real price advantages and thus structure 'CPI-X' escalation where X is either expressed as a percentage (for example, 30% of CPI) or as percentage points (for example, 2%). This may have some bearing on the 'k' efficiency factor used in some pricing scenarios, especially PPP price formulae.
12 *Cost-plus* is another tool for price setting, with the added amount a function of profit, a percentage, or to pay management fees.
13 *Open book* is a variety of cost-plus where the inputs, outputs, and intermediating costs are all declared. The one thing pre-negotiated is a guaranteed return expressed as an IRR percentage.

14 *Cost pass through* which means that the price rises and falls with the movement of costs/inputs. For a cost corporation (discussed in Chapter 22) this might extend to opex, debt service (including FX changes), depreciation/amortisation/capital return and profit/equity return. For power projects, the energy charge pricing in a PPA is usually on a no-profit basis.

The base price itself is crucial in these circumstances and besides the escalation/de-escalation (rise and fall) must itself not easily be subject to alteration. Any concept of evergreen pricing or contract reopening/roll-over clauses may have a very real danger of such an occurrence.

**Case study: Quintette, Canada**

For the C$950 million project financing for the Quintette project in British Columbia, Canada, led by Bank of Montreal and CIBC, the bank syndicate gave a 12-year project financing.[11] Quintette had 15-year contracts with the Japanese at a base price of C$75/ton fob and 53% of consumer price index (CPI) escalation. However, the contract had a five-year re-opener by way of an 'equity' clause – a favoured device in such Japanese contracts. The price forecasts by the government incidentally had examined price escalation as 0.6% to 1.17% per annum in real terms based on an analysis of the last 100 years in the US. At the first five year price re-opener, the base price plus escalation level was C$105. The Japanese steel mills offered C$60, still above the spot market price at the time. Through arbitration, C$85 was settled. The Canadian-led bank project finance syndicate went on to lose about C$700 million from the washed-up project economics.

**Case study: Sithe Independence, US**

The Sithe Independence power generation transaction assumes that the starting price is pegged to the avoided energy cost of its main purchaser, Con Ed, (see Exhibit 13.2). Over time this went down to 88.75% of the utility's (Con Ed's) avoided energy costs. A capacity payment – linked to a minimum availability threshold of 93.6% of operating hours per annum – is also made instead of an initial US$0.026/kwh fixed capacity charge. At the same time, Sithe receives variable O&M charge escalating at US CPI.

### *Additional sales contract options*

A wide array of contract conditions can modify the general form. These break down into three main sub-headings.

*Force majeure*

Whether the contract conditions are relieved, payments adjusted, rolling offsets, and cumulative periods/fall out dates, and so on, are all negotiable as the cure provisions.

### Priority

Whether the purchaser has priority of offtake to anyone else, or indeed may be the sole offtaker, brings additional obligations both ways.

### Capacity changes

If the purchaser wants to move the band of minimum, average, or maximum quantities, then some payment provisions, notice periods, and other adjustments may be built in. (Obviously spot sales can be supplemented at any time).

## *Trading company financing*

In recognition of the rights to trade the inputs and outputs of a project, a trading company may provide or back some of the project finance directly. The incentive for the merchant is the control of the physical as well as the ability to trade or hedge. From the banker's viewpoint, a normal trading profit is expected in the circumstances; the concern is of supernormal profits since the merchant's 'cut' is off the top by way of transfer pricing or service.

## *Customer financing*

The ultimate extension of a sales contract structure is when the purchaser also provides some of the project finance directly. The concern about transfer pricing heightens with the additional fear that once the purchaser knows a project's cost structure (from the inside), it knows how to squeeze the contract with pricing, usually the first item to be put under pressure. Note that an equity holding by the consumer may be even worse in this regard if it has a larger offtake percentage than its equity percentage (which may amount to 'extra leverage').

**Case study: Candelaria, Chile**

For the Candelaria copper mine project in Chile, the offtake was split 60% to Japan, with the remainder to Finland and Germany. As part of the original US$290 million project financing (later augmented by US$150 million for an expansion), the Japanese giant, Sumitomo essentially backed half of the US$200 million Japanese tranche, but its subsidiary only held 20% of the equity. Sumitomo would expect to profit from the freight side, downstream 'processing', and physical sales/hedging (although their copper hedging was subsequently scammed by their chief trader, Yasuo Hamanaka, to the tune of US$2.6 billion!).[12]

## Trigger situations

Some of these, such as floor pricing arrangements, have already been discussed. Others are not just price triggered but may be more directly pitched at covering cashflow/debt servicing deficiencies. Others fall under the generic term 'hedging' by direct or derived means.

### *Hedging*

Prices of many commercial activities can be hedged under a myriad of structures.[13,14,15]

*Forward contracts* may be written with organised exchanges, principals, and traders. The danger from a credit standpoint is that when the price goes up – which may be very good from the project finance viewpoint – margin calls can be required. If the project cannot deliver (this margin money) then the extra exposure may be doubling up on the loan exposure.

*Options-based structures* hung around put and call options and all of the derived outcomes like floptions and swaptions.

*Swap-driven structures* are keyed off the contractual obligation to exchange financing or total price risks, such as floating to fixed.

*Cross-swaps* may translate a price exposure in one product and express it in pricing terms of another.

*Natural hedge* transactions may match the price exposure to the denomination of the loan exposure, for example, a gold loan for a gold mine.

**Case study: Brazilian aluminium**

A company desiring to build a power station to supply a Brazilian aluminium smelter wanted to be able to charge for its electricity in grams of aluminium per kwh. The aluminium smelter, for whom electricity is about half its direct opex, is very interested since it gives it a major natural hedge for a key cost component. By project financing the power station by way of an aluminium loan (synthesised), the power station also has a direct hedge since its capacity charge can now be predominantly in aluminium with those aluminium revenues from the power sales repaying the aluminium loan.

### *Contract for differences*

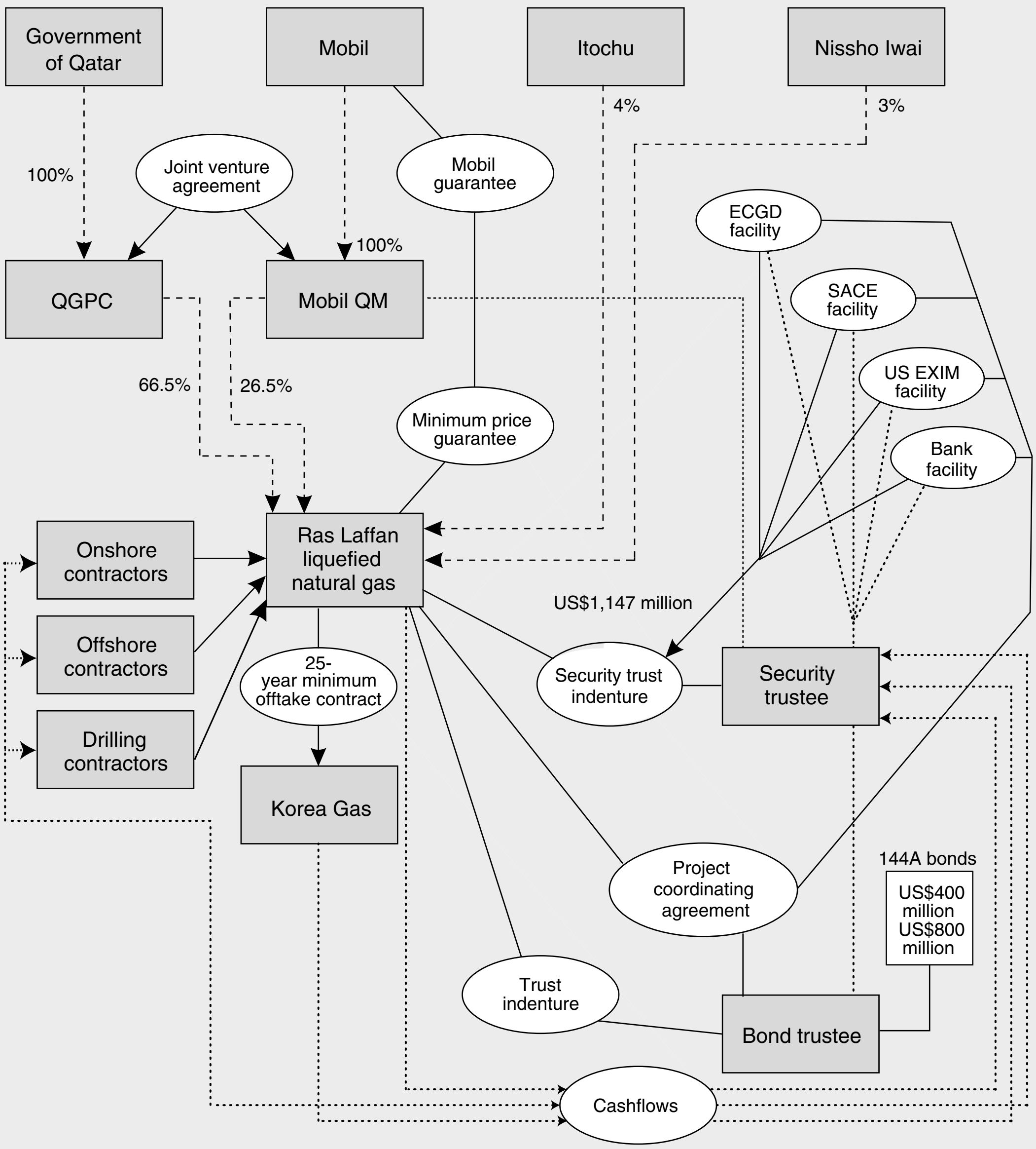
This hedging structure has been developed to formalise a floating-to-fixed swap mechanism in the power industry. The offtaker pays the unders and overs of the pool/spot electricity price compared with an agreed fixed price/set price. The contract for differences (CFD) obligation can also be flipped to the fuel supply side. Both could be subject to a cap on cumulative exposure on one level, above or below the set price.

**Case study: Ras Laffan, Qatar**

The Ras Laffan LNG project in Qatar was project financed on the back of 25-year contracts on a take or pay basis with Korea Gas, with limited downward flexibility in annual shipments of 5% in any one year and 10% maximum. However, LNG is priced against crude oil for which prices are volatile. Accordingly, one of the Ras Laffan owners, ExxonMobil, granted a minimum price guarantee (a 'floor') equivalent to approximately US$10.40 per barrel to 2009, subject to recourse to it being limited to US$200 million cumulative. This price floor (quite low on an historical basis) is a major support to the cashflow evaluation (the rating) for the deal.[16]

Exhibit 11.5

**Ras Laffan**




*Source:* Tinsley, CR, *Project Finance in Asia Pacific: practical case studies*, Euromoney, London, 2002

### *Make-up/deficiency agreements*

If the market price cannot be achieved then a per-unit subsidy or grant/buydown payment is made from the purchaser or the project sponsor. The idea is to restore the original economics caused by a fall in prices.

> **Case study: Sydney Harbour Tunnel, Australia**
>
> In the Sydney Harbour Tunnel in Australia, if the toll revenue is insufficient for debt service, then the state government will make up the difference (provided the tunnel is open). This is not a true project financing, since the recourse ultimately rests with the government through this (unlimited) deficiency agreement.

### *Insurances*

In some limited situations, it may be possible to find an insurance company willing to underwrite a price hedging arrangement.

> **Case study: Oakajee Steel, Western Australia**
>
> For Kingstream's US$1 billion steel mill development at Oakajee, Western Australia, the company sought insurance from a European company to stand behind the prices obtained on its tonnage offtake commitments for steel slab.[17] Ultimately, this project did not proceed.

## Study techniques

### *Market forecasts*

Reliance on price forecasting brings to mind advice to all forecasters: '*If you are going to forecast, forecast often*.' Nevertheless, some disciplined consideration of the market's performance throughout the business cycle might provide useful information on how flexible a repayment structure needs to be. Forecasting techniques can be summarised as follows.

- Macroeconomic techniques look at trends, econometrics, input/output, and all manner of modelling techniques. The difficulties facing modellers are highlighted in Chapter 6.
- Microeconomic techniques look at individual sectors, regions, or even a specific project – usually using modelling techniques. Traffic studies come under this heading.
- Charting where the tea leaves of price movements are sifted for head and shoulders and pennant shapes. These are usually too short term for project finance. Sometimes pure statistical techniques masquerade under this approach.
- Cycle analysis using mathematical filtering is very useful. The length of the 'down' periods may also be determined, again pointing the way for structural flexibility in the project financing.

For a while, price forecasting was held out as a major tool for project financing, particularly econometrics. However, repeated failures on price turning points and levels, plus the difficulty in accommodating hazards to the forecasts made them interesting, but not instructive. The good news? Little simulation or macros are tolerated by the project finance community, who understand better than most that cashflow forecast accuracy/trend is everything.

Some sector and forecasting considerations are given in Chapter 7. Almost all seasoned project finance bankers have turned their attention to cost competitiveness as a primary cashflow foundation rather than resting on price forecasts or supply/demand projections.

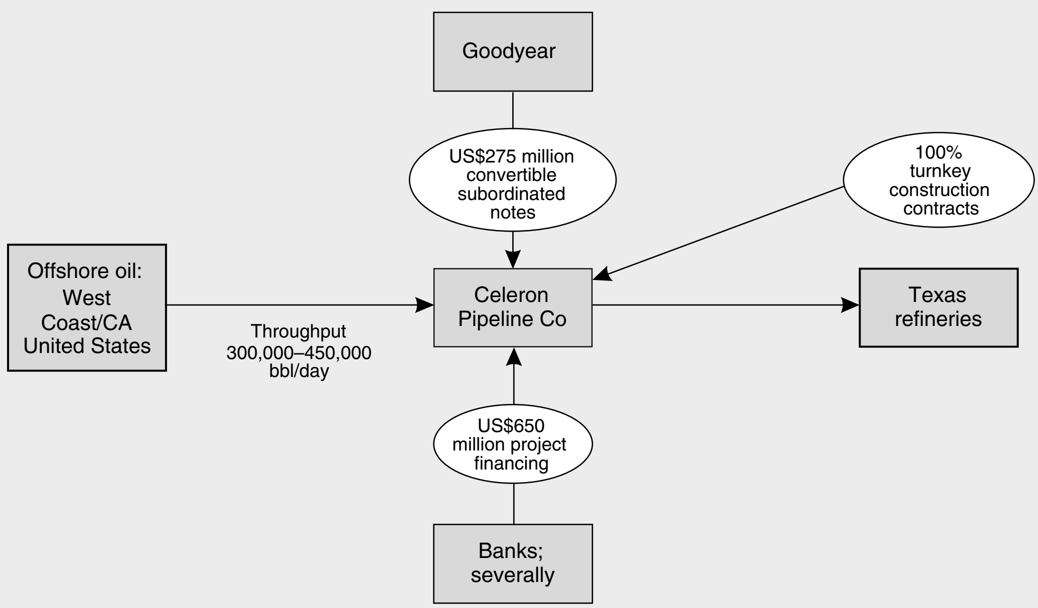
This skill is especially relevant in the consideration of merchant risk where the project financier has no or only little structural cover over market risk. See Chapter 14 for more discussion on merchant project structuring.

**Case study: Celeron, US**

The Celeron transaction provided a two-year period for the build-up of usage of this wholly merchant development. The completion test included a threshold usage level and the issue of US$50 million of rated debt (just above investment grade, see Box 2.3). This is a long and strong incentive for the sponsor to get to the target usage and ratings level if it wishes to exercise the option to convert to a limited recourse project financing.

Exhibit 11.6

**Celeron**




*Source:* International Advisory & Finance 2014

## Summary

Most of the structuring attention for market risk is in contract language and 'rise and falls'. Does the revenue exceed the downside case? Options are used where possible, even insurances. Reliance on price forecasting has declined in favour of cost competitiveness.

---

[1] Hoffman, SL, *The Law and Business of Project Finance*, 3rd edition, 2008, Cambridge University Press, p. 228.
[2] Veron, EL and Martarano, LA, 'Sutton Bridge IPP: a new generation of projects taps the international capital markets,' *Journal of Project Finance*, 1999.
[3] Standard & Poor's, 'Sutton Bridge Financing Ltd', *Infrastructure Finance*, 1999.
[4] Cox G, 'Financing an oil company', in McKechnie (ed), *Energy Finance*, 1983, Euromoney Books.
[5] Standard & Poor's, 'Compania de Desarollo Aeropuerto Eldorado S.A.', Latin American Projects, Concessions, & Project Development.
[6] Tinsley, CR, 'Structuring and funding', in *Practical Introduction to Project Finance*, 2000. Euromoney Books.
[7] Bill, J, 'Sonangol: Angola's treasure', in *Trade Finance*, 1998, Euromoney Books.
[8] 'Oil securitisation done,' *Project Finance International 132*, 1997.
[9] Fabozzi, FJ and de Nahlik, CF, 'Reserves oriented financing and drilling funds', in *Project Financing*, 8th edition, 2012, Euromoney Books.
[10] State vs Quintana Petroleum Co. Sup. Ct. Texas, 134 Texas 179, 133 S.W. 2nd, 112.
[11] Tinsley, CR, 'Coal financings: the good, the bad, the ugly', at the Ninth Pacific Rim Coal Conference, 1994.
[12] Weintraub, J, 'La Candelaria signed loan signed up', *Mining Finance*, 1997.
[13] Chase Manhattan, *Commodity Derivatives and Finance*, 1996, Euromoney Books.
[14] Das, S, *Swaps and Financial Derivatives*, 2nd edition, 1994, LBC Information Services/McGraw-Hill.
[15] Enron Capital and Trade Resources, *Managing Energy Price Risk*, 1998, Risk Publications.
[16] Standard & Poor's, 'Ras Laffan', Global Project Finance, 1997
[17] Drummond, M, 'Kingstream's novel insurance hedge,' *Australian Financial Review*, 2000.

Chapter 12

# Foreign exchange risk

Foreign exchange (FX) risk arises from a mismatch of the currency of the revenues, operating costs, and the debt. Many forward contract and derivative structures can be used. Unfortunately, these markets may be very thin or very short term, often 12 months or less, or, post global finance crisis (GFC), seen as very risky. The in-house swaps desk relishes nothing better than burying some nice (fat?) front-end fees and basis points into a 'captive' project finance deal.

## What percentage to structure?

There is a temptation to go for the maximum 'fix' of hedge and swap exposures. However, this might overly constrict the project in later years when flexibility is required and some resetting of the overall structure is desired (without incurring break costs from derivative/ forward contracts structuring. The cost of breaking a swap can be prohibitive.) The tool to measure FX risk is the downside case – discussed in Chapter 3 – although an FX series of breakeven cases may be run to validate the final percentages and periods that are selected.

In all, it is customary to structure almost the full amount but leave some space in the length of the FX structure to allow some early repayments/prepayments. A rule of thumb is around 30% to 40% of the term remains open, although if there is concern, then replication and options may be later used to extend the FX risk cover. Two other cover levels (in common with quantifying the interest-rate exposure) are the debt service (DS) and operating costs (opex) – the cost curve – one or both of which should be fully covered to protect loan repayments and the project itself.

## Contract structures

The main contract architecture is for forward contracts/derivatives followed by cross-border parallel structures.

### *Forward contracts*

If the local currency is weak, a forward discount will likely apply, which can even still risk a loss. Margin calls need to be accepted or structured out by options, much favoured by the project finance community. An assessment needs to be made of the swap points/arbitrage alternatives and there is a wide array from which to select.

If rolling forwards are assumed, then the cover is still only until the contract expiration with the remainder fully exposed. Rollover replication may be able to structure this, given that sufficient term options are available.

**Case study: Tribasa, Mexico**

The offshore proceeds account for the US$110 million Tribasa toll road 144A/Eurobond issue included automatic conversion into US dollars. While described at the time as 'excellent' FX cover, given the deal had an 18-year term, in fact only 1/36th (3%) of the FX risk was covered at any point in time. The subsequent 50% devaluation of the peso brought the project's cashflows to just about break even in one fell swoop.[1]

### *Parallel loans*

Developed especially to get around Brazil's punitive interest withholding tax (IWT) and its country debt rescheduling, banks shadowed a local currency loan with an offshore loan which usually required the sponsor to make up any FX difference. The offshore agreement offset the cross-border depreciation. In this case currency inconvertibility and transfer (CIT) risk is also being structured.

### *Barter*

Certain varieties of barter, such as compensation trade, may yield something like a natural hedge, particularly if the repayment obligation can be denominated in the product being produced by the project or delivered by the system. Barter is difficult to negotiate because of different value and currency perceptions, but when it does work, it can work very well.

Entities familiar with the former Soviet Union (such as the Austrians) or with sanctions busting/exchange control manoeuvring (South Africans, Zimbabweans, South Americans) may have developed the necessary talents the hard way to pull off a barter deal. Although providing a different 'currency' basis for repayment, this structure usually adds more risk than it structures because of the weak credit quality and indeed sometimes political risk (the subject of Chapter 21) of the barter party.

## Trigger structures

Project finance structures have no unique or special features to make them different with regards to foreign-currency derivatives. The reader is directed to any number of authorities.[2,3,4] It is not the objective of this book on risk structuring to explore the likes of spraddles, floptions, and wing nuts, although a brief reference is made to Herstatt risk (see Chapter 18), a type of cross-currency settlement risk.

### *Currency swap*

In a straight currency swap, the parties exchange the underlying currencies on the basis of a re-exchange at a later date, or in European-style currency swaps, at its expiration. This re-exchange brings with it a redelivery credit risk. It is customary to have a financial institution intermediate the participant risk of the swap counterparties, thus taking the participant's/counterparty's credit risk.

Even the best 'name' banks can get stuck as was seen after the GFC.[5] It is no coincidence that the book entitled *Fatal Risk* discusses the role of AIG as a risk-insurance counterparty to credit default swap transactions, widely blamed for the GFC.[6]

> **Case study: Korean counterparties**
>
> With the collapse of the world's 11th largest economy, Korea, JP Morgan ended up with US$600 million in defaulting swap counterparty risk.

### *Exchange rate agreements*

Synthetic FX structures are widely available under exchange rate agreements. Project financings usually have uneven swap profiles and require flexible swap arrangements with fluctuating amounts ('rolly polly').

## Avoided

### *Natural hedge*

The best way to avoid FX risk is through natural hedges among the revenues, opex, and loan currencies.

- A local currency loan for a toll road makes sense, since tolls are inevitably collected in the local currency.
  - The oil price is denominated in US dollars, so a US dollar borrowing will always be naturally hedged (except for the local opex currency exposure after netting out imported opex and maintenance items).
  - Similarly, many mineral products are priced and traded in an underlying US dollar amount, even though commodity exchanges may otherwise denominate their contract currency.

### *Commodity lending*

With revenues from the sale of a commodity, either the commodity producer or a supplier to that production enterprise can elect to fund itself in that commodity (see the discussion under 'Commodity-based lending' in Chapter 2). It must then charge for its services in terms of units of that commodity to derive sufficient amounts to repay the loan in kind.[7] A case study example of this (Brazilian aluminium) is given under 'Hedging' in Chapter 11.

### *Consumer price index lending*

Although this might be considered an interest rate risk structure, the fact is that many consumer price index (CPI) loans index the principal as well as the interest (in CPI). Thus the whole principal is exposed, not just the interest rate obligations (see Chapter 23). If a tariff is structured in relation to CPI or CPI-X, then a CPI-based funding is a natural hedge (see also Chapters 2 and 11). As mentioned in these chapters, pension funds are the primary target for CPI-based bonds and notes.

### *Foreign exchange tariff*

In the independent power producer (IPP) financings in Asia (Philippines, China, Indonesia, India) it was customary to denominate a substantial portion of the capacity charge in US dollars, with the local portion a function of local maintenance expenses. Since the fuel price (if imported, the fuel would represent an FX risk) was a pass-through via the power purchase agreement's (PPA) energy charge, then any FX impact on it was passed through to the power purchaser.

**Case study: Navotas, Philippines**

Hopewell's Navotas power plant in the Philippines had a tariff 96% denominated in US dollars. Bankers (in this case co-financing with ADB and IFC) could ignore the Filipino peso FX rate in their evaluation (see Exhibit 10.1).

**Case study: Paiton, Indonesia**

The Paiton power plant in Indonesia has a power tariff adjusted to account for exchange rate fluctuations between the US dollar and Indonesian rupiah. Most of the tariff is denominated in US dollars, starting off above US$0.08 per kwh. The purchasing power parity (PPP) theory of progressive exchange rate devaluation did not hold in Indonesia since it was usually much more cost effective to borrow in US dollars for about 10 years prior to the Paiton project financing. The cashflows were run at 2,038 rupiah/US$1. When the rupiah crashed to 18,000/US$1, the tariff became a nightmare for the state power utility offtaker, Perusahaan Listrik Negara (PLN), even though the fuel, coal in this case, is locally sourced. The rupiah has since recovered half of the ground, nevertheless still trebling or quadrupling the tariff in local rupiah/kwh terms. Although properly structured for FX risk, the devaluation has introduced a strong political risk component to the outcome as well as participant risk stress on the power purchaser, PLN. This is the closest sovereign default (not) experienced by IFC!

Perhaps one should add the following two rules to the list of common sense rules at the end of Chapter 9.

1 Does the deal make sense in terms of local affordability?
2 Is the FX risk capable of sensible coverage?

### Purchasing power parity

A favourite approach to FX is the purchasing power parity model. There are a number of versions but the simplest expression is the difference in two countries' projected inflation rates. This figure will be reflected in the period's devaluation of the local currency.

The first difficulty stems from the economist's approach to it working 'in the long term'. This is fine, but most people want to know about now? What about next year?

The author has seen this purchasing power parity model provide all the cashflow (available) for debt service, due to the exponential devaluation algorithm assumed in this theory, which is unrealistic and unacceptable. Nevertheless as a sensitivity case, it is worth looking at, as are progressive devaluations seeking the 'breakeven' devaluation. With all these modelling exercises, the overall loan outstanding profile may still require yet further flexibility. Most bankers welcome early loan repayments, but not too much, and less so in the case of a good loan being a performing asset.

### Exchange rate forecasts

Specialist consulting or publishing services or the in-house economist at the bank/investment bank/institution makes a projection or attempt to predict exchange rates – forecasts beyond 18 months would be deemed 'heroic' for many countries. In some countries there may be a sufficiently long swap market to determine, say, an average loan life FX figure. However, FX markets usually have a term which is much shorter than the project finance term.

One is reminded of Doelger's thought that '*forecasting is a difficult thing – especially when it deals with the future*'.

## Summary

The FX structuring tools are not much different in a project finance than for any financial or industry sector. Forward contracts and derivatives are widely available but often have too short a term to fully mitigate FX risk. The best structure all round, is to use natural hedges.

---

1 Warne, JL, 'Case study: the performance of Tribasa Toll Road Trust 1 notes – post devaluation,' T*he Journal of Project Finance*, 1995.

2 Nevitt, PK and Fabozzi F, *Project Financing*, 6th edition, 1995, Euromoney Books.

3 Das, S, *Swaps and Financial Derivatives*, 2nd edition, 1994, The Law Book Company.

4 Sheedy, E and McCracken, S, *Derivatives: the risks that remain*, 1997, Allen & Unwin.

5 Campbell M and Weaver C, Eds, Syndicated Lending, 6th Ed., Euromoney, London, 2013.

6 Boyd, R, *Fatal Risk: a cautionary tale of AIG's corporate suicide*, 2011, Wiley.

7 Tinsley, CR, 'The latest in project financings', at Contemporary Gold, The AusIMM/BCAE Conference, 1988.

Chapter 13

# Operating risk – technical component

Technology risk cannot be cleaved from the management and cost components of operating risk. The ability of management to achieve the best cost and efficiency outcome with the given technology, or indeed remain cost competitive and technologically competitive, are mutually dependent. The sole reason to split the operating costs (opex) line of the cashflow projections into three categories is to assist in organising the different structuring solutions.

Essentially project finance is not a tool for research and development (R&D) and venture capital. A project financier is delighted to be second after the project's technology has been proved elsewhere. Besides never tackling new technology, the second component of operating risk: technical component is technological obsolescence.

With technology risk there is no single mitigating structure which will likely be enough and, therefore, a combination of structuring techniques is often employed. (See Exhibit 13.1.)

## Contract structures

There are a number of ways to structure or to contract technology services (via the operation and maintenance (O&M) contract) or standby/redundant equipment/spares to minimise technology risk.

### *Technology management*

A party skilled in operating the technology is appointed as the project operator under an O&M contract. Their personnel, computers, systems, and management skills can be checked through reference to prior deals and other projects.

In some fields, the technology contractor commits to add process and technology improvements that become available to it during the project. Alternatively, it manages a continuous improvement/R&D/innovation to keep the project technologically competitive.

Some plants licence their process technology from an established technology provider. For a fee, the licensor can run the process unit, be on standby, or regularly 'trim' the unit's performance from a cost and technology point of view.

### *Technology warranty*

The sponsor or a party supplying goods or services warrants a specific technology outcome in terms of physical (and better still, financial) performance.

**Case study: GE warranties**

For instance, General Electric (GE) will warrant the fuel efficiency (heat rate) and availability (hours per annum ready to generate) for its gas turbines. Failure to achieve this warranty/performance guarantee will bring on a liquidated damages (LDs) claim against GE.

### *Quality assurance*

By the use of the system or equipment, a minimum service or product quality is warranted (be it in million minutes, percentage purity, and/or so on). This is one step down the line from the technology measure to the project's actual outcome. Any cashflow shortfall arising from failure to achieve this outcome will be for the sponsor/assuring party's account to pay the deficiency. Like any LD-style of structure, bonuses need to be on offer too if the project is performing better than expected.

**Case study: Murrin Murrin, Western Australia**

In the Anaconda Murrin Murrin 144A-Bond/FRN issue, the plant was scaled up from existing technologies installed in Cuba and licensed from a Canadian company, Sherritt Gordon. The licensor entered into a multiple technology management arrangement which can be seen in Exhibit 13.1. The technology risk was structured:

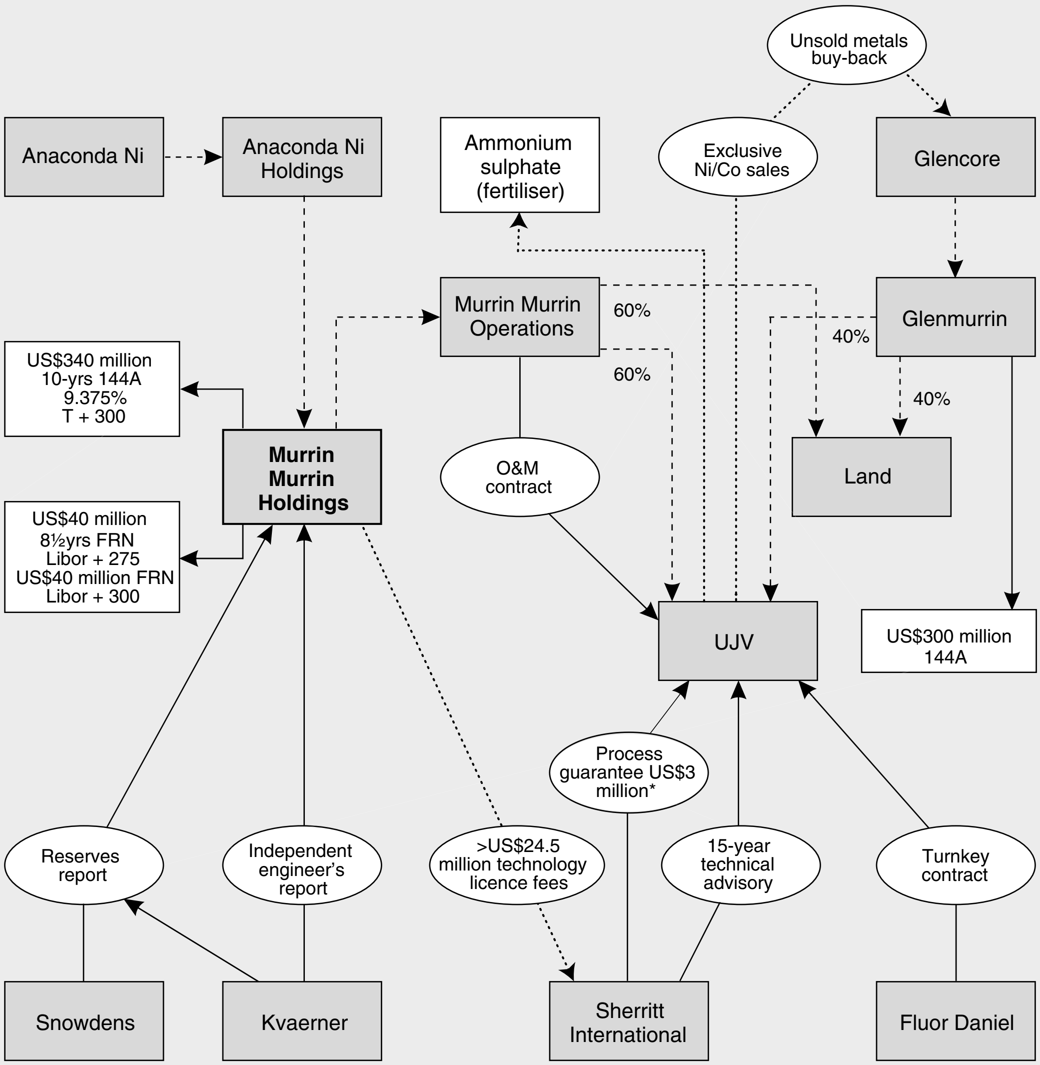
| *Method* | *Amount/mitigant* |
|---|---|
| Process guarantee | US$3 million |
| Technology insurance | US$50 million (being sought) |
| Technology advisory | Contracted |
| Independent engineer | Report (described in Exhibit 9.3) |
| Automatic technology upgrades | Licence fees |

*Continued*

Case study *continued*

Exhibit 13.1

**Murrin Murrin**




* Technology insurance top-up to US$50 million being negotiated.

*Source:* Author's own

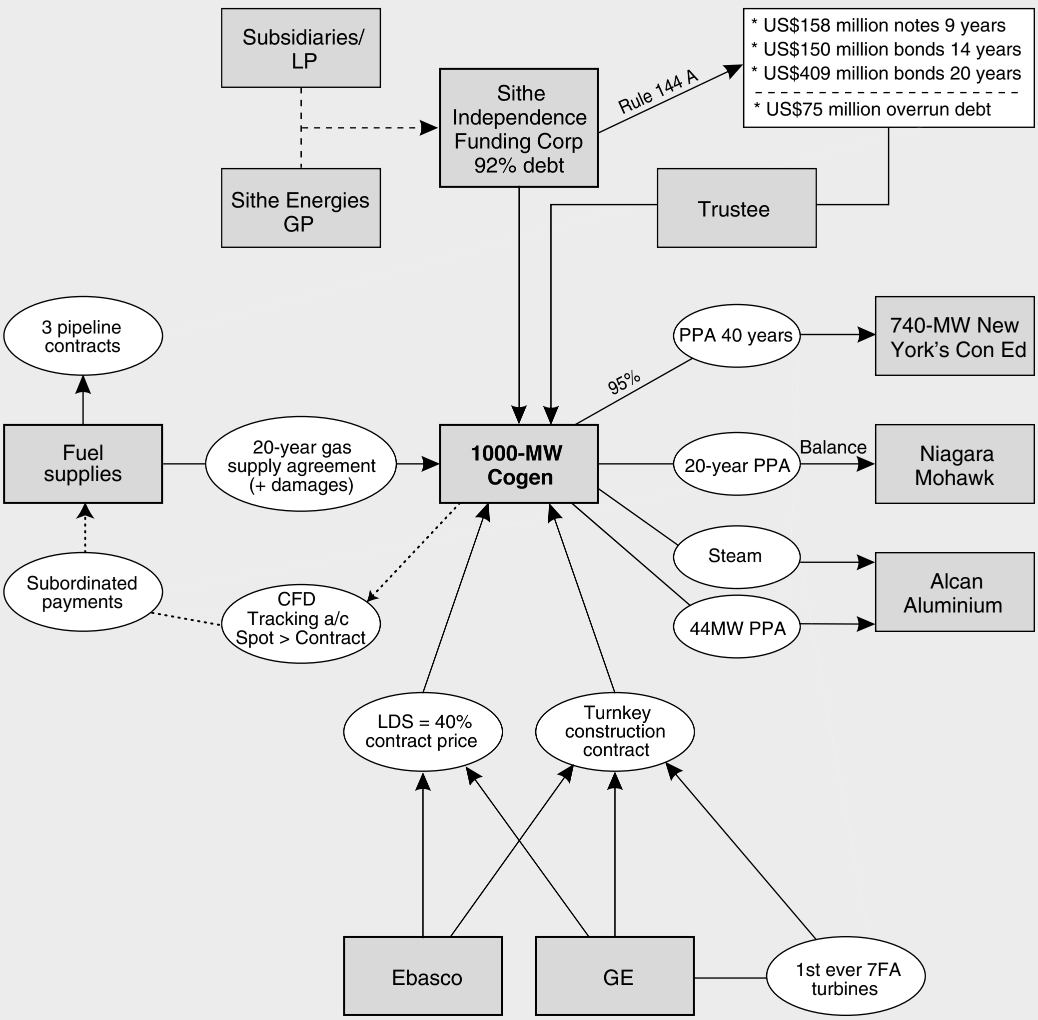
**Case study: Sithe Independence, US**

General Electric (GE) introduced a new gas turbine technology at the 1,000MW Sithe Independence project, in New York state. The new FA machines swapped some interconnection and rotor arrangements with the latter causing the main problem to arise from rotor imbalance, effectively shaking the plant off its foundations. GE was required to give much higher LDs in the circumstances and a five-year maintenance warranty period (where 12 to 18 months is typical).

This FA problem also appeared in UK installations. GE has reportedly spent in excess of US$800 million directly fixing the problem or in LD payments caused by delays/failure of the FA machines. Without this GE performance warranty/LD architecture, it is improbable that the project financier would attempt a 92.5% debt deal.

Exhibit 13.2

**Sithe Independence**




*Source:* International Advisory & Finance 2014

### *Technology guarantee*

If the technology is responsible for any reduction in cashflow realisations, the difference will be paid by the sponsor/parent group or the technology provider. The project financier is not being asked to accept this risk at all.

**Case study: Petropower, Chile**

Two relatively 'risky' technologies were being installed at the Petropower project financing for a beside the fence refinery processing/co-generation project in Chile. (See Exhibit 19.4.) These are:

| *Unit* | *Factor* |
|---|---|
| Delayed coker (from refinery feedstock) | Foster Wheeler experience |
| Circulating fluidised bed combustor | Completion contract with Foster Wheeler |

The transaction has Foster Wheeler also covering the problems with operating both technologies through its 100% LDs/buy-out structure and commissioning/completion construction contract (making it a Type 1).

**Case study: Voest Alpine, South Africa**

Austria's Voest Alpine established the first Corex direct-reduction steel process for Iscor, South Africa – a significant technological development since low-quality thermal/steam coal could be used instead of natural gas or coking/metallurgical coal to make steel. To get the plant at Iscor running, Voest Alpine had to spend an additional US$180 million for this medium-scale plant. Bankers on other Corex deals would likely now accept the Voest Alpine technology, debugged at Iscor, at least for the same-sized production module.

## Trigger structures

### *Fleet assurance*

If the project utilises a high-technology aspect that can be readily replaced, then either:

1 redundancies/back-ups can be installed on site or nearby; or
2 a system of 'shared spares' is provided, so that replacement of the key technology item can be effected within a short time period.

The structure here is driven to minimise the cashflow foregone during any downtime caused by this sensitive technology. A plant operator would recognise the term 'insurance spares' and this is a refined way of achieving the same end.

**Case study: GE aeroderivative power plants**

General Electric (GE) has a lease program for its 40MW aeroderivative power station engine. If the engine fails, a replacement will be sought from the nearest depot with a spare. If the spare is being used by someone else, then a change-out unit will be flown to the project from Houston within three days, if necessary. In this way, even though an aeroderivative engine is quite high tech, the cashflow will only ever be out by one to three days.

### *Business interruption insurance*

If the technology tends to cause an insurance event, for example, by catching fire or exploding, then this policy may provide an indirect cover of technology risk. Care is always needed in the insurance industry to act in 'utmost good faith' and disclose that this might be an event to be considered. Insurers are just as wary of new technology as project financiers.

### *Technology insurance*

This exotic and unconventional insurance may be structured in London either with Lloyds or specialist brokers. The capacity is occasional and not large, US$50 million to US$100 million maximum. As a trigger support, it could add a floor to technology risk levels.

## Financed structure

### *Performance bond*

A performance bond is established to be released after a period of sustained proof that the technology outcome is above the standard negotiated. (See Exhibit 19.5.)

## Study structures

### *Independent certification*

A highly reputed consultant or company certifies acceptance of the technology and perhaps the feasibility studies – in the same manner as would be expected in engineering risk (see Chapter 20). Such a consultant might also put forward a judgement as to whether the project can keep technologically competitive.

### *Alternative technology*

If the technology fails to achieve the desired improvement, then by taking one step backwards or through retrofitting the project, a respectable cashflow can still be achieved. The corollary is that if a new project technology requires a single-purpose capex, then if the technology does not function, there is no opportunity to step anywhere or retrofit anything and the project's worth is its scrap value. In the corex example given earlier, if the project does not work the equipment is of little value for anything else.

### *Technology curve*

A comparative study is done of competing technologies, including those existing and being developed. Each is reduced to an economic model in the form of a spreadsheet and the production unit cost outcomes examined. The project financier can now evaluate whether the technology selection is competitive and will remain so in the face of the introduction of a new commercial technology(s) – technological obsolescence.

Another approach is to examine the time an industry takes to commercialise new technology. If it takes a decade or more, as Exhibit 13.3 shows, then no new technology can seriously compete until 15 to 20 years from now.

Exhibit 13.3

**Commercialising steel technology**

| *Steel process* | *First pilot plant* | *First operation* |
|---|---|---|
| LD | 1948 | 1952 |
| QS | 1974 | (not yet commercialised) |
| Corex | 1981 | 1987 |
| HIsmelt | 1986 | 2010 (GFC has this on 'care and maintenance') |
| DIOS | 1990 | Not yet commercialised |

*Source:* Author's own

Some sectors are facing a blizzard of technology developments – such as telecoms and satellites – which makes it difficult to gauge the expected half-life of a technology which will obviously impinge on the term of the deal. Satellites are very high tech and can have lives easily shortened by technology and management failures.

## Summary

Multiple approaches will be taken to structure technology risk if it is accepted at all. Equipment suppliers and service/system providers are the usual source of structural supports via performance warranties/guarantees and management arrangements such as licensing. Some limited insurances may also be structured.

Chapter 14

# Operating risk – cost component

The operating cost competitiveness of a project has developed into an important way of discriminating between project proposals for project financings. It is vital in circumstances where poor contract opportunities are available to ameliorate market risk, such as: merchant power plants where a project is fully exposed to the market; oil and metals which are subject to fluctuating prices; or telecoms which are dependent upon creating subscriber traffic.

## Contract structures

### *Cost guarantee*

Major components of operating costs will be guaranteed by the sponsor, operator, service provider, or merchant to lock in costs that would otherwise be subject to upward pressure. This can be an extension of performance and technology structures, individual service costs or downstream processing costs.

**Case study: Woodcutters, Australia**

GlencoreXstrata, a large Swiss commodity trading and mining house, offered to provide a contract to fix the 'downstream' processing charges for a period equal to the loan life. Although the charges were higher than the current levels at the time, the benefit of no escalation/de-escalation of this large component of opex (around 40%) was a key support for the project financing.

### *Sales contracts*

Sales contracts are in the realm of market risk. However, certain contracts provide for costs either as a straight/cost-plus/pass-through to the ultimate offtaker or else formulae-based escalation clauses linked to cost elements (see the discussion on price in Chapter 11). With a productivity gain, hopefully the project can get the full benefit. Unfortunately, the regulators seem intent on extracting that benefit too.

> **Case study: Power purchase agreement fuel cost pass through**
>
> In a classic power purchase agreement (PPA) used in the power industry, the cost of fuel is passed through the PPA contract on a no-profit basis, that is, all rises and falls in the fuel price are reflected in the directly variable energy charge part of the power price on a no-profit basis. Therefore, the risk of fuel cost variations is passed straight through to the power purchaser under the PPA. This large component of the tariff, an operating cost risk, is zero since it is taken by the purchaser. (Whether the purchaser can absorb these price fluctuations is another risk, part participant risk and part market risk.)

## Trigger structures

### *Economic test*

So far only seen in North American resources transactions, the economic test works to control a situation where a cyclical event overtakes the cashflows. The trigger is specified as, for example, when cash operating costs plus debt service are less than revenues for four quarters in a row. The sponsor has the option to shut down the special purpose vehicle (SPV) provided that it (re)assumes three risks:

1 pay interest (interest rate risk);
2 arrange and pay for care and maintenance expenses for the project (operating:cost risk on the fixed component); and,
3 re-complete the project when the reverse of the closure test is expected to occur, for example, the next three years (completion risk).

The third element is either done by a formula or else a third-party expert is relied upon. The recompletion trigger must be made easy to determine. Re-completing also re-opens the pre-completion architecture of recourse to the sponsor (via Type 1). The project finance option in a Type 1 structure can be satisfied again subsequently and the sponsor can remove balance sheet support until the next economic test trigger.

## Financed structures

### *Cost subordination*

In the event that available cashflow is insufficient to meet the scheduled debt, then cost components to the project, the 'payables' will structure subordination of their payment in favour of the project finance lender, to be repaid out of later surplus net net cashflow. Therefore, they need to internally fund this payment shortfall until later reclaimed.

**Case study: Dighton, US**

The Dighton power project in Massachusetts, US, uses a fuel subordination for its US$85 million project finance for a 169MW merchant power plant (MPP) project.[1] In this case, 100% of the natural gas fuel purchase payment is subordinated in favour of the project financiers.

## Study structure

### *Cost curves*

The main structural defence for operating cost risk is to have excellent cost curve information, not only for the present but for the future, certainly out to 5 to 10 years or more if feasible. A cost curve is built up progressively from the capacity and opex and total costs (opex and capital return or debt service) per unit.

Faced with volatile pricing, the resources sector adopted cost curves in a big way in the 1980s – at about the same time that everyone gave up on econometric price forecasts. However, every single project finance proposal sighted since that day is always in the lowest quartile – that is, at the lowest cost part of the curve.

Although some cost curves are readily available, others are proprietary or expensive to obtain, US$100,000 plus in some instances. The preparation of these curves can also verge on industrial espionage, since not everyone publishes their competitive position readily. A way to handle highly competitive information is to:

- investigate the capture system to get each operation modelled and expressed on the curve:
  - (i) request to audit a sample of say three different operations at different points on the curve;
  - (ii) have an accounting/audit firm sign off on the appropriateness/accuracy of the data overall; or
  - (iii) simply audit the three points nominated in (i).

If a company is unable to show comprehensive analysis of its competitive cost position, that is a risk. *If they know, but will not tell you, that is another risk.*

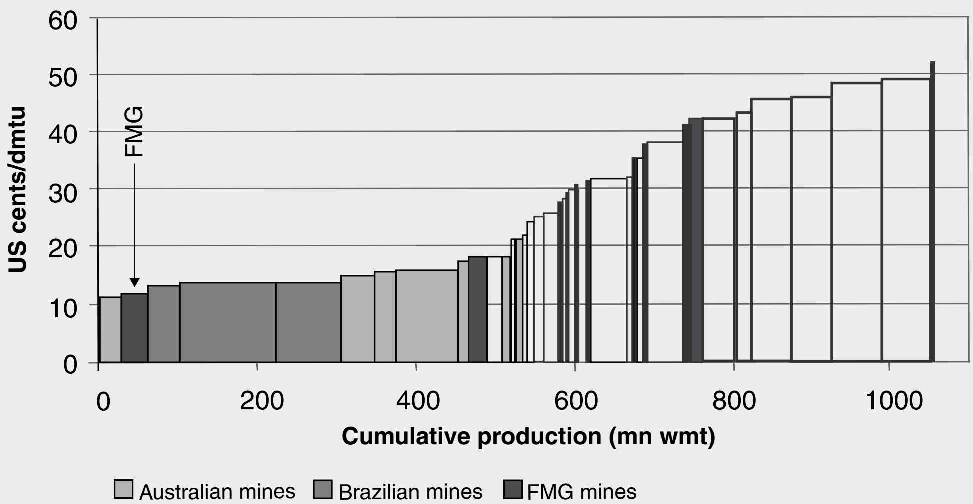
The scrutiny of projected curves is also valuable as one must then work the scenarios of barrier to entry, future industry/system capacity/long-run marginal economics, looming threats from large new entrants, and/or the efficiency response to merger and acquisition (M&A) activity that might affect the competitive response (as expressed through a lower cost profile).

**Case study: FMG iron ore cost curve**

For the 144A US$2.05 billion capital markets project finance for Fortescue Metals Group (FMG) to develop two new mines, a railway and a port in the Pilbara iron ore producing region in north-western Western Australia, the Offering Memorandum had the cost curve shown in Exhibit 14.1. Actually the situation is better than shown for FMG, since the cost curve shown is at the mine site. The actual comparison would show the Brazilian mines – the three to the right of FMG – should have included the (substantially higher) freight from Brazil to China. Vale, the main iron ore miner in Brazil, is building 400,000 dwt iron ore carriers to try to lower the shipping cost disadvantage Brazil to China!

Exhibit 14.1

**FMG iron ore mine site cost curve,* 2008**




* Site operating costs are those costs used to determine free cashflow and include raw material costs and conversion costs.

*Source:* FMG Offering Circular, 11 August 2006

## Avoided

### *Waiver*

A government may subsidise or waive certain operating costs like power, infrastructure levies, even taxes (political risk). Relocation expenses, training subsidies, preferential rail freights (although unusual), and cheaper port access would be examples of this element of mitigation.

The sponsor can waive management charges, royalties, licence fees, dividend rights, preference capital or subordinated debt payments for a period, not just due to structured subordination.

## Summary

Operating cost competitiveness is a key ingredient to the robustness of any enterprise. To be able to demonstrate this or support this facet of the opex line in the cashflows is prized highly by project financiers. Besides cost pass through and cost supports, some elements of costs may be waived or subsidised by government.

---

[1] Nielson, K, 'Merchants test syndication market', *Project Finance International 144*, pp. 54–7.

Chapter 15

# Operating risk: management component

Of all of the risks badly reviewed and structured, the management component of operating risk must rank as the poorest performance by project financiers. It is a truism that many mega-projects depend on a few good people at the top. In fact, three types of key people need to be selected for a development.

1 During construction, the lead team or individual is a driver, excellent at the back and fill of construction critical paths and local nuances, and with the hands-on experience and proven track record of on time and on budget developments.
2 The completion/commissioning specialists are well tested by the frenetic, round the clock pace of start-up and the implementation of the transition to the operating regime. They have worked with independent completion engineers before and understand the dynamics of this process (see Chapter 19).
3 The operations chief:
   - is discreet – able to keep board information private to the board;
   - is accustomed to the close management required;
   - is good at keeping the board away from the project;
   - is excellent with local and political relations;
   - is flexible, yet directed;
   - is cool under pressure;
   - is good with the local people/workers; and
   - understands the reporting/scrutiny/due diligence requirements of the project financiers.

These are usually different people, as each rarely has the right aptitude across all disciplines. In a sense, this is the sixth 'C' of credit – what is the character of the key project operator? How then is 'management risk' structured?

## Contract structures

### *Management contracts*

The individual or team is part of the operation and maintenance (O&M) contract where a pool of skilled personnel is available. It is important to offer large long-dated incentives for good management performance to prevent people leaving or being headhunted.

The O&M agreement may provide for access to specialist personnel who can be drawn in to address/correct specific problems, usually physical in nature, but could also be public relations, environmental/NGO relations, or political in character – closer to the 'soft skills'. Some companies have large pools of computer, accounting, and engineering talent which can join the project teams when their support is needed.

**Case study: Coline, China**

For the Coline joint venture to produce chocolate in Shanghai, China, the foreign investor, Eureca, was controlled by France's CEMOI, the ninth largest producer of chocolate in the world. Besides CEMOI's proprietary technology, CEMOI brought in its management expertise and marketing know-how.[1] Training of Coline staff was undertaken in Europe and by CEMOI in China. CEMOI's main partner was a Malaysian company which recognised the '*Bing Fa*' or Chinese art of war strategy, yet relies on personal relations and old-friend connections to get the deal done, thus invoking both its cultural as well as management skills.

### *Labour contracts*

Union contracts are settled to allow multi-skilling efficiencies and appropriate worker collective bargaining. One area of great concern worldwide is the industrial relations of many wharf and dockside unions. Many ports and transport operations have had to cope with mafia-style criminal and corrupt practices which can severely disrupt the project's infrastructure. The perennial battles over pay, the working week, salary versus hourly, and so on, can be squarely structured here.

### *Training contracts*

Training contracts can be part of the O&M arrangements. Many governments have excellent resources on offer to assist in training.

The incentives to undertake this are clear. Can a 12-year project financing be completed with a six-year O&M agreement? The answer is 'yes,' if in-house training has succeeded by year five and six and is reflected in good project performance. For a project financier, this test is easy to set – a continued debt service cover ratio (DSCR) above an agreed level. Failure to achieve these targets means that the O&M agreement is automatically extended (which can introduce a disincentive). Alternatively, if the project can meet a much shorter performance test with full reporting and monitoring – just like another completion test run – then the O&M contact can cease because the test has shown that the existing team can do the job and the project's cashflows are performing equal to or better than the expected standard.

## Trigger structures

### *Key-person insurances*

There are many projects where an individual or small team may be pivotal.[2] It is their concession, their entrepreneurial skill, their contacts, his/her knowledge, their vision, their charisma. If that person dies, there is without doubt a problem period ahead for the project. Boards of directors and management teams have gone down on executive aircraft with all killed. Actually, it is not the board that is the subject of this arrangement, it is the key management, in particular the operator/managing director (MD).

Besides insurance to cover the project's weaker cashflow performance, money is required to identify and relocate a replacement. How much cover? Sufficient for the whole debt? By considering the downside effect of the person's demise as a scenario for the project (down 20% for one year, back to 95% thereafter), one can estimate from the project cashflow model roughly what amount should be insured – payable to the benefit of the project special purpose vehicle (SPV), of course. Key-person insurance is relatively cheap and usually can self-fund itself after a year or two.

In addition, joint travel restrictions can be imposed on the top two or three people felt to be indispensable. Another aspect is to examine the succession planning for these key personnel.

## Study

### *Personal screen*

Humans are quite good at picking up a sense of the manager, especially during a visit to that manager's present operation – housekeeping, the attitude of the cleaning staff or the photocopy operator, the quality of reporting, the enthusiasm of the engineers, and so on.

Some large companies get insulted when asked who will run the project – in two years' time. They have any number of well-qualified people to choose from. Some companies do not now want to nominate the operations manager for fear her/his brain and attention will shift from the present assignment towards the new one. Other companies are happy to provide a panel (with résumés) from which the operating personnel will be selected.

If the company cannot tell you who will be the operations manager, that is a risk. *If they will not tell you who will manage the project, that is another risk.*

**Case study: Operator**

When quizzed who would run the project, the subject of a US$400 million complex project finance package, the MD said: 'When we announce this financing, we can get anyone we want [as operator]'. In other words, the MD had no idea, other than to put an 'ad' in the paper!

The cross-cultural aspects are very important in developing countries as well as the family position of the key managers. The cultural sensitivities and skills of expatriates should fit well.

## Summary

There is nothing better than a personal rapport with the key personnel. If a problem emerges in a project, top management will be spotlighted. Some 82% of projects that have gone wrong have experienced management problems. The project financier needs some idea who might run the project instead.

Operating contract arrangements, training and insurances are additional structures that can be mobilised to help mitigate this very important project finance risk.

---

[1] Potter, WJ, 'Emerging marketing financing – survival of the entrepreneur', in *Project Finance Yearbook 1999/2000*, 1999, Euromoney Books.
[2] Bilbeault, DB, *Corporate Turnaround*, 1998, McGraw-Hill.

Chapter 16

# Environmental risk

If a project has unacceptable environmental risk, project financing should not be used. The 'deep-pocket' of the financier is too tempting to government and perhaps the corporate alike.

There are five forms of environmental risk that need to be structured.

- *Emissions:* the daily physical emissions of solids, liquids and gases, such as nitrogen oxides (NOx) seen in the photochemical smog from some power generation. Greenhouse gases such as carbon dioxide ($CO_2$) and methane ($CH_4$) are other examples.
- *Catastrophe:* a major event occurs, usually uncontrollable, which requires major rehabilitation works such as in the case of Total Fina/Exxon Valdez and BP/Anadarko Macondo (oil spills). Human fatalities in major disasters, such as Bhopal (chemical plant) and Chernobyl (nuclear-power), illustrate a fatal flaw in a project.
- *Contextual:* the position of the project in its ecological, physical, and scenic surroundings, as well as cultural/sociological impact represent a group of risks outside the political risk (environmental activities/green parties) and legal risk (environmental lawsuits/blackmail).
- *Contamination:* the site has been contaminated from prior activity, for example, a town gas plant (making gas from coal).
- *Sustainability:* sustainability is a very fuzzy concept and can include financial as well as environmental aspects. The project has cashflow obligations for items (left) after the project's closure.

Governments are naturally wary of unscrupulous companies who abandon (through bankruptcy) the special purpose vehicle (SPV) and the government is left with the clean-up job and cost.

## Contract structures

Specialists in supplying environmental equipment and services structure this risk via their contractual arrangements.

### *Environmental management*

A party highly skilled in managing the environmental risk is appointed as the operation and maintenance (O&M) company, in a supervisory role, or as a consultant/regular monitor for the project. Their function may also be contracted to establish operational procedures to meet environmental compliance in any one day or season and to prepare for environmental responses.

This can extend to local, regional, non-governmental organisation (NGO) liaison, and management of government relations, and regulatory reporting. Establishing visitor briefings and environmental education can be included. Best practice benchmarking may also then be wrapped into environmental action plans to ensure long-term compliance and adaptation/pioneering of advance pollution control practices.

### *Rehabilitation management/revenues*

An outside party conducts this activity. The project's waste or by-products may be reprocessed to produce revenue to offset the costs, as is the case with the conversion of coal-fired power station fly ash into pozzolanic cement. Sewage treatment processes can produce acceptable landfill and water able to be sold for industrial uses.

## Trigger structures

In the event of some environmental damage, trigger structures act to clean up the problem. Conversely, if rehabilitation is ahead of plan, then reserved moneys may be released.

### *Rehabilitation release*

The project is studied once or twice a year to see whether reclamation activity is within or ahead of targeted rehabilitation norms. If the project is doing well, then some of the rehabilitation reserve or environmental bonding will be released back to the SPV.

### *Emergency response*

In the event of an environmental catastrophe, there needs to be quick action and plenty of available resources to contain, rescue, and rehabilitate the area and handle the people, flora, fauna, and the media. Project financiers want to see the highest environmental standards applied and emergency responses well practised and well resourced. This will usually go far beyond any concept of regulatory compliance into active management of the rehabilitation response and the restoration of project cashflows at the earliest opportunity.

### *Environmental warranty*

Environmental control/management equipment and systems are warranted by the sponsor and/or its suppliers who, conscious of the consequential risks, will carefully prescribe the events which might cause the warranty to be called. The preventative environmental management regime needs extra due diligence in these circumstances.

### *Environmental insurances*

In many insurances, environmental risk is an exclusion along with war and nuclear radiation (Fukushima, Japan) and the atomic bomb. Lloyds almost collapsed on long-tailed environmental risk for asbestos, so it is not a natural source of this insurance. Unconventional and US insurers are better prepared; however, capacity is quite limited and the deductibles tend to be quite high.

## Financed structures

The highly-structured discipline of a project finance transaction works very well to address environmental risk through guarantees, bonds, and sinking funds/rehabilitation reserves.

### *Rehabilitation guarantee*

The banks agree to provide additional moneys to the company or the government in the event that the project is shut down for environmental reasons. This money stands behind the SPV's rehabilitation obligations or, if the SPV has failed, pays government the money to do the job. The only way that this has been financially engineered to date is to use a pool of funds developed from a sinking fund. Up-front collateral variations are usually structured with bonds. (See Case study: Ranger, Australia.)

### *Pollution control bonds*

Some countries have municipal or national tax exempt programs to encourage financing of pollution control facilities. This carries a tax advantaged lower interest rate, which is always attractive. However, most investors or financiers in this sector do not understand or desire the attached suite of project finance risks and seek a guarantee or letter of credit from the project financiers. Such programs established for encouraging infrastructure development can readily be adapted to the pollution control aspect of project development/operation.

**Case study: Inspiration, US**

For the US$150 million Inspiration project finance, the banks channelled their guarantee via a letter of credit (LC) for US$90 million to back tax free Pollution Control Revenue Bonds issued by The Industrial Development Authority of the County of Gila, Arizona, US.

### *Rehabilitation reserve*

Akin to maintenance and debt service reserves (see Chapter 3), an environmental rehabilitation reserve will be established to back any programmatic expenditures or to act as a sinking fund to rehabilitate the site entirely when the project is closed down. This may be a statutory reserve as implemented early on for North Sea oil platforms or it may be a requirement for best practice by a project financier anxious to preserve the value of the residual (the net cashflow after the loan has been repaid).

It is unwise to assume that an environmental reserve starts to build up after the project finance loan maturity. Better practice is to see a progressive reserve build-up program perhaps over the last half or two thirds of the project's life/concession period. It should be established out of revenues, perhaps with some springing recourse if environmental management has gone awry.

### Case study: Ranger, Australia

For Australia's first privatisation by way of project finance, the Ranger project, the funding was as follows:[1]

| | *US$ million* |
|---|---|
| Bank Consortium – project finance | 250 |
| Rehabilitation guarantee | 55 |
| Japanese banks (customers) | 140 |
| IPO (largest to that date) | 65 |
| *Total* | 510 |

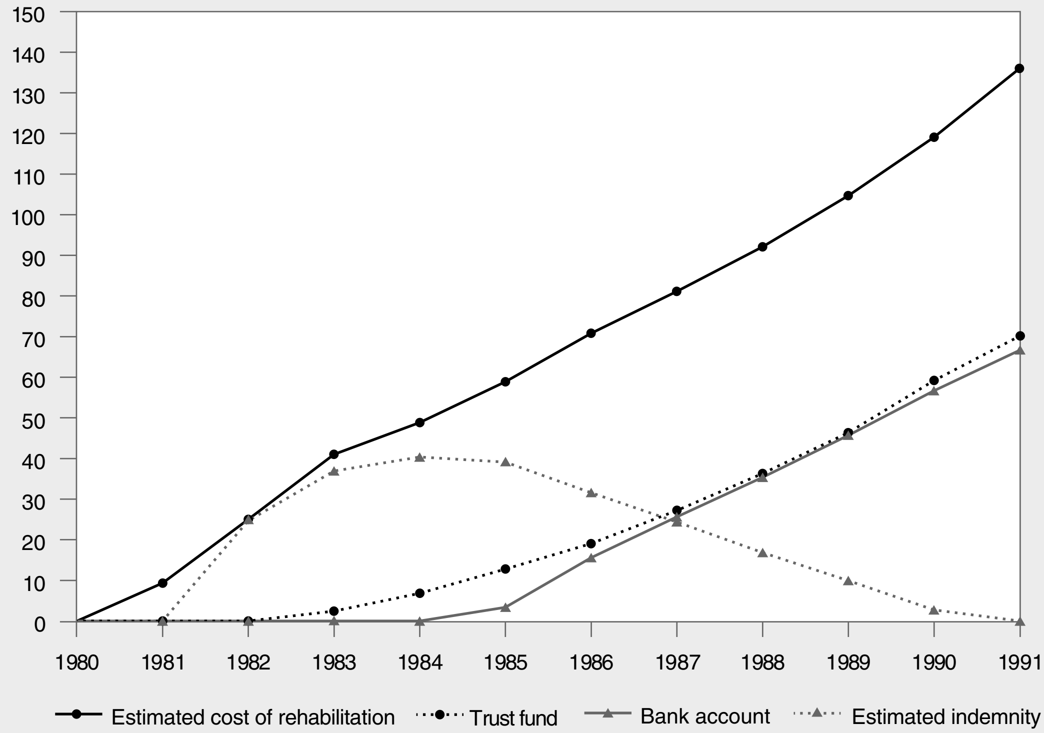
From these proceeds, the Australian government received US$144 million. The rehabilitation guarantee was created from a 2% royalty on revenues and was engineered to progressively match the project's rehabilitation as it was operating. It is a second project financing within the umbrella structure. Although set at US$55 million (around A$50 million at the time), the maximum rehabilitation exposure was modelled as capping out at considerably less than that – around A$40 million – and was down to less than A$10 million seven years after start-up (the project's designed half-life). Exhibit 16.1 shows the structure's actual performance with the Commonwealth Trading Bank bank account cash collateralising the rehabilitation cost estimate very quickly.[2] The company, Energy Resources of Australia (ERA) was able to draw on this account after 10 years since it was now subject to a rehabilitation release.

ERA's Ranger project was adjacent to significant wetlands, which was not only the main aspect of its environmental impact statement (EIS) but was the subject of a major public enquiry which culminated in the project area being put outside the boundary of a national park and the government implementing a limitation of three such projects nationally. The Office of the Supervising Scientist, a government agency, ended up employing more people directly and through consultants at Ranger than were employed for the Ranger project itself.

*Continued*

Exhibit 16.1

**Ranger environmental rehabilitation, 1980–1991 (A$ million)**




*Source:* Author's own

## Study

Environmental standards have been established in many countries. There are two main criteria for acceptance should the standard fall outside the Environmental Health & Safety (EHS) guidelines of IFC/World Bank.[3]

1 Has the local standard been established after scientific investigation and is it capable of being objectively measured? (Emissions.)
2 Has the environmental review and approval process fully informed the local people affected in a public and transparent manner to invite comments (publicly)? (Contextual.)

### *Environmental impact statement*

The developer and specialist environmental due diligence companies survey the project site (and if necessary the region) to develop an analysis and report of expected environmental impacts and risk mitigants or reasons to ignore the impact. This will look at all biophysical aspects as well as cultural ones.

**Case study: Wyoming, US**

For the development of a new production centre in Wyoming, US, the EIS reported that an increased workforce moving to the local town (population 8,000) would increase the number of fights at the local bar!

The environmental policy of many MLAs actually increases the risk to the project. The World Bank in particular – under great pressure from NGOs on mega-project lending, especially hydropower projects – requires the project to be 'open-season' for 45 to 60 days to any NGO comment/attack before the project advances to board approval. What used to be an EIS process is now an environmental defence report at substantial expense to the developer – easily US$10 million plus. In this antagonistic atmosphere, it is wise to spend plenty of time checking that the project complies with the EHS Guidelines of IFC/World Bank and that none of the NGOs, local action groups, or Greenpeace has the project in their sights. Multilateral agencies (MLAs), and increasingly bilateral agencies, will not allow a project finance application in the door until they first get an environmental clearance.

### *Environmental plan*

A detailed study is conducted of the catastrophe/disaster response to ensure that the emergency response capability is adequate or can quickly draw in adequate resources. The best example is an oil-spill plan, which would examine the topography, if on land, and wind/wave/coastal issues, if at sea or in a port.

This would not necessarily be the same as the EIS aspect, more a study of likely response measures (or the lack of need for same). There are elements of liability management of consequential losses lurking behind these reports.

**Case study: Brent Spar, North Sea**

When Shell decided to decommission the Brent Spar concrete platform in the North Sea, NGO pressure forced it not to dump it further out to sea. Elaborate plans had to be prepared for its reuse in another role. It is now forms part of a Norwegian wharf extension.

### *Equator compliance*

No discussion on project finance today would be complete without a discussion of the Equator Principles. These IFC-driven principles – a type of project-approval protocol – has been refreshed and extended to project finance advisory assignments as well. Most export credit agencies (ECAs) have joined the 80 (and going up) signatories – mostly banks – who undertake 10 actions with regards to project environmental compliance and project finance approvals. A structuring problem arises when banks in a project financing do/do not require 'Equator compliance' – a syndication risk (see Chapter 24).

## Avoided

There are three styles of avoiding environmental risk.

### *Regulatory waiver*

The only acceptable waiver regime by a government is where a project self-rehabilitates quickly such as in tropical environments. A pipeline through the jungle does not take up much access way and, if left alone (it is buried), would be hard to detect a year later.

### *Regulatory purchase/trade*

Where pollution credits can be traded, the necessary amount to be waivered can be purchased either off a trading screen or through a clearance agency. At the encouragement of the US EPA, sulphur dioxide credits can be screen traded among US polluters.

The remarkable situation of a coal-fired power plant being able to sell carbon credits shows up the vulnerability of carbon pricing everywhere.[4]

> **Case study: Tata Mundra, India**
>
> The Tata Mundra project was able to sell carbon credits from the 'additionality' of supercritical boilers from China, which it showed as much more efficient with regards to carbon pollution, especially using imported 'clean' coal from Indonesia. Tata invested in 30% of the Indonesian coal producer's equity.

The problem with trees themselves is that besides being a carbon sink, they can generate bio-carbon pollution. It is worth noting that only 3% of carbon dioxide emitted annually is man-made.[5] Carbon sinks have come and gone as attractive for financing, including the UN Reduction of Emissions from Deforestation and Degradation (REDD) initiative under the UN Framework Convention for Climate Change (UNFCCC).[6]

> **Case study: AES Tiete, Brazil**
>
> This US$300 million project finance bond deal claimed that it had reforested 1,800 hectares (ha), out of its obligations to reforest 13,939 ha up to 2029. Any environmental benefit or payments, for example, certified emissions reductions (CERs) under the United Nations (UN) 'Clean Development Mechanism (CDM)', will be retained by the SPV, AES Tiete.

### Physical waiver

In order to install a pollution source, the equivalent amount must be cleaned up first in that place, usually an industrial zone. If necessary, a heavy polluter must be purchased and shut down first. The overall emissions into the 'air shed' over the industrial zone cannot physically be increased by the new project. Another name for this is a 'pollution pool'.

## Summary

Excellence in due diligence is necessary to examine environmental risk fully. Compliance with standards and guidelines is pretty obvious. The contingency planning for catastrophic risk is not as easy.

The most treacherous of all may be the contextual risk from pressure groups. Some special financial engineering routes can be structured within a project financing.

---

[1] Hodge, SJ, Miskelly, N and Tinsley, CR, 'Development of the Ranger Uranium Financing from banks, customers, shareholders, and the stock market', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration, pp. 755–68.

[2] Tinsley, CR, 'How a financier can handle the rehabilitation costs', SME Annual Meeting, Denver, US, 1992.

[3] IFC, Environmental Health and Safety (EHS) Guidelines, 2012.

[4] Misra, R, 'Financing power projects in India', PFI Conferences, Mumbai, India, April 2008.

[5] Ramani, RV, 'Global warming: fact or fallacy', in *Mining Engineering*, 1998, Society of Metallurgy and Exploration.

[6] 'The UN-REDD Programme Strategy', 4–5 November 2010.

Chapter 17

# Infrastructure risk

Infrastructure risk – sometimes labelled transportation or interconnect risk – may be present even in an infrastructure project. All projects need power, water and telephones, even infrastructure projects themselves.

- Transportation projects need access ramps, drainage, telephones, and land.
- Ports and airports need access routes (water, air and land), storage/handling, and parking structures.
- For resources projects, infrastructure costs can be up to one half of the capex or even the majority gross revenue!
- Prisons and hospitals need parking structures and land.
- Water projects need pipelines/rights of way, catchment/disposal areas.
- Power projects need fuel supply – storage, conveyors (for coal), pipelines (for oil and gas), and access to the grid if the power is to be exported/evacuated (substations, transmission lines).
- Telecoms need rights of way and access to buildings/land (cell station/earth stations and telephone exchanges).

The infrastructure itself may be a limiting factor for the project as is the case with port, rail, or pipeline access being required for a remote project.

**Case study: SmarTone, Hong Kong**

In the SmarTone project financing for a cellular telephone concession in Hong Kong, one of the shareholders, Sun Hung Kai, is a leading property owner. It could grant ready access to building roofs for cell station installations.

**Case study: Kovikta, Russia**

When Canadian junior Bitech, looked to develop the massive Koviktinskoye gasfield in Irkutsk Oblast, Russia, the new 600km pipeline capex precluded development.

**Case study: NCA, Australia**

In the development of what was at the time Australia's largest project financing, NCA, the Queensland government's rail-freight costs exceeded the cost of mining and loading the coal onto the trains – even though: (i) the mine had the shortest railway connection to the port of any competitor in Queensland; and (ii) the project's new high-capacity port, Abbot Point, – the 'A' in NCA – was the closest to the target market, Japan. Surprisingly, the project bankers agreed that the sponsor, MIM, now part of GlencoreXstrata, could walk away from the project if the going got too tough.[1]

## Contract structures

### *Infrastructure contract*

Before commitment of the project finance (via the project finance offer letter or as a condition precedent for financial close), infrastructure may need to be contracted for a term equal to or longer than the project financing itself. This is especially true if a new infrastructure is being implemented as part of (or 'captive' to) the project. The performance of the infrastructure will form part of the completion test (see Chapter 19).

**Case study: Alcoa Aluminio, Brazil**

For the US$750 million project financing of the Alcoa Aluminio aluminium smelter in Brazil, the government contracted to supply 372MW for 20 years. The electricity supply would come from the government's electricity utility, Electronorte, which had 12 330MW generators under construction at a massive hydropower project at Tucurui, all connected by a 500kv high-voltage transmission line for the 900km to the Alcoa Aluminio site.

### *Government commitments*

A government may commit to fund, develop, and maintain the requisite infrastructure for the project. This interlinking would usually place the government as a strong supporter of the deal overall.

Any involvement with government introduces other risks. Additional bureaucracy will usually require more time. Opposition politics will mean constant vigilance to flash any delay or minor negative to the media (loosely labelled as 'image' risk from the project company's point of view). When matters are not progressing well on the project, the government may be tempted to squeeze harder if they can use the project's infrastructure as an easy point of pressure.

**Case studies: Quintette and Bullmoose, Canada**

For the Quintette and Bullmoose project financings (C$838 million in total) in British Columbia (BC), the Canadian federal government in Ottawa, the capital, together with the provincial government BC, invested an additional C$1.2 billion in the new town, railway, and port infrastructure required by the two projects – neighbours in inland BC. The political involvement was at the premier/prime minister level in Canada and in the target market, Japan.

**Case study: Airport-city link, Australia**

For the New Southern Rail development in Sydney, New South Wales, Australia, some A$569 million (approximately US$370 million) was required to build the railway line extension to the airport with stops at suburbs along the route.[2] The NSW government invested three quarters of the money to bore the tunnels and provide the necessary rolling stock (mostly existing); whereas the private sector's sole responsibility was to design, build and maintain the track and tunnels for a pre-agreed contract (paid by the NSW government). The remaining 25% of the capital cost was at full risk for the sponsors to finance, design, build, and operate the railway stations (and get the associated property benefits at the stations). All contracts were for 30 years. Part of the ticket price purchased at each of the new stations was directed to the station operators. This project failed.

### *Pooled infrastructure*

Some infrastructure may have pooled providers. This is very common for national pipelines, roads, and railways.

Another concept is to sequentially develop infrastructure with each party adding its piece of the infrastructure matrix and with every party recognising the (financial) contribution of the prior and future participants. This can only work with a master plan steered by co-operative governments. For example, one party may put in the water, gas supply, power plant, industrial park, chemical plant, port, town, and so on. Each is mutually dependent upon the sequence, investment, and operational success of the other. There are examples to reference this:

- Thailand's Map Ta Phut (power, cogeneration, refineries, petrochemical plants);
- Freeport Indonesia's town, port, power sell-off (privatisation-style);
- Mineralogy's Western Australia project (railway, port, power, gas pipeline); and
- Energy Equity's Barcaldine power plant (gasfield, pipeline, transmission line).

The interplay of completion risks for this style of multiple development is described in 'Multi-party turnkey contracts' in Chapter 19.

**Case study: Mineralogy, Western Australia**

For Mineralogy's greenfield direct reduction of magnetite concentrates – the first time this had been attempted in the Pilbara in the north western corner of Western Australia – the project required six inter-related turnkey developments for the mine, plant, railway, power station, township, road, and gas pipeline. About half of the project cost was for infrastructure. The Chinese developer later experienced huge cost overruns.

## Financed structure

### *Tax exemption*

When infrastructure is built, the investor – a local individual or corporate – has tax free earnings from it. In India, the capital gains may also be tax free and the individual investor may gain a tax credit for part of his/her investment. A tax exempt financing is cheaper.

## Study

### *Transport studies*

Transportation options will be studied to examine the project's long-term technological and economic competitiveness and availability. If the project itself incorporates significant infrastructure, then ongoing capital and maintenance costs will need to be assessed.

**Case study: An Tai Bao, China**

The An Tai Bao project in Shanxi province, China, was promoted as the world's largest surface coal mine (although this is not the case), the largest joint venture with foreign investors to that date and the first project financing in China.[3] The rail haul required from mine to port was some 800km. However, any analysis of the Chinese rail system would show that the coal wagons would be diverted, if necessary, at harvest time.[4] In addition, reviews of Chinese coal ports, that is, load-out rates, demurrage, vessel size, showed them as uncompetitive to other sea-borne coal suppliers.

**Case study: Paiton, Indonesia**

The US$180 million 144A project finance bond issue for the Paiton coal project in Indonesia substituted for a bank project financing of the same amount, all part of a US$1.8 billion Japan Bank for International Cooperation (JBIC), US Exim, and Overseas Private Investment Corporation (OPIC) project financing. The project was for 1,230MW coal-fired power and associated infrastructure development in east Java, Indonesia. The power plant was essentially dependent on a coal supply chain:

- 74km truck haul from Tutupoa surface coal mine to a loader onto river barges at Kelanis on the Barito River;
- barges carry 10,000 tonnes each;
- 200km barging to the river mouth;
- two days transit in open sea to the port of Pulau Laut;
- unloading of barges onto ground storage;
- loading onto 45,000-dwt grab self-unloading ships;
- approximately 400 nautical miles to Paiton (open sea); and
- self-unloading into storage at the project.[5]

Paiton needs 3 million to 4.5 million tonnes of coal annually. The independent engineer looked not only at this infrastructure chain but made an assessment of whether other coals could be shipped to the power plant if the above infrastructure system was disrupted. The infrastructure risk in this cascade was entwined with supply risk (described in Chapter 10). The engineer also had to assess whether the customer's electricity transmission capacity was adequate. This aspect of infrastructure risk could be covered under the power purchase agreement (PPA) (see Chapter 11).

## Avoided

### *Free on board offtake*

The letters fob signify 'free on board'. The infrastructure risk may be passed to the purchaser who takes delivery at the project's 'gate'. However, this may mean that:

1 the project operator has to have extra storage, stockpile capacity, or a buffer; or
2 the party controlling the infrastructure may have to expand first before any project expansion.

The project operator also may have no means to keep the transportation competitive long term if the capital and maintenance obligations are in someone else's hands.

**Case study: TelecomAsia, Thailand**

In the US$784 million TelecomAsia project financing by way of US$ fixed rate supplier credits, the company was installing two million fixed wire telephone lines in Bangkok, Thailand and operating them on an exclusive basis for 25 years (within the Thai government's existing and future phone system). If the government's Telecom Organisation of Thailand (TOT) upgraded its telephone exchanges connecting to the TelecomAsia system – for example by using new technology – the company had to match this upgrade in order to stay interconnected.

## Summary

The interrelationship with government, suppliers, and offtakers may bring infrastructure risk. Contracts and study techniques are the usual structures, although efforts to pool or shed the infrastructure risk can be structured too. Tax breaks for infrastructure spending are an incentive.

---

[1] 'Second thoughts about project risks', *The Banker*, 1982.
[2] Macquarie Corporate Finance, *The Guide to Financing Transport Projects*, 1996, Euromoney Books.
[3] 'Trade finance report', Euromoney, 1987.
[4] Tinsley, CR, 'Coal financings: the good, the bad, the ugly', at the Ninth Pacific Rim Coal Conference, India, 1994.
[5] Wingfield, S, ISIS, Newburyport, Massachusetts, US, personal communication.

Chapter 18

# Force majeure risk

*Force majeure* means outside the control (of the parties). Lawyers will give a long litany of such events, and try to condition the event, the consequence, and the remedy along with the words 'material' or 'reasonable' (more on this in Chapter 25) or 'materially adverse'.

There are four varieties of force majeure:

- acts of nature (often called acts of god);
- acts of man;
- acts of government – usually handled in a project financing under political risk (discussed in Chapter 21); and
- impersonal acts.

The reason they are segregated in this way is that there are different solution sets in project financing for each *force majeure* risk and each *force majeure* should be dealt with separately in the documents. The type of disruption, the consequences, associated solutions, and remedies/cure provisions differ markedly.

Beware of the overlap of engineering risk and other risks which might be in the arena of *force majeure* risk. This chapter sees it as a fruitful exercise to check out the *force majeure* aspects separately.

It is also worthwhile to search for any *force majeure* that may be permanent – that is, where that particular event's occurrence means the project is not worth continuing with or restoration costs would greatly exceed the (future) cashflow benefit. This *force majeure* is fatal to the project financing. This will be recognised as a foundation element in fatal flaw analysis (discussed as part of Chapter 9).

## Acts of nature

Acts of nature comprise fire, flood, earthquake, and (a list of) similar events which usually mark some physical disruption to the project or transit to and from the project.

**Case study: Ok Tedi, Papua New Guinea**

At a project financed development in Papua New Guinea, Ok Tedi, a 50 million tonne landslide had wiped out one of the project's waste disposal facilities. (Annual rainfall at Ok Tedi is 7,600mm, or 300 inches). This waste disposal into the nearby Fly River had caused all sorts of environmental problems.

## Acts of man(kind)

Although wars, terrorism, or riots are often labelled an 'act of man', it is best bundled into the solutions considered under political risk in Chapter 21. The *force majeure* event most usually considered here is a strike. Other aspects include theft ('fidelity' of cash in the insurance business or fraudulent trading in the commodities or finance businesses), vandalism (on cars and vacant property), crime (mafia activity), accidents or carelessness, operator error or 'passive' sabotage,[1,2] and now hacking!

Another aspect in this category would be fraud, wilful negligence or misrepresentation – cause for full recourse to the parent company/sponsor. This is one of the classic 'Cs' in any credit analysis: character. This area is usually caught by due diligence; by the lawyers' investigations; or in the representations and warranties part of the documentation.

## Acts of government

Perhaps this would be better described as organised activity with a political aim having some general or widespread effect. For example, a general strike would be classed as a political risk, whereas an electricians strike at the project site is an act of man. Since almost half of all project financings are undertaken to shed political risk, this *force majeure* risk is handled better in Chapter 21.

## Impersonal acts

The fourth class of *force majeure* can occur for no particular reason. The system just collapses. The easiest arena to consider this is the derivatives area where the financial system has been significantly stress tested with problems such as Barings, Sumitomo and Long-Term Capital Management (a case of failure of the risk modellers' correlation striking again).[3,4] The spill over may affect the project financing, indeed any funding market.

Another example would be the collapse of an electricity grid which might have single or multiple points of weakness. The risk to be examined here is the non-availability of the electricity generation/distribution system on the project.

### Case study: Bank Herstatt, Germany

Following Bank Herstatt's impact on the Eurodollar funding in the days following its collapse/liquidation, lawyers began to insert 'alternate-funding' clauses into documents. If one could not get Eurodollars at the classic Libor benchmark rate then the financier may have to purchase a deposit in another tradable currency at whatever rate that might entail. (As mentioned in Chapter 23, the extra interest expense is often passed on through to the sponsor, that is, recourse.) When the German central bank, the Bundesbank, tried to deal with the collapse of a German bank it initiated its actions on a week day after the closure of inter-banking settlements in Germany (3.30pm). However, the Bundesbank officers forgot that it was only

*Continued*

9.30am in New York and Eurodollar and foreign currency trading continuing there with Herstatt's counterparties believing that they would receive US dollars later that day in New York. Its effect on the Eurodollar market the following day meant that it was difficult/impossible to buy Eurodollar deposits on any normal basis. This is the impersonal risk that is now structured in the Eurodollar project finance documents.

A risk labelled 'Herstatt risk' has been adopted in the derivatives/foreign exchange business to mean foreign exchange (FX) settlement risk.[5] The collapse of the bank itself is properly a participant risk (see 'Alternative funding' in Chapter 23).

## Trigger structures

### *Deferral*

Given that many bank project financings are funded on a floating rate funding basis, banks can accept *force majeure* risk much more readily than any fixed rate funder, especially the bond markets. This flexibility is a key advantage for bankers in the project finance field.

Naturally an extensive review of the likely *force majeure* influences will have been built into the banks' 'base case' financial model and *force majeure* sensitivities run to test the cashflow effects; to check the deductibles (adequate funding in the interim) and the exclusions (permanent *force majeure*) in the various policies. This will be summarised in the independent insurance review.

**Case study: Consolidated Goldfields, Western Australia**

A US$10 million production payment was structured for London's Consolidated Goldfields' existing operations in the north-western area of Western Australia. There were three operations – two production centres, 186km and 150km from Port Hedland, the export terminal, and stockpile. Two weeks after financial close (and full drawdown) a cyclone/hurricane demolished the central operation. Three weeks after that, a double-eyed cyclone/hurricane wandered through the port and the most remote operation, missing the central one. *Force majeure* was declared by the company which was able to reinstate everything within seven months losing out only on standing/fixed charges and US$750,000 in insurance deductibles. Seven months later the project finance repayments recommenced and the whole loan schedule shifted forward six months by agreement; although technically Goldfields could have held the bank to seven months deferral.

### *Insurance*

For acts of nature, the whole concept of insurances comes to the fore – a statistical mass of events, actuarial analysis, and measurable/defined events or losses. For any project financing, an insurance review is required (see 'Customary reviews', in Chapter 9), which will check on the individual policy coverage exclusions, deductibles, and other conditions. It is crucial to recognise the insurance industry's compartmentalism, for example, marine versus non-marine risks, which mainly stem from its long history of specialised insurance syndicate assembly. A handy table to explore this is given in Box 18.1.[6]

**Box 18.1**
**Core insurances**

*Erection/contractors/builders 'all risks' (CAR/BAR)*
Provides against loss or damage during construction, however caused, at the manufacturer's premises both during transit in land and whilst on-site. Cover would normally include the damage and protection during testing and commissioning.

*Advanced loss of revenue or delay in start-up (DIS/DSU)*
Provides protection against the financial consequences for loss of revenue as a result of delay following insured loss or damage occurring during the period of construction. (See also 'Delay in start-up' in Chapter 19.)

*Marine cargo*
Provides protection against loss or damage to plant and materials during transit from the supplier's premises anywhere in the world to the project site. It includes cover for losses during unloading.

*Operators 'all risks'*
Provides protection against loss or damage, however caused, occurring once the project has been taken in to commercial operation. Also includes cover on plant whilst being overhauled or repaired away from the owner's premises.

*Operator's loss of revenue or business interruption*
Provides protection against loss of revenue suffered as a result of insured physical loss or damage occurring at the owner's premises. It can be extended to include loss of revenue suffered arising from loss or damage at suppliers and customers premises (see discussion under 'Business interruption insurances' in Chapter 13).

*Third-party liability*
Provide protection against legal liability for compensation for bodily injury, property damages, nuisance, and so on. Cover includes liability for pollution provided that it is 'sudden and accidental'.

*Employer's workers compensation*
Provides against legal liability for death or injury to employees who are engaged on the company's business.

### *Negotiation*

With regards to strikes, most project financiers accept that the outcome must be fully negotiated between the parties involved. Otherwise, to impose a settlement deadline on either side would mean a cost detriment to the project. A sponsor's management company's experience and track record in handling labour and disputes will count for a great deal. If not, then the focus will shift to the management component of operating risk (the subject of Chapter 15) or on the participant risk (see Chapter 22) aspect of the sponsor/turnkey contractor during the construction phase for a Type 2 project financing.

## Studies

### *Risk manager*

An integral part of the insurance profession, the risk manager, can be mobilised to study insurance risks. (Recall the discussion under 'Insurances' in Chapter 6, in which insurance risk management means the loss assessment potential.) The study, in which the lead arrangers/financial advisers should be involved in the scope setting, will analyse the individual and systemic loss profile of the project. In essence, this is examining physical and perhaps operational weaknesses.

A risk-management report may be commissioned, which goes beyond the state of the insurance covers, and investigates an identifiable causes of (catastrophic) problems for the project or its infrastructure.

**Case study: Victoria Hospitals co-generation, Australia**

In the state of Victoria, Australia, a A$38 million project bond financing for a total of 34MW small cogeneration gas turbines is distributed over six hospitals.[7] The high dependence of any hospital on back-up power – and steam from the cogeneration boiler – is (life) critical. Back-up power, steam-boilers, black start, and standby power import from the regional electricity transmission grid are all pivotal to a successful private power supply to a hospital. From the insurance industry's risk manager's review, jointly commissioned by the project finance banks and the borrower, some surprising weaknesses were uncovered in the back-up power at a main substation near two of the hospitals.

### *Safety measures*

Either explicit safety equipment is built in to the project or perhaps standby equipment or system redundancies can emerge should one part of the project fail due to breakdown/*force majeure*. In addition, the system may be specially configured so that it can quickly start up again and so enjoy high reliability.

Where safety threatens the life or health of workers or the surrounding community, then zero-tolerance programs may need to be implemented within high-quality maintenance and safety training regimes. In certain circumstances, this may mean an orderly shutdown of the project, disconnection to infrastructure components, and evacuation of personnel.

Special designs and procedures may need to be incorporated into the project's operating system which itself may introduce engineering risk. Companies with poor safety records can also be subjected to government shutdown orders with a resultant cashflow loss far exceeding the safety/training costs.

## Summary

Insurance can readily handle the acts of nature *force majeure* risk. Preparedness/back-ups and preventative measures require management skills. Risk management studies can help identify the weak links. Otherwise, deferral can be structured provided the *force majeure* is not permanent/fatal.

---

[1] Masala MNC, 'The Union Carbide disaster at Bhopal', www.igc.org/trac/feature/india/profiles/bhopal/original.htm.

[2] Kalelkar, AS, 'Investigation of large-magnitude incidents: Bhopal as a case study', at Conference on Preventing Major Chemical Accidents, London, 1988.

[3] Shirreff, D, 'Lessons from the collapse of hedge fund, Long-Term Capital Management', http:risk.ifci.ch/146480.htm.

[4] Lowenstein, R, *When Genius Failed: the rise and fall of Long-Term Capital Management*, 2000, Random House.

[5] IFCI, 'Settlement risk', http:risk.ifci.ch/134710.htm.

[6] Popplewell, M, 'The role of insurance', at Asian Power, Singapore, 1996.

[7] National Mutual Assets Management, 'Infrastructure bonds', Prospectus, 1994.

Chapter 19

# Completion risk

Completion risk (also called development, delay and cost-overrun, or construction risk), is the key concern in any project yet to be built. Completion risk is not present when taking over a project already in existence and producing cashflow (as in a privatisation where the government is selling off an operating enterprise).

This focus on completion risk is entirely natural since the cashflow is all outgoing during the construction or pre-completion stage and none of the conditions exists whereby the project finance option can be exercised as in a Type 1 project finance where the owner/sponsor has full recourse for completion. This is in stark contrast to Type 2 where the risk is laid off onto the contractors 'package' which inevitably includes a turnkey contract and associated liquidated damages (LDs) as may be extended by delay in start-up (DIS/DSU) insurance. However, both LDs and DIS/DSU have ceilings of financial support. The rather obvious question is what happens after all the (financial) support is used? There is no structure – a flaw in Type 2 project finance structuring!

Project finance lenders only want to fund a deal which can be expected to come in on-time, on budget, and on performance. Whilst not wanting to spend their days watching to ensure that money is being spent correctly and that construction timetables and milestones are being met, they also do not want to face continuing negotiations or virtual blackmail concerning the funding of any cost overruns from this and that (external) cause.

As stated in Chapter 2, the capital (debt) markets long ago decided that it did not want this completion complexity and would be happy to fund after the start-up after the project is complete. This also fits well with capital market practices of a single drawdown and simple repayment schemes. By contrast, the banks look like forensic police checking every detail of the entire project's construction story to the date of the next drawdown.

Occasionally the finance process is undertaken as a two-step process: a construction loan and a term loan or take-out by a capital markets bond or note issue. But the refinancing risk is often felt to be much greater in this circumstance compared with satisfying predetermined and measurable completion testing conditions with known validation procedures. Be careful that an acceptance certificate or project certificate may simply signal that the project has been built to contractual specifications. Contractual completion has been tested all right, but still cashflow generation has not yet been tested.

The bank practice in project financing is to capitalise interest during the drawdown/completion stage into the loan. If a delay is expected, then more interest will need to be funded. The question inevitably arises: 'funded by whom?' This is the essence of completion risk. The banks seek to have a ceiling on their loan commitment and to strongly structure the other contractual and financial supports to ensure a *de facto* cap, not simply a documented cap on their project finance exposure from delay, underperformance or, indeed, project cancellation or abandonment.

The banker and borrower both know that the bank is at its most vulnerable when the loan outstanding is at its maximum and the project is just about to commence its completion test run – either for the contract (Type 2) or for the project cashflows (Type 1). In one of the few studies into the actual experience of completion risk, two thirds of the projects experienced capital cost overruns and that overrun exceeded 20% of the original funding cost for just over half of the deals. Only 22% reached production levels on time with 44% getting there in up to three years after start-up. In total, 78% had some difficulty in achieving the projected output level. While two thirds had cashflows less than projected, an astonishing 28% of the deals never produced a positive cashflow. Little more needs to be said to conclude 'that there is a very high probability that any new project shall run into (completion) problems…' But the study goes on to observe: 'It is interesting to note that no banks lost money… The main reason why… is that in all these cases, the sponsors have provided completion undertakings or sufficient equity which has forced the sponsors to stick with these projects and overcome problems that developed.'[1]

In closely scrutinising completion risk, all parties will have considered and tested the cash outflows for a downside case, focused on delays and project underperformance. (Discussed in detail in Chapter 3.)

- Project financiers have also become 'name' sensitive; they recognise that some sponsors and construction companies have excellent track records in project delivery.
- Poor regional experience at getting projects built on time – as with India – weighs heavily on the completion architecture to be adopted.

## Completion test (Type 1)

The option conditions to turn off the pre-completion supports are laid out in a completion test or through some progressive release mechanism, as seen in some telecoms and resources transactions. The completion test is simply the manifestation of the option conditions.

Since, post-option exercise, the financiers expect to rely on the entity's cashflows for debt service, the completion test needs to be a good test of actual versus anticipated cashflow generation as well as a means to recognise that all the pre-completion project risks have been properly mitigated and that the balance of the project finance structure can be expected to perform as originally structured, for the remainder of the repayment period.

To determine what a completion test should be, it is worth examining what it is *not*. The completion test has *not* been passed by virtue of:

1. the contractor having completed its construction contract – often referred to as 'physical completion' – Type 2 project finance. The project has not been started up or commissioned, and operating personnel have not yet been tested properly;
2. the builder serving notice that the project has been completed;
3. the equipment having passed International Standards Organisation (ISO) testing. These are physical, rather than cashflow, in character and unacceptably short;
4. all of the plant/system having been started up and tested. The trap here is that the whole system needs to have been running for a while to shake out any bugs and bottlenecks;

5 the independent completion engineer's 'punch list' of deficient items has been checked and cleaned up. Again, the integrated system needs to run for a while anyway before cash is generated;
6 the product/system performance having met pre-agreed specifications (perhaps as laid out in the concession). Once more these may be physical in nature rather than evidence that surplus cashflow is available, as predicted, for servicing the debt on the basis agreed; or
7 a certificate signed by an officer of the borrower/sponsor is issued to the banks certifying that the project is now complete!

Given the nature of risks being packaged in a project financing, the spectrum of completion tests has to be very wide, yet is unique for each project. An experienced project finance banker will try to incorporate as many risk testing components as possible and to make the length of the completion test period as long as possible.

A collection of different bank completion test formats is given in Box 19.1. There are eight styles. Many variations have been seen within each. Whereas the 144A project finance market seems to rest content with a more physical 'will it work?' test, rather than a cascading test with its attendant suite of performance measures: financial and market-linked.

**Box 19.1**
**Various completion test formats**

1 Completion guarantee – date certain (Type 1).
  - If not achieved, trigger to linear amortisation, say, over the next five years, but with recourse to the sponsors. (Thus the corporate finance facility has been increased.)

2 Completion undertaking – cashflow performance (Type 1).
  - Accrued *force majeure* to a fixed time frame, one year to 18 months.
  - Unlimited *force majeure* (unusual).
  - Ordinary and extraordinary *force majeure* categories.
  - Operating cost test.
  - Physical performance of plant operations.
  - Economic test (partial abandonment).
  - PV tests:
    - loan life ratio;
    - project life ratio;
    - sales life ratio; and
    - warranty life ratio.
  - Financial test:
    - debt service cover ratio (DSCR) greater than (say, 1.5) for four quarters; and
    - total Debt:EBITDA (telecoms).
  - Multi-component tests including infrastructure, contract conditions, and so on.

*Continued*

Box 19.1 *continued*

- Buydown tests for underperformance of the project (an LD component paid, after a set period has elapsed).
- Cost to completion – estimate reports at fixed intervals.

3 Physical and sales completion (Type 1).

4 Top-up completion (Types 1 and 2).
- Via interest-bearing subordinated debt:
  - *pari passu*;
  - with later maturities; and
  - after distributions test.
- Via standby overrun tranche:
  - separate margin, fees;
  - additional covenants;
  - accelerated access to project cashflow and;
  - clawback to any excess cashflows.
- Escrow release.
- Cap (upper limit) on interest capitalisation/capex item.

5 Equity subscription (Type 2)
- Progressive debt:equity (D:E) ratios.
- Informal.
- Default – after fixed period has elapsed.
- Leap-frogging tranches/debt:equity subscription.

6 Standby with cashflow or DSCR test (Type 1).
- Higher spread.
- Price-linked:
  - defined amount; and
  - release clawback.

7 Delay in start-up insurance (Type 2).
- *Force majeure*.
- LDs/delay penalty.
- Contingent contractual liability.
- Unconventional covers.

8 Turnkey contract (Type 2).
- Liquidated damages:
  - delay; and
  - underperformance.
- Warranty pass through.

Another way to contrast these styles of completion tests (banks versus bond investors) is to ask the independent engineer about the differences in their completion and evaluation reports. The bankers want a comprehensive review of all the risks, a double check on all the cashflow estimates, and a view of the adequacy of the various construction, equipment and operating contracts, even to the extent of interviewing the prospective system operator/ plant manager.[2] The bond underwriters are content with a more descriptive review (rather than cashflow performance) with simple statements: 'It can be expected to work' or 'We see no reason why it should not work.' The focus is on disclosure – particularly with the US Securities and Exchange Commission (SEC) – rather than a comprehensive risk assessment. In fact, eyes tend to glaze over when reading the risk factors in a bond document – apparently everything is a risk: none of the projections can be relied upon; the documents may not work; government deals are there to be reneged; there will be no assured market for the bonds or anything else; judgements obtained in one court cannot be enforced anywhere else, and so on. So the noise of the completion risk is drowned out by the din of disclaimers.

These differences need to be recognised particularly when structuring hybrid/two-step bank to bond project financings.

**Case study: Panda Global Energy, US**

The US$155.2 million Panda Global Energy, 144A, seven-year note issue was predominantly for the construction of 120MW coal-fired co-generation power plants at Luanngan near Tangshan (7.8 on the Richter earthquake scale) in eastern China. The completion test date is the 'Luannan Commercial Operation Date' whereby the power plant simply has to demonstrate that it can be operated continuously at full load for 72 hours, clearly only physical completion (Type 2). But the deal includes these warnings:

- no one is obligated to provide any additional funding to cover any completion cost overrun (at the point where construction had not yet begun);
- delay insurances, equipment warranties, and contractor performance guaranties may not be adequate to cover debt service (DS);
- the 35% LDs may not be sufficient to cover completion problems and delays;
- if the utility taking the power under a 20-year power purchase agreement (PPA) fails to install the transmission line (infrastructure risk), then its consequential damages obligations may be insufficient to cover DS; and
- default under the PPA would then likely render the project insolvent.

It is important to have completion test components that are capable of objective measurement. The rise and rise of independent completion engineers is testimony to the desire to make the certification process as certain as possible. The exact text of the completion certificate should be attached to the project finance facility agreement. Even greater security can be gained by having the completion test procedure manual as an appendix to the loan agreement.

If the completion certification process is not familiar to the borrower or the construction contractor, then (before the signing of the loan agreement) it may be necessary to convene meetings among them and the independent completion engineer to establish protocols, access, and information flows satisfactory to each party. In some cases where commercial matters are featured in the completion test (as opposed to technical, operational or contractual thresholds), then a company of chartered accountants or market/infrastructure specialists may need to be co-opted into the completion test procedures.

Projects with two or three stages – separated by a number of years – are perhaps the most difficult for which to design completion tests – especially if internal cashflows from an earlier phase are being used to finance the later stages. The main challenge is to design a completion test to trigger the non-recourse option to the sponsors after the first stage without springing back to recourse during the construction of the subsequent stages.

**Case study: N3 toll road, South Africa**

In the 1.7 billion rand (approximately US$275 million) N3 toll road project financing in South Africa, besides converting some of the existing road to two lanes, a key feature is the obligation to finance a new alignment and mountain pass known as De Beers, at a cost equal to that of the initial construction work, when traffic reaches a threshold level – in some 8 to 10 years. This would mean that there are two funding periods within the first 16 years of the project.[3]

An elaborate system of subordinated debt and sinking funds was needed along with a De Beers construction quote from the contractors that would hold in real terms for an extended period. All had to fit within acceptable DSCR and loan loss reserve (LLR) financial tests before any funding had to be committed. Nonetheless, the initial sponsors are only risking their project return targets if their support to complete the De Beers second stage is indeed required – a situation to be welcomed; it does not present a project finance structuring problem.

**Box 19.2**
**Misima completion test**

The 'Project Completion Date' means the date on which:

(i) the development of the Project has been completed and commissioned substantially in accordance with the Feasibility Study, except for such material changes as have been approved in writing by the [Canadian] Parent; and
(ii) the mill has recovered a minimum 50,000 troy ounces of gold from any consecutive period of 90 working days

as certified by the [Australian] Holdco pursuant to the Project-Financing Agreement.

The Parent will cause the Project to be completed [by a date certain]. To the extent that funds are required by the SPV in excess of those provided pursuant to the Project-Financing

*Continued*

Agreement to cause the Project Completion Date to occur by [date certain], the Parent will advance such funds to the Australian Holdco. Holdco will advance such funds to the SPV.

The Parent undertakes to the [Australian] Holdco as follows:

(a) that it will not change, nor will it permit the SPV to change, the Feasibility Study in any material way without the consent of the Parent, such consent to be not unreasonable withheld; and

(b) that it will not take or omit to take, nor will it permit the SPV or the Barbados borrowing vehicle to take or omit to take, any action, the taking of which, respectively, could be reasonably be expected to increase the obligations of the Parent under this Completion and Performance Guarantee.

Note: this is a typical Type 1 structure for a completion guarantee. A completion guarantee is full recourse to a parent's/sponsor's balance sheet pre-completion.

## Contract structures

Spurred by many independent power plant (IPP) deals, the project finance community has begun to accept the completion risk associated with turnkey construction contracts (TCC) and the associated ceilings on LDs.

### *Turnkey construction contract (Type 2)*

The market for construction work has always been fiercely competitive with enormous costs and great attention to bidding detail as tenders are called for projects. Contractors are learning that a financial edge by way of delivery of a pre-committed project finance package (Type 2) is more often than not the winning factor. There is only so much massaging one can do with cubic metres of concrete or delivery of a cellular phone system. Sponsors, in turn, are eager to pass the completion risk onto the contractors and to persuade the project financiers accordingly.

In some sectors, the TCC itself will be accepted by the banks for known sponsors, familiar equipment/systems, and safe locations.

**Case study: Barking, UK**

For the £661 million, 1,000MW co-generation Barking Power Project financing in the UK, the principal construction contract price was 53% of the projected drawdowns. (See Exhibit 8.25) An additional £67 million was structured as overruns and standby facilities, and included £21 million for working capital. All-up the transaction is 87.5% debt. A tightly structured TCC with 20% LDs – delay (16.5% cap) and underperformance (9% cap), close scrutiny by independent engineers, plus parent-company guarantees of the contracting companies, was sufficient to have the completion obligations otherwise non-recourse to the borrower or its shareholders (Type 2).

## *Multi-party turnkey contracts*

A series of contractors may give turnkey offers, perhaps also trickling in some equity as a *quid pro quo* to get the contract. In such circumstances, the completion risk danger arises from one party being late, but not the others (see Exhibit 19.2). What happens to completion and the LDs? Soon enough, each party blames the other for delays, non-performance, and the flow on to capex overruns. This stalemate has been addressed in five ways in project financing.

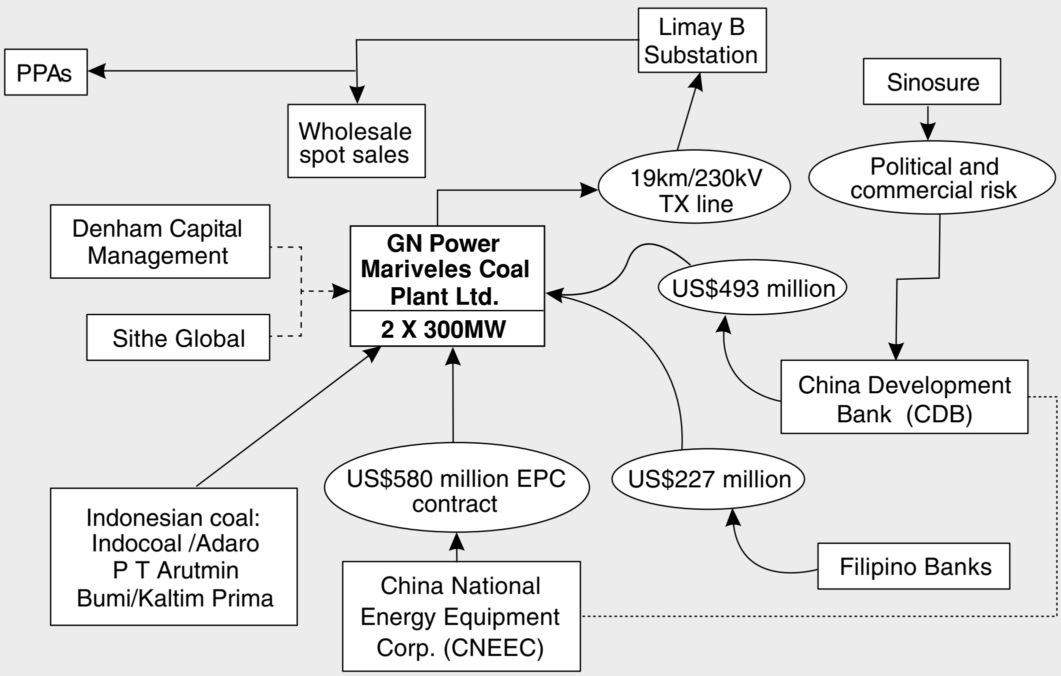
1 A head contractor is made responsible and pools the LDs under its wing. Naturally it will exact a price for the lead role.
2 A large bonus pool, say 10% to 20% of the EPC contract price, is set for early completion (and early, extra cashflow generation). But a concomitantly larger LDs obligation, say 30% to 40%, is extracted from each turnkey contractor.
3 A very detailed independent engineer is inserted into the construction process. Multiple milestones and exacting critical-path criteria are imposed on each of the contractors yet with substantial float.
4 An 'owners' engineer is appointed with the oversight and power to compel contractors to spend money to catch up. (*The contractors hate this*.) This engineer needs to be meticulous; highly experienced and readily trusted; and granted some authority in enforcement; measurement; payments; and for corrective actions.
5 A partnering charter can also be considered (see below).

### Case study: Mariveles, Philippines

In the Mariveles power project finance transaction in the Philippines, Sinosure showed itself fully capable of doing the export credit financing on its own, in this case backing the engineer procure construct (EPC) contract from China National Energy Equipment Corporation. China Development Bank receives the political risk insurance (PRI) guarantee from Sinosure. Some 10 years earlier, Sinosure had attempted (and failed) to do project finance for China National Offshore Oil Corporations' (CNOOC) interest in the Tangguh export-LNG project, Indonesia.

Exhibit 19.1

**Mariveles**



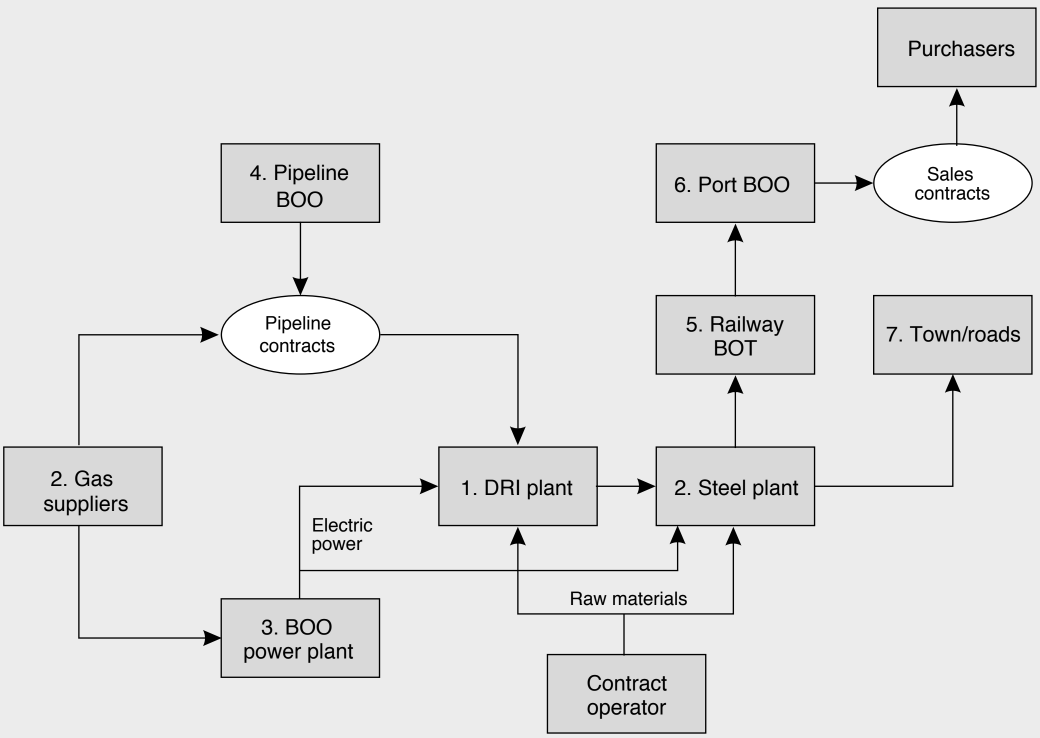

*Source:* International Advisory & Finance 2014

**Case study: DRI**

In a direct reduced iron (DRI) project, some intermediate processing steps are removed in the overall steel-making process. Exhibit 19.2 shows an example where seven separate turnkey construction contracts were tabled, all but one on a build own operate (BOO) basis. The total project finance exceeds US$1 billion.

Exhibit 19.2

**BOO DRI/steel project**




*Source:* International Advisory & Finance 2014

## *Partnering charters/alliance contracting*

The concept of partnering has promising application to mitigating completion risk under construction contracts. Besides the focus on controlling the construction budget, a partnering charter includes a system of progressive mediation or alternate dispute resolution (ADR) to handle any scope changes early, change-order effects (time and costs) and critical path/ scheduling issues.

An example of a partnering charter might work like this:

- every week the owner's engineer and the construction site manager meet to review variations. They try to agree these at each meeting;
- failure to agree at the next weekly meeting means that the point in question must be addressed by their superiors; and
- if, in turn, the direct superiors cannot agree within two weeks, the matter is referred to the president/managing director of the construction contractor and the owner/sponsor to resolve.

In this manner, variations are caught early. In addition, an information gathering exercise on problems is developed on the go which will be useful to the independent completion engineer – however, the engineer must not become part of the escalating dispute resolution chain.

This can also be applied to safe working practices. If a contractor is early and qualifies for an early-completion bonus and works safely, the contractor can be paid more. Unsafe working means the contractor may lose his/her margin (completely?).

## Trigger structures

### *Liquidated damages*

LDs in a project finance construction contract are seen everywhere. They are also to be found in operation and maintenance (O&M) contracts and many equipment delivery/supplier-credit transactions. It is first necessary to be clear what 'liquidated' and 'damages' mean.

At law, damages has to be quantifiable (in court) as an actual measure of costs/losses. It should not include any measure of penalty (for non-performance) as this may be unenforceable, especially in any derivative of English 'crown law'.

Secondly, the term 'liquidated' means: 'I agree to liquidate my claim for damages at a limit of X.' In other words, the recipient has contracted away the right to further damages above X. The LDs have a negotiated cap/ceiling of X. Thus although the project finance cashflow model may show Y is required (higher that X), the LDs have agreed a limit of X. Sub-limits for different causes of damages are also freely negotiated and vary from deal to deal.

Project finance is an excellent discipline for determining LDs since the natural focus is on a high degree of structuring and risk quantification/mitigation (Type 2 project finance) which is all eventually expressed as a suite of documents and a financial model. In fact, the cashflow modelling exercise (see Chapter 3) should give the tools necessary to estimate what LDs should be in both categories – delay and project underperformance.

Naturally, the bank credit committee/bond underwriter and the sponsor want to see the highest LD figure possible, while the contractors want the lowest acceptable number they can get away with. There is no free lunch. This LD commitment costs money and will increase the cost of the project and accordingly the EPC contract price. That is why the contractor is so concerned. And that is why a bonus must be visible/attainable by the contractor where LD payments are high – the author's '*rule of thumb*' is, a bonus must exceed one third of the LDs so that the option value of the bonus will fully finance the option cost of paying the

LDs. But contractors today know that if they cannot deliver a financing along with their bids, they will be uncompetitive. The financiers are funding most of the 'premium' cost anyway.

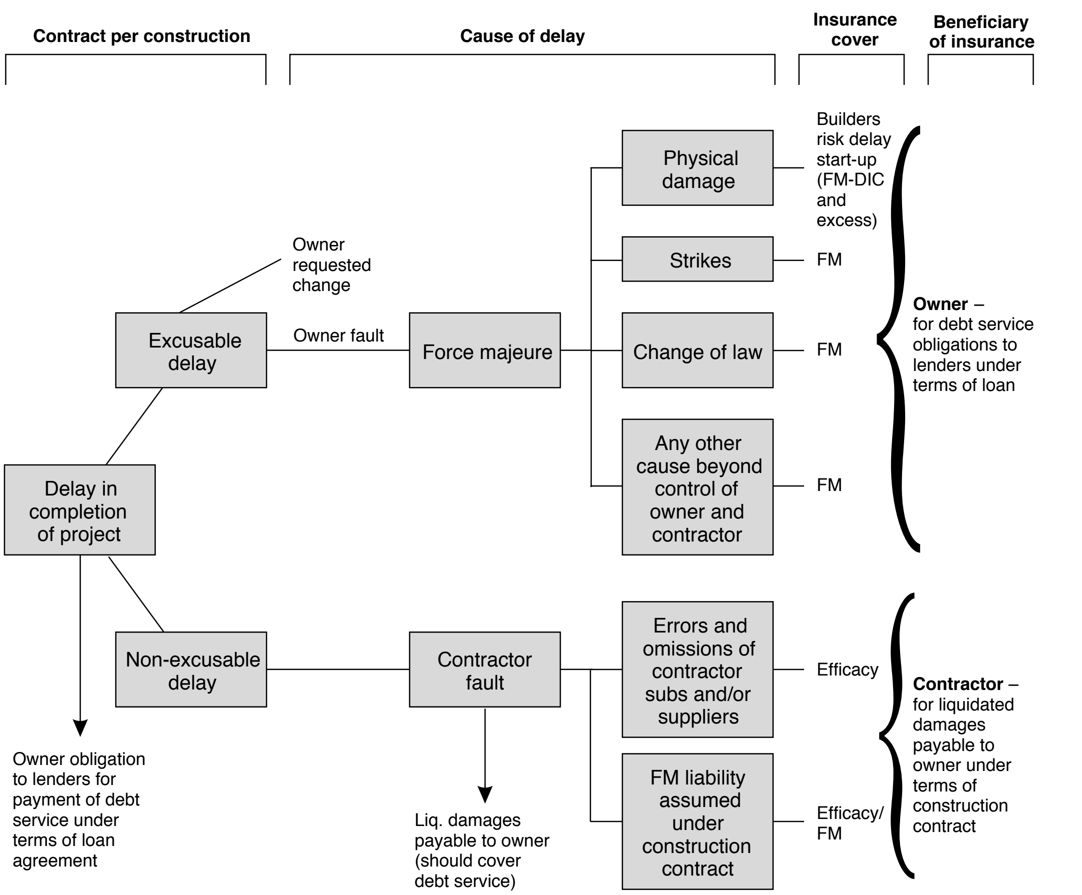
Besides the cashflow modelling sophistication already referred to in Chapter 3, there is nothing to guide the project financier as to what can be easily achieved: 'What is the normal level of LDs for this sector?' A crude reckoner is given in Box 19.3.

The explanation is that much of the LD obligations are, in any event, back to back with equipment suppliers anyway. Perversely, a toll road, where the risk of a construction delay is much greater than for a power plant, the LDs are one third the percentage of the more straight forward – but higher equipment content – power station.

If the LDs commitment is significant, a contractor or sponsor may wish to lay off some of that risk into the delay in start-up (DIS/DSU) insurance market.

Exhibit 19.3

**DIS/DSU insurances**




*Source:* Author's own

### Case study: Petropower, Chile

The most stunning achievement with LDs in project financing has been the Petropower transaction in Chile. In this project, Foster Wheeler is adding a residual upgrading plant to an adjacent refinery owned by the state petroleum company, ENAP. The delayed-coker unit makes coke which is used as a fuel for a 59MW co-generation plant, while any saleable products from the unit are sold back to the refinery – three cashflow streams exist: refined products, electricity, and steam. The delayed-coker technology is a relatively proven Foster Wheeler technology. The circulating fluidised bed (CFB) boiler for the co-generation plant has had completion problems at other installations. Plant and equipment is a high 97% of the engineer, design, procure, and construct (EDPC) price.

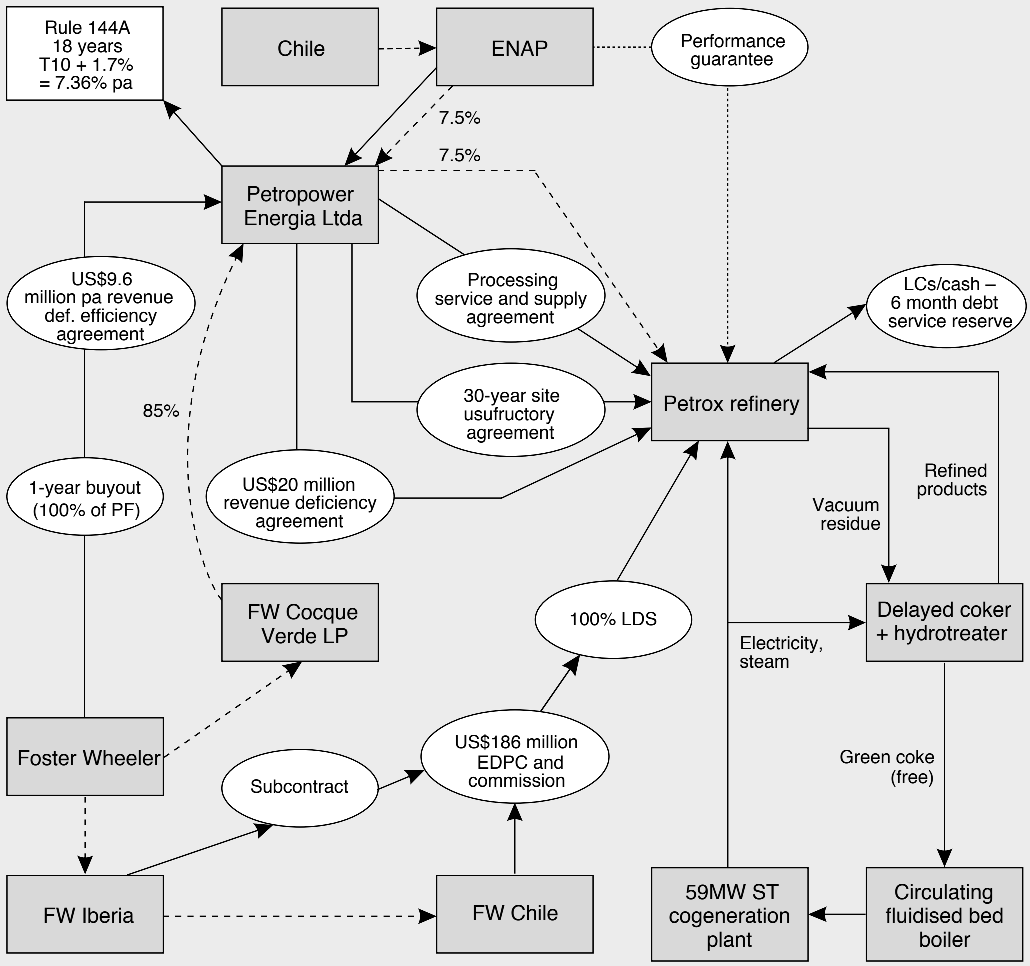
Since Foster Wheeler saw the opportunity to get very long, fixed rate project finance bonds from the 144A market, it decided to offer 100% LDs, mainly by way of one year buydown payout of the whole bond if the project failed to be completed within one year. Interestingly, the company also understood the completion concerns over such a project finance deal in the 144A bond market explicitly by offering not just the standard EPC contract (plus design 'D') but also to commission 'C', the plant – via an EDPC construction contract. This orchestration of project financing (see Exhibit 19.4) has been repeated successfully since this pioneering Chilean deal.

*Continued*

Case study *continued*

Exhibit 19.4

**Petropower**




*Source:* © International Advisory & Finance 2014

**Box 19.3**
**Levels of LDs – a crude tool**

Take the funding costs required in that sector. Work out the amount of new equipment that has to be purchased. Normal LDs are around one third to one half of the equipment expressed as a percentage of the EPC contract price.

| | *Power %* | *Toll road %* |
|---|---|---|
| Equipment | 55–65 | 10–20 |
| Civil engineering, other construction | 10–20 | 55–75 |
| EPC contract price (subtotal) | 65–85 | 65–85 |
| Interest during construction | 10–15 | 15–25 |
| Total funding | 100 | 100 |

From the above one could say that, in the power sector, LDs should be around 40%, 20% to 30% would be 'normal'. For a toll road, LDs should be around 10%. 'Normal' would be 5% to 10% LDs.

**Case study: LDs, US partnership**

For a power project package being put together by an engineering partnership on a turnkey basis, LDs of 25% represented a US$15 million commitment from that partnership, or approximately US$300,000 each partner. There were other such partnership LDs commitments. The only way to stitch that commitment into the project financing was to insist on DIS/DSU cover for the maximum obtainable – made easier by one of the partners being an insurance broker.

LDs are usually split in two parts (see 'Delay in start-up' below):

- delay with payment on a daily or weekly basis up to a limit (percentage of the EPC contract price); and
- underperformance where the project's performance has deteriorated to pre-agreed limits (liquidated = ceiling).

These limits and associated sub-limits are all a matter of negotiation, but it is common to see the percentage limits split about evenly between the two parts. Delay LD payments have now been experienced at the very high US$1.25 million per day.

The contractor will be given a period to remedy underperformance, usually one year, at its own expense. Failure to fix the problem is commonly handled by way of a one-time payment – the 'buydown' payment. It is usually a present value (PV) measure of the reduced cashflows which should be easy to test against the project finance spreadsheet. If the banker wishes to receive the buydown payment to reduce the project finance loan, then care is needed to direct those payments to the bank. (See Box 6.3.)

As discussed before, all the LDs obligations, bonding, and guarantees are not going to be maximised unless the contractor is given early completion bonuses. The higher the LDs, then the higher the bonus should be. Naturally, one has to be cautious during negotiations about a contractor disguising the readily attainable completion date. Some construction companies are famous for committing to complete on a delayed schedule and finishing construction one year early, thereby picking up a bonus, which can be in excess of US$100 million!

**Case study: Sithe, US**

For the US$717 million, 144A-bond/notes issue for the 1,000MW Sithe Independence transaction in up-state New York, US, this was a major step-up in size of project attempted by the company. But more importantly the deal incorporated the first installation of a new technology, dubbed 'FA', for the General Electric (GE) gas-turbine generators (jet engines). Although GE has built thousands of gas turbines, the pressure for a new high-fuel efficiency machine is intense. Sithe was able to get 40% LDs from the turnkey contractor and, as another stretch to GE's support of these LDs, the normal 12-month post-completion component of buydown LDs was extended to five years back to back with GE for underperformance of the new machines. (See Exhibit 13.2.)

## *Delay in start-up insurance*

The adoption of Type 2 turnkey construction contracts as acceptable cover of completion risk is relatively new in project financing. This level of acceptance has been spurred by the overlay of delay in start-up (DIS/DSU) insurances coupled with *force majeure* insurances especially that of the turnkey contractor (efficacy). These DIS/DSU insurance covers are diagrammed in Exhibit 19.3.[4] DIS/DSU could be expected to readily cover 30% of the EPC contract and substantial capacity exists for each project – US$500 million plus. It supplements the builders/ contractors all risks (BAR) policy (discussed in Chapter 6). The reader is also directed to Appendix 2.

The three main covers for DIS/DSU are:

1 all non-site force majeure;
2 change of a (key) law; and
3 contractor non-performance/failure (efficacy).

### *Force majeure*

*Force majeure* covers are fire and allied perils – on or off site (including damage in transit and at the suppliers' premises) – on a difference in conditions basis to the consequential loss in the BAR policy for strikes, lockouts, and/or labour disputes, as well as any other cause beyond control of the assured/owner, the contractors, and other project participants (for example, gas suppliers and electricity purchasers).

## Change of a law

Change of a (key) law is the adoption, promulgation or modification of any federal, state, or municipal legislation which establishes any requirement affecting the project more burdensome than the most stringent requirements contained in an existing law.

## Efficacy

Efficacy of the contractor is directly linked to its LD obligations including the performance of its subcontractors and suppliers. These covers are usually closely linked to the TCC itself and the retentions, advance payments, and performance bonding requirements therein. The insurance industry term is 'manuscript', in effect, a tailor-made agreement. Efficacy can extend to the engineering, design, procurement, construction, and commissioning of the project. The LDs cover is usually two-fold:[5]

1 *late completion* payments for each day that final completion of the project is delayed beyond the guaranteed completion date (as defined in the construction contract); and
2 *performance shortfall* payments should the contractor fail to achieve the contracted performance criteria (for example, not achieving the guaranteed electrical output heat rate, process steam flow and emission levels for a co-generation plant).

It can also be wrapped together with three other insurances to cover contingent contractual liability.[6]

3 On demand or *conditional bonds* because they may be unfairly called. The contractor can pursue its rights under the contract to recover moneys.
4 *Court arbitration* award may be granted by a court, even if a contract does not have a liquidated damages clause or require bonds to be issued. A contractor can still be sued by the sponsors for failure to perform under the contract (for example, late delivery, failure to meet specifications).
5 *Indemnity* cover for the contractor can also be structured to catch performance failures directly or by subcontractors or suppliers.

## General provision

There are some general rules of the DIS/DSU road (Type 2 project finance) of which one also needs to be aware (see Appendix 2 as well):

- a self-retained uninsured 'retention' is generally 30 to 45 days of delay (after payout of the liquidated damages for delay) or 10% of the exposure;
- underwriters will only provide indemnity for contractually due damages/liabilities (extreme care is needed with penalty clauses which may be unenforceable);
- the underlying contract must usually contain a *force majeure* clause;

- insurance underwriters usually require an independent legal review (this is often done by the underwriters' internal lawyers) on the actual contract document(s) and will require that the contracts are not materially changed during the policy period. Occasionally underwriters will also require an independent engineer's report on the project;
- the DIS/DSU policy will exclude:
  - financial default/insolvency;
  - liabilities arising from personal accident/injury; and
  - infringement of intellectual property rights;
- costs of rectification and/or improvement are not normally covered; and
- the maximum DIS/DSU policy period available is around three years.

As in any insurance, a greater deductible significantly lowers the premium cost. Also care is needed with the special words used in insurance industry (legal risk).

Replacement of a TCC contractor midway through construction is a very difficult process. Recall that bankruptcy is an exclusion in some DIS insurances.

**Case study: Turnkey contract, Philippines**

The construction of a multipurpose hydropower, tunnel, and irrigation project in the Philippines was financed by a US$356 million 144A notes/bond issue.[7] The fixed price, date-certain TCC – underlying a Type 2 project financing – was being done on a joint and several basis by Hanbo Corporation and You One Engineering Co. Ltd, both Korean corporations. Hanbo controls You One which has 25 years of tunnelling experience. Out of the total project capex of US$495 million, the TCC represented US$236 million (48%). Interest during construction (IDC) was estimated to total US$155 million (30%). Hanbo's LDs obligations were 50% (of the EPC price) backed by an LC from Korea First Bank. When Hanbo and You One went bankrupt, it took a year to find a replacement contractor – an Italian firm with a new TCC at 32% LDs. The borrower was able to settle Korea First Bank's obligations at US$90 million.[8] The new target completion date was seven months later than the original.[9]

## Financed structures

### *Default agreement*

A dangerous subset of the equity and debt subscription structure (see 'Debt:equity subscription' below) is the default agreement. Once all the debt and equity commitments have been drawn, the parties will sit around and discuss who will fund the next overrun portion. Failure to reach agreement within 90 days means a default under the loan agreement (but no obligation to provide any guarantee or repay the loan).

Any experienced banker would see the danger since at this time – again the maximum is outstanding under the loan agreement – it is highly unlikely that agreement could be reached for responsibility for the delay and each party will apportion blame.

**Case study: NCA, Australia**

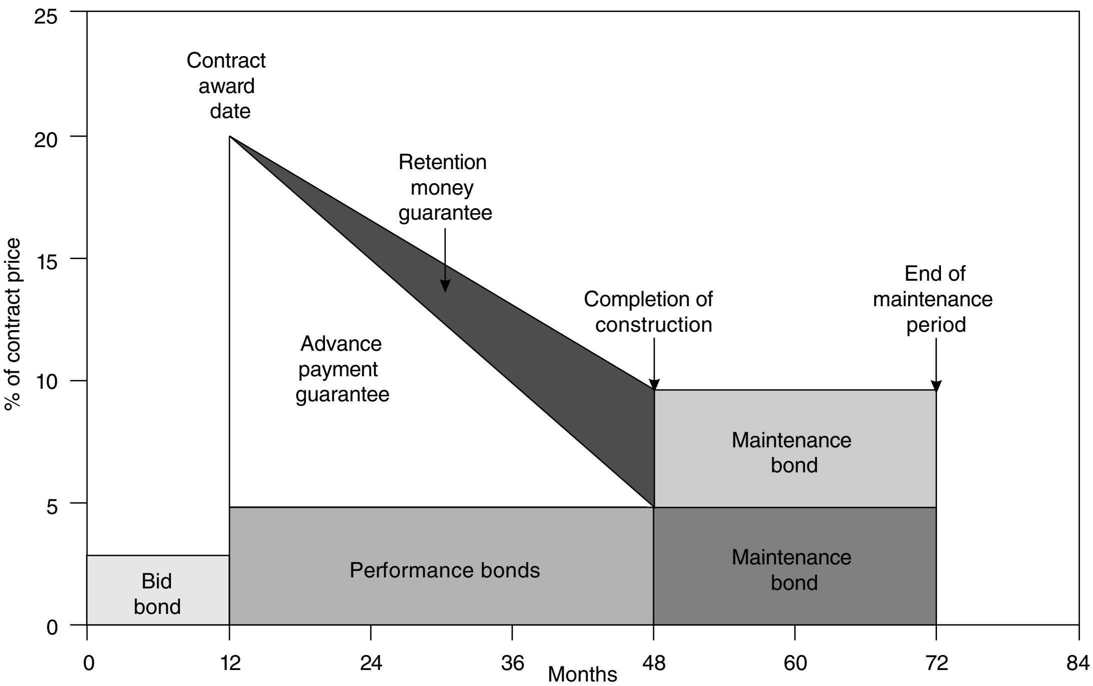
New York investment bankers persuaded a group of international banks to provide US$730 million for Australia's largest project financing at that time, the MIM's Newlands-Collinsville-Abbott Point in Queensland, on a Default Agreement basis. MIM – now a part of GlencoreXstrata – thus gave no completion guarantee. No wonder *The Banker*[10] reported: 'There is a lot of me-too-ism in this market… 80% of the people who had participated in the project financings didn't know what they were looking at. They were drawing comfort from the presence of some large companies…!'

## *Bonding/guarantees*

Embedded in standard construction contract/TCC documentation are LDs, retentions, and maintenance bonds. Advanced payment bonds may also be provided by the client to allow the contractor to mobilise and place down payments or order key long-dated equipment on the critical path timetable for installation. As can be seen in Exhibit 19.5, these all converge on the date of completion of the project. On that date, the usual format is to roll up the performance bond and retention into a maintenance bond, a kind of warranty that whatever maintenance needed will be done for the first 12 to 24 months. The percentages in Exhibit 19.5 are typical.[11] (See Case study: Don Muang toll road, Philippines.)

Exhibit 19.5

**Bonding/guarantees in construction contracts**




*Source:* Nevitt, PK and Fabozzi, FJ, *Project Financing*, 6th edition, Euromoney Books

**Case study: Don Muang toll road, Philippines**

The US$274 million project finance for the Don Muang toll road (linking Bangkok's airport to the city) was funded by a mix of foreign currency loans (42%) and Thai Baht facilities[12] described in Exhibit 19.6. The construction contract had the following provisions.

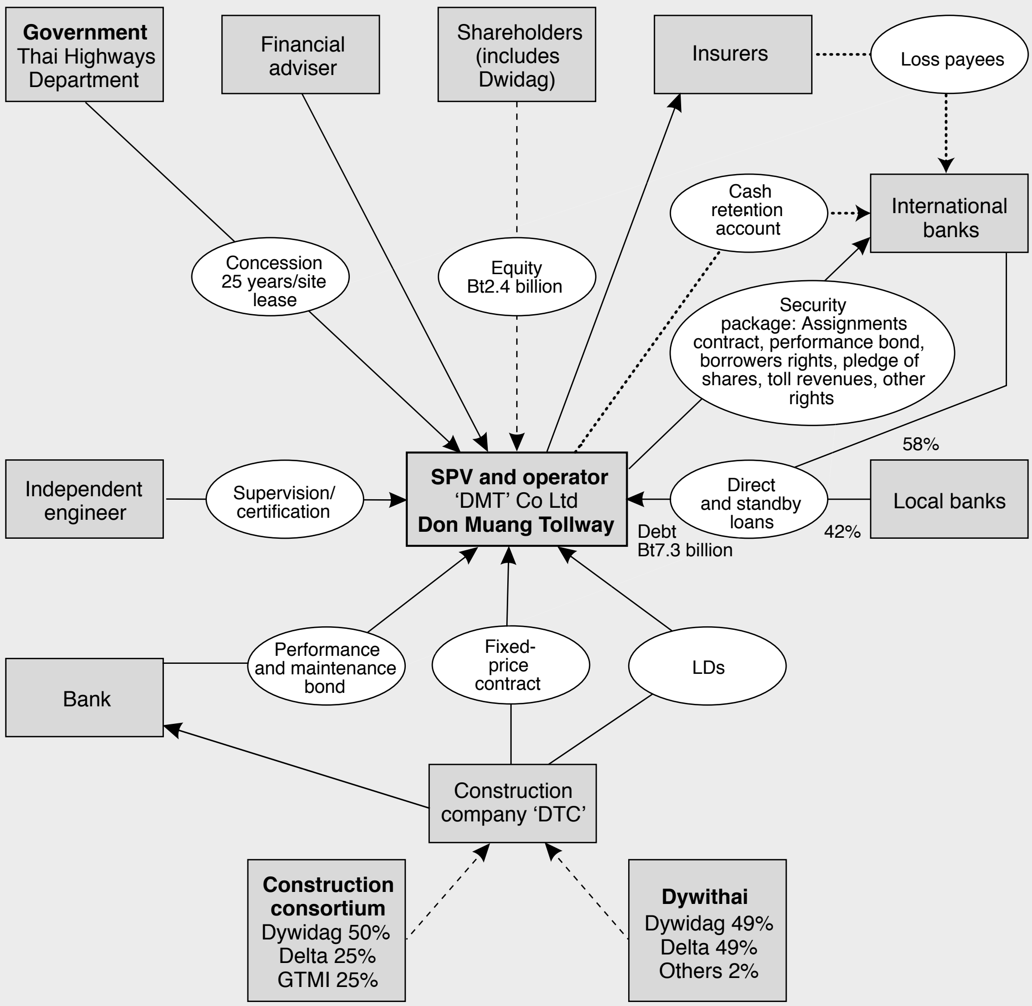
- Advanced payment of 12% at 90 days after signing the construction contract and an additional 5% at 120 days later.
- Straight line recovery of advance payments.
- Monthly progress payments subject to 5% retention (unless substituted by contractor's bank guarantee).
- The retention moneys (or substituted guarantees) will be released 30 days after 'completion of the works' – physical completion.

*Continued*

- This release is actually an exchange into a 12-month maintenance bond (of 5%).
- Delay LDs at the rate of 0.1% per day of the contract sum subject to a maximum of 5% (50 days).

Exhibit 19.6

**Don Muang**




*Source:* Author's own

### Retention

Within almost all construction contracts, the client/sponsor withholds payment of 5% to 10% of the EPC contract price progressively as payments are due under the contract. The contractor can elect to receive full payment by providing substitute bank guarantees/letters of credit (LCs) for the retention moneys.

The underlying premise is to have some 'hurt' money from the contractor who is then anxious to properly achieve completion in order to get the retention money paid or the substitute guarantees released. However, like many construction contracts, the completion definition is more often than not simply physical completion (Type 2), which may not be adequate for a project finance completion test.

### Performance bond

Once a construction contract has been awarded, a 5% to 10% bank performance bond is required from the contractor. This is usually provided by the contractor's bankers (on a full-recourse basis). Many banks establish bonding lines whereby the contractor's treasurer simply phones up to get the bond issued to whomever, wherever. (This is illustrated at the bottom of Exhibit I.1.) Like retentions, this performance bond is released once completion occurs – as determined by the definition of completion in the contract. If a project finance banker is also providing the performance bonds, then he/she is doubling up on this risk.

### Maintenance bond

A maintenance bond – often composed of the retention and performance bonds – covers the defects liability period and usually runs for one or two years after contract completion, as defined. This is to hold the contractor liable to make whatever repairs are necessary to restore the project to its original (usually physical) specification. It is the contractor's warranty that the construction work was up to standard.

This overlaps somewhat with the underperformance element of LDs when the contractor, at their expense, is required to endeavour to bring the project's performance (again usually measured in physical terms) back to pre-agreed tolerance laid down in the original design/performance criteria.

## *Completion guarantee*

A full completion guarantee means that the sponsor(s) have committed their balance sheet (full recourse) to 'do all things necessary' to achieve the completion test (Type 1 project financing). Until the completion test is passed and certified, the sponsors will provide whatever moneys and resources are necessary to complete, which may mean the direct corporate obligations for debt service payments.

Completion by a date 'certain' means that there is a fall-out date when the failure to complete requires all loan outstandings to be repaid in full. Although *force majeure* may have occurred, the cumulative delay is limited – often by 12 to 18 months after the expected completion date with perhaps grace only on principal (the sponsors commence to pay interest). Thus the capitalisation of IDC is limited to that date or to a pre-established amount.

**Case study: Batu Hijau, Indonesia**

For the US$425 million construction term loan for the Batu Hijau project in Indonesia, the sponsors were allowed one year cumulative *force majeure* delay in their several obligations to complete a multi-component completion test, similar to the second completion test format in Box 19.1.

Sponsors are eager to shed these completion guarantee obligations onto the turnkey construction contractors and to get the financier to accept the final/top portion of completion risk (Type 2). Yet surprisingly, other sponsors have seen that there is not much point suffering through the uphill slog of trying to renegotiate, reschedule, or extend the completion test period and are using a date-certain completion/guarantee as a way to remove the financiers (usually banks during construction) by having the requirement to pay the outstandings under the loan agreement.

**Case study: Atlantic LNG, Trinidad**

For the US$640 million project financing for the Atlantic LNG Company of Trinidad and Tobago led by oil major Amoco, the sponsors were quite content to provide a full completion guarantee to US Exim, OPIC, and the banks. If the project got into trouble, then the best parties to provide a fix are the sponsors rather than the agencies and banks. The in-service completion was targeted to be some nine months ahead of the 'completion date certain' when such guarantee could be called.

### *Completion undertaking*

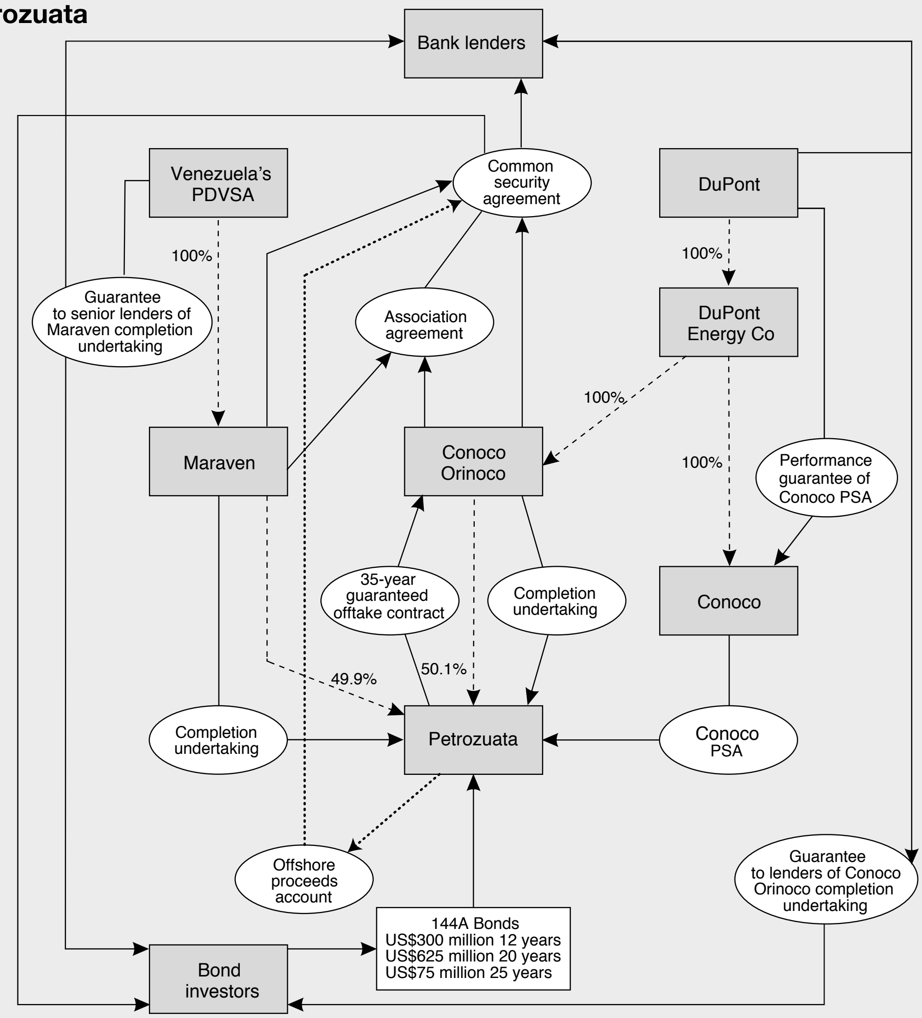
Rather than a firm guarantee of completion, a completion covenant is drawn using weaker language such as 'reasonable' or best 'endeavours/efforts'. This is often coupled with a slightly longer drop-dead date, say 18 to 24 months after the expected/scheduled completion date. Failure to pass the completion test by that date will mean that the construction loan outstanding will convert to, say, a five-year equal amortisation term loan but with full recourse to the sponsor(s). This, in essence, expands the corporate loan but the project facility is not a project finance. It is a corporate loan obligation, on balance sheet. The difference to a completion guarantee, if any, is the conversion to term rather than 100% repayment/acceleration of the project finance loan.

### Case study: Petrozuata, Venezuela

Given the distinct preference of the capital markets to take no completion risk, when the advisers to the Petrozuata petroleum export project in Venezuela went to the market, the structure had full completion support from the Venezuelan government's PDVSA and DuPont of the US (Type 1). With no concern about completion risk, the 144A market granted the 'Project Finance Deal of the Year' US$1 billion out to 25 years (twice the length of a sovereign Venezuelan Issue) at a rating better then Venezuela sovereign rating 'piercing the sovereign ceiling'. Exhibit 19.7 shows these supports, which have proven to be necessary because cost overruns have exceeded US$750 million.[13]

Exhibit 19.7

**Petrozuata**




*Source:* Author's own

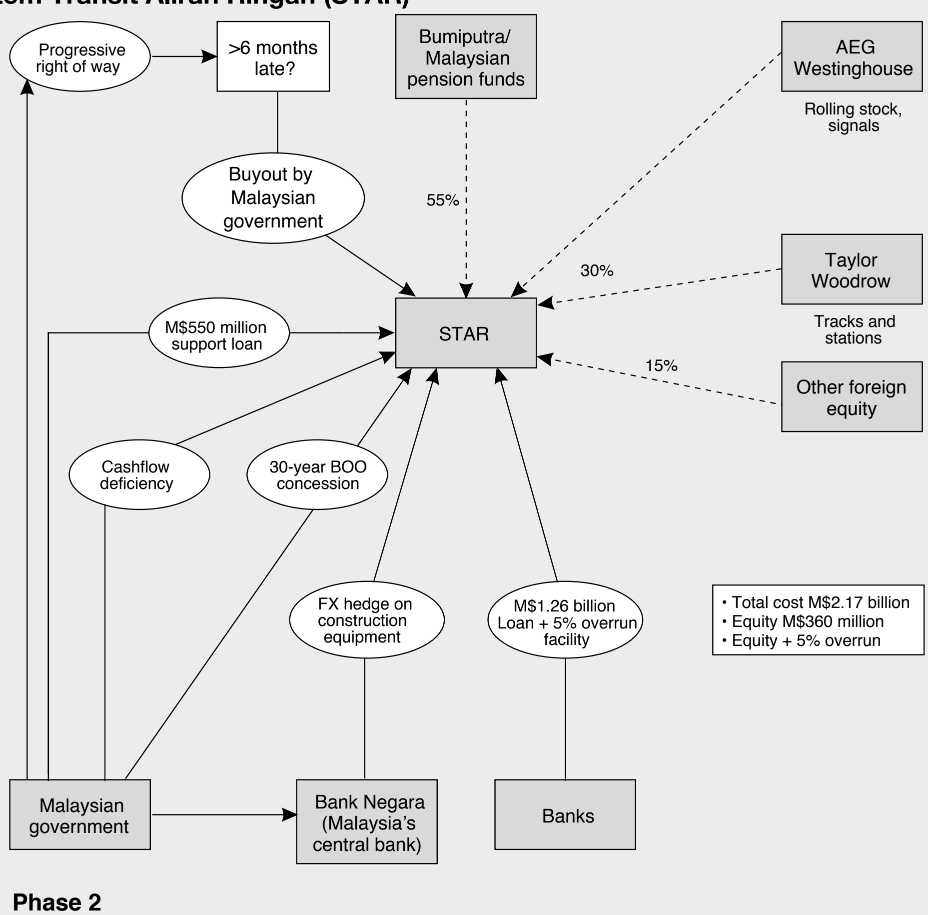
## Case study: STAR, Malaysia

In the Sistem Transit Aliran Ringan (STAR) transaction for the second phase of a light-rail transport system in Kuala Lumpur, Malaysia, the government could not deliver the full right of way on the date of signing the Phase II concession, which could cause completion problems. The overall structure (described in Exhibit 19.8) was enhanced by:

- 5% standby facilities from the project finance banks;
- a government support facility; standby style;
- a government debt buyback if it overran its grace period of six months to deliver the right of way;
- an undertaking to deliver the right of way to STAR; and,
- 5% overrun equity from the equity holders of STAR.

Exhibit 19.8

**Sistem Transit Aliran Ringan (STAR)**




*Source:* International Advisory & Finance 2014

### *Overrun – standby facilities*

Each of the sponsors and/or the financiers may provide additional facilities to cover some or all of the capital cost overruns or any funding needed to meet the completion test. With the expectation of cost overruns being quite high as indicated earlier in this chapter, these facilities are seen frequently.

- The sponsor(s) facilities can be injected as cash or subordinated debt.
- The banks usually put firm limits and constraints on the usage of their facilities. They may also tighten the 'base' loan repayment conditions. Accordingly, the bankers usually charge higher fees and margins to reflect the higher level of completion risk.

**Case study: TelecomAsia, Thailand**

For the TelecomAsia 25-year concession to provide two million fixed line telephone lines in Bangkok, Thailand, the total amount of funding was split:

- one third equity (cash up front);
- one third US dollar fixed rate supplier credits;
- one third internal cashflow generation during rollout of the system; and
- one third standby facility from Thai banks in baht (the local currency of Thailand).

In this way the Thai bank standby facility was covering both the cost overruns as well as any deficiency in cashflow generation from early telephone line completion during the three-year construction/roll-out period. (See Exhibit 25.1.) This case study is also the subject of further analysis in Chapters 17 and 25.

### *Debt:equity subscription*

The sequence of injection of funds into a project is hotly debated.

- Some bankers, including the World Bank's private sector arm, the International Finance Corporation (IFC), want to see all the equity in first.
- The sponsors would prefer to put their equity in last as that will improve the rate of return.
- Many bankers prefer to see funding pro rata.
- The capital markets usually prefer to fund once (single drawdown) and given its preference to invest post-completion, this falls into the first category.

Although the equity in front results in the maximum hurt money from the equity investors/sponsors, it runs the considerable risk that the sponsors will simply 'shrug their shoulders' should completion require extra funding – the sponsor has invested what it was asked to, when it was asked to do so. It is back to the banks to fund the gap (at the time of maximum loan outstanding with the chasm of completion still between construction and cashflow).

Box 19.4 shows some variations on this debt:equity subscription theme. If completion risk is expected to require overrun funding, then the independent completion engineer can certify the anticipated 'cost to complete' at every drawdown and the debt:equity subscription mechanism itself may be adopted as a way to handle subsequent overrun funding.

**Box 19.4**
**Equity:debt subscription**

In the case of a project requiring US$150 million in funding (includes IDC), each of the debt and equity agreed to US$20 million, each as overruns. This could be provided in three ways (debt:equity in US$ million) as follows:

| | Together | Equity | Debt |
|---|---|---|---|
| Base Tranche 1 | 150 | 50 | 100 |
| Overrun Tranche 1 | 40 | 20 | 20 |
| Thereafter | n/a | All | 0 |

The relative debt:equity is changing with sequential tranches.

**Case study: Springvale, Australia**

In the Springvale mine-mouth fuel supply project financing for a power station in New South Wales, Australia, the development joint venture was between Korea's Samsung and an experienced, but medium-sized, local coal miner, Clutha. Since Clutha could not provide a full, albeit several – its part only – completion guarantee and Samsung was unwilling to provide joint and several completion support, excess funding of some 30% was structured in sequential debt:equity subscriptions by the banks and the joint venturers (Type 2). This still left any overrun above that level to be provided by someone, most likely the banks. Soon after financial close, Clutha went bankrupt.

## Study approach

### *Independent completion engineer*

The most obvious scenario in which to use an independent completion engineer is one where the sponsor is the owner, constructor, supplier, offtaker, and operator, as well as the provider of equipment and services – and similar inherent conflicts. The independent completion engineer activities can be considered for the following.

1 *Construction cost audit* where the very fine detail of the capex estimates are audited – not re-estimated to examine different aspects of the capex. These may also be benchmarked against other similar developments in like environments.

2 *Anticipated cost to complete* reports are issued regularly, perhaps with each drawdown or after each milestone is achieved. *This has successfully been deployed in the D:E subscription structure outlined above.*
3 *Full estimate review* where the whole of the capex and timetable is reviewed by a third-party company and their approval/disapproval is obtained.

**Case study: Eurotunnel, France and UK**

Billed as the greatest project since Cheop's Great Pyramids, Eurotunnel had plenty of completion risk. Nine months prior to the award of the Eurotunnel construction contract, the world's longest tunnel, the 56km Seikan tunnel in Japan had just achieved 'breakthrough' by the tunnel boring machines. This feat had taken 20 years, twice as long as budgeted, and 10 times the cost of the original estimate. A new British Labour government pulled out of a second Channel Tunnel proposal when the cost to complete more than doubled to £1.9 billion from the original estimate of £850 million. Eurotunnel, the third effort to cross under the English Channel, was built at a cost of £10.5 billion (US$16 billion) again more than double the original estimate of total funding of £4.8 billion. (See Exhibit 1.2 of *Project Financing* (8th edition) by Frank Fabozzi and Carmel de Nahlik which shows the authors' deal diagram.)

The track record of sponsors who are also contractors has made the project financiers deeply suspicious on both the cost and timetable fronts. To an extent, the independent completion engineer can act as a shield while these suspicions are being investigated, in a sense protecting the project lender. Equally, a sponsor can allay those fears by putting up such a study by a 'namebrand' company. But care needs to be taken to ensure that such a namebrand study is indeed independent, rather than 'commissioned' to a limited scope of work.

To dig for omissions may be another task of the independent completion engineer. Specifically asked to examine the project as a whole, they may also look at every other party's inputs with regard to the infrastructure risk or the interconnect. They can be asked to comment on the overrun/delay experience in that sector/region/country or with that sponsor/contractor. Some of the largest well-known 'names' have had not so well-known completion capex/timetable blow outs.

A firmer view of the independent completion engineer role, before signing the loan agreement, is obvious (as well as catching design specification problems as discussed in Chapter 20).

## *Completion tests*

Type 1 project financings will have a completion test to check cashflow generation:

1 on time; and
2 on budget; and
3 producing sufficient cashflows per period for debt service (in that period).

The types/styles of completion tests are given in Box 19.1. As must be evident from any perusal of Box 19.1, significantly more than mere construction contract completion will be included. It must also be evident that failure to meet this completion test (before the drop dead date, say, 15 to 18 months after the targeted/expected completion date) means that the financing stays as full recourse to the sponsor's/promoter's/developer's balance sheet.

**Case study: Ok Tedi, Papua New Guinea**

In the Ok Tedi project finance, Papua New Guinea (PNG), BHP failed to pass the completion test; therefore the full loan exposure and repayment stayed as a corporate obligation of BHP (corporate finance) – Type 1.

For a Type 2 project – where the contractors 'package' is relied on for completion – only the first 'and' is attempted with regard to the completion: on time and on budget. This means only fixed in time and fixed in price, without testing cashflow generation at all. This is too often seen as complete coverage of completion risk. The 'package' includes the turnkey obligation, LDs as may be extended by DIS/DSU insurance. As referenced before, this means a 'loss ceiling' is agreed, above which there may be no structure. But obviously the cashflow generation of the project has not been tested yet.

**Case study: Cross-city tunnel, Australia**

This tunnel, project financed in 2002, was for a 2.1km tunnel in Sydney, Australia, avoiding the use of 16 traffic lights. It was finished five months early. The tunnel went broke twice (from optimistic traffic forecasts) and was bought for A$474 million by Transurban, an owner of other Sydney toll roads, in 2013. The original tunnel had cost investors about A$750 million.[14,15] Traffic experienced on the tunnel was about 70% short of traffic forecasts. Rather obviously the completion testing was for a Type 2 project financing; the traffic cashflow results were never tested!

## Sector completion protocols

Each industry sector tends to have its own conventions with regard to completion tests. (Sector profiles are covered in Chapter 7 and further sector guidance is given in Chapter 9.) All completion test structures assume that:

- the underlying contract documentation is still on foot – no default has occurred;
- there has been no abandonment;
- *force majeures* are all solved/gone;

- nothing is evident in the matter of defaults (incipient, latent or anticipated defaults);
- representations and warranties are holding/funded;
- no litigation is hanging around;
- the concession deadlines and payments have been met; and
- the government is happy and all start-up permits/consents/approvals and all end of construction sign offs have been properly obtained.

### *Toll roads/bridges*

As would be expected in a sector where contractors are very often sponsors, these completion tests structures tend to be physical in character (Type 2). One of the weaknesses may be that key infrastructure risk aspects, such as interconnection/entrance/exit ramps, are outside the principal construction contract. If the sponsor behind the project finance is also the constructor of the project, there is a conflict of interest if the construction arrangements allow the sponsor to make money in the event of a completion cost overrun.

### *Rail/light rail*

Individual parts of the system are first individually tested or tested in modules. Then the whole system will be run to examine transit time, signalling, station time, and so on.

- If the project is part of an urban mass-transit system, then the ability to dispatch at frequent intervals, recover from interruptions and station delays, and schedule trains from the (reserve) stable will be tested over a relatively short number of cycles: between three and 10.
- For heavy rail, bridges/viaducts, and tunnels may each be subjected to special tests. Tunnel ventilation and safety aspects will require special attention. (Recall that the Eurotunnel project was stopped by a disastrous fire on a truck.)

### *Ports/airports*

Besides meeting specifications for individual components, these facilities have to be tested and retested on a dry-run basis before being 'open' to public/commercial business.

- For project financing, the throughput capacity needs to be tested, even though such a facility rarely starts off at full capacity.
- The infrastructure risk aspects – such as storage space, power, access/egress – each need to be fully operational.

### *Prisons/hospitals*

These sectors usually have a very long list of key performance criteria. Often one segment is commissioned at a time. Indeed some may be started off in temporary quarters (to be dismantled later) just to fit the overall commissioning sequence.

- Government sign offs and acceptances would be expected to take longer. To offset this, most governments are happy to accept a more physical sign off by engineers, quantity surveyors, and architects, and may be not nearly as particular as project finance bankers.

### *Water supply/sewage treatment*

Since most of these are concession-based, completion revolves around concession conditions concerning quantity/service/quality aspects. Overall the criteria are straight forward except for the biological/virological status of the product. Environmental matters obviously need to be rigorously examined.

### *Power*

The completion protocol is probably the most developed in this sector thanks to the high profile of independent engineers.[16]

- All items on the Punch List (which may include non-essential items such as landscaping) are all cleared/done. This stage means that no underperformance LDs are needed.
- Mechanical completion is when all plant and facilities are physically complete, but not yet tested for performance as a system.
- Performance testing where individual aspects are tested such as fuel efficiency (heat rate – the multiplication of the heat rate by the fuel costs should result is the cost per (kilowatt hour (kwh)), capacity (MW and steam generation), availability (per cent of hours expected to run per annum), reliability/starts, and the binary (yes/no) question of environmental acceptability.

This three-step protocol needs to be negotiated with the power purchaser and it is common practice under a PPA to only pay the energy charge (covering fuel and variable O&M) during the performance testing. Finally, the utilities/purchaser's 'certificate of acceptance' is part of the process.

Bankers will also wish to see the plant up and running for 30 days or more before granting a Type 1 project finance option (for the sponsor to withdraw its balance sheet support for the deal).

### *Telecoms*

Completion is by far the most difficult to assess in this sector. Part of the problem is that completion is dynamic. If subscribers are not coming on to the system one can slow down the capex (provided one can stay within the parameters of the concession concerning minimum roll out).

- Many fixed line wire-line telecom deals have been build transfer operate (BTO) concessions where title to the phone lines passes to the government once laid. A revenue split,

perhaps with minimum licence fee/government revenue receipt thresholds, then commences as soon as the lines are in a subscriber's hands.
- If subscribers are not coming on, then expenditures to market the lines, may be needed which may delay completion.
- Some lenders adopt a debt:EBITDA ratio as a way to progressively price system build-out and revenue build-up. But this does not take care of completion risk.
- A cash pool may be present at physical completion of the system to cover subscriber shortfalls in the early operating months.

**Case study: SmarTone, Hong Kong**

One of four new Global System for Mobiles (GSM) cellular/wireless telephone licences in Hong Kong, SmarTone, elected to use project financing. The bankers halved the subscriber take-up assumptions in the sponsors' case to structure a cash completion shortfall pool of an additional 30% of the project finance loan before releasing recourse (Type 1). The 30% was available for 18 months on a use it or lose it basis – a bit like an automobile warranty of 36 months or 100,000 kilometres!

### *Oil and gas*

Besides a string of multi-component physical completion aspects, the 'upstream' side of this sector implants heavy reliance on reserve life and loan life PV ratio tests at completion. This may determine the amount of limited recourse project finance that will be granted; the balance or pre-completion funding remaining on full recourse.

- Supply/reserve risk may be independently tested/audited again.
- Infrastructure aspects will always be in the forefront.

For petrochemical plants, the 'downstream' side, the completion protocol is closer to the power sector.

### *Mining*

Multi-component testing will be seen in this sector testing the:

- mine – ore grades, recoveries, dilution, and perhaps unit costs.
- plant – recoveries, technology, product quality, and perhaps unit costs.
- infrastructural aspects.

In some deals, the loan life and reserve ratios will also be conditioned by the state of the residual (cash, physical reserves tail or ratio). Many good tests will also incorporate a sales/market measure as well.

## Summary

Each facet of construction and commissioning is examined if the project finance banker is funding pre-completion. Many completion support arrangements have been developed and insurance products boosting application of the turnkey contract route. Project financiers have effective protection from completion risk in the face of persistent cost overruns and delays suffered in many project developments.

---

1 Castle, GR, 'Feasibility Studies and other pre-project estimates: how reliable are they?', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration, pp. 461–5.

2 Brack, J, 'Beyond the independent engineering review,' at the Power Project Finance Course, Melbourne, Australia, RW Beck, 1999.

3 'South Africa's largest BOT closes,' *Project Finance*, 1999.

4 Fritz, C, Personal communication, New York, 1993.

5 Good, M, 'Project Risk Advisers', London (cited with permission).

6 See endnote 4.

7 Davis, HA, 'Casecnan Water & Energy Co.', in *Project Finance: practical case studies*, 1996, Euromoney Books.

8 Standard & Poor's, 'CE Casecnan Water & Energy Co.', *Infrastructure Finance*, 1998.

9 'CE Casecnan Water and Energy Company Limited', *Project Finance Sourcebook*, 1999, Moody's.

10 'Australia: project finance: second thoughts about project risks', *The Banker*, 1982.

11 Fabozzi, FJ and de Nahlik, CF, *Project Financing*, 8th edition, 2012, Euromoney Books, London, p. 11.

12 Pyle, TH, 'Finance aspects of BOT projects (in transportation)', UNCTC Roundtable, 1992.

13 'Overruns cause concern', *Project Finance International 184*, p. 28.

14 NSW Roads & Traffic Authority, 'Post-implementation review', March 2010.

15 'Transurban buys doubly broke Sydney Cross-City Tunnel', *Australian Financial Review*, 12 November 2013.

16 Fletcher, PD and Anderson, JA, 'Basic concepts of project finance', Milbank Tweed, 1995.

Chapter 20

# Engineering risk

Engineering risk arises because of failures in engineering analyses such as the input data, calculations, or design. These aspects will overlap with operating technology risk and the effect can occur at any time. As is evident for a new project development, the main worry is at completion (see Chapter 19).

**Case study: Waste energy plant, India**

For an Indian waste to energy plant, the municipal waste was gathered from the neighbourhood in Mumbai. Incineration tests were conducted, the design was optimised, the equipment suppliers warranted plant efficiency and the project was duly financed. However, when waste is dumped in India, thousands of people inhabit the dump scouring every recyclable scrap from the rubbish. By the time they are through – and it is politically impossible to deny access – the thermal value of the waste is next to nothing. It would not burn. The equipment warranties cannot be called as the fuel is not the same as that gathered for the combustion test.

Failures in engineering analyses may arise from the input and/or samples. The gathering of sample information may be flawed either in the method of sampling, omissions in identification of what needs to be looked at or in the direct sample information exercise itself.

One of the key components of this risk is geotechnical data, the state of the earth. Geotechnical problems persist not just on the surface of the earth, but also below it, as is evident in any tunnelling or underground mining exercise. It is quite common to have this as the key exclusion in what would otherwise be a full turnkey construction contract.

Vast amounts of measurements are not sufficient. The response of the ground (geotechnical risk) to the construction techniques used and the fit of the project foundation design and bearing loads need to be assessed.

**Case study: Eurotunnel, France and UK**

Eurotunnel represents the third attempt to construct a crossing under the English Channel. The second was halted in mid-dry rock (chalk) by a new British Government. Nonetheless, salt water (the English Channel) kept pouring into the French end. For the third attempt, an infamous project financing, the engineers were not going to take any risks. The tunnel

*Continued*

would be lined by the world's strongest concrete segments – twice as strong as required for a nuclear power station's containment pressure dome. These 450,000 segments would fit neatly inside the (dry) tunnel. Within a few metres of starting to tunnel with a machine designed for working in the dry, the UK side hit wet ground which almost brought tunnelling to a halt.[1] Now these segments became almost impossible to fit into place.

## Design/calculations

The design itself may be subject to problems with bottlenecks, weak materials, and scaling (building a project much larger than anything built to date – taking a plant to full commercial scale from the laboratory or a small test plant size). Another problem is with the design and integrated continuous operation of interconnected equipment systems.

The three most common engineering errors are:

1 decimal points in the wrong place;
2 wrong sign used in a calculation; or
3 transposition of numbers.

Others engineering errors include:

- incorrect data entry/usage (Microsoft Excel is full of this);
- mistaken use of formulae;
- incorrect computer coding;
- omission of data;
- incorrect comparisons selected;
- improper factors and factoring methods; or
- incorrect units (of measurement).

This list is evidence of why rules of thumb are so prevalent and so useful to top-down double check the bottom-up calculations.

### Case study: Eurotunnel, France and UK

At the Eurotunnel design studios, the redesign of the shuttle rolling stock to carry heavy goods vehicles (HGVs) discovered that 'they could not be built. The design requirements for speed, payload, axle load and the enclosed structure did not add up. If you enclosed the wagons, they would be so heavy that the axle load would be exceeded.'[2] This was two years after the first £5 billion project finance loan facility had been fully underwritten and syndicated to 40 banks worldwide.[3]

## Trigger structure

### *Insurance*

The insurances referenced here are the errors and omissions (E&O) policy of the engineers and contractors. However, these are seldom large enough to cover the consequential problems to completion risk and operating risks for the project itself.

- If the engineer/contractor has no such E&O cover, then it is not seriously committed to the business.
- If the engineer/contractor carries this insurance but does not want to disclose the amount, that is a different risk, signalling either low cover or a prior claims history.

**Case study: North West Shelf, Western Australia**

For the world's largest offshore gas platform at that time, the banks pumped in US$1.4 billion to Woodside's North West Shelf Joint Venture (NWSJV) project financing phase. When the Japanese-built US$700 million platform was rolled off the barge and upended into position, the legs started to sink into the sea floor, a situation further complicated by its location in cyclone and hurricane-prone north Western Australia. The insurers ultimately paid up some US$200 million and the total remediation cost (to build up bulk 'boots' at the platform's feet) was close to US$300 million. The NWSJV includes BP, Shell, Mitsubishi, Mitsui, and Chevron.

## Study

### *Independent certification*

Many projects have been the subject of successive feasibility studies, government scrutiny, and investor/ventures validation. It is commonplace to have these checked by an independent engineer. (See Chapter 9, on how to select that engineer.) The independent consultant, then, is expected to provide an increment of credulity and/or reliability to the 'tools' which others will use to make a decision; the consultant is really not in a position to directly recommend a 'go' or 'no-go'.[4]

It is no coincidence that the international power project finance business has been significantly boosted by the availability of high-quality independent engineers' reports. Besides checking the design aspects, they can be asked to comment on the suitability of that equipment for the expected duty, peaking, pool, or power purchase agreement (PPA), as well as the integration of the plant's various components, in other words the suitability of the system being project financed to its expected capability to generate cashflows (sufficient on their own to service that debt taken on board by way of a project finance.

Many banks employ engineers who have industry experience and can be expected to spot design flaws or question engineering assumptions. However, these engineers cannot be truly independent. Their careers depend on continued approvals – they cannot be so pessimistic that their institution loses business. Project financing is very competitive. However, the engineers can quickly spot the scam deals and screen away the bloopers and crackpots.

In-house engineering talent can also be pivotal in a workout combining their industry experience with a knowledge of what the banks can do on the funding side. In fact, one may be able to manage an outside independent engineer to act as an informal mediator if cashflow remediation actions need to be undertaken.

**Case study: Project finance bank, US**

At the Continental Bank of Chicago, the US$6 billion portfolio in the independent oil and gas sector ranked it way ahead of its competitors. The 13 petroleum engineers and two chemical engineers in the bank's petroleum division were given full support (to say 'no' if necessary) by the division head, also a petroleum engineer. When the division head left, the new head, a corporate lender to GM and Ford, then ignored the petroleum engineers to enter into transactions at the rate of US$100 million a month dealt to it by a bank in the second storey of a shopping centre, Penn Square. A year later, the bank went broke.

All of the matters considered in Chapter 9 apply to the engineering work required on the project. In addition, the computer modelling for project finance has become so complex that it requires independent certification by large accounting companies. Why large companies? Why no specialist modelling consultants? Large companies are selected in part because they can be sued if their audit of the model failed to catch the errors. In the author's experience, all model audits are flawed!

[1] Anderson, G and Rosbrow, B, *The Channel Tunnel Story*, 1994, E&FN.
[2] Fetherston, D, *The Chunnel*, 1997, Times Books.
[3] Finnerty, JD, *Project Financing*, 3rd edition, 2013, Wiley, p. 446.
[4] Schreiber, HW, 'The role of the independent consulting firm in project financing', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration, p. 488.

Chapter 21

# Political Risk

About half of all project financings are undertaken to shed political risk onto the financier. Accordingly the project finance banking community has become expert at structuring in this arena.

Most project finance bonds absorb the country risk, although they expect the political risk (for the country) to be wrapped in to the pricing/margin. One of OPIC structures (currency inconvertibility and transfer (CIT) cover and partial foreign exchange devaluation cover) has been overtly designed for the capital markets/project finance bonds.

## Definitions

Political risk is an assemblage of risks, which includes political *force majeure* (see Chapter 18). There are 20 plus categories that can be identified readily. However, many overlap or are consequences of the other. Unfortunately, names like sovereign risk or country risk really do not do justice to this array of risks.

Three risks, the 'classic' three, will be examined first since they are insurable; then another three added (also insurable), followed by a long list of risks which are much harder to analyse and structure. The political risk insurance (PRI) business is heavily driven by the 'defined events' and this is the sequence:

1 the event has occurred as defined, through no fault of or cause by the sponsor; and
2 the time deductible has passed (90 to 180 days): and
3 the special purpose vehicle (SPV) is prevented from making payments of debt service (DS).

### *War and insurrection*

War and insurrection (W&I) means war (declared or undeclared), revolution, civil war and civil strife of a lesser degree, but the term can also include political violence and hostile actions by any national or international armed forces, terrorism, and sabotage. Thus the exact wording in the definition of the 'defined event' in the PRI policy is crucial.

Practices vary as to whether the insured has to prove that the action was politically motivated; the private PRI sector has no such caveat.[1] There is 10% self-insurance for private insurers and 0% to 5% is possible under national PRI programs. The project has a minimum 90 day wait after damage/'defined event' – a time deductible. Business interruption policies have a one-year waiting period.

### *Currency inconvertibility and transfer*

The analysis of CIT – the next political risk category– is what 'country' risk or sovereign ratings is chiefly about. This examines the national balance sheet and cashflows to see when a tight or negative position could trigger a debt rescheduling. One needs to discriminate between active blockage and passive blockage – again focusing on the definition of the CIT defined event. A passive blockage is normally a delay of more than 180 days, instigated by the central bank.[2]

CIT means that the project cannot execute foreign exchange transactions locally (for example, it cannot buy US dollars) and, if it can get US dollars, it cannot transfer them overseas as needed for debt service, capital equipment, or supplies. A country debt rescheduling is a classic example of how CIT can arise.

A common confusion is that CIT is a foreign exchange (FX) risk. FX changes, devaluation, or existing convertibility restrictions are excluded. Care is also needed to catch the situation where bank accounts are actually expropriated rather than just procedurally blocked or frozen. These are more properly considered under the next category. Funds may become blocked due to embargo such as those placed by the US on Iran and China on Taiwan.

### *Expropriation and creeping expropriation*

Following a string of nationalisations in the 1970s, project financiers became sufficiently cynical to require adequate coverage for this event. Expropriation cover – insurance underwriters use the terms confiscation, expropriation, nationalisation, and deprivation (CEND) – is quite standard in a PRI policy. Again the definition is important. OPIC recognises nationalisation by a political entity having *de facto* control over the project area, whereas MIGA limits its cover to an action by the host country (itself a MIGA shareholder).

Under international law, governments are perfectly entitled to nationalise anything provided that they:[3]

- keep contracts afoot;
- follow due process of law;
- are non-discriminatory;
- have a public purpose; and
- pay proper compensation.

With the exception of the first of these provisos, establishing that the remaining provisos have been adhered to is a matter of definition. The expropriation event has to have subsisted for a reasonable length of time – three to six months – and, with creeping expropriation, the waiting period might stretch to a year to be sure it is not a short-term squeeze policy. The term 'creeping' means that the project cannot generate (sufficient) cashflows because the rules are being changed bit by bit. First it is impact licences/quotas, next it is visas for foreign workers, then handling charges, and so on.

Other covers have to be developed to accommodate outcomes such as:

- deprivation – the physical assets are stuck; and
- forced abandonment – the key operators' lives are in danger and they have to be evacuated.

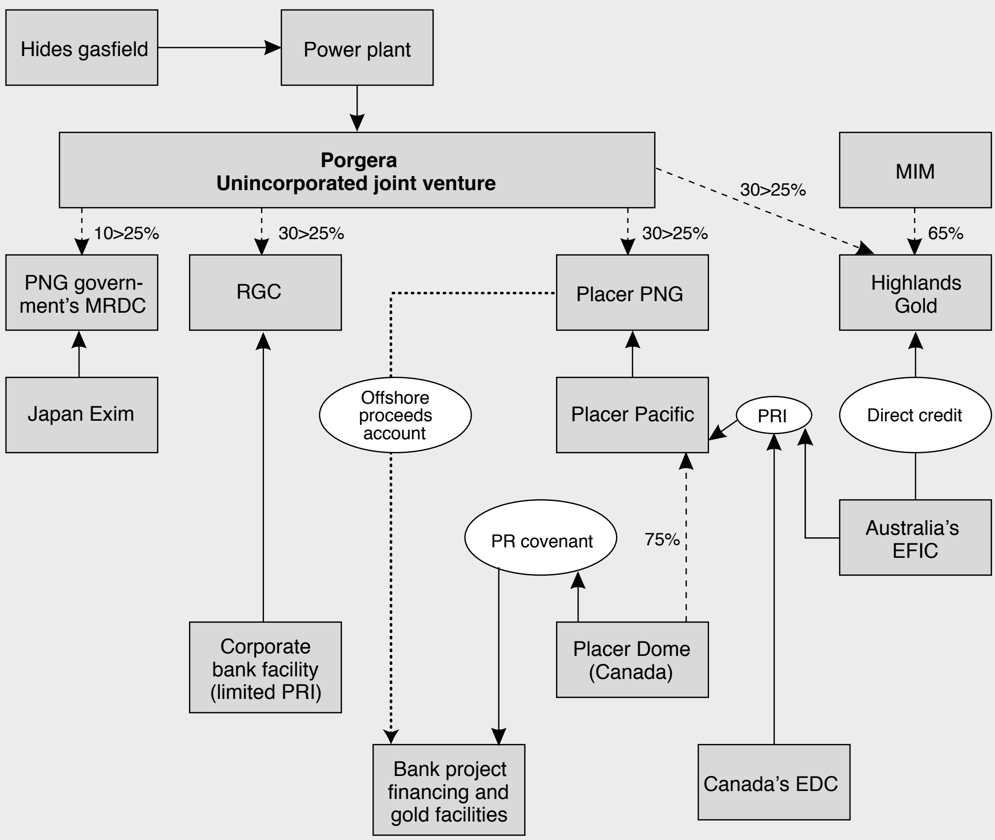
Another variation on creeping expropriation is an ownership squeeze. The state tries to raise its percentage equity interest by strong-arming the project – perhaps citing deficiencies in the company's honouring of concession conditions or poor local relations (perhaps instigated by the government). (See Exhibit 21.1.)

**Case study: Porgera, Papua New Guinea**

For the Porgera project (see Exhibit 21.1), the government of Papua New Guinea claimed that the other companies in the unincorporated joint venture (UJV) had misled it at the inception of the project so that the government only took up 10% of the UJV when it was entitled to take up to 30%. Eventually, a deal was cut to move the government's interest to an equal 25% of the project (paid out of future project cashflows), a backdoor style of creeping expropriation.

Exhibit 21.1

**Porgera**



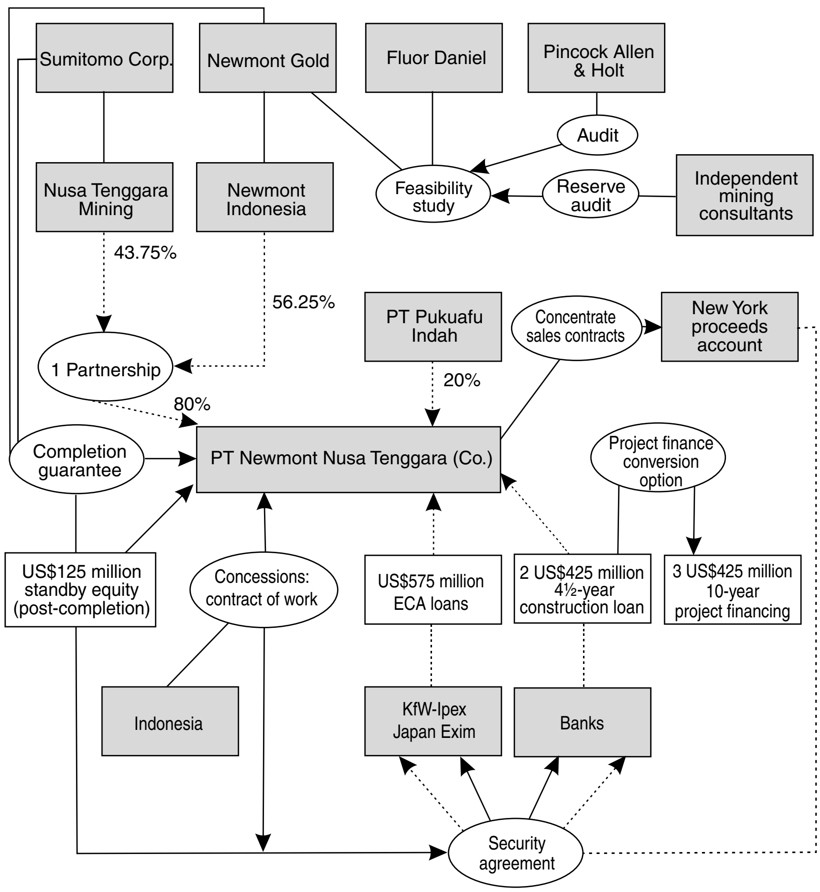

*Source:* International Advisory & Finance 2014

### *Landowner/indigenous peoples' disturbance*

This category of political risk has been able to be included in the political violence/insurrection part of the defined event. As more land rights and national/regional frictions are in evidence, cover for this risk category makes sense for inclusion in PRI, perhaps under the insurrection definition.

Exhibit 21.2

**Batu Hijau, Indonesia**




1 Partnership between Sumitomo and Newmont for their investment in the special purpose project company.
2 Four and a half year construction loan convertible into three.
3 10-year term loan, project finance basis, with extra sponsor supports.

*Source:* Tinsley, CR, *Project Finance in Asia Pacific: practical case studies*, Euromoney, London, 2002

## *Terrorism and sabotage*

Terrorism and sabotage are usually wrapped into the W&I policy but can sometimes be insured as a sub-category. The rule always applies that if the project can be readily restored, then physical terrorism/sabotage protection or project restoration measures may have to be deployed. Terrorism has also been used as a front for heroin and cocaine trafficking/cultivation and some countries have persistent attacks from drug armies or drug-funded separatist movements, for example, Colombia, Myanmar. Armed organised criminal groups can act to try to control the government or achieve sovereignty over their territorial stronghold – be it a county, province, or city – as may be said to apply in parts of Russia.

**Case study: Pipeline, Colombia**

In a Colombian gas pipeline project finance transaction, the concession could be cancelled for failure to restore the line within three days, four times in a row. The expectation is that the pipeline will be blown up (regularly). The project's security system had to be capable of withstanding a four-hour sustained assault. Why four hours? That should be enough time to get the military on-site.

## *Wilful breach of contract/deprivation*

The final category which can be wrapped into PRI is contract frustration, sometimes tagged as 'breach' coverage. It is difficult to get any adequate affordable cover in a project finance for other than limited defined events. To some extent, wilful breach of contract may overlap with the expropriation and creeping expropriation category.

Breach can also extend to frustration of the arbitration process (discussed also under 'Dispute resolution' in Chapter 25). Arbitration is seldom a good structure due to the ability of almost any party to drag out arbitration proceedings, perhaps up to five years.[4] The claim is only payable on attaining a successful arbitration judgement. Besides the delay and judgement aspects, breach cover will not usually pay for the legal expenses. Local arbitration is poorly regarded in a political risk situation and is likely to be uninsurable too.

Attention is needed to differentiate wilful breach of contract from the contract frustration perils. In trade finance import/export cover, this spills over into:

- wrongful calling of guarantees;
- non-refund of bid bonds;
- bankers failing to honour a letter of credit;
- non-payment (often all other contract matters have been fulfilled);
- licence termination; and
- trade embargoes or blockades.

### *Change of government*

This provision covers the eventuality that with a change of government, everything negotiated with or approved by the prior government is overturned and the negotiating process recommenced. In a few countries, this happens as a matter of course. In others, the new government tries to squeeze a concession which it can proclaim to the populace as victorious vindication of the new electoral mandate.

The obvious preventative measure is to ensure bipartisan or better multi-partisan backing for the project. Better still is to ensure a wide local constituency, such as through a locally listed company.

**Case study: Dabhol, India**

When a coalition of Indian nationalist parties won an election in Maharashtra state, India, the new government accused the former government and the sponsor, a US company, *inter alia* of corruption in obtaining the 20-year power purchase agreement (PPA) for the Dabhol project. The new chief minister invited the company to 'make a proposal' to lower the tariff and re-negotiate the PPA.[5]

The question then arises: how much local or national participation is desirable in a project in order to mitigate political risk? Too high a percentage means local control. It may also cut away a substantial source of political risk cover. For example, MIGA cannot insure a local entity. The principle is that one cannot insure the sovereign against the acts of the sovereign. The local company may be (is deemed to be) under the thumb of the sovereign/government.

A preferred number, purely from the viewpoint of maximising the sources of political risk cover would be 10% to 15% – small enough not to be 'determining', but representing a meaningful commitment. Another factor here is that most of the political risk programs exist to back cross-border foreign investment or, put another way, *de facto*, to support large direct investors who are usually foreign in countries requiring political risk cover.

**Case study: Tolukuma, Papua New Guinea**

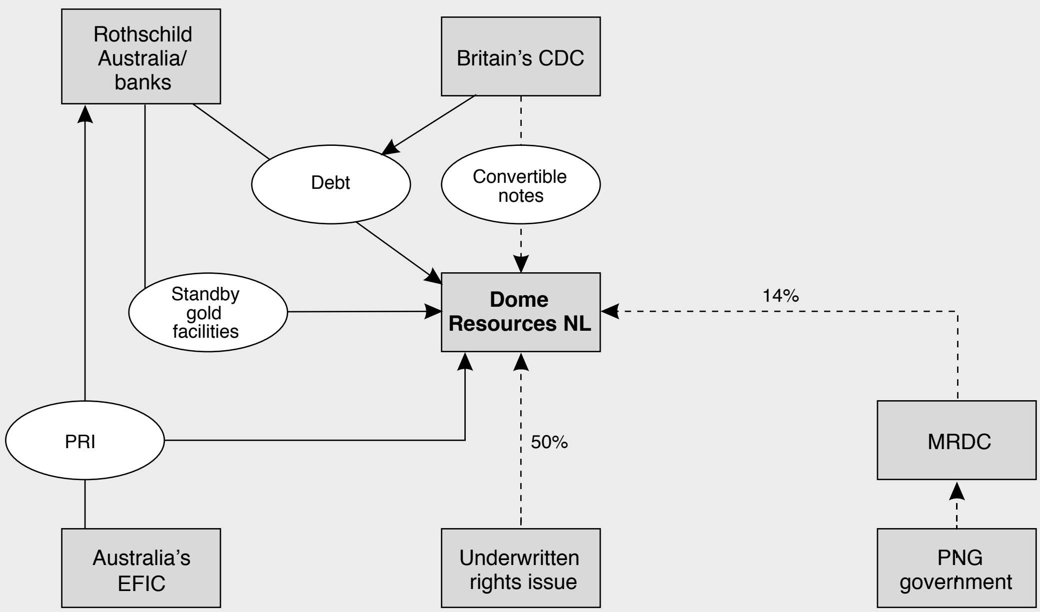
In the Tolukuma project financing, the government's resource development arm, Minerals Resources Development Company (MRDC), invested 14% in the Tolukuma project. Britain's CDC took a convertible note as well as some of the project finance debt insured by Australia's Export Finance Insurance Corporation (EFIC). (See Exhibit 21.3) This investment level is at about the right percentage. These MRDC interests were subsequently vended into an IPO/ float which is even better from a political risk standpoint, because there is now a wider constituency involved as indirect shareholders in the project.

*Continued*

Case study *continued*

Exhibit 21.3

**Tolukuma**




*Source:* International Advisory & Finance 2014

## *Corruption*

Change of government may mean that new kickbacks are requested in order to continue the concession and approvals processes. Most financiers understand the penny corruption which is really a personal wage taxed on a transaction. However, major payments essentially purchases political risk – it is a never-ending saga of bribes, blackmail, and money laundering. US citizens are particularly pressurised under the Foreign Corrupt Practices Act where facilitation of a 'gift' to a foreign official is a criminal offence treated more or less on a 'guilty if indicted' basis and therefore requiring that you prove yourself innocent. Canada has also enacted a somewhat parallel law. (Australia simply removed bribes from being tax deductible – but bribery income was taxable!) The usual areas of forensic diligence include overly large development fees, lawyers' fees, and 'linked' consulting fees with nothing to show for it.

Another aspect is criminal 'protection' activity such as is required by organised crime in Russia. Special measures may need to be taken with regard to physical and financial security. A criminal group may have a personal connection to politics and may also exacerbate infrastructure risk by control of the highways and byways. They can often strangle port activity too.

### *Unions*

When unions attack the government or act in concert internationally then clearly it has the character of a Political Risk. This can go as far as general strikes but the industrial unrest of most interest to a project financier is usually much more project specific. The worry is that political risk has risen to the level of a directed attack on the project or because of the foreign investment in the project.

**Case study: Political meeting, South Africa**

A former Labor prime minister of Australia, Bob Hawke, was convenor of a meeting in South Africa of all of the unions internationally involved with the operations of the world's largest mining company, RTZ. The purpose was to act globally to draw union pressure against the company. RTZ, like many other companies, wishes to employ its workers on individual salaries, without any collective labour agreement. The unions turned this into a political action on the basis of RTZ being anti-union.

### *Environmental activists*

Many environmentalists are organised politically (under the catch-all title of 'green' parties) or internationally (as is the case with Greenpeace), many with an avowed anti-development platform. Some non-governmental organisations (NGOs) extend this category into an anti-human/population-control agenda. A project financier will want to be careful where a project is a target for these activists – although it may seem hard to find any project that is not a target somehow.

Because of close scrutiny by the NGOs, the multilateral agencies (MLAs) are acutely green and many bilateral/national agencies are increasing overtly 'green' in their agendas. This issue will be addressed further when considering political risk cover from the actions of these agencies.

**Case study: Nam Theun II, Laos**

For the 600MW Nam Thuen II hydropower project in Laos, the environmental impact documentation had to be converted into an environmental defence document at a cost of US$30 million plus, together with an 18-month delay in approval by the World Bank. The project was under NGO pressure on virtually every front: biodiversity, greenhouse gases, hill tribes, protection, village relocation, and endangering species.[6] Happily, a new mammal population was discovered in this process.[7]

### Approvals/bureaucratic risk

The ability to get project approvals is the summary definition for this category. But it also includes the working of regulatory authorities (perhaps overstepping the bounds of their mandate), interdepartmental squabbling and the professional capabilities and training of government officials.

Besides the day to day approvals, this risk category hits hardest at the first approval point where the company/consortium may have outlaid tens of millions of dollars on development, mostly studies and testing, or on bidding and attempting to close on the concession agreement itself.

**Case study: Bre-X, Indonesia**

For the infamous Busang gold swindle in Indonesia, the Canadian-listed company, Bre-X, required government consent to farm-in a major company to develop the (supposedly) huge reserve. Indonesia had an excellent reputation with its contract of work (COW) operating regime over many decades with an impressive bureaucracy managing the regulatory and approvals process. However, a mentor of Indonesia's then president Suharto, propelled himself into this COW approval process 'taking' a 30% shareholding while the major arranged 25% for itself plus a project commitment of US$1.2 billion from Chase Manhattan.[8] At Bre-X's market cap at the time, that equated to an 'approval' commission of approximately US$1.5 billion. The responsible minister was 'persuaded' to get his top bureaucrat to cancel the Bre-X permit and the minister's name suddenly appeared in a local magazine about accepting large bribes from government companies. The magazine was owned by the same mentor.[9]

**Case study: Lake Cowal, Australia**

In New South Wales (NSW), Australia, the A$180 million Lake Cowal project was approved at every level of local and state government, including a nine-month round of meetings with locals and interested parties with regard to the environmental impact statement (EIS), after which it was recommended for approval by the NSW government's own environmental committee. However, the project was rejected by the state premier over a holiday weekend – ostensibly over environmental concerns, but more likely because the project was in the wrong electorate.[10] The sponsor/SPV closely examined the legal concept of due process before starting all over again.

### Conflict of authority

Local, provincial, and central government may each consider themselves as capable of granting a concession and providing the necessary approvals. The usual target is tax or royalty income.

There are many such conflicting jurisdictions and Argentina, Thailand, and Vietnam are high on the list. China is at the top of any list in this area.

This may also extend to situations more akin to W&I where control of parts of the country is now outside the realm of the government. This brings a new meaning to the concept of local taxes!

**Case study: Alumbrera, Argentina**

For the US$1.2 billion Alumbrera development in Argentina (US$542 million project finance led by Citibank), the local province demanded the 3% royalty be calculated on gross revenue while the national government calculated the 3% after deducting production costs – a difference of US$18 million to US$20 million annually.[11]

### *United States*

The US has brought on itself its own political risk category, with the most embargoes of any nation and a political desire to extend its legislative remit well beyond its national borders. Elected judges have granted jurisdiction over corporate activity in Hong Kong with zero nexus to the US, other than a trading relationship. Bank accounts have been blocked as a result. The Helms-Burton Act tries to impose business restrictions on European and Asian companies doing business with countries designated by the US, such as Iran, Cuba, and Libya. This can affect other project activity of non-US corporations.

The US also uses its political influence at the multilateral level, which can affect the responses of the World Bank, IFC, MIGA and other political risk entities. The litigious nature of the US legal environment is also a type of political risk feature of doing business with anyone in the US.

**Case study: Sithe Independence, US**

In the Sithe Independence power transaction (see Exhibit 13.2), one of its customers Niagara Mohawk attempted to litigate its way out of take or pay contracts (before going bankrupt). Sithe's other major customer had been trying a similar tactic to break the legal/statutory basis of the 40-year PPA as well as managing to get the regulator to disagree on the fixed-charge components in the tariff.[12]

### *Religious fundamentalism/ethnic tension*

In many parts of the world, religious movements are highly politically charged. The Christian–Orthodox–Muslim wars in Egypt; the faction fighting of Islamic sects in Afghanistan; the Hindu–Moslem–Christian–Maoist tensions in India; and the Protestant–Catholic tension in Northern Ireland are all political risks. Christian–Muslim rioting in Indonesia caused some project financed projects to halt operations even though the political violence tended not to be directed at foreign investors there.

Tribal and clan hostilities may overrun a country such as has occurred in the Democratic Republic of the Congo and 'ethnic cleansing' will impact upon projects too. The long ethnically-driven 33-year Angolan civil war disrupted many projects there as well as others in neighbouring Zaire/Congo which had reached the project finance information memorandum stage.

### *Interest withholding tax increases*

The government may change the taxation basis for a project. Most project financiers will accept the risk that the relevant authorities could change the income tax rates. That is seen as the cost of doing business with the country. However, discriminatory taxes (creeping expropriation) which attack the return to the project financier, such as interest withholding tax, may not be accepted above an agreed amount. *This may require full recourse for the increase.*

The country's central bank can also levy charges or increase deposit requirements as a way to fund itself (at a cost to the project or the financiers). Pre-export deposits/taxes may again act to increase the funding costs of the project.

### *Change in law*

The government simply changes the rules trying at all times to skirt the nationalisation/expropriation tag. This may affect, say, the offshore proceeds account or the safety regulations for the project. Countries with provision to impose decree law can be especially susceptible.

As discussed in Chapter 25, one defence against changes in the law is for the project itself to be an act of parliament. This is not entirely secure, as an act can be repealed and replaced. It does, however, show that the project has been the subject of a full political debate and scrutiny. Recall also from Chapter 19, that delay in start-up (DIS/DSU) insurances may be effective for the impact on completion caused by changes in a (key) law.

Another concern is discriminatory legislation. If the project finance is for the only newsprint recycling mill in the country, then a new law, nominally for all such mills, is obviously discriminatory if this is the only one.

The international surge to deregulate is also creating some risks as contracts get shifted into market-based or pool arrangements, many of which impose a regulator, whose remit has the effect of ensuring that project cashflows are driven downwards.

### *Partisanship*

One may wish local national participation in the project as an aid for structuring political risk; but not if the local portion carries with it the partisanship of one/all of the local players in the deal. This will particularly 'bite' whenever there is an election or change of government.

### *Xenophobia*

Xenophobia may bring some political risk in some countries such as India or South Africa. There may be a real danger that the locals will attack the project.

**Case study: Phuket, Thailand**

Although often cited for its idyllic atmosphere, one of the author's project financings was burnt to the ground in Phuket – thankfully after the project finance loan had been repaid!

### *Political independence of the courts*

This is important to check for political risk aspects. The government may have control over court decisions favouring its own government or local citizens against foreigners. In both cases, the courts can be shown not to be independent (of politics).

**Case study: Russian courts**

The activities of local litigants in Russia using the courts against projects is quite well known; not just against Russians, but also foreign projects and foreign investors. There is no doubt that the Russian court system was used against a potential leader of the opposition, Mikhail Khodorkovsky against Vladimir Putin, but also to take over a silver project from a Canadian company, Pan American Silver, in eastern Russia.

### *Regional blocs*

Perhaps the only political interaction with a country is through a regional bloc of nations. The risk arises when the bloc moves for or against the rogue state involved.

**Case study: Myanmar**

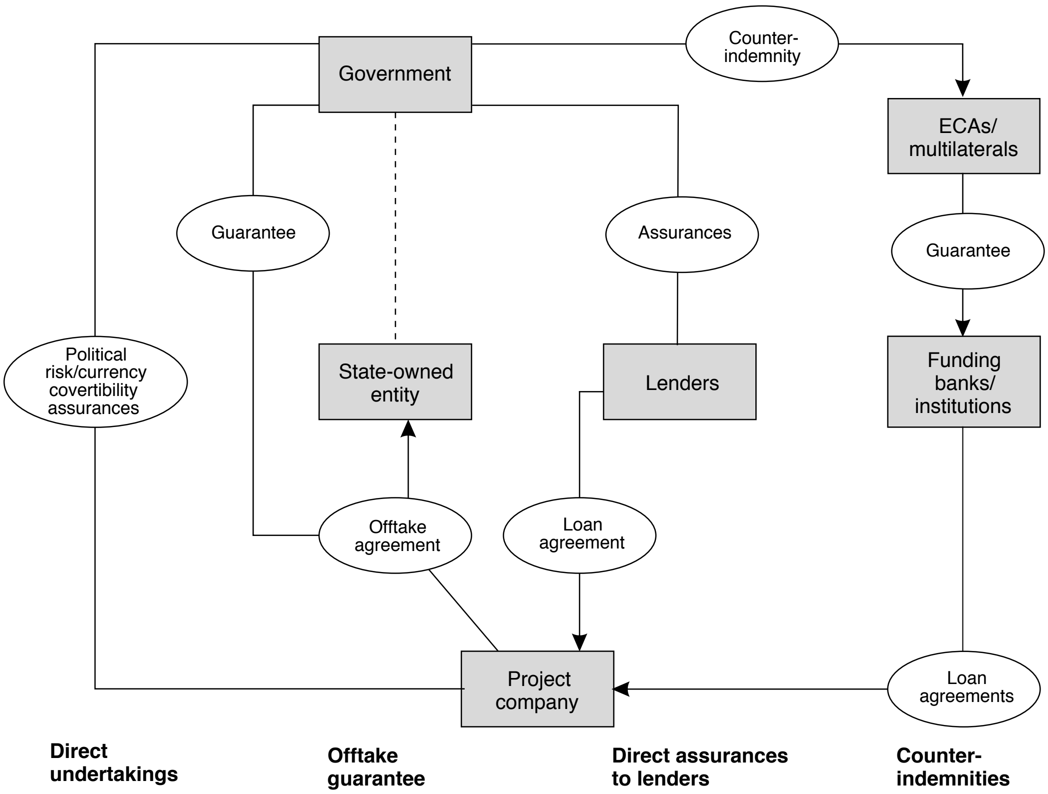
Myanmar's position as an emerging member of the Association of South East Asian Nations (ASEAN) is perhaps the best example of the politics that had to be navigated before the release and acceptance of Aung San Suu Kyi.

## Government supports

It is worthwhile considering what elements of government support can help to mitigate political risk. A summary is provided in Exhibit 21.4.

Exhibit 21.4

**Government guarantees**




*Source:* Jonathan Inman, Linklaters

## *Direct undertaking*

The host government guarantees CIT.

## *Offtake guarantee*

The government credit enhances (providing partial risk cover) its own state-owned enterprises. If the project delivers its service to that state-owned enterprise which fails to pay/perform, the government (or its finance ministry) will perform instead.

## *Direct assurances to lenders*

Assurances and letters of comfort will be provided to lenders on a non-binding unenforceable basis to affirm that the project complies with national policy, and so on. The absence of such assurance/letter is implicit that the project is not approved. Such letters are part of the approval process, but are not binding on the minister/ministry/government involved.

### *Counter indemnities*

Export credit agencies (ECAs) and MLAs can fund a project either directly, through the government, or through lending institutions. This support may be in parallel to other PRI-covered project finance tranches. Before offering to do so, the MLAs have a counter-guarantee/counter-indemnity from the host government.

### *Treaty protection*

In areas where no one usually goes, such as outer space or beyond the Exclusive Economic Zones of the Law of the Sea treaty (*res nullius*), it may be necessary to gather protection from the relevant treaty itself or through international governing bodies given responsibilities in this area. Geo-stationary orbit 'slots' and submarine fibre optic cables are project finance examples.

In other areas, it may be bilateral treaty issues with regard to cross-border investment, double-tax treaties, and even mutual defence pacts that need to be considered. Exactly what 'International Law' actually means is still open to debate.

## Contract structures

The concession contract itself may contain elements of political risk mitigation. Co-financing loan agreements, usually with an MLA, also contract across much of the political risk.

### *Concession agreement*

The concession agreement may include provision whereby the government guarantees currency convertibility and transfer (through access to FX) as well as waiving sovereign immunity. Although the minister's discretion, say, on tariff levels is not fettered/restricted, nevertheless if such a ministerial action causes a cashflow or internal rate of return (IRR) loss, the government contracts to make up the deficiency. Non-discriminatory protections can also be spelled out as well as privileges and exemptions codified. An important element of this may be sanction for international arbitration.

With this underpinning, the political risk structuring can make progress much easier especially if a breach (by the government) of this concession agreement is one of the defined events. (See Case study: PNGOR, Papua New Guinea.)

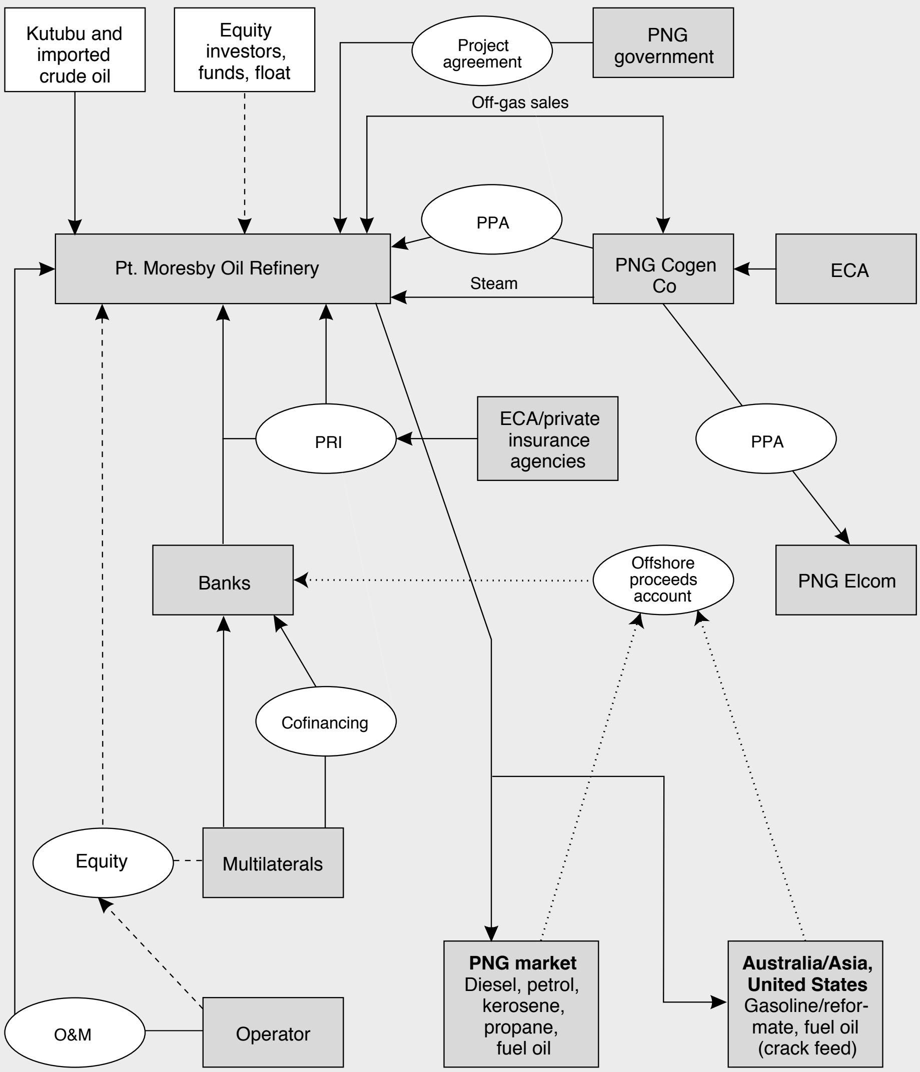
**Case study: PNGOR, Papua New Guinea**

In the PNGOR refinery project financing,[13] the government agreed:

- not to enact any discriminatory legislation to prevent dumping (by the oil majors);
- to allow products to be priced at import-parity pricing; and,
- to have a special development status which attracts a five-year tax holiday.

Exhibit 21.5

**PNG Oil Refinery Ltd**




*Source:* © International Advisory & Finance 2014

## *Co-financing*

As the lender of record, an MLA agrees to a project financing in the country of risk. To protect itself from a loan being rescheduled or otherwise the project being attacked by the government, the MLA puts in place a counter-guarantee/counter-indemnity agreement back with the host country. The usual nomenclature is for the MLA to provide the (smaller) A tranche of the loan while sub-participating out the B tranche of its loan to participating banks.

The main six project finance co-financing MLAs, discussed further in Chapter 2, are:

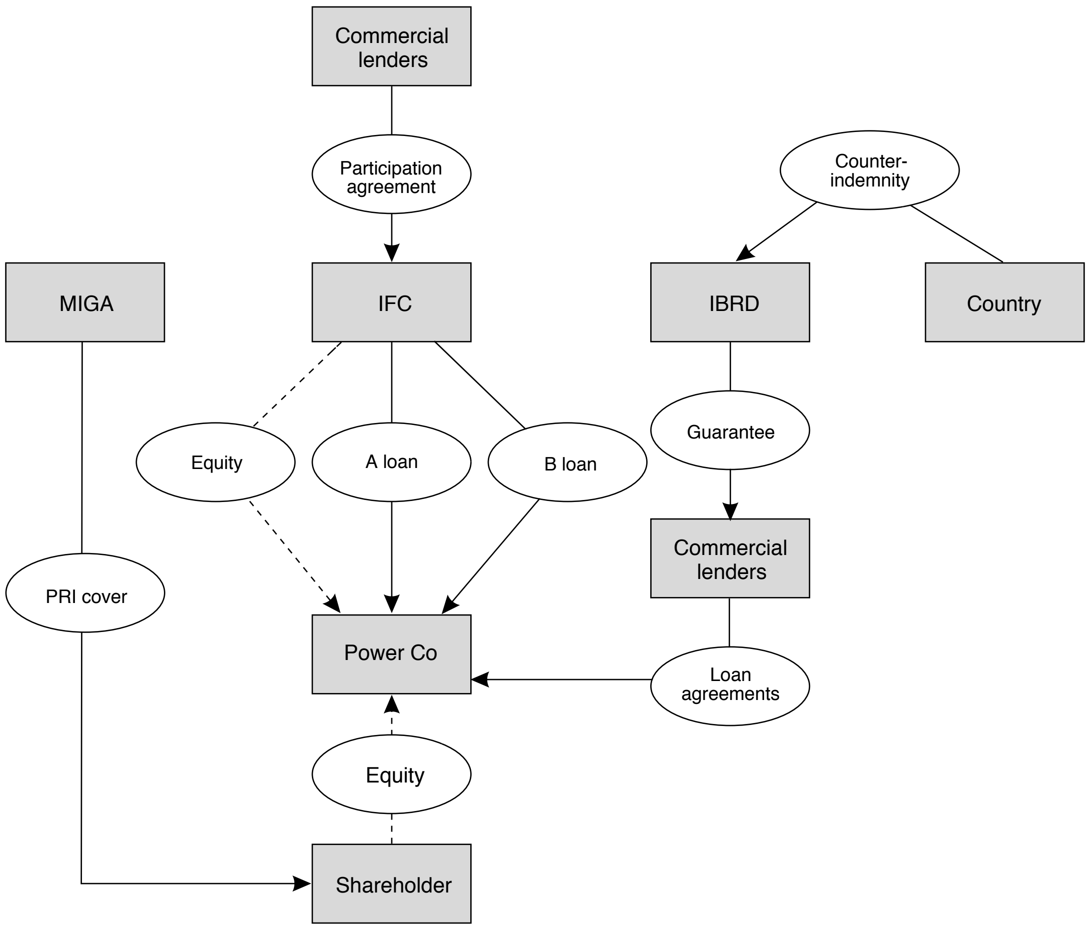
- World Bank (IBRD) for government-related deals;
- International Finance Corp (IFC) for private-sector deals;
- African Development Bank (AfDB) – Africa
- Asian Development Bank (ADB) – Asia;
- Inter-American Development Bank (IADB) – Americas; and
- European Bank for Reconstruction and Development (EBRD) – former Soviet Union; and now the 'Arab Spring' countries in the Maghreb: Northern Africa and the Middle East.

In preparing for a co-financing, the MLA will carefully consider its environmental stance, its development role, its internal professional and funding capabilities, and will often wish to see extended studies of its own before giving its stamp of approval. IFC, in particular, usually seeks an equity position which it will exit at some future date, hopefully to local investors, and hopefully at a profit!

The typical IFC A-B loan structure is shown in Exhibit 21.6. The IFC is experienced over many decades and particularly as far as country-debt rescheduling and avoiding CIT. It was founded in 1956 and – besides coming very close to a political risk default with PLN, Indonesia's state-owned power purchaser in 2000, it has never taken a hit on any project financing – some 2,000 to date – because of political risk. So much so that many central banks permit their bankers to exclude a loan under an IFC B-tranche from their country exposure limits – very handy in risky countries. The major exception to this is the US Federal Reserve. Incidentally, an IFC co-financing carries with it zero interest withholding tax (IWT) on cross-border loans, which is important in many borrowing countries.

Exhibit 21.6

**World Bank group structures**




*Source:* Author's own

## *Multi-party structures*

Parallel or complementary loan agreements may be entered into by the:

- World Bank (IBRD);
- International Finance Corp (IFC);
- ECAs indirectly via guarantees to project finance banks or directly;
- project financiers;
- local banks;

- development banks; and
- specialist funds.

The staging and percentages of political risk cover may vary from pre-completion only (followed by political risk and 'commercial' risk after completion) at levels of 60% to 100%.

**Case study: Hubco, Pakistan**

For Pakistan's Hubco project (shown in Exhibit 1.2) the political risk cover was assembled in many parts.[14]

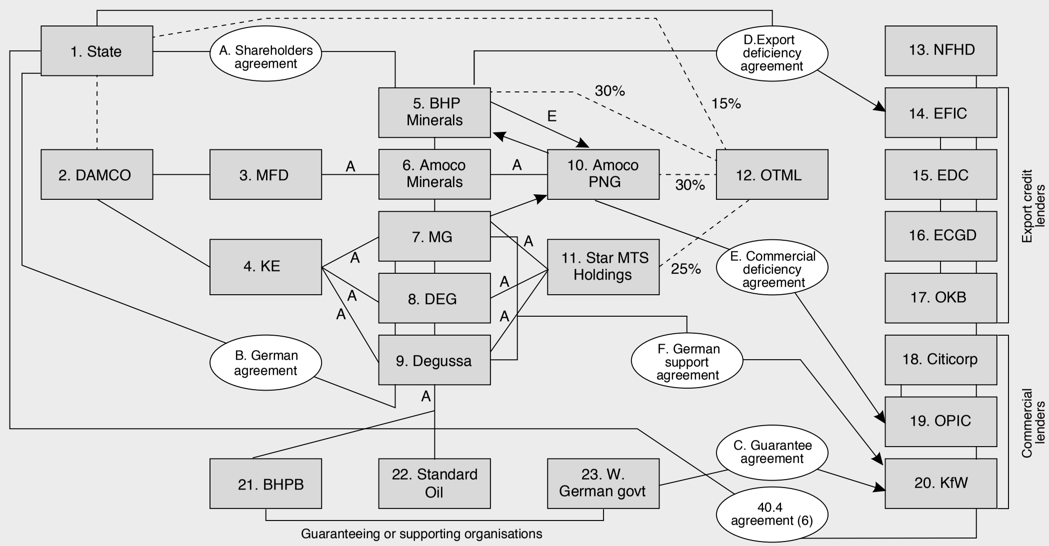
- The World Bank's ECO – the precursor to its partial risk guarantee (PRG) program – covered the Pakistani government's four inputs:
  (i) fuel oil supply;
  (ii) fuel supply pipeline (from the Karachi, Pakistan, oil refinery);
  (iii) foreign exchange: specifically currency inconvertibility of Pakistani rupees and transfer overseas (FX/CIT); and
  (iv) credit enhancement of the PPA offtaker, the state-owned power utility – Water and Power Development Authority (WAPDA).
- ECA's supported equipment sales (Japanese boilers, Italian turbines) and the contractor (French).
- A mix of Commonwealth Development Corporation (CDC), local Pakistani rupees, and Islamic lending was also drawn in with special provisions of an asset basis for the Islamic tranche.

## Case study: Ok Tedi, Papua New Guinea

For the Ok Tedi project, four ECAs, KfW and Citibank (OPIC-covered tranche) were assembled from a blend of the parties investing in the project. Various government and shareholder supports are also carried through the structure, including the government's 20% equity in the project.[15]

Exhibit 21.7

**Ok Tedi**




1 Independent State of Papua New Guinea (PNG).
2 Dampier Mining Company Limited (BHP subsidiary).
3 Mt. Fubilan Development Company (formerly a Standard Oil group subsidiary).
4 Kupferexplorations GmbH.
5 BHP Minerals Holdings Pty Limited.
6 Amoco Minerals Company.
7 Metallgesellschaft AG.
8 Deutsche Gesellschaft for Wirschaftliche Zusammenarbeit (Entwicklungsfesellschaft) MBH.
9 Degussa AG.
10 Amoco Minerals (PNG) Company.
11 Star Mountains Holdings Company Pty Limited.
12 Ok Tedi Mining Limited (Borrower – SPV).
13 North Fly Highway Development Company Pty Ltd.
14 Export Finance and Insurance Corporation (Australia).
15 Export Development Corporation (Canada).
16 Export Credits Guarantee Department (UK).
17 Oesterreichische Kontrollbank Aktiengesellschaft (Austria).
18 Citicorp NA.
19 Overseas Private Investment Corporation (United States).
20 Kreditanstalt fur Weideraufbau (Germany).
21 Broken Hill Proprietary Company Limited.
22 Standard Oil Company (Indiana) – Amoco
23 Federal Republic of Germany.

**Description of agreement**

A. Main shareholder agreement between all sponsors together with the parent companies of BHP Minerals and Amoco Minerals.
B. German group shareholder agreement (whereby state holds 5% of its OTML holding through Star Mountains Holding).
C. Guarantee agreement (whereby W. German government meets some of German group's support obligations).
D. Completion and cash deficiency agreement among all sponsors and all export credit agencies.
E. Completion and cash deficiency agreement among commercial lenders (Citicorp and OPIC) and Amoco PNG and BHP Minerals.
F. Loan support agreement among MG, Degussa and KfW.
G. 40.4 agreement among the state and all lenders (on rights of lenders on termination of principal agreement).

*Source:* McGill

### *Partial risk guarantee*

A credit enhancement technique has been adopted by some MLAs, – the World Bank in particular. It can also be supplied by a bilateral agency (see Case study: Sasol pipeline, Mozambique and South Africa). With a PRG, the government's financial and contractual supports are covered by the World Bank under a structure, again counter-guaranteed/indemnified by the host country, shown in Exhibit 21.8. The banks can then rest easy concerning that government's commitment(s) to the project. Typical government inputs, in addition to those seen in Hubco in Pakistan (see Exhibit 1.2), might include:

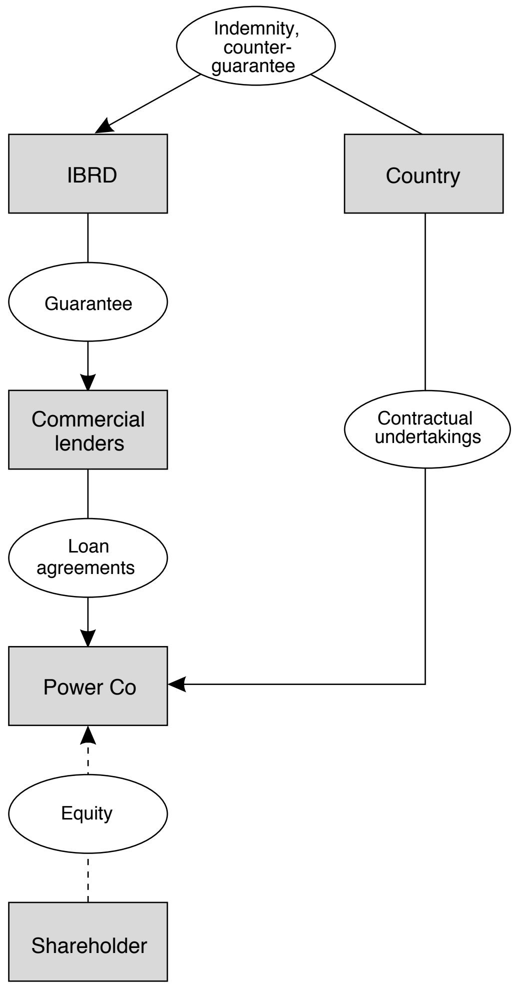
- change in law;
- political events;
- compensation for project delays caused by government action/inaction;
- maintaining the regulatory framework;
- holding to agreed tariff formulae; and
- acts of nature affecting the government's obligations.

Just like the defined events with PRI, the implementation agreement entered into by the government is very carefully worded.

The World Bank PRG program has also successfully been used to credit-enhance bond issues, examples of which have been seen for national power companies in Lebanon and the Philippines. OPIC of the US is also offering its PRI as a way to credit enhance or ratings uplift the obligations of the local company. (See Exhibit 21.11.)

Exhibit 21.8

**World Bank partial risk guarantee**




*Source:* World Bank

**Case study: Sasol pipeline, Mozambique and South Africa**

In this financing, Sasol arranged for a South African institution, Development Bank of Southern Africa (DBSA) to provide it comfort of the Mozambican government's obligations on their side of the gas pipeline from the Pande/Temane gasfields in Mozambique.

### *Partial credit guarantee*

Partial credit guarantee (PCG), a sister program to PRG, has been developed by the World Bank as a means to extend loan maturities. The commercial banks and the World Bank jointly fund the project. However, the banks get paid out, say, by year end seven after which the World Bank starts to get repaid out to a loan maturity of, say, year end 12. In this manner, the World Bank is taking the whole project finance risk for the end/extended part of the loan term – thus the name 'partial credit'.

By so doing (extending maturities) the World Bank and/or MLAs, the project financing is helped by the extended maturities and the cheaper pricing seen on partial credit deals. Each of the PRG and PCG attract guarantee fees which are significantly less than the cost savings or implementation (a binary issue) with the project financing.

### *Market tie*

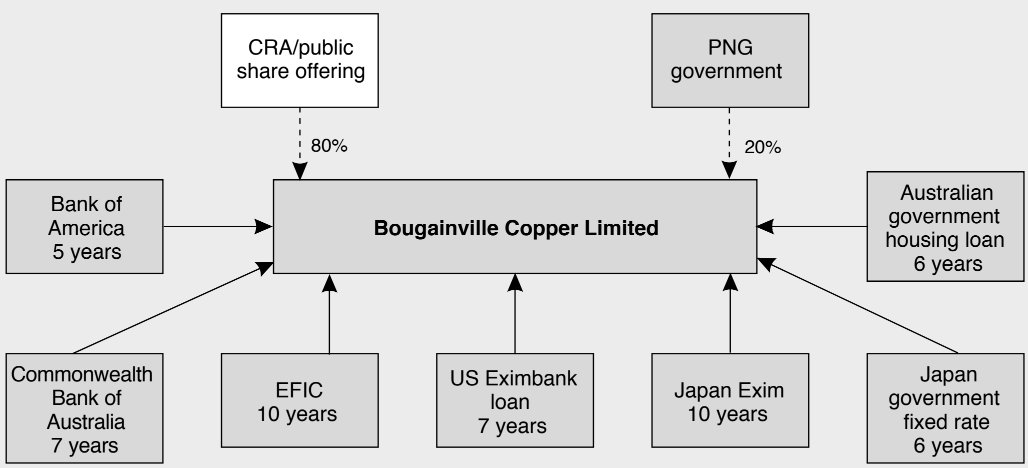
Where a project's output is being sold cross-border and is a strategic source of supply, then political risk points will be 'paid' to recognise this indirect support. (See Case study: Bougainville, Papua New Guinea.) The offtaker country will do whatever it (politically) takes to restore the supply cross-border.

**Case study: Bougainville, Papua New Guinea**

The Bougainville project financing was driven by first securing the offtake contracts, mostly to Japan, with agreed floor prices. A combination of bank, government and ECA facilities from the purchasing countries were used for the US$309 million project finance, shown in Exhibit 21.9.

Exhibit 21.9

**Bougainville**




*Source:* International Advisory & Finance 2014

### *Countertrade*

Technically, countertrade arrangements may be able to cover political risk. However, if it is part of government to government barter arrangements, then participants are probably picking up another country risk, all of which is likely to be outside the sphere of influence of a project finance banker. Countertrade is effective where it can be made to work; however, it is notoriously difficult to financially engineer without multiplying the underlying risk profile.

## Trigger structures

### *Political risk insurance*

PRI is the purchase of explicit insurance cover of specified risks including the classic three: W&I, CIT, and expropriation, as well as landowners, terrorism/sabotage and breach of contract. These covers may be provided as part of an ECA package pre-completion and after completion too. Besides the ECAs, the main players in project finance are:

- MIGA – World Bank entity;
- OPIC – US government entity for private enterprise; and
- AIG – US private company.

All can cover the project finance debt component. Recall the 'defined events' discussion for political risks above. Happily, the ECAs are agreeing to use joint definitions (of 'defined events') in their documents. Most ECAs (and MIGA) prefer some equity/investment insurance at the same time.

MIGA has been able to raise its per-project limit to US$150 million and has developed an aggressive yet stable team which is very active in project finance. It is noted for its ability to co-operate (and sub-underwrite) with other agencies. (See Exhibit 21.10.)

OPIC has the best experience of all and has seen countries 'come and go'. Although threatened by Washington politics, its ability to self-fund allows it to survive and thrive, although it has become much 'greener'. OPIC's direct lending upper limit is US$250 million per project.

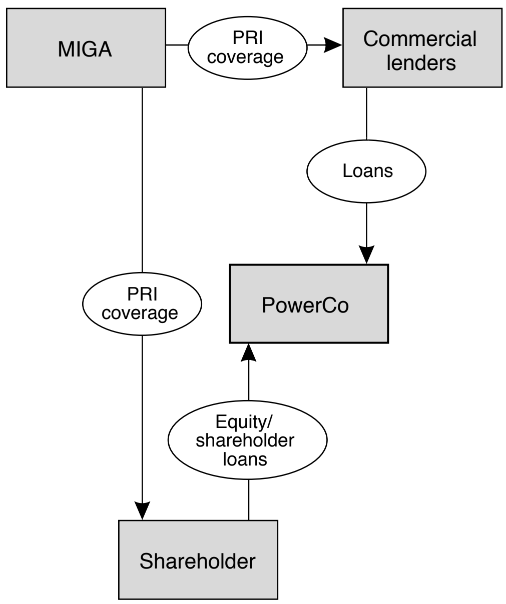
AIG is a goliath in the private (non-public) PRI business. The major development of note has been the extension of PRI out to 10 years and beyond. Its project limit has moved above the US$150 million mark.

A useful rule of thumb is that the classic three risks each cost 0.7% to 0.8% per annum of the total amount insured. Thus PRI premiums of 2% to 3% per annum are around the middle of the range. Certain sectors such as petroleum have higher expropriation premiums. Full sabotage and terrorism cover may cost another 0.3% to 0.5% per annum, if not already included. Pricing is a matter of negotiation, so some competition among the ECAs is advisable.

Many ECA's entered the business of project finance in the mid-1990s. Prior to this an ECA required either a government, a corporate, or bank guarantee and while offering concessional funding, took zero project finance risk. An ECA is in the business of promoting the export of that country's goods, services, and investment, (and, for some ECAs, imports of raw materials), so each has sourcing rules that tie the use of the credit accordingly. The individual ECA's have been reviewed in Chapter 2. Their political risk covers range from 90% to 100% with many insisting on no completion risk – effectively insuring political risk only to pre-completion. The effect of this is to throw the completion structuring right back to the banks that must carry the possibility that the ECA does not re-finance at completion or the completion test fails to be passed.

Exhibit 21.10

**MIGA insurances**




*Source:* MIGA

## *Currency inconvertibility agreements*

If the currency is blocked, then a program is required to manage the blocked currency by re-investment, deposit, or 'remobilisation'. It may be possible to establish parallel loans to track (and offset) the blocked amounts. Companies have also engaged in sanctions-breaking commercial transactions, ably developed by the Rhodesians/Zimbabweans and South Africans in the 1970s and 1980s, to convert trade and physical items into exportable cash – effectively smuggling.

**Case study: Malaysia**

In Malaysia, local currency cash collateral accounts (CCAs) were used. Even though blocked, dollar parity is maintained in the CCAs and the dedication of cashflow for debt service is increased to cover that shortfall. Once the block is lifted, the principal and interest plus overdue interest are all paid.[16]

## *Foreign exchange devaluation*

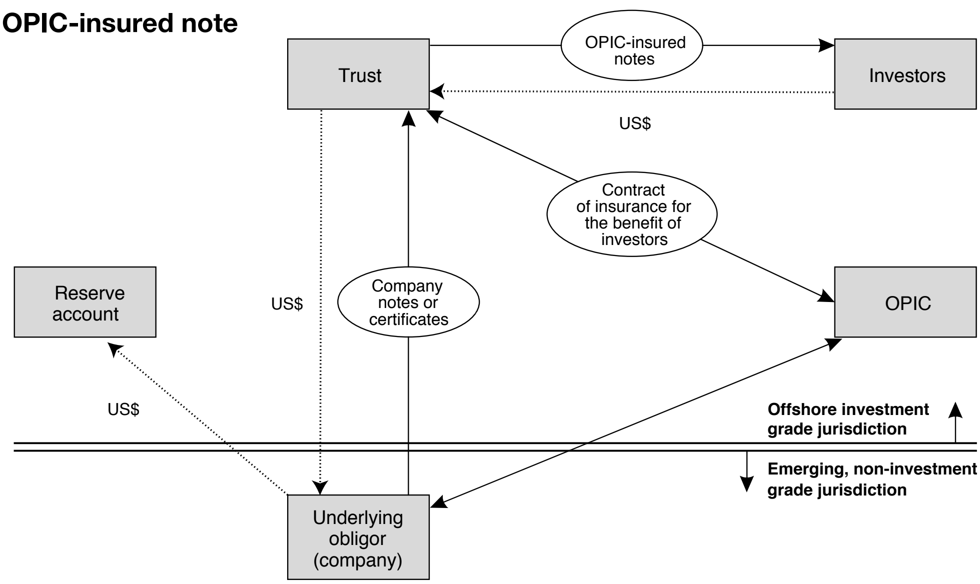
OPIC of Washington, DC, US, has developed a product to insure capital markets transaction for progressive (not unlimited) devaluation of the local currency. OPIC can also insure against CIT as well. This is a classic OPIC role anyway. The way money flows in an OPIC project finance note issue is given in Exhibit 21.11.

**Case study: Tiete, Brazil**

OPIC's devaluation and CIT cover was first implemented for an AES hydropower project by way of a US$300 million 144A project financing at Tiete, Brazil. This deal is to partly refinance the 10-dam project's acquisition debt.

Exhibit 21.11

**OPIC-insured note**




*Source:* OPIC

### *Debt:equity swaps*

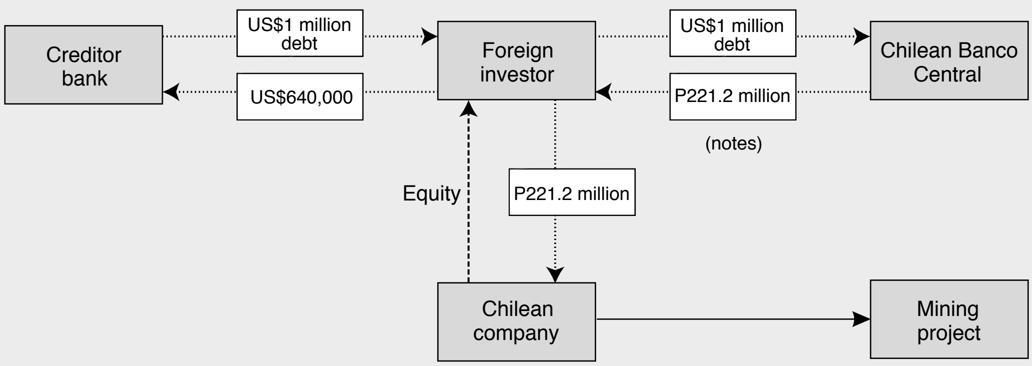
Again if local currencies are blocked (the CIT category of political risk), the currency may be remobilised locally into another export-generating project or by using discounted sovereign debt/Brady bonds. (See Exhibit 21.12.)

**Case study: Los Pelambres, Chile**

In Chile, Midland Bank (HSBC) engineered the cancellation of the peso equivalent of US$67 million of sovereign debt to invest US$53 million in a new project. Strict rules apply to the repatriation of net profits, initially 25% of net profits moving up to full capital repatriation by year 10.[17] Writ simple: the blocked local currency was converted into a project financing in order to get the money out, albeit delayed.

Exhibit 21.12

**Los Pelambres – debt:equity swap**




Assumptions:
1 Secondary market value of Chilean debt is 64% of the face value.
2 Banco Central exchange debt for cash at 79% of the face value of the debt.
3 Official exchange rate P280.00 per US$1.00.

In the case of Los Pelambres the creditor bank and foreign investor are both Midland Bank plc. The benefit to a foreign investor who buys Chilean debt in the secondary market is in excess of 25%.

*Source:* HSBC

### *Tax indemnification*

In the event of tax increases, either extra cashflow is required (loan repayment will be earlier) or the increment springs to recourse for the sponsors. Bankers and bond holders cannot tolerate any attack on their yield via IWT increases. In such an instance, beyond an agreed limit (usually the percentage on the date of signing) then IWT increase is someone else's risk, chiefly meaning full recourse to the sponsors, not stopping at the SPV.

## Financed structures

In a way, the shortfall in PRI cover means that the sponsors have to cover the risk appertaining to that uncovered hurt money. Some other structures can be employed.

### *War and insurrection residual*

War and insurrection residual provision will provide for instances in which the project is blown up. The banks reduce their exposure until the project is restored. If it is never restored, then the banks may cover the hurt moneys. No bank is going to offer this unless it is convinced that the project is 'hard' – it can be easily defended or is hard to attack/blow up. The project financier must also believe in the sponsor's drive and commitment to restore the project and restart it. This cover is seldom seen, but has been used in South America.

### *Cash escrow*

The uncovered percentage in PRI is cash collateralised or guaranteed by the sponsor.

### *Prepaid political risk insurance premiums*

An escrow account is established up-front wherein all the PRI premium payments are lodged, so there is never any question that the PRI premium payments will not be made.

## Study sources

### *Prince chart*

How does one get useable information on political risk? There is no substitute for reading, knowledge and experience but that is hard to accumulate for the 70 to 80 countries where project finance deals can be done.

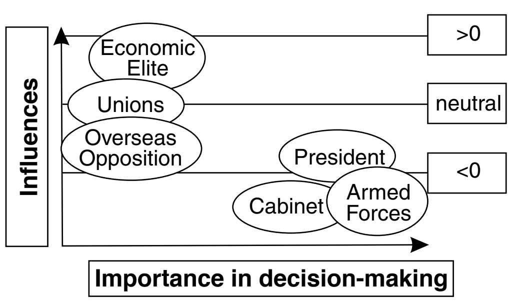
- *Banks* themselves are useful sources as each will have a country limit committee. Some banks have large international branch networks with plenty of political risk expertise.
- *Embassies* and governments can have useful commercial, political, and personality perspectives, the best of which are not usually in writing. Access to diplomatic assessments may be valuable.
- *Intelligence agencies* can also be useful. One can purchase the combined CIA/KGB country files on CD by mail order – most of this country information is now also on the internet.
- *Country reports* are sold by consulting companies and publishing houses: the Economist Intelligence Unit or IBC's ICRG, for example. The economic information is relatively easy to obtain. The harder task is the country's soft side – the politics. Some services offer ways

to quantify a country such as a Prince chart (see Exhibit 21.13). Information providers such as the PRS group has such reports for 140 countries.[18,19]

- *League tables* published in Euromoney or its American magazine, *Institutional Investor*. The measures tend to be historic and therefore not necessarily good predictors. (See Exhibits 21.14 and 21.15.)
- *Ratings agencies* have had a long history with sovereign ratings. However, the overly quantitative approach of the agencies (and the banks) has not been shown convincingly to catch the Latin American debt crisis in the 1970s and the Asian contagion which started in 1997.
- *Insurance country* specialists can have excellent information, much of it quasi-intelligence in character, because of their need to be predictive.
- *Econometric services* establish elaborate country models, regional models, and so on, in an effort to develop forecast tools. A Prince chart – charting the interaction among the political players – is often a way to understand the soft side of political risk, the politicians. Their main problem has been well covered when discussing the modellers' approach to risk – covariance (see Chapter 6). Their reports are issued 'hazard-free' when it is precisely a hazard that one wants to expose as soon as one can.
- *ECAs* can be useful sources of political risk information, mostly informal, but also evident by their inaction/unwillingness in some countries. Each ECA has a country-ranking system although these are not always made available.
- *MLAs* cannot really be considered useful sources since their own shareholder may be the subject of the query.
- *Advisers* can be good sources such as merchant banks experienced in the region. Some accounting companies have good local connections and insights.
- *Lawyers* too can have the mind to absorb the nuances and the ethos so necessary to identify political risk(s).
- *Government agencies* themselves in the subject country cannot be consistently relied upon.

Exhibit 21.13

**Prince chart**




*Source:* Wiley, 'Country risk assessment', 2003

Exhibit 21.14

**Institutional Investor's 2013 country credit ratings***

| *Rank* | | | | |
|---|---|---|---|---|
| *September 2012* | *September 2013* | *Country* | *Institutional Investor credit rating* | *One year change* |
| 1 | 1 | Norway | 95.3 | 0.6 |
| 2 | 2 | Switzerland | 94.4 | 0.1 |
| 3 | 3 | Sweden | 93.3 | 0.0 |
| 4 | 5 | Canada | 93.2 | 0.4 |
| 5 | 6 | Germany | 93.0 | 1.5 |
| 6 | 4 | Singapore | 92.8 | 0.6 |
| 7 | 7 | Finland | 91.7 | –0.9 |
| 8 | 12 | USA | 91.3 | 1.4 |
| 9 | 8 | Luxembourg | 90.7 | –1.5 |
| 10 | 9 | Denmark | 89.5 | 0.7 |
| 11 | 11 | Netherlands | 88.9 | n/a |
| 12 | 10 | Australia | 88.8 | –1.5 |
| 13 | 13 | Austria | 87.1 | 0.0 |
| 14 | 15 | UK | 86.7 | 1.1 |
| 15 | 16 | New Zealand | 84.9 | 1.2 |
| 16 | 14 | Hong Kong | 84.3 | –0.5 |
| 17 | 17 | France | 83.7 | –0.2 |
| 18 | 18 | Japan | 82.5 | 2.5 |
| 19 | 19 | Taiwan | 81.0 | 0.3 |
| 20 | 21 | Chile | 80.7 | –0.7 |
| 21 | 20 | Belgium | 79.9 | 0.9 |
| 22 | 22 | South Korea | 79.2 | –0.1 |
| 23 | 25 | Qatar | 76.9 | 2.1 |
| 24 | 23 | China | 77.5 | –0.3 |
| 25 | 27 | Kuwait | 76.4 | 0.8 |
| 26 | 28 | Saudi Arabia | 75.9 | 2.9 |
| 27 | 24 | Bermuda | 75.4 | –2.1 |
| 28 | 29 | United Arab Emirates | 74.6 | 1.0 |
| 29 | 26 | Czech | 74.3 | –1.1 |
| 30 | 30 | Slovakia | 73.7 | 0.5 |
| 31 | 32 | Estonia | 73.3 | 1.6 |
| 32 | 33 | Poland | 72.2 | 1.6 |

*Continued*

| Rank | | | | |
|---|---|---|---|---|
| *September 2012* | *September 2013* | *Country* | *Institutional Investor credit rating* | *One year change* |
| 33 | 36 | Israel | 71.9 | 1.3 |
| 34 | 31 | Malaysia | 71.8 | 0.2 |
| 35 | 34 | Malta | 69.7 | −2.4 |
| 36 | 35 | Oman | 69.7 | 0.4 |
| 37 | 37 | Mexico | 69.3 | 1.2 |
| 38 | 41 | Russia | 68.0 | 1.5 |
| 39 | 39 | Brazil | 67.7 | −1.4 |
| 40 | 42 | Italy | 66.1 | 2.5 |
| 41 | 43 | Peru | 65.4 | −0.3 |
| 42 | 44 | Colombia | 64.1 | 0.1 |
| 43 | 40 | Bahamas | 64.0 | −3.9 |
| 44 | 45 | Trinidad & Tobago | 63.6 | −0.6 |
| 45 | 46 | Thailand | 63.1 | 1.2 |
| 46 | 47 | Botswana | 62.5 | 2.3 |
| 47 | 53 | Panama | 61.2 | 1.0 |
| 48 | 38 | Slovenia | 61.2 | −12.4 |
| 49 | 48 | Lithuania | 61.0 | −0.4 |
| 50 | 49 | India | 60.0 | −2.7 |
| 51 | 55 | Kazakhstan | 60.0 | 3.6 |
| 52 | 50 | South Africa | 59.5 | −1.4 |
| 53 | 57 | Ireland | 59.4 | 5.0 |
| 54 | 56 | Uruguay | 58.9 | −0.1 |
| 55 | 59 | Latvia | 57.9 | 4.3 |
| 56 | 52 | Spain | 57.7 | 0.1 |
| 57 | 58 | Indonesia | 57.3 | 0.4 |
| 58 | 51 | Bahrain | 57.2 | −2.0 |
| 59 | 62 | Philippines | 57.2 | 2.2 |
| 60 | 61 | Mauritius | 57.2 | 4.6 |
| 61 | 64 | Turkey | 55.7 | 2.6 |
| 62 | 54 | Barbados | 55.7 | −4.5 |
| 63 | 66 | Bulgaria | 55.7 | 2.5 |
| 64 | 60 | Croatia | 55.0 | 0.8 |
| 65 | 63 | Costa Rica | 54.2 | −3.9 |
| 66 | 68 | Iceland | 53.9 | 4.0 |
| 67 | 69 | Romania | 53.1 | 1.8 |

*Continued*

Exhibit 21.14 *continued*

| *Rank* | | | | |
|---|---|---|---|---|
| *September 2012* | *September 2013* | *Country* | *Institutional Investor credit rating* | *One year change* |
| 68 | 70 | Algeria | 53.0 | 0.6 |
| 69 | 65 | Namibia | 52.4 | –0.4 |
| 70 | 71 | Morocco | 52.1 | 1.7 |
| 71 | 72 | Hungary | 50.5 | 0.2 |
| 72 | 73 | Portugal | 49.2 | 3.9 |
| 73 | 67 | Azerbaijan | 48.9 | –3.1 |
| 74 | 74 | Tunisia | 45.9 | –2.4 |
| 75 | 77 | Vietnam | 44.2 | –1.0 |
| 76 | 80 | Gabon | 43.2 | 1.9 |
| 77 | 81 | Macedonia | 42.9 | 3.3 |
| 78 | 75 | Jordan | 42.9 | –1.8 |
| 79 | 78 | Guatemala | 42.7 | –1.5 |
| 80 | 83 | Serbia | 41.5 | 1.8 |
| 81 | 87 | Nigeria | 40.9 | 2.7 |
| 82 | 79 | El Salvador | 40.1 | –1.7 |
| 83 | 93 | Paraguay | 39.4 | 3.9 |
| 84 | 85 | Montenegro | 39.4 | –0.6 |
| 85 | 82 | Georgia | 38.9 | 0.2 |
| 86 | 105 | Cape Verde | 38.3 | 3.5 |
| 87 | 92 | Ghana | 38.2 | –0.6 |
| 88 | 88 | Bolivia | 38.2 | 2.8 |
| 89 | 84 | Dominica | 37.8 | –3.1 |
| 90 | 86 | Mongolia | 37.8 | –1.4 |
| 91 | 91 | Angola | 37.4 | –1.5 |
| 92 | 98 | Zambia | 37.0 | 0.5 |
| 93 | 90 | Albania | 36.8 | –1.6 |
| 94 | 97 | Armenia | 36.6 | –0.9 |
| 95 | 122 | Equatorial Guinea | 36.4 | 8.9 |
| 96 | 89 | Libya | 36.4 | 3.5 |
| 97 | 104 | Sri Lanka | 35.5 | 1.1 |
| 98 | 95 | Venezuela | 35.4 | 1.6 |
| 99 | 102 | Ukraine | 34.8 | –8.0 |
| 100 | 103 | Suriname | 34.2 | –1.2 |
| 101 | 118 | Kyrgyzstan | 34.2 | 5.8 |

*Continued*

| *Rank* | | | | |
|---|---|---|---|---|
| *September 2012* | *September 2013* | *Country* | *Institutional Investor credit rating* | *One year change* |
| 102 | 106 | Kenya | 33.3 | 1.0 |
| 103 | 94 | Senegal | 33.2 | −1.6 |
| 104 | 100 | Papua New Guinea | 32.3 | −3.5 |
| 105 | 76 | Cyprus | 32.3 | −18.7 |
| 106 | 112 | Bangladesh | 32.0 | 2.3 |
| 107 | 109 | Argentina | 31.8 | −4.0 |
| 108 | 121 | Uzbekhistan | 31.8 | −0.3 |
| 109 | 116 | Bhutan | 31.7 | 6.7 |
| 110 | 101 | Lesotho | 31.7 | −1.5 |
| 111 | 99 | Uganda | 31.0 | −3.6 |
| 112 | 108 | Mozambique | 31.0 | 1.7 |
| 113 | 95 | Egypt | 30.9 | −3.9 |
| 114 | 111 | Tanzania | 30.9 | 0.5 |
| 115 | 113 | Honduras | 29.8 | −1.0 |
| 116 | 107 | Lebanon | 29.6 | −2.1 |
| 117 | 129 | Vanuatu | 29.5 | 1.9 |
| 118 | 114 | Bosnia & Herzegovina | 29.3 | −4.4 |
| 119 | 124 | Belarus | 29.0 | 1.5 |
| 120 | 125 | Iraq | 28.6 | 2.9 |
| 121 | 133 | Ecuador | 28.5 | 0.6 |
| 122 | 119 | Cambodia | 28.0 | 1.7 |
| 123 | 134 | Cameroon | 27.8 | 3.2 |
| 124 | 117 | Jamaica | 27.6 | −2.5 |
| 125 | 115 | Moldova | 27.6 | −0.7 |
| 126 | 123 | Guyana | 27.3 | −2.0 |
| 127 | 128 | Iran | 27.2 | −0.4 |
| 128 | 137 | Cote d'Ivoire | 27.2 | 3.6 |
| 129 | 136 | Belize | 26.6 | −3.5 |
| 130 | 110 | Turkmenistan | 26.6 | −4.5 |
| 131 | 120 | Fiji | 26.1 | −0.9 |
| 132 | 142 | Swaziland | 26.0 | 3.4 |
| 133 | 131 | Rwanda | 25.9 | −0.5 |
| 134 | 144 | Greece | 25.5 | 6.4 |
| 135 | 135 | Pakistan | 25.4 | 0.4 |
| 136 | 141 | Djibouti | 25.1 | 3.2 |

*Continued*

Exhibit 21.14 *continued*

| *Rank* | | | | |
|---|---|---|---|---|
| *September 2012* | *September 2013* | *Country* | *Institutional Investor credit rating* | *One year change* |
| 137 | 143 | Malawi | 24.1 | 2.3 |
| 138 | 140 | Kiribati | 23.6 | 2.2 |
| 139 | 149 | Nepal | 23.3 | 2.5 |
| 140 | 161 | Democratic Republic of Congo | 23.0 | 3.4 |
| 141 | 139 | Laos | 22.9 | 0.3 |
| 142 | 152 | Tajikistan | 22.7 | 1.0 |
| 143 | 126 | Congo–Brazzaville | 22.6 | –1.0 |
| 144 | 127 | Seychelles | 22.6 | 0.6 |
| 145 | 156 | Yemen | 22.1 | 4.0 |
| 146 | 132 | Benin | 21.8 | –0.7 |
| 147 | 146 | Togo | 21.7 | 1.1 |
| 148 | 151 | Solomon Islands | 21.7 | 2.3 |
| 149 | 147 | Nicaragua | 20.8 | –1.4 |
| 150 | 160 | Tonga | 20.5 | 0.2 |
| 151 | 148 | East Timor | 20.4 | –4.9 |
| 152 | 145 | Burkina Faso | 20.3 | –1.3 |
| 153 | 162 | Sierra Leone | 20.2 | 2.0 |
| 154 | 138 | Mauritania | 20.2 | 0.1 |
| 155 | 150 | Mali | 20.2 | –2.7 |
| 156 | 163 | Cuba | 19.5 | 5.7 |
| 157 | 153 | Gambia | 18.7 | –2.1 |
| 158 | 158 | Madagascar | 18.5 | 1.3 |
| 159 | 157 | Myanmar | 18.3 | 3.0 |
| 160 | 165 | Chad | 18.0 | 2.1 |
| 161 | 154 | Niger | 17.8 | –0.7 |
| 162 | 159 | Ethiopia | 17.6 | –3.6 |
| 163 | 164 | Sao Tome & Principe | 16.6 | 0.5 |
| 164 | 155 | Liberia | 16.5 | –1.1 |
| 165 | 166 | Syria | 15.1 | –3.4 |
| 166 | 130 | Grenada | 14.4 | –16.7 |
| 167 | 169 | Guinea | 14.1 | 0.4 |
| 168 | 170 | Haiti | 13.9 | –0.7 |
| 169 | 175 | Afghanistan | 13.9 | 2.6 |
| 170 | 168 | Burundi | 13.8 | –0.9 |

*Continued*

| *Rank* | | | | |
|---|---|---|---|---|
| *September 2012* | *September 2013* | *Country* | *Institutional Investor credit rating* | *One year change* |
| 171 | 172 | Comoros | 13.6 | –0.4 |
| 172 | 176 | North Korea | 13.6 | 8.7 |
| 173 | 167 | Eritrea | 13.3 | –0.5 |
| 174 | 173 | Guinea-Bissau | 11.6 | –0.7 |
| 175 | 171 | Central African Republic | 11.4 | –2.4 |
| 176 | 174 | Sudan | 7.8 | –2.2 |
| 177 | 178 | South Sudan | 6.6 | –1.2 |
| 178 | 177 | Zimbabwe | 5.6 | –1.3 |
| 179 | 179 | Somalia | 5.4 | 1.8 |
| | | Global average | 44.6 | 0.1 |

*Institutional Investor is 100% owned by Euromoney.

*Source:* Institutional Investor

Exhibit 21.15

## Institutional Investor's country credit index

| | |
|---|---|
| *Analytical indicators:* | *50%* |
| Economic performance | 25% |
| Political risk | 25% |
| | |
| *External debt indicators:* | *30%* |
| Synthetic indicator | 10% |
| Unpaid or renegotiated debt | 10% |
| Credit rating | 10% |
| | |
| *Market indicators:* | *20%* |
| Access to bank lending | 5% |
| Access to short-term finance | 5% |
| Access to capital markets | 5% |
| Access and discount on forfaiting | 5% |

*Source:* N San-Martín-Albizuri and A Rodríguez-Castellanos[20]

## Avoided

### *Offshore proceeds account*

Much favoured in project financing, this structure provides for all revenues, certainly export proceeds, to be paid directly to an escrowed account. There, debt service is paid, money reserves topped up and sometimes operating costs and local income taxes paid. The balance is then repatriated. About 100 countries of the world's 200 countries allow offshore proceeds accounts.

Structured in terms of 'months of proceeds', a typical account would have central bank permission to marshal three or six months of proceeds offshore at any time. Obviously keeping that amount offshore – usually immediately converted into US dollars – means no FX risk on the portion already converted exists, but it be quite wrong to say it provides mitigation of FX risk. What it does structure is CIT quite formally and a means to measure cashflow activity in the offshore bank account. It may also short circuit commissions/corruption, at least from the top slice of the revenues.

## Summary

Look at Mariveles, Porgera, and Train F (Exhibits 19.1, 21.1, and 8.4) as templates. In fact, in Train F, the direction of the take or pay revenues to the offshore proceeds account, is the very heart of the cashflow structuring.

---

[1,2,3,4] Wagner D, IRMI's political risk insurance guide', International Risk Management Institute, 1999.

[5] Morrison, R, 'Re-negotiation offers add to Dabhol confusion,' *Project Finance International 79*, 1995, pp. 2–4.

[6] *Bangkok Post*, 1998.

[7] Bardacke, E, *Financial Times*, 1996.

[8] Goold, D and Willis, A, *The Bre-X Fraud*, 1997, McClelland & Stewart.

[9] Francis, D, *Bre-X: the inside story*, 1997, Key Porter Books.

[10] Woodford, J, 'Carr bans $1bn gold mine at heritage lake', *Sydney Morning Herald*, 1996.

[11] 'Lofty royalty', *Metals Finance 49*, 1998, p. 16.

[12] Standard & Poor's, 'Sithe/Independence Funding Corp.', *Creditweek*, 1995.

[13] Tinsley, CR, 'How to structure financings for political risk: the case of Papua New Guinea', at the Asia-Pacific Project and Infrastructure Financing Conference, 1995.

[14] Crisell, M, *Hub Power: an innovative approach to project financing*, 1995, Euromoney Books.

[15] McGill, S, 'Financing the Ok Tedi Mine – case study of the process from the government perspective,' in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration, pp. 724–35.

[16,17] Tinsley, CR, 'Handling political risk', at the Pacific Rim Congress, 1990.

[18] www.prsgroup.com.

[19] Coplin, WD and O'Leary, MK, 'A systematic approach to political risk analysis', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration, pp 445–53.

[20] San-Martín-Albizuri, N and Rodríguez-Castellanos, A, 'Globalisation and the unpredictability of crisis episodes: an empirical analysis of country-risk indexes', *Investigaciones Europeas de Dirección y Economía de la Empresa* 18(2), 2012.

Chapter 22

# Participant risk

The many participants in a project finance transaction are shown in Exhibit 22.2, all 21 of them. The regulator is now a risk, especially for their propensity to destroy public-private projects (PPPs).[1]

Many of these entities have already been reviewed/rated, some over many years, and this should be a comfort to the bankers and ratings agencies. Even though the forecasted credit assessment for each entity is not lengthy – three to five years is actually quite far ahead – this is sufficient for most project financings during the pre-completion phase, pre Type-1 project finance as an option. However, for an ongoing project or post completion during the true project finance phase, then a three to five-year analysis may not be enough.

This book is not about conventional credit analysis which assesses the five Cs – cash, collateral, capability, character, and comparison – plus the three C 'limits' – customer, country, and currency. It is about risk analysis and developing a systematic approach to establishing cashflow projections as a primary tool to choose the structure to mitigate the risks.

A way to identify each participant's impact on the risk matrix is laid out in Exhibit 22.1 showing where many of the non-credit analysis aspects are covered in this book. It is the interaction of the elements in this matrix which requires the best structuring skill and solution set(s).

Exhibit 22.1

**Participant risk matrix**

| *Participant* | *Risk/aspect* | *Chapter* |
|---|---|---|
| Sponsor | Participant | 22 |
| Subcontractors | Participant | 22 |
| SPV | Participant | 22 |
| Financial advisers | Participant | 4 |
| Arrangers/lead funders | Syndication | 24 |
| ECAs/MLAs | Political | 2, 21 |
| Agent/trustee | Syndication | 24 |
| Lessors | Participant | 8 |
| Independent experts | Due diligence | 9 |
| Lawyers | Legal | 25 |
| Government | Political | 21 |

*Continued*

Exhibit 22.1 *continued*

| *Participant* | *Risk/aspect* | *Chapter* |
|---|---|---|
| Constructor | Completion | 19 |
| O&M company | Operating risk management | 15 |
| Insurers | *Force majeure*; completion | 18, 19 |
| Swap counterparties | FX; interest rate/funding | 12, 23 |
| Suppliers | Supply | 10 |
| Equipment vendors | Completion; engineering | 19, 20 |
| Offtakers | Market | 11 |
| Transportation | Infrastructure | 17 |
| Ratings agency | Stages; funding/interest rate | 1, 2 |
| Regulator | Imposition on concession agreement | 22, 21 |

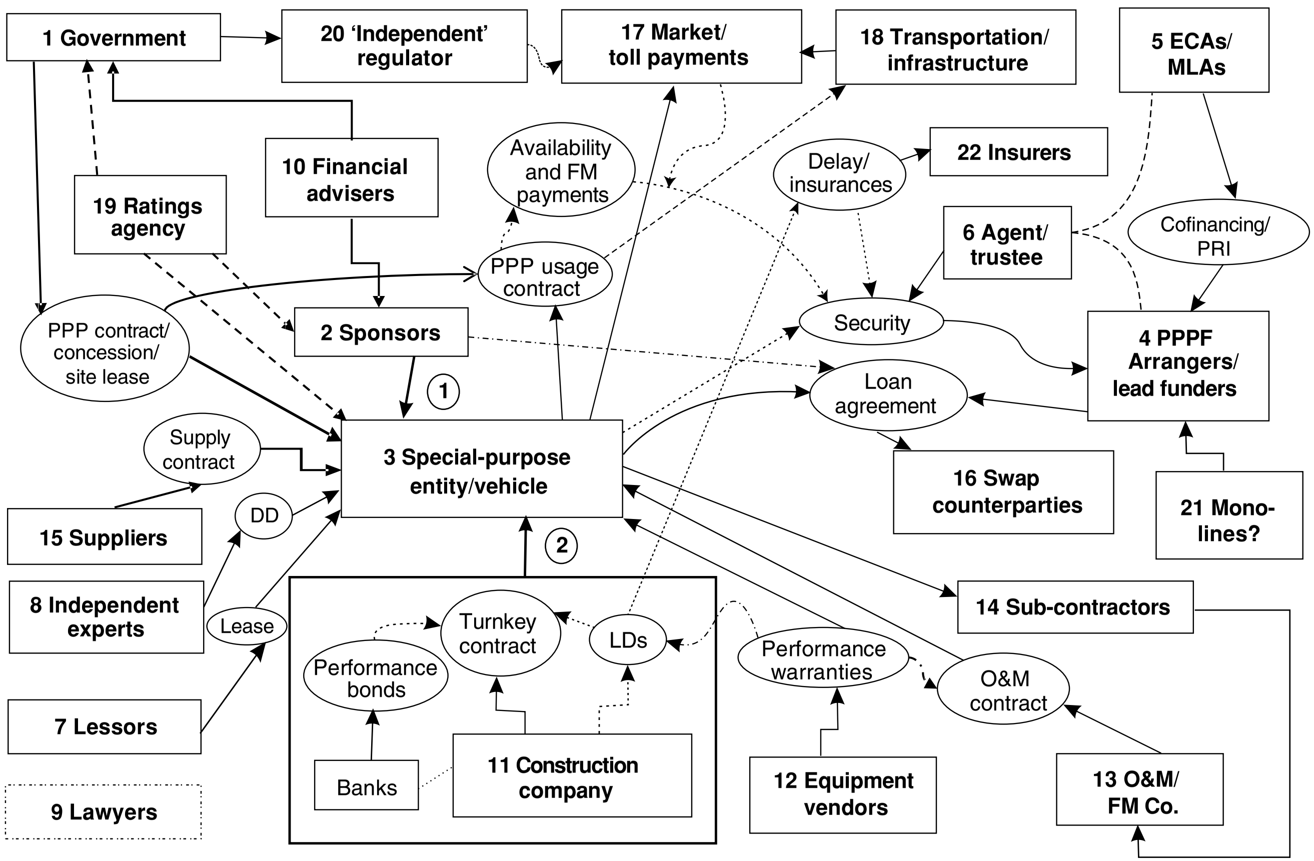
*Source:* Author's own

## Sponsor pre-completion

Standard credit supports pre-completion on the sponsors use conventional corporate financial covenants such as minimum tangible net worth, minimum liquidity and debt:equity ceilings. These may also be applied to other contracting parties to mitigate their participant risk. These financial covenants are being substituted by a maintenance of ratings approach for resetting covenants or pricing, more capital markets in style. This relieves the banker of policing the corporate and management accounts.

Exhibit 22.2

**Project finance participants**




*Source:* © International Advisory & Finance 2014

## Special purpose vehicle

The first focus is to select the appropriate special purpose vehicle (SPV). This is the key means to isolate recourse to the sponsor's post-completion. There are seven choices listed in Box 22.1.

**Box 22.1**
**Special purpose vehicles**

1 Project company or 'incorporated' joint venture where the ownership is held through shares or loans to the project company. Here the project is developed and managed by a board of directors and project income is taxed as a company. The sponsors rely on dividends. This route makes sense if all parties are borrowing together or a single party is the sponsor.
2 Unincorporated joint venture (UJV) or contractual joint venture where the sponsors contract together to construct and operate the project through a management agreement. The project itself is owned together as tenants in common where the project's physical assets cannot be split up. A feature of a UJV is the right to take the proceeds of production in kind. Thus each sponsor can treat its portion of the UJV separately for tax and financing purposes. (Put another way, each sponsor owns 100% of its (several) UJV interest.) This is the preferable borrowing structure to project finance a minority participant.
3 Partnerships, made up of limited partners (where liability is limited to the investment made) and general partners, are popular borrowing vehicles in the US. A partnership implies a common sharing of profits and losses and is usually treated as a single entity for tax purposes. However, under English law and many other jurisdictions, a partnership may not have a separate legal personality, and taking security over partnership interests has particular legal risk.
4 Trust structures can provide for one trust entity or its trustee to operate as the borrower. However, the convoluted legal status of trusts and trustees presents difficult legal risks particularly concerning enforcement of security. It is usually found as part of tax structuring. (Many trusts are set up to not be taxed. Alternatively a charity could be selected. Most charities are tax exempt.)
5 A cost corporation can sometimes be structured for a tolling entity. In this circumstance, the cost corporation's revenues are just sufficient to cover operating costs plus debt service. Predictably, tax authorities resist this 'no income' (no tax) feature.
6 EEIG, the acronym for European Economic Interest Groupings, is a 'rather curious beast'[2] with the pan-EU membership jointly and severally liable, yet the entity may not have a legal personality in each EU country. Surely this could only have been designed in Brussels? The author has never seen this as an SPV, so its existence is still theoretical.
7 The sponsor can, of course, be the project finance borrower, and, therefore, will focus on the switch away from recourse post-completion. It is harder to quarantine the security in this instance.

Taxation matters can also affect the choice of SPV; indeed double-tax treaty parking and tax haven intermediary subsidiary/holding vehicles are common.[3,4]

Some other features require elaboration.

The *company* SPV route opens up compliance with the national company law which can be daunting. Dividends can be locked up since, although cashflow may be positive, many projects experience an accounting loss in the early years. Dividends can usually only be declared out of accounting profits; but many structures could be used to 'spring' the surplus cash, such as subordinated debt.

A *company* structure is the SPV choice when a party seeks to deconsolidate its project finance debt by moving to an equity percentage of 50% or less – keeping an eye on local accounting standards which can vary the consolidation threshold based on the concepts of 'control' and 'risk' rather than percentage ownership. International Financial Reporting Standards (IFRS), which now apply to almost every country's financial disclosure, puts all contingencies and intangibles into the notes to the balance sheet or into the balance sheet itself. There is little room left for off balance sheet (OBS) treatment of a project finance.

A *cost corporation* is suited for club or tolling structures where the project is perhaps an intermediate step or feedstock processor. Each party shares the capex, opex, and contributes just enough revenues to clear the debt service.

**Case study: Queensland Alumina, Australia**

Queensland Alumina Limited (QAL) was established on a cost corporation basis. With hell or high water commitments to pay the tolling charges and debt service obligations (akin to a throughput agreement), this really is a structured recourse transaction. QAL was able to take the financing to the bond markets who, true to form, received a completion guarantee from the sponsors (a Type 1 structure; see Chapter 19).

A Scottish 'special' variety on this company theme for schools done as PPPs is called a 'non-profit distributing organisation'. If the SPV makes more than the expected profits some/all of the surplus is reinvested into the local community on a pre-agreed plan. This has, therefore, elements of a charity structure to such an SPV.

An unincorporated joint venture (UJV) enables each party/SPV to deal with its part of the cashflows, severally. However, to take the benefit of the security, the project financier has to enter the cross charge and other project documents directly (see the discussion under 'Direct agreements' in Chapter 25). This inter-party UJV cross relationship is a double-edged sword and needs very close examination to gauge whether this adds legal risk to the deal. If one of the parties is a government entity, political risk is introduced.

Each UJV party can individually finance, tax, and account the system's output, usually without reference to the others. In essence then, a UJV is a several financing among the parties' SPVs. Rules will apply to joint management, co-operation on sales, and so on, although each party has the right to offtake their UJV interest in kind, that is, to collect gross revenues provided that party pays its capital and operating-cost (opex) calls.

Besides the cross-charge (to take gross revenues to pay UJV opex in a default), cross-collateralisation and/or forced dilution could be structured – again a double-edged sword. One would also expect first right of refusal on sale of a UJV interest along with a slew of joint management, budget, marketing, and technical aspects.

The huge advantage is that the UJV can be written/tailored to suit the deal exactly, unlike a company law arrangement or shareholders agreement which would be much more prescribed by, for example, the takeover code.

Partnerships are a favourite in the US chiefly as a tried and tested tool to limit financial liability. However, partnerships may present legal risk (especially when they are not regarded as legal entities). In some jurisdictions, the pledge or mortgage of partnership interests is ineffective. However, in the US it is standard operating procedure to secure the partnership interests to the benefit of the project financier (see Exhibit 8.3 for a US-style partnership security structure).

## Trigger structures

### *Deficiency agreement*

In the event that the participant's aspect of the project – say, a contractual obligation – is not performing as expected, then the participant may agree to limited or comprehensive deficiency support. These include:

- *working capital maintenance agreement* which is back door recourse if current liabilities includes the current portion of the project finance debt;
- *cashflow deficiency agreement* that may still be subject to contractual performance and the limits in contract payments. If debt service itself is to be 'performed', then it is back door recourse again;
- *contingent equity underwritings* are more likely to be of a limited recourse nature, but it is some recourse nonetheless;
- *shortfall guarantees* may be triggered by technical or financial performance failures; and
- *performance guarantee* that is often used as a credit-enhancement tool more in the nature of a payments guarantee. If the project performs, and the payment entity does not pay, then someone else will make that payment. This architecture is in evidence in Exhibits 8.24 and 10.1. Alternatively, if a participant fails to perform any contractual or support obligation, another entity – usually a creditworthy parent/holding company/sponsor/government – will do so.

### *Share pledge*

If the participant is unable to grant proper security by way of a charge, mortgage or hypothecation, then the security route may be more through the equity which may be pledged or held as security. This can sometimes crop up where land is subject to rules prohibiting any ownership or security holding by foreigners. However, care is needed as sometimes the pledge itself may also contravene local equity rules.

### *Cross collateralisation*

If one party gets into difficulty in the UJV structure, the other venturers' interests and security can be taken to cover the 'gap' for the party in trouble. This cuts both ways and will usually only work with friendly parties, parties financing jointly, or affiliate structures. As with all 'cross' structures, the endeavour of the project financier is to pick up this right without attached obligations, which is possible, but rarely achievable.

**Case study: IFC, Europe**

In a European woollen textile privatisation, besides a regular security package, IFC took a pledge of shares. 'By obtaining a share pledge, IFC could take control of the project if things went wrong, whether the mortgage could be successfully enforced or not.'[5]

### *Board control*

If a foreign lender cannot get a valid security position in some part of the local project or local entity, then it may be necessary not just to exercise a share pledge, but to have control of the local board of directors. One structure has the signed, undated resignations of all the directors held by the bank (along with the minutes of a properly convened board meeting) to enable the bank to replace the board with friendly local directors in the event of a default.

### *Call option*

A similar route to board control is a call option upon a company/SPV's share upon a default. This helps the bank deal with the security and collateral via the equity.

**Case study: IFC, security**

At the time of signing an IFC loan, if a country did not have mortgage laws, IFC took a call option on the foreign sponsor's shares for US$1 exercisable in the event of a default. In turn, should the IFC elect to sell the shares, the foreign party can 'purchase the shares at a price equal to the outstanding IFC loan, principal and interest'.[6]

## Study route

The SPV may be the subject of a legal, tax, or accounting opinion, for example, for its capacity to provide the cross-border arrangements or is an acceptable proxy for bankruptcy remoteness. A Colombian case is given in Chapter 25, where in all practical circumstances the SPV could not be attacked from bankruptcy-type events and was sufficiently self-contained and robust.

## Avoided

### *Bankruptcy remoteness*

One aspect that has arisen from the US experience with Chapter 11 reorganisations is the concept that the SPV must be bankruptcy remote, both horizontally (within project financing) and vertically (through any ownership or subsidiary bankruptcy affecting the SPV itself). The concept is essentially to firewall the SPV (and its cashflows) from the courts as far as possible. This extends to the establishment of special cash management structures and a waterfall of accounts (see Exhibits 3.4, 3.5 and 3.6) all designed to corral the cashflow from the hands of the (US) bankruptcy court as far as is practicable (and is legal).

This attribute is regarded as an absolutely standard pre-requisite to rating in any part of the world. Standard & Poor's description is given in Box 22.2.

**Box 22.2**
**Bankruptcy remoteness**

*Special purpose corporations or partnerships*
Many transactions involve developers or lessees that do not qualify as municipalities or public purpose corporations (PPCs). PPCs are entities that are deemed not 'moneyed, business, or commercial corporation[s]' under Section 303(a) of the [US] Bankruptcy Code (such as not or profit corporations or partnerships, state or municipal agencies, or state or municipally chartered organisations). These entities are usually limited partnerships or corporations. To the extent that the transaction is to be rated primarily on the strength of the offtake agreements and not on the strength of the borrower or lessee.

Standard & Poor's (S&P's) criteria are designed to ensure that a borrower or lessee that is a limited partnership or corporation is bankruptcy remote, that is, the bankruptcy or dissolution of such an entity would not adversely affect debt service payments or the bondholder's lien on the trust estate.

S&P's criteria seek to ensure that the entity is unlikely to become insolvent or be subject to the claims of creditors (who may file an involuntary petition against the entity). The following criteria would need to be met to ensure that such entity is a special purpose corporation (SPC) and thus 'bankruptcy remote':

1 the entity should be prohibited from engaging in a merger, consolidation, or asset transfer with an entity not rated as highly as the bonds or that does not meet S&P's single-purpose criteria;
2 the entity is restricted from incurring additional debt;
3 the entity's organisational documents prohibit additional debt other than debt rated by S&P as high as the rating on the issue in question; or
4 the additional debt:
   - is fully subordinated to the rated debt;

*Continued*

- is non-recourse to the SPC or any assets of the SPC other than cashflow in excess of amounts necessary to pay holders of the rated debt; and
- does not constitute a claim against the SPC to the extent that funds are insufficient to pay such additional debt.

In addition, the following requirements would apply to limited partnerships.

1 The other assets of the general partner(s) and all successor general partners should not be commingled with any assets of the limited partnership.
2 If the general partner has a controlling interest in the partnership (50% or more), S&P needs to receive acceptable non-consolidation opinion with respect to the general partner and partnership. In the absence of such an opinion, no general partner should own at any time 50% or any greater percentage interest in the profits and losses of the limited partnership (either as a general or a limited partnership interest).
3 Upon dissolution of the partnership, or other events of default, the trustee for noteholders must have the independent ability to retain the collateral and continue to pay scheduled debt service or to liquidate the collateral in the event that the proceeds would be insufficient to repay all amounts due to the noteholders.

These criteria should be incorporated in the entity's certificate of incorporation or partnership agreement and, as appropriate, in the other transaction documents.

*Equity participants*

In the event that the transaction is structured with one or more equity participants operating through an owner trust vehicle, S&P will seek assurance in the form of an opinion of counsel that in the event of the insolvency of such equity participant, the indenture collateral will not become a part of the bankruptcy estate of the equity interest under Section 541 of the [US] Bankruptcy Code and that the automatic stay under Section 362(a) of the [US] Bankruptcy Code will not apply to payments by the owner trust.

*Use of preference-proofed moneys*

Certain transactions have used various funds and cash deposits as credit support. Various structural devices address preference concerns including ageing of funds with the trustee, providing letters of credit (L/Cs), insurance policies, and capital contributions to a bankruptcy remote entity. S&P will review the investment agreement, guarantee, L/C, or insurance policy to ensure that there are no circumstances that would relieve the institution from its obligation to pay. S&P will co-operate with each issuer to ensure that the transaction meets the rating criteria.

*Source:* Standard & Poor's (S&P), 'Global project finance'

### *Pre-assignments*

Where there is a risk that a project financier cannot get the benefit of a contract, if there is an election to step-in after a default, that contract might be pre-assigned to the benefit of the lenders. An example is given for TelecomAsia's build transfer operate (BTO) concession in Chapter 25.

## Summary

Classic credit analysis is put to work in this risk category. Standard financial ratio controls can be used to govern the parties to the project. Variations of recourse via deficiency agreements can include new equity commitments. Special attention is needed to structure the SPV itself.

---

[1] MIGA, World Investment and Political Risk, 2014.
[2,3] Hoffman, SL, *The Law and Business of Project Finance*, 3rd edition, 2008, Cambridge University Press, pp. 85–92.
[4] Vinter, GD, *Project Finance: a legal guide*, 1998, Sweet & Maxwell.
[5,6] Ahmed, PA, *Project Finance in Developing Countries*, IFC, 1999, p. 66 and 62.

Chapter 23

# Interest rate risk

Interest rate risk is also known as funding or escalation risk. It is the interest rate cashflow line in the project finance spreadsheet; the availability and cost of funds. As mentioned in Chapter 2, banks usually fund themselves on a floating rate basis.

Although banks do not own their money – a bank has to purchase and intermediate its money – this is one risk they choose essentially not to absorb, no matter how much within their control the funding actually is. Bond investors are much more accustomed to a fixed rate yield milieu and the continuous portfolio rerating and repricing which will reset their return.

For volatile commodities, such as oil, a floating rate of interest may be acceptable on the basis that oil and inflation rates are positively correlated as are interest rates and inflation rates. The mirror to this line of non-structuring is that high volatility of revenues requires greater flexibility in repayment which will naturally favour a floating rate transaction. Post global financial crisis, these relationships are hard to defend!

## Contract structures

The suppliers can get very caught up in the rush for a sale – power and telecoms has witnessed this from equipment/system suppliers – in an effort to defend market share. Occasionally the turnkey contractor acts in a similar manner. If they then get into difficulties, their only option – besides flipping it into a project financing – may be to convert their facility/bridge into equity and seek a take-out route through subsequent sale of that equity.

### *Supplier credits*

Many suppliers will use their balance sheet (and treasury skills) to offer fixed rate and concessional interest rates. Offshore captive finance entities may be able to be structured to this end. Some suppliers may have access to subsidised local funding which enables them to offer favourable financing terms. Naturally, this funding is linked to an order for that equipment, service, or system.

Suppliers would prefer to act as bridge financiers with a take-out as soon as possible. Project finance after completion may be one such take-out route. Pre-completion architecture may require guarantees from the suppliers.

### *Leasing*

Leasing structures are covered in Chapter 8. Of relevance here is that in most leasing deals, the lessor arranges the funding (and therefore takes the interest rate/funding risk) and uses the taxation system(s) to offer a lower cost interest rate basis in the lease payments.

Special care is needed to evaluate leasing deals since often a single number, the lease 'interest' rate, is the deciding one. Many assumptions can be input in achieving that figure which can introduce inflexibility, termination premium problems (especially early on for leveraged leases), and hidden fees. Amongst the pitfalls is that the offer looks like a one-single lease rate, when the deal is pure and simply on a floating interest basis (and therefore does not take the interest rate risk).

As pointed out in Chapter 2, lease payments usually take *de facto* seniority to the project financing. However, leasing is usually inflexible. It is not easy to stop a lease and then re-lease the equipment a few months later.[1]

### *Hedging/swaps*

If there is a decision to mitigate interest rate risk by hedging or derivatives structures, the question arises, just as in Chapter 12: how much of the interest rate risk exposure should be hedged and for how long? The answer is similar to foreign exchange (FX) hedging.

1 Examine the downside (cashflow forecast) case to see that it is not threatened by interest rate changes. It may be necessary to construct a downside case specifically to test this. Alternatively, this can be tested by running a series of interest break-even cases.

   Present value (PV) ratios use the interest rate plus margin as the discount rate. Thus any change is more than three times compounding since the interest expense line, tax, and PV discounting are all affected by any change in interest rate assumptions. Again the periodic debt service cover ratio (DSCR) comes in to its own.

   It is ridiculous to move interest rates, say by 5 to 10 percentage points, without changing the underlying escalation/inflation basis for the model. Interest and inflation/escalation should be ratcheted together.

2 See whether it is advisable to hedge a sufficient amount of the interest rate exposure to achieve a minimum DSCR (without changing other risk mitigants).

3 Look at the overall price, FX and interest programs to just cover:
   - opex;
   - debt service (DS);
   - both: or
   - the rest = taxes, profits, returns (equity and debt) – not usually hedged.

4 Review the desired flexibility with regard to prepayment and resetting/refinancing the transaction. A program to swap the lot, say to fixed rate, for as long as possible now builds in extra risk of break costs to unwind the swaps upon default (if that forces a refinancing/partial write-down). Recall that in an interest rate swap – unlike an FX swap (see Chapter 12) – usually the underlying principal is not exchanged, merely the obligation to pay interest.

There are many authorities on swaps and derivatives[2] and many colourfully named products are under development all the time – such as cocktail swaps, skylocks, swaptions, and rolly-polly. Any bank/investment bank will be more than happy to advise on the latest techniques. Flexibility through reset and extension mechanisms (synthesised from options) should be sought in a project finance context. Risk management in the derivatives context usually means volatility control (through the use of the entire Greek alphabet, plus vega).

### *Natural hedge*

If the revenues, cost, or interest rate exposures can be hedged naturally, this should be sufficient to mitigate the interest rate risk. There are overlaps with the market risk, price, and hedging discussion. (See Chapter 11.)

Consumer price index (CPI)-based funding can match a CPI-based escalation for tolls or transmission/distribution charges – often seen in regulated environments.

- Commodity-based funding can match a revenue line to provide a completely natural hedge of the DS.
- In fixed revenue transactions, obviously a fixed rate funding is valuable. Examples include pipelines (around 90% to 92% fixed revenues for capacity), power purchase agreements (PPAs), water (for the capacity-charge component) and the fixed price component of prisons/hospitals contracts.

## Trigger structures

### *Alternative funding*

In the event that one cannot purchase a deposit (banks cannot fund themselves), then one may have to structure an alternative interest rate regime if it is available. The event might be due to an impersonal *force majeure* (see Chapter 18) – such as a collapse of a particular funding market (for example, Herstatt) or collapse of a financial system (as might be caused by a derivatives crash (global financial crisis)).

The alternative funding might be allowed:

1 as a permanent replacement;
2 until an alternative is agreed. Failure to agree within 30 days may accelerate the loan to the point even of full repayment;[3] or
3 to substitute immediately, but must revert within 30 days to the original interest rate basis; otherwise full acceleration.

The documents have to provide this replacement procedure with realistic timetables and methods to consult and agree. Most times the banks will seek very short terms on the replacement funding basis.

### *Interest protection agreement*

Where debt service repayment flexibility is constrained, then the project financier may agree to capitalise interest above a certain level into the project financing. This might be repaid when interest rates subside or are merely added to the end of the loan, as a mandatory loan extension.

Banks assembled portfolios of these structures in the 1970s and 1990s and got burnt (again). The hope is that they do not get burned on the derivative caps and captions that are now written instead to achieve this end.

It is pointed out:[4]

> By providing advice or assumptions used in projections, it can be argued that a lender has assumed some responsibility for providing additional financing if future cash requirements are higher than expected, due to unanticipated increases in interest rates.

### *Interest make-up agreement*

The parent/sponsor group agrees to pay any excess above an agreed interest-rate ceiling. Alternatively, this will be 'banked' with a credit against subsequent interest payments (if the interest rate is below the agreed ceiling) or perhaps subject to a maximum dollar amount.

### *Bank-ended interest*

The bank offers a low interest rate basis in the early years, via an accreting swap, with an algorithm to increase it over subsequent years of repayment to recapture the amount yielded. In such circumstances, the bankers will build in ferocious prepayment clauses to recapture the foregone yield either completely or with extra premium (to compensate for an opportunity cost for that bank's balance sheet commitment). The overall interest rate can be considered in this case as fixed within a period, such as a year, but increasing steadily in subsequent years.

## Summary

All of the hedging/swaps/derivatives products are used for interest rate risk control. Many bonds are fixed rate. Concessional interest rates can be achieved from lessors and suppliers. Other cashflow structuring can be used to provide interest rate ceilings or back-end interest rate bases.

---

[1] Tinsley, CR, 'Risk analysis and allocation' in *Practical Introduction to Project Finance*, 2000, Euromoney Books.
[2] Das, S, *Swaps and Financial Derivatives*, 2nd edition, 1994, The Law Book Company.
[3] Sometimes this type of loan acceleration is labelled 'recalled'.
[4] Fabozzi, FJ and de Nahlik, CF, *Project Financing*, 8th edition, 2012, Euromoney Books.

Chapter 24

# Syndication Risk

Once a project financing has been structured and agreed, the actual funding has some risks which should be understood. Syndication Risk is, therefore, sometimes labelled the financing or underwriting risk. Because of the size of many project finance transactions, the underwriters are keen to sell down some of their exposure from a risk portfolio point of view. The sell down by way of syndication will also substantially improve their front-end yield from the deal.

Syndication in project finance is not much different to other loans or issues. A sponsor group can adopt three approaches to funding.

1 Select a financial adviser to structure the deal (see Chapter 4):
   - the financial adviser goes on to secure the funding (and collect associated fees?); or
   - the financial adviser then competes with everyone else to provide the funding.

2 Select a lead arranger/underwriter to find an underwriting group and manage the syndication process. The assembly of a lead underwriting group can actually be undertaken in four ways:
   - whittle down from a group of bidders;
   - select from a set of bank-club bids;
   - select a 'UN' syndicate; or
   - be told by the sponsor(s) who to ask.

3 Solicit bids from either anyone or a pre-qualified group. This can be done either through a given term sheet or by riffling through the terms and conditions offered for the most advantageous terms.

## Roles

Besides the financial adviser (discussed in Chapter 4), the main syndication roles are as shown below.

1 A lead arranger/co-ordinator is the top-tier implying a role or large underwriting commitment. It is expected to:
   - prepare the information/offering memorandum;
   - engage lawyers to finalise the documents;
   - scope the work for any independent reviews or due diligence (see Chapter 9);
   - arrange the marketing of the deal either by phone/fax/email or through presentations; and
   - co-ordinate any roadshow logistics.

2 A bookrunner is the lead arranger who manages the invitations to the syndicate and the 'book' tally of syndicate commitments. It is a desirable role for establishing reciprocity

among syndicate lenders. The bookrunner would often arrange the roadshow. Alternatively, each lead arranger runs the syndicate book for its given part of the world.
3 An agent/trustee manages the documentation and technical due diligence (see Chapter 9) and therefore often has engineers/industry specialists on staff who are responsible for shepherding this aspect.
4 A closing ceremony bank arranges the 'signing of the deal' event.

The rank of syndicate members below the top tier is by way of an honorary name according to the amount of money tabled/final take, and will run:

- arrangers (now called mandated lead arrangers (MLAs));
- managers and co-managers;
- managers; and
- participant.

This is in descending order on the tombstone with the top left being the most prestigious slot. Again, this follows general loan syndication market practice.

## Choice of banks and placements parties

Ideally the parties fully recognise the risk profile inherent in a project finance. In the world, there are 30 to 50 experienced and committed funding parties among the banks (arrangers) and bond markets (underwriters) with the same number again as committed project finance players.

Usually the choices depend on:

- experience with prior project finance deals/league tables in that sector or region;
- relationship with the participants, usually the sponsor group, purchasers, or contractors; or
- specialists/niche/sector financiers.

If the relationship with the participants is the basis or pressure to make the choice, then caution is needed since the whole concept of a project finance option is to cut that cord after completion. *Project finance is not a relationship service/business.*

The main syndication types are shown in Box 24.1.

**Box 24.1**
**Syndication types**[1]

*Underwritten*, then
- Selling down the underwriting by between 40% and 70%.
- Arrangers/lead managers consider:

*Continued*

- market pricing, especially the margin;
  - likely tier commitment levels;
  - recent transactions;
  - industry/sector;
  - country/region;
  - part of front-end/success fee passed on to participants (the balance is the praecipium); and
  - final take.
- Bookrunner (managing the invitations/commitment levels).
- Documentary bank/agent (managing the negotiations/administration):
  - trustee relationship.
- Technical bank(s).

*Club*

- Two to three groups of underwriters:
  - take and hold;
  - no information memorandum needed;
  - saves time – about two months; and
  - syndicate later.

*Broad*

- Large bank/underwriting group approached:
  - roadshows are needed;
  - extra time is required to brief wide group and get commitments;
  - 'global' appeal needed to succeed; but
  - do not do it!

*UN*

- Two banks/underwriters from each major region/country associated with the project:
  - political risk cover may be gained from this approach.

*Equator*

- banks are selected for their Equator principles compliance:
  - bond investors have not signed the Equator principles;
  - most private insurers have not signed the Equator principles; and
  - no one will project finance an environmentally offensive project anyway!

## *Pricing*

The global financial crisis caused syndication to freeze. Front-end fees vary from 0.25% to 2.5% for banks and 2% to 4% for bond underwriting of the amount being sought. Less than this is passed on to syndicate banks (50% to 70% of the fee for the next level dropping to 10% to 25% of the fee for the smallest level of participation. The balance, called the *praecipium*, is split among the lead arrangers/underwriters.

Pricing is referenced to recent deals or others currently in the market for similar transactions especially those done for the same sponsor. Syndicate levels will be closely matched to estimated appetite, prior deals/participations, and marketing/bookrunners/lead arrangers' position. The sponsor group may want to specify who can be invited and at what tier, but usually the sell down is ultimately left to the lead underwriting group.

### *Disclosure*

The standard of disclosure should be very high in a project finance. Unfortunately, the front page of every information memorandum says something like this:

> No representation or warranty, express or implied, is given as to the accuracy completeness, or suitability/level of disclosure of the information (and spreadsheet model) contained herein. We do not covenant to update this information whether or not information comes into our hands subsequently. Before making any decision about participation in this transaction, you agree to undertake independent investigations and will not rely on this information.

Each potential project financier can expect a heavy due diligence load on each and every deal.

## Contract structures

### *Fully underwritten*

A single bank underwriter or lead-arranger/underwriter group agrees to underwrite the whole of the deal based on an agreed terms and conditions offer letter, the commitment letter, to be syndicated later. This 'term sheet' may have some 'out' closures which may include a change in financial markets – either bank, bond, or equity markets generally – or passing through a threshold level of, say interest rates, bond yields, sales price level, or stock-exchange indices.

In the author's experience such bank commitment letters are strenuously complied with as a matter of honour, not just legal commitment. Sponsors and underwriters quickly get to know who agrees to a deal and then tries to reset everything (in their favour) during the negotiations.

However, a deliberate 'out' clause, called a 'market flex', is sometimes seen. If the deal cannot be syndicated at the pricing offered or some event has occurred in the nature of the above-mentioned 'out' clauses, then the underwriters can increase or decrease the deal pricing.[2] Occasionally the sponsors' treasury may be able to see a decreased price if the market can be demonstrated to have improved pricing. Minor price shaving should never hold back any project financing, which is much more heavily driven by structuring leverage and flexibility, rather than one eighth of a percentage point per annum.

If the loan/issue is all underwritten and provided by one institution, then this risk does not apply. As would be expected, this would be for medium to small-sized amounts, say below US$50 million. Occasionally a bank will take on a large deal which it holds, usually for a sponsor which it likes, say up to US$400 million.

### *Club underwriting*

In this fully-underwritten version – often the only way a project finance deal could progress after no one knew whom to trust post global financial crisis (GFC) in 2008 – a club of banks agree to underwrite and not syndicate for the moment. This can save considerable time and expense since the lead group does not:

- require a formal information/offering memorandum stage;
- need to market to a syndicate;
- wait for syndicate approval processes; or
- need to handle syndicate banks' inputs into the documentation process. A savings of one to two months, or more, may be achieved (see Exhibit 24.1).

Exhibit 24.1

**Typical syndication timings (approximate)**

| *Cumulative (in months)* | *Lead-group activity* | *Task time* |
|---|---|---|
| 2 | Building 'bank' computer model. During this time:<br>• select two to three structuring options (risk profile);<br>• define 'bankable' studies needed;<br>• scope bankable studies;<br>• start drafting information memorandum.<br>Decide on underwritten, club or broad syndication. | 1–2 months<br><br>1–2 weeks<br>1–2 weeks |
| 3 | Sponsors agree project finance alternatives (amount, term, repayment) and up to three alternate structures. | 1–4 weeks |
| 4 | Initial marketing to financiers and information memorandum. Narrow field to 3–6 arrangers or 2–3 clubs. | 3 weeks |
| 6 | Solicit financial offers. | 1–2 months |
| 8 | Finalise term sheet, bank/underwriter approvals, and documentation.<br>*Variations*<br>Club route:<br>Government/export credit agency (ECA) programs:<br>World Bank/MLA program:<br>Broad syndication (do not do!): | 2 months<br><br>Deduct 1–2 months<br>Add 4–9 months (each)<br>Add 1+ year(s)<br>Add 2–3 months |

*Source:* Author's own

The fastest time claimed to get a 144A deal done is two months, but that was for a deal already prepared and rated. The fastest bank club deal is three months, which would still require round the clock attention.

- Although a bank/underwriting group may think that a one-club situation is ideal (a monopoly), it is not the case, because competition is imperative to avoid the lowest common denominator ruling the term sheet development.
- Too many clubs is also self-defeating as now too many losers have been created. A way to short circuit this is to require the winning club to offer, say, up to 50% of the deal for participation by the losing club(s).
- One club may be preferred if it is difficult marshalling, say, all the country exposure needed for the (large) deal.

### *Broad syndication*

As wide a net as possible is cast, perhaps 80 banks or more, in the hope that enough will have appetite for the deal, sector and/or region. Although such a large group may be seen as an achievement by some, the reverse is the case. Participant banks or places unfamiliar with the complexity of project finance structuring can quickly bog down the waiver process seen in just about every transaction and can panic when things appear to be going wrong or the deal needs to be revisited. The smallest participants often wail the loudest in the hope that they will be taken out to stem the verbal, written, and negotiating angst.

**Case study: Shajiao B, China**

For the HK$3.3 billion project financing of the 700MW Shajiao B project in China, the original 46 initial financing banks were expanded to 65 refinancing banks, with only a few participants new to the project finance business.

### *UN syndication*

Two project finance banks are included in the syndicate from each country/region, for example, two British, two German, two Canadian, two Asian banks, in a deliberate effort to distribute the exposure across countries. This is a very indirect political risk approach, akin to a market tie (see Chapter 24).

## Study structures

### *Information memorandum*

Where the syndication/route is selected, an offering circular (known as a red herring for the US capital markets) or a bank information memorandum is prepared. It has the function of being both a selling aid and to bind in the borrowers/issuer's representations and warranties – that the information is true and the projections are not misleading.

The format is often a smart cut and paste of the executive summaries of the engineering and financial feasibility studies along with cashflows more refined to show the project financing. The usual format is shown in Box 24.2.

**Box 24.2**
**Information memorandum**

The usual format is a 40 to 100-page document giving:

- confidentiality disclaimer;
- summary timetable;
- project description,
- project financing: structure, terms and conditions;
- key contracts (summary);
- sponsor profile(s);
- risk discussion ← ;
- cashflow proforma, sensitivities (4 to 10);
- summary of independent expert reports; and
- documentation summary/diagram.

*Source:* International Advisory & Finance 2014

Due diligence and disclaimers require the project financiers to do the full due diligence and to review:

- the feasibility study(ies);
- all project contracts;
- any financing document drafts (usually reserved to the arrangers or lead managers);
- sponsor/participant financials; and
- all experts' reports and background studies prior to commitment to a participation or final take.

Each project financier likes to redo/audit the cashflow proforma as a check against its own template.

Like a formal prospectus, an information memorandum carefully gauges the disclosure level and the marketing pitch. Care is needed not to be overly swayed by the technical/feasibility aspects which have dominated the process prior to the issuance of the information memorandum. As a general rule, the bankers want to see all of the information to construct the downside case and six breakeven cases cashflows (see Chapter 3). Bond investors are more interested in what is behind the rating and the 'names', and usually do not go back a step to review feasibility study reports, preferring to rely on a good 'name' independent expert/engineer's review and, of course, the rating agency's due diligence.

Although many information memorandum formats could be recommended,[3,4] it should be remembered that at and until this stage, the whole project process has probably been dominated by the engineers. What is now uppermost of concern is a thorough risk review and examination to see that the structures are robust and can (help) mitigate the risks. The project description can now be shortened considerably, while a risk by risk review will be the most productive and appreciated aspect during syndication.

The next most appreciated part of the information memorandum is an easy-to-use yet comprehensive cashflow spreadsheet model, preferably in Excel. Obviously, all of this is encapsulated in the ratings agency's report and rating assessment. The banks wish to examine each factor to sift out the weaker points, try to find fatal flaws, and identify uncovered risk aspects or attributes.

## Avoided

### *Equator syndicate*

Syndication risk arises when one bank is a signatory and is following the Equator principles and the bank to which the deal is being syndicated does not, and vice versa. Banks are selected because they are/are not Equator (principle) compliant (see Chapter 16). Capital markets project finance players are not Equator signatories nor are any of the private insurance entities.

### *Syndicate Excel model*

Each bank likes to double-check the financial projections, often adapting the financial information into templates, screening models, or lookalike deal models (see Chapter 3). However, it is always a welcome shortening of this whole process to have a project model that can be all things to the banks, the information memorandum, and the project development plan (discussed below). It is either easy to audit or has already been audited/signed off by a name accounting firm. Many deals adopt a project 'electronic model' and attach it to the loan agreement.

The practice of some lead arrangers or financial advisers to never share the model even with their client – the sponsor group – arises from time to time. All sensitivity runs then have to be channelled through one source. This approach stems apparently from the desire to hold the cell logic proprietary. Rather than assist the process (by getting someone else to run the cashflow sensitivities), most experienced players then have to go to the trouble of retrofitting a model to the print-outs – a time-consuming process.

### *Project development plan*

A 20 to 30-page document can be prepared to describe the project and includes the electronic model. This project development plan (PDP) is trying to delimit, delineate, and define the project: no more and no less. It is not a short version of what would normally be thought of as a 'business plan'.

This document can then be used for the project drawdown schedule, certifications and covenants by both the banks – to monitor drawdowns and deal compliance – and the independent engineer, especially in policing Type 1 completion tests.

### *Loan administration*

A loan administration document can also be abstracted from the various agreements to document the timetables for drawdown, repayments and floating interest rest mechanisms. This would be 'field-tested' by the back-office administration staff before signing. It should be handed to all project finance parties especially the sponsor/special purpose vehicle (SPV) manager and the other banks/participants/trustee. It would always have the caution that this is not a substitute loan agreement.

## Summary

This is a fairly standard risk to structure/cover/mitigate. Care may be needed where environmental aspects require structuring, especially in Equator situations (where one party has signed the Equator Principles and the other syndicate party has not/will not).

---

[1,2] Campbell, M and Weaver, C, (eds), *Syndicated Lending: practice and documentation*, 6th edition, 2013, Euromoney Books.

[3] Fabozzi, FJ and de Nahlik, CF, 'The offering memorandum', in *Project Financing*, 8th edition, 2012, Euromoney Books, pp. 44–57.

[4] Hoffman, SC, 'The offering memorandum', in *The Law and Business of International Project Finance*, 3rd edition, 2008, Kluwer Law International, pp. 306–9.

Chapter 25

# Legal risk

Legal risk occurs when either the documentation or the legal system does not work. Due to the complexity of most project finance deals – many with cross-border documents – this can easily happen. An additional complication arises in some countries where the concession basis is new and the constitution and legal system have not been brought up to date to accommodate the seniority expected by international lenders. This includes security, land, step-in rights, foreclosure/receivership, and tax remittances – which are perfectly normal in a project finance, but are seen as a threat to national courts and sovereignty by some countries. An understanding of the circumstances where legal risk can arise is obviously required before refining the approach or structure that can work.

Documentary complexity is a fact of project finance life. Many deals can amount to well over 1,000 pages when taking into account permits, concessions, operating agreements and offtake/supply contracts. Deals with more than 10,000 pages are known. One public-private partnership (PPP) deal had 500,000 pages! One look at Exhibit 8.1 will be sufficient to highlight the scale – at least 26 documents are listed there for a typical BOO/BOT concession-based PPP transaction and not forgetting the 21 participants or so in a typical deal (see Exhibit 22.2). It is not just the sheer magnitude of the documents but also their interrelationships that add to the complexity. Additionally, the translation of a complex financial model into a term sheet and then into the documents suite is a process that can take, literally, years. It is asking a great deal of the lawyers to capture every actual and perceived risk structuring in the paperwork.

In tax-based cross-border transactions, there is both a risk of yet additional complexity and the moves by the respective governments to close the loophole that is being exploited by the tax structuring. This could be retrospective, caused by a future loss of tax benefits, or even attract a fine/penalty besides all the other break expenses on funding, swaps, and equity/tax shelter. Examples here could include zero risk collateral structures such as defeasance or structures endeavouring to treat debt as equity such as in some convertible preference share structures.

**Case study: Sithe Independence, US**

In the Sithe Independence power transaction (see Exhibit 13.2), delays in completion of the new FA turbines would mean that Sithe would be required to draw on the partly established debt service reserve for its very first repayment of principal and interest. An initial review of the project finance documents indicated this debt service reserve (established to service the debt) 'could not be tapped to make principal repayments' – not a good prospect for the first project to fund completion risk on the 144A bond market.[1]

## Legal regime

The legal system of a country may not be adequate to cope with the complexity of project finance. Some countries have constitutional and legal regimes which are highly protective of domestic entities and not at all suited for any foreign investment, not least a project finance. The legal system may need revamping; for example, it was necessary to amend the constitution of Turkey to facilitate power project finance deals. In many countries, foreigners cannot own land or real property. Projects can only be held by local entities with majority local directors notwithstanding the underlying ownership or beneficiary percentages.

The security documents have to be under local law as a practicality. It is crucial to examine how the local laws and courts function before setting up the project consortium bid or the ownership vehicle. Of relevance here is the legal standing of special purpose vehicles (SPVs). An unincorporated joint ventures (UJV) structure is quite tricky to synthesise in the US within the overlay of the Uniform Commercial Code in that country.

The law of trust is particularly weak all around the world. One should always be doubly diligent to be sure of a full understanding of the stature of a trust, the powers and obligations of a trustee, and the likely view of the courts in any trust litigation.

In other countries, the government may be able to shelter itself by invoking sovereign immunity[2] or invoking the emergency powers vested in ministers (in often amazing ways in almost every jurisdiction).

Changes in law, regulation, or the bureaucracy are more usually in the nature of political risk described in Chapter 21. However, legal risk can arise when permits and approvals lapse as the renewal or re-application process may be legally fuzzy.

For a project accessing the coast with a port, there are many title issues that may arise such as to the sea bed or land above low-tide marks, and so on. Maritime access rules are very different to those applying to land-based projects.

If the land is owned by a company, company law needs investigation as well as the company's own articles of association. If the land is leased or sub-leased, then cascading defaults may trickle down to the project or spring from the project.

In many countries, the legal difference between fixed and movable assets is profound. It may be necessary to make fixed assets capable of removal such as container-based modules or even to have the whole plant, say, barge-mounted.

Some countries do not recognise or provide security over inventory or receivables or allow mortgages to be registered (or kept up to date) in foreign currency.[3] In code-law jurisdictions, a security interest over receivables may have to be notarised which may be difficult to perfect for future receivables.

### Case study: Indonesian law

Indonesia has a blend of Dutch code, decree law, and Islamic law. There are many legal traps – not least that a decision by the board of directors of a company does not bind the board.[4]

- If a pledgee ceases to hold physical possession of a movable asset, the security interest is automatically terminated, except for theft or loss.
- In general, foreigners cannot mortgage Indonesian land (whoever may own it?) or leasehold interests.
- The Indonesian legal system does not possess a doctrine of precedent.[5]

Because of these types of difficulties, security is often battened down through the equity via a pledge of shares and cross-border equity interests, rather than reliance on the conventional security package over the assets.

### Case study: Chinese law

China has instituted new project finance laws intended to codify and clarify approval procedures, especially oriented at build own transfer (BOT) transactions.[6] However, higher authorities have different views and the subsequent classifications further confused the issue. China's foreign investment laws initiated in 1979 still have not seen all the necessary regulations issued.

## Concept of law

The concept of law may be perceived differently in differing contexts. It is almost as if the question is being asked: 'Why bother with the documents? They are merely statements of intent. We will re-negotiate everything anyway.' This may extend to a concept of 'equity' or 'fairness': 'You will share my pain' no matter what the agreements say.[7]

An extension of this risk is the very concept of land. Was the land unoccupied (*res nullius*) at the time people started to develop and record land? Is the person on the land using it – for whatever purposes – or owning it? Rights to land might extend to migratory behaviour – following the caribou, hunting for a cassowary once a year – or annual access for solstice or religious festivals. Many indigenous peoples are trying to convert this *usufructuary* (literally 'use of the fruits') right into ownership and, by extension, money and power.

If land is traditionally seen as a tribal or clan asset, an additional legal problem arises. Who has the authority to negotiate and bind the clan or does the whole clan have to sign? Is there any concept of democracy, royalty, or clan chiefs? If not, then landowner associations/companies may be needed to sort out this leadership/authority issue before starting on the access/land negotiations. Access to land, may also entail political risk, discussed in Chapter 21, as well as environmental risk, the subject of Chapter 16.

**Case study: Bougainville, Papua New Guinea**

In the Bougainville civil war, the indigenous people's Bougainville Revolutionary Army (BRA) destroyed the main income generator on the island, a project financed mine (described in Exhibit 21.9.) The commander of the BRA invoked a new view of the original concession granted by the Papua New Guinea government.[8] In essence it read: 'You made that concession contract with our fathers, not with us.'

In China, it is not uncommon for the party who is signing a contract to view themselves as only an agent and therefore not responsible for the obligations assigned in the contract. 'Documentation may be poorly written and loosely drafted. This may reflect the intent of the parties to the contracts or it may simply reflect a lack of understanding of the risks involved and who would be expected to shoulder them.'[9]

## Enforcement

The enforcement of project finance documents throws up some additional legal risks.

1 Carriage of a judgement across borders is notoriously difficult to achieve. The listing of 11 factors which countries consider in determining to enforce a foreign judgement includes whether it is contrary to a judgement obtained in a local court.[10]
2 This may even be true of an arbitration award where the respective countries have signed the relevant treaty respecting mutual award enforcement.
3 Exercise of security documents often have extremely hazardous legal ramifications such as:
   - subordinated and unsecured local creditors can spring into seniority (to the project financing);
   - all approvals and permits have to be obtained again; and
   - the bankers/landholders are forced to sell any asset upon which they have foreclosed/exercised their security. The timetable and conditions of that sale process may be very antagonistic to foreigners.

Conflicts of jurisdiction is another insidious enforcement issue. One seeks to enforce a particular aspect of a concession only to discover that a provincial, state, or federal/central authority now claims jurisdiction – a version of political risk (see Chapter 21). For political (and sometimes negotiating) reasons, these conflicts of authority are often not resolved and are used to 'trump' enforcement or to stymie negotiations. (The threat of local councils imposing local taxes is more correctly a political risk addressed in Chapter 21.)

## The courts

The operations of the courts may carry risks which cannot be controlled or structured:

1 private citizens may be able to attack a project at the highest courts in the land. This has been seen in India (private citizens can object directly to the High Court)

and Hungary (a private citizen obtained a judgement that the highway toll was one third too high);
2 the timetable to get a judgement on any matter brought before the court may be ludicrously long. Again in India, 10 to 15 years is expected in this regard;
3 foreigners may have no standing (no legal position) in a local court;
4 racial problems can interfere with the actions of the court because of covert discrimination; or
5 corrupt judges may be endemic and progress depends on the willingness to pay.

It is most important to select a legal jurisdiction for the main loan agreements where one can expect to have an experienced and independent judiciary. In some countries, it is evident that the government can get any 'right' judgement in its favour.

Surprisingly, New York law (and other states of the US) has major holes with regards to jurisdiction for international transactions. English, Canadian, or Australian states' law is considerably easier and cheaper.

### *Dispute resolution*

The methods of dispute resolution may be problematic. A country may not permit international arbitration or recognise, say, the ACDC Guidelines for Commercial Mediation.[11]

Arbitration is preferred outside the country in a neutral venue.[12] The forums include:

- International Chamber of Commerce (ICC);
- London Court of International Arbitration (LCIA);
- UNCITRAL (UN) rules;
- International Chamber for the Settlement of Investment Disputes (ICSID); and
- Stockholm Chamber of Commerce.

Specialist advice is needed to select the best one and additional care is needed on how the arbitration is initiated, arbitrators are selected, the procedures to be followed and any timetable weaknesses. A useful point is to ensure that the arbitration cannot be nationalised!

It is sobering to quote: 'The case law related to these matters is unhappy, inconsistent, and confusing – it would not be fair to say that the cases lead to any uniform result'.[13]

**Case study: Dabhol, India**

The US$150 million, Dabhol Phase I project finance was for a power plant development in Maharashtra, India. Upon a change of state government, the concession was not terminated, repudiated, or cancelled. A new legal concept was used: it was 'scrapped' by the new government.[14] Tough legal, political, and publicity pressures were successfully resisted by the US sponsor group, which initiated arbitration procedures in London, which it was entitled to do. The Phase II project financing was syndicated before a full default caused by non-payment for power by the state-owned offtaker.

Prior to allowing a case in court, many judges require an attempt at mediation. The sheer weight of time and cost often forces settlement of the vast majority of court suits anyway. A well-structured mediation clause will have nominated the procedures, practices, and timetables. Because of the complexity and multi-disciplinary nature of project finance, it may be difficult to get mediation to work quickly.

There is considerable merit in considering experts with authority to settle disputes outside the courts (thereby disappointing the legal fraternity). Experts are nevertheless 'liable for negligence in performing… otherwise unreviewable functions.'[15]

It is a good idea to pre-nominate an uneven number in the expert panel – individuals or preferably companies – within the documents. The nomination process starts by agreement on the selection; failing which the remaining expert is chosen by default (non-selection). However, in some countries, it is unconstitutional or illegal to contract anything away from the courts – an expert determination therefore is void.

## Solicitors/lawyers

Last, but not least are the solicitors/lawyers themselves. Most are *not* formally trained in risk assessment and cashflows. The tendency of legal practitioners is to look backwards at prior/recent transactions as the documentary authority, rather than drafting anew.

> **Case study: Lawyers, Australia**
>
> Instructed to draft a new model document for a project development in Mexico, the law firm obliged quite quickly. Too quickly, as it turned out, as they forgot to word process the address in the notices clause – Avenido Bernardo O'Higgins, Santiago, Chile!

Local lawyers may be 'unversed' in the sorts of issues likely to arise.[16]

- A good local lawyer is a vital source of non-legal advice too, with insight into personalities, procedures, and politics.
- It is usually helpful to have a link to an international legal group or else a lawyer who has some commercial/finance experience overseas (but not Europe!).
- A familiarity with the office of the state solicitor/attorney general may be of value in ascertaining any regulatory/within-government concerns about permitting, approvals, or government matters, for example, tariff or environmental approvals by the cabinet/local government.
- Language nuances may be critical in finalising the documents.[17]
- There may not be enough experienced local lawyers around to avoid conflicts of interest among the many participants in a project finance transaction. (See Exhibit 22.2.) Get the best local counsel early!

The lawyers are easy targets for criticism when, in essence, many bankers simply turn over the term sheet to their law firm. In these circumstances, many lawyers have come to believe that they do the project financing! This may be perfectly justifiable and may in part result from high staff turnover at many financial institutions. Lawyers with three to five years' experience in project finance can be considered 'seniors' in this context.

A good project finance executive will take a hand in drafting if needs be, by giving clear guidance, instructions, and feedback from sequential drafts. A project financier must be comfortable with legal matters and must undertake him/herself to read all the documents and work with the lawyers, however pedantic the process may seem.

The character of the solicitor/lawyer is writ large on the process – we have all been in negotiations almost destroyed by a lawyer's/solicitor's belligerence – raising this or that problem without proffering a solution, or indeed the lawyer who spies a constitutional problem lurking behind every point.

Good project finance lawyers know how cashflows work, what drives people to choose project finance, and also how to make sure negotiations provide efficient inputs into a complex documentary process. Economy with words and concepts is also an asset (although one is struck by the difference between US law and English law – in English law: 'You mean what you say' and in US law: 'You have to say what you don't mean'. The latter springs from the liability and litigation milieu which permeates the US legal landscape).

Whatever, the jurisdiction, whoever the law firm, it does come down to – like so many things in commercial life – the individual lawyer in charge of the documents. There is a shortage of good project finance lawyers. Their individual skill is the key, just as it is the skill of the individual banker or the underwriter in the project finance business. How then to structure legal risk?

## Contracted structures

### *Direct agreements*

Where the project financier wishes to take the collateral benefits to other agreements and contracts, it may be necessary for the lender to become a party to those documents. Naturally, the project financier wishes to pick up all the rights and interests without any obligations. That is seldom possible. For example, in order to establish a legal charge over a borrower's interest under a UJV, the banks will seek to step into the rights of their borrower in the UJV. However, under the cross-charging provisions in a typical UJV, each party charges the others' revenues to pay operating costs (opex) that have not been paid by the other parties – a double-edged sword.

Banks have been doing this for 30 years and the practice is now called direct agreements.[18] The term 'tripartite agreement' is sometimes used since it is between the banks, the company/borrower, and the government. In this way, the banks have 'privity' – a direct connection to the party rather than indirectly through a pledge or assignment.

### *Legislation*

In some instances, the government may need to enact legislation to clean up conflicts between state and federal laws, such as the legal position on land or compensation claims. Failing legislation, the national government may have to indemnify the company/SPV if the local council and state legislature issue restrictive regulations or impose new operating standards, even taxes on the project. (This is getting very close to political risk, however.)

**Case study: Project state acts, Western Australia**

In the state of Western Australia all major projects are embodied in a state government act. This incorporates the project's title, statutory exemptions, and future obligations, if any. Although this takes some extra time, it empowers the minister responsible for that act to have authority (from the act) over all the other government departments – which much improves the state's co-ordination of major developments. Conversely, if the developer is on the other side of politics, the act has proven to put too much negotiating strength into the hands of the responsible minister.

## Trigger structures

### *Title insurance*

Title insurance may only be available in some jurisdictions, notably in the US and now Canada. This covers deficiency in title to tenure to the site.

## Study structures

### *Title searches*

Professionally executed title searches are mandatory. Title investigations should extend beyond ownership to usage regulations, access to land, rights of way, as well as sub-surface and maritime/coastal issues, if necessary.

In some code jurisdictions, the powers of a notary may be paramount in getting proper title. Some notaries price that power accordingly, and their signature can be quite expensive.

Conflicts of title may require documentary and sometimes cultural archaeology to dig for the title holder. In many parts of the world there are major conflicts between native title and national/crown title, disregarding any effort at a legislated 'fix'.

### *Legal opinions*

The character, language, and caveats in the legal opinion need to be scrutinised, debated, and tidied up or accepted well before loan signing to ensure no undue legal risk is embodied in the documents.

- A second opinion or jurisprudential credence (for example, Queen's Counsel or the Attorney General) may give weight to specific legal matters.

- Multiple opinions are needed for multiple-jurisdiction deals. However, the cross-border, inter-jurisdictional aspects may fail to be addressed.
- Conflicts of laws and jurisdictions need to be sorted out early.

The main problem with a legal opinion is the collective partnership liability. The opinion may read like this – annotated in *italics* to illustrate what is really going on:

> Thank you for your instructions on this matter *which were not complete – but we're not going to tell you.* We have investigated – *as little as we could get away with – plus a bit more on liability grounds* – the project and, if it's ok, it's ok. Furthermore, we cannot say whether the country is properly constituted or whether any of its legislation works. We're not sure about the courts either – *but can't say any more on that in case we offend someone*. We can show you lots of legal cases and precedents – *which can show you that nothing works* – but aren't sure they apply to this project's situation anyway. We're not insurance, environmental, or engineering specialists – *so we don't know about those parts of the deal.* Although we know which permits are on foot we can't tell you which ones should be done – *or are now missing.*

Most of this legal opinion is a list of disclaimers (to the benefit of the firm's partners) and is simply unsatisfactory.

### *Due diligence 'books'*

Well before the final documentary negotiations, it is useful to invite a litigation team (foreign and local) to run through worst case, hostile scenarios to test the documents. Do the agreements work in the event of disagreement? One way would be to examine the sequential solutions that can arise upon various defaults, perhaps chasing down individual risks and their impacts.[19]

Another technique for inordinately complex legal arrangements is to draw up a logic diagram of all of the events that are addressed in a document. Engineers and MBAs will all be familiar with the technique. A logic diagram will expose a great many items of dangling (unresolved) logic in a project finance suite of agreements – hopefully they are dangling in mid-air and of no consequence.

What is needed is a due diligence report which is what the lawyers were paid to do, in addition to the contractual aspects of the deal. This should display all the acts, permits, ministerial authorities, and constitutional references, in a manner which shows that the correct documents are in place, are in good standing, and are robust in terms of the legal and regulatory regime, and the history of the country.

**Case study: Aeropuerto Eldorado, Bogota, Colombia**

In Colombia's Aeropuerto Eldorado transaction, the deal was to build a second runway at Bogota International Airport. The concession was assigned to a trust-like *patrimonio autonoma* which in turn assigned its rights to an offshore trustee. Extra care was taken to extract Colombian counsel opinion on the robustness of this structure and its priority to any other claim (save the usual wages and taxes) if the trustee was insolvent.[20] Even if the borrower went bankrupt, the legal opinions showed that the cashflows would be properly quarantined to the benefit of the project finance bond holders.

## Avoided

### *Parallel security structure*

Besides the mortgage, pledge, hypothecation and attendant registrations/notarisation in the host country, a parallel security structure, especially directed at receivables, is established in the hope of avoiding some of the weak links in the domestic security regime of the country where the project is situated. This will include, if necessary, double notifications concerning security interests – all within the tolerances of 'choice of law' considerations.[21]

**Case study: TelecomAsia, Thailand**

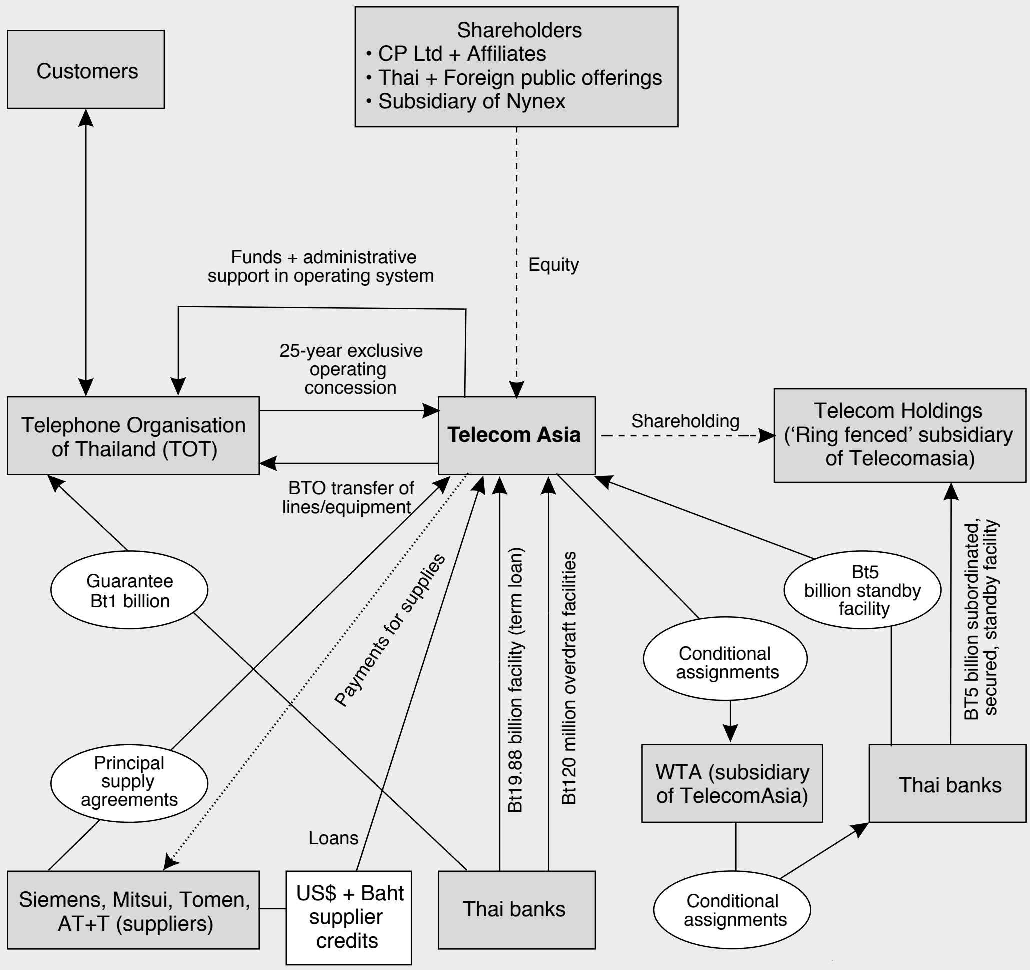
In the event of a problem with TelecomAsia in Bangkok, Thailand, the lenders were particularly concerned about access to the concession since the project was on a build transfer operate basis with the Thai government's Telephone Organisation of Thailand (TOT). The key cashflow comes from operating the 25-year exclusive concession. If TOT was squeezing the project (it had responsibility to market the fixed wire telephone lines transferred to it under the concession), then perhaps TOT or the Thai government could squeeze out the banks' access to the concession. To avoid this risk the concession was (pre)transferred to a subsidiary of TelecomAsia, WTA, already under the control of the banks, as shown in Exhibit 25.1.

*Continued*

Case study *continued*

Exhibit 25.1

**TelecomAsia, Thailand**




*Source:* M Sullivan, DC Gardner Training, London

## *Offshore security structure*

In instances where constraints exist on foreign interests in the project, and in particular the rights to land, the project financing is arranged to an offshore venue either from a choice of law viewpoint but often with suitable double-tax treaty arrangements. The security is then heavily routed through the equity in the shares in the local company or the partnership interested if they can flow cross border. The thrust of this structure is to try to leave the local company and its attendant security package untouched in the event of a default and simply exercise the 'security/collateral' rights through the control of the board of directors of the local company, if necessary nominating a complete board of 'friendly/sympathetic' locals.

### *Pre-transfer arrangements*

A project financier seeks a priority right to step in directly or through others to the project and its security package in the event of a default/workout. In some jurisdictions, this may spell trouble if the underlying problems are legal or the local legal system is being mobilised against the venture. Where possible, all the areas of step-in are arranged/completed and registered in advance.

## Summary

The choice of the lawyer is just as important as the choice of law. Due diligence should be thoroughly documented. Many project financings are exposed to cross-border legal risk. Local aspects can seriously erode the legal position of the borrower, security, enforcement and standing in the (local) courts. Some legal risk structures have a measure of political risk protection underlying them.

---

[1] *Project Finance International* 76, 1995.
[2] Feo, EF, *et al*, *Project Finance: the guide to financing international oil and gas projects*, Milbank Tweed Hadley & McCloy, 1996, Euromoney Books.
[3] Anenkova, N, 'Mitigation of project risks', master's thesis, Webster University, 1998.
[4] Tinsley, CR, 'Financing mining ventures and security requirements in Indonesia', Indonesian Mining Update, at the Outlook New Developments and Opportunities Conference, 1986.
[5] Ransome, C, 'Development of Indonesia's Infrastructure', at the Infrastructure Indonesian Conference, 1995.
[6] Jones, TE, 'Issues pertaining to project financing in the People's Republic of China', at the Euromoney Conference, Hong Kong, September 1999.
[7] Moody's, 'Chinese infrastructure: searching for fundamentals among sirens, myths, and mazes,' Special Comment, 1998.
[8] Tuke, Sir A, 'The history of financing a multinational mining company', in Tinsley, Emerson and Eppler (eds), *Finance for the Minerals Industry*, 1985, Society of Metallurgy and Exploration.
[9] See endnote 7.
[10] Skadden Arps Slate Meagher & Flom, *Project Finance: selected issues in choice of law*, 1996, Euromoney Books.
[11] Australian Commercial Disputes Centre, 'Commercial mediation guidelines', 2012.
[12] Hoffman, SC, 'Choice of panel', in *The Law and Business of International Project Finance*, 3rd edition, 2008, Kluwer Law International, pp. 411–2.
[13] See endnote 10.
[14] *Project Finance International* 79, 1995, pp. 2–3.
[15] Vinter, GD, *Project Finance*, 3rd edition, 1998, Sweet & Maxwell.
[16] Clifford Chance, *Project Finance*, 1991, p. 22.
[17] Sullivan, RF, *International Project Financing*, 3rd edition, 1999, Juris Publishing, pp. 2–7.
[18] See endnote 15.
[19] Woodhouse, T, (ed), *Project Finance: the guide to financing telecommunications projects*, 1997, Euromoney Books.
[20] Penrose, JF, 'Legal aspects – Compania de Desarrollo Aeropuerto Eldorado S.A.' in *Global Project Finance*, 1997, Standard & Poor's.
[21] See endnote 10.

Appendix 1

# Differing definitions

Project finance comes as two types (in this book labelled Type 1 and Type 2). Type 1 project finance has full sponsor support prior to completion. If there are overruns or if the project fails to meet the completion test, then full balance sheet support is given. However, once the completion test has been passed (completion risk is at an end) then the sponsor earns the automatic option to withdraw such balance sheet support.

Another way to look at what is not a project finance is to say that if the project has a financial guarantee of debt service from a government, corporate, or a bank, then the transaction is not a project finance. That does not mean that performance guarantees are not running – if in a project finance the project fails to perform, then there is no payment/project cashflows are zero. Type 1 project finance (full sponsor support pre-completion) is seen in just about every resources transaction. For a Type 2 project finance, the contractor/builders' 'package' – which likely includes turnkey arrangements; liquidated damages (LDs) as may be extended by delay in start-up (DIS/DSU) insurance – is the case for all public-private partnerships (PPPs), most infrastructure, and many power projects. As pointed out in this book, Type 2 projects are subject to limited support (from the builder/contractor) and have a flaw (no structure) if the project concerned costs more or requires more finance than the amount structured.

Rod Morrison, the Managing Editor of Project Finance International (PFI), has redefined what is project finance:[1]

> The technique of project finance involves funding a large capital expenditure project via non-recourse or limited recourse financing. This means that a project company is established to build and run the project which raises both debt and equity to fund the project. The project company solely depends on the [cashflow] performance of its asset to provide a return to its equity and debt investors.

This makes project finance look like asset-based financing, which it is very definitely not. The idea that only large capital projects can be covered is also a myth.[2,3]

## Mergers and acquisitions

If one adopts the project finance option definition embedded in a Type 1 project finance in the Introduction of this book, one can see that the bridge loan leading to a project finance bond is entirely consistent within its deployment for merger and acquisition (M&A) purposes.

Put the other way round, if the financing is simply to build a new project or acquire an existing project without reliance on that enterprise's future cashflow as the primary means of repayment of the debt, then one has financed a project, but not by way of a project financing. The definition of project financing[4] has been refined:

> the financing is not primarily dependent on the credit support of the sponsors or the value of the physical assets involved.

This is very confusing since it implies that the loan is either to the sponsors or to the asset (of the project) which it is not in a project financing.

**Case study: Argentinian securitisation**

Reliance on a stream of cashflows, say in the case of the US$400 million structured export notes for Argentina's YFP, certainly relies on a long-term oil purchase agreement with the state-owned Chilean oil and gas company, ENAP.[5] Neither party used the proceeds to develop a specific cashflow for repayment. Yes, the YPF-ENAP contract cashflows are the (primary) source of debt service, but this is a monetisation/receivables securitisation, not a project financing.

## Project financiers

Nevitt's classic definition (modifications indicated in italic):

> A financing of a particular economic unit in which a *senior* lender is satisfied to look initially to the cashflows and earnings of that economic unit as the source of funds from which a *debt* will be repaid and to the assets of the economic unit as *legal/financial* collateral for the *debt* within a specified risk framework.[6]

The key in this definition is: 'initially', since on a 'worst case' basis this may require undertakings or direct or indirect guarantees by third parties.

A one sentence simplification is:

> project finance is the level of funding (raised) based purely on the merits of the relevant project.[7]

**Box Appendix 1.1**
**Legal definition of project finance borrowing**

*Nobody would pretend to offer a legal definition which will be suitable for all purposes, but, by way of illustration, the following wording based on a definition used in a recent Euromarket transaction is worth consideration.*

*Continued*

Box Appendix 1.1 *continued*

Project-Finance borrowing means any 'borrowing' to finance a project:

(a) which is made by a single-purpose company (whether or not a member of that group) whose principal assets and business are constituted by that project and whose liabilities in respect of the borrowing concerned are not directly or indirectly the subject of a guarantee, indemnity, or any other form of assurance, undertaking, or support from any member of the group except as expressly referred to in paragraph (b)(iii) below; or

(b) in respect of which the person or persons making such borrowing available to the relevant borrower (whether or not a member of the [sponsor] group) have no recourse whatsoever to any member of the group for the repayment of or payment of any sum relating to such Borrowing other than:

  (i) recourse to the borrower for amounts limited to aggregate cashflow or net cashflow (other than historic cashflow or historic net cashflow) from such project; and/or

  (ii) recourse to the borrower for the purpose only of enabling amounts to be claimed in respect of that Borrowing in an enforcement of any Security Interest given by the borrower over the assets comprised in the project (or given by any shareholder in the borrower over its shares in the borrower) to secure that Borrowing or any recourse referred to in (iii) below; provided that

    (A) the extent of such recourse to the borrower is limited solely to the amount of any recoveries made on any such enforcement; and

    (B) such person or persons are not entitled, by virtue of any right or claim arising out of or in connection with such borrowing, to commence proceedings for the winding up or dissolution of the borrower or to appoint or procure the appointment of any receiver, trustee, or similar person or official in respect of the borrower or any of its assets (save for the assets the subject of such Security Interest); and/or

  (iii) recourse to such borrower generally, directly or indirectly to a member of the [sponsor] group under any form of completion guarantee, assurance, or undertaking, which recourse is limited to a claim for damages (other than liquidated damages and damages required to be calculated in a specified way) for breach of any obligation (not being a payment obligation or any obligation to procure payment by another or an obligation to comply or to procure compliance by another with any financial ratios or other tests of financial condition) by the person against whom such recourse is available; or

(c) which the lender(s) shall have agreed in writing to treat as a Project-Finance borrowing.

Provided that where any borrowing is made to finance a project and that borrowing does not qualify as a 'Project-Finance borrowing' pursuant to the above sub-paragraphs (a), (b) and (c); but would so qualify if there were not recourse to a member of the Group under a form of guarantee, assurance, or undertaking (a 'limited guarantee') which is either:

*Continued*

(i) limited as to the period during which it is in force (for example, during the period up to completion of the project); or
(ii) limited as to the obligations of the Borrower to which it applies;

then, in any such case, the borrowing shall be regarded as a 'Project-Finance borrowing' for the purpose of this definition to the extent that, and during such period that, the obligations of the borrower in respect of the borrowings concerned are not the subject of the limited guarantee.

*The above wording recognises that some degree of recourse to another member of the group is almost inevitable, but deals with the difficulty by causing such recourse to (apply to) the definition only on the extent that the recourse exists. Thus a Project Finance borrowing that converted to a non-recourse basis only on completion would only count as a Project Finance borrowing once the conversion took effect (Type 1).*

*Source:* McCormick R, *Project Finance*, 4th edition, 1996, Freshfields

Yet still there is confusion about the characterisation and process of project finance[8] or indeed about the objectives of the various parties.[9]

Three of these stand out from the crowd:

1 high leverage;[10]
2 highly structural[11] and contractual;[12]
3 use of special-purpose project entity/borrowing vehicle (SPV).[13]

## Summary

There are two definitions for any project finance. They are labelled as follows:

1 Type 1 where, pre-completion, there is full sponsor support.
   - Usually completion is tested by way of a completion test, which shows that cashflow generation is acceptable (as well as project completion – physically).
2 Type 2 where the construction of the project is limited to the financial support embedded in the contractor's/builders' 'package'.
   - This 'package' includes a turnkey commitment to build the project on time and on budget.
   - If the project is delayed or does not perform as structured, then liquidated damages (LDs) are payable in an amount linked to the engineer procure construct (EPC) amount.
     - Such payments are by the day or week for delays; and
     - a one-off payment, called a buydown payment, is structured to the lack of performance.

- The LDs may be extended by delay in start-up (DIS/DSU) insurance:
  - after a time deductible (anywhere for 30 to 60 days from the end of payments of regular LDs.

  The implication (of a Type 2 'package') is that contract/construction completion does not mean that the project's cashflow generation is satisfactory to repay the debt.

---

1 Morrison, R, (ed), *The Principles of Project Finance*, 2012, Gower, introduction.
2 McCormick, R, *Project Finance*, 4th edition, 1996, Freshfields, appendix 1.
3 Esty, BC, *Modern Project Finance*, 2004, Wiley.
4 Khan, MFK and Parra, RJ, *Financing Large Projects*, 2003, Pearson/Prentice Hall.
5 See endnote 3.
6 Fabozzi, FJ and de Nahlik, CF, *Project Financing*, 8th edition, 2012, Euromoney Books, p. 1.
7 Macquarie Corporate Finance Limited, *Project Finance, the guide to financing transport projects*, 1996, Euromoney Books, p. 5.
8 Scheinkestel, NL, *Rethinking Project Finance*, 1997, Euromoney/Asia Law and Practice, p. 2.
9 Pollio, G, *International Project Analysis and Financing*, 1999, Macmillan Press, p. 88.
10 Buckley, A, *International Capital Budgeting*, 1996, Prentice Hall.
11 Clifford Chance, *Project Finance*, 1997, p. 1.
12 See endnote 7.
13 Tinsley, CR, *Practical Introduction to Project Finance*, 2nd edition, 2000, Euromoney Books, p. 6.

Appendix 2

# Owner controlled insurance program (OCIP)

Disclaimer 1: USE AS A GUIDELINE ONLY (Power-Generation Plant) [square brackets indicate that the user fills in the amount(s)]

Disclaimer 2: All US$ dollar figures stated are suggested possible limits or deductibles.

## Section 1: Owner's project company insurance coverages – construction phase

*Insured*
[Asia Private Power] (the Owner) and/or [Bevan International] (the Contractor) and/or any other Contractor, Sub-Contractors, Supplier, Consultant, or any other interested Company, or Party for their respective rights and interests. Owner and lenders as insured under Section 3.

*Period*
Whole period of project until final completion estimated at [24] months from date to be agreed, plus [3] months testing, startup, and commissioning and [12] months extended maintenance thereafter.

**1 Contractors all risks, and so on, including delay in start-up (DIS/DSU)**

*Type*
Contractors all risks (CAR), third-party liability, and advance loss of profits (ALOP) insurance.

*Form*
Policy wording to be agreed.

*Interest – contract works*
[1000MW Coal-] Fired Power Co-Generation Plant located in [Ania] together with all ancillary and associated works including overhead transmission lines to grid.

**Section 1 – All risks**
All Contract Works, whether permanent or temporary, materials, incorporated or for incorporation therein, temporary buildings and their contents, and all other property or equipment of whatsoever nature (other than property insured by 2 below – Marine Cargo and so on) the property of the Insured or for which they are responsible, whilst at the contract site(s) or elsewhere in the territorial limits, including whilst in transit.

**Section 2 – Third party liability**
To indemnify the Insured for legal liability arising out of death of/or bodily injury (including disease) to persons and/or loss of/or damage to property arising out of/or in connection with or execution of the Insured Contract.

**Section 3 – Delay in start-up**
To indemnify the Insured for their loss of gross profit including but not limited to fixed expenses, fuel expenses, interest, and debt repayment following delay in start of commercial operations as a direct result of physical loss or damage covered by the insurance described in Section 1 – All risks.

*Sum insured*
*Section 1 – All risks*
Estimated contract value – US$ [1,000,000,000].

*Section 2 – Third party liability*
US$ [10,000,000] any one accident or occurrence.

*Section 3 – Limit of liability – indemnity period*
[18] months US$ [1,125,000,000].

*Situation*
Anywhere in [the Republic of Ania] in connection with the Contract.

*Deductibles*
*Section 1 – All risks*

(i) US$ [150,000] each and every loss or damage arising out of storm, tempest, flood, water damage, subsidence, collapse and landslip;
(ii) US$ [250,000] testing and maintenance;
(iii) US$ [150,000] each and every other loss or damage.

*Section 2 – Third party liability*
US$ [2,500] any one accident or occurrence for property damage only.

*Section 3 – Delay in start-up*
[60] days from originally scheduled completion date.

*Conditions*
Policy wording includes:

- Debris removal – US$ [5,000,000] or 25 per cent of loss.
- Expediting expenses – US$ [1,000,000].
- Inland transit – US$ [5,000,000] per conveyance.
- Architects, surveyors, and consulting engineers' fees.

- Offsite Storage – US$ [10,000,000] per location.
- Design, Materials, Workmanship, Clause – DE5/LEG3.
- Deductible for DE5 and so on – US$ [250,000] each and every loss.
- Automatic Increase Clause – 25 per cent.
- Cross Liabilities Clause.
- Strike, riot and civil commotion, sabotage, and terrorism.

*Premium rates*
*Section 1[a] & 2*
Calculated at the rate of [3.25]‰ (per mille) on final contract value estimated at US$ [1,000,000,000].

*Section 3*
Calculated at [5.0]‰ (per mille) on limit of indemnity.

*Premium for period*
US$ [8,875,000].

*Premium taxes*
Premium excludes local taxation and stamp duties.

*Instalment payments*
Payment of the Premium will be in [4] equal instalments.

**2 Marine cargo and delay in start-up**

*Type*
'All risks' of physical loss or damage from any external cause including: war, strike, riot, civil commotion, and marine delay in start-up (DIS) insurance.

*Form*
Policy wording to be agreed.

*Conveyance*
Land, water (including barges), and air (including any conveyances owned, hired, leased, or otherwise under the control of or operated by the Insured).

*Property covered*
Goods and/or merchandise of every description incidental to the project as may be declared, the property of the Insured or for which the Insured have or assume a responsibility to insure, whether contractually or otherwise, or for which the Insured receive instructions to insure prior to shipment or prior to known or reported loss or accident.

*Limits*
US$ [50,000,000] any one vessel, aircraft, conveyance, or location.

*Valuation*
As per terms of the contract but not less than cost plus freight plus 10 per cent.

*Voyage*
At and from ports and/or places anywhere in the world to arrival at the Project site by direct shipment or via ports and/or places in any order, including transits to or from and while at the premises of forwarders, packers, consolidators, hauliers, warehousemen, and other bailees, via any route, including risks in customs and temporary storage as required.

*Attachment/termination of risk*
Notwithstanding the limitations of the 'Duration' Clauses in the Institute Cargo and Institute Strikes Clauses, the insurance commences from the time the goods are set in motion in the Insured's and/or supplies and/or [sub] contractor's premises, storage depots and/or warehouses for the commencement of transit and continues during packing, repacking, storage, consolidation, deconsolidation, and containerisation and at transhipping points until the subject matter insured is finally delivered to the project site. Including all loading and unloading risks. Notwithstanding the foregoing, in respects of good purchased by the Insured on F.O.B., F.A.S., C.&F. or similar terms where title passes to the Insured after transit has commenced, it is agreed that cover hereunder attaches in accordance with the commencement of risk as detailed above, underwriters being subrogated to the Insured's rights of recourse against the suppliers and/or their insurers except underwriters would have no right of subrogation against any Insured or additional insured under this policy.

*Additional coverages*
- Concealed damage – 180 days.
- 50/50 clause.
- Duties clause.
- Port blockage.

*Other conditions*
Subcontractors of every tier added as Additional Insured. Waiver of subrogation against contractor and affiliates, and its subcontractors of every tier.

*Deductibles*
US$ [5,000] physical damage losses.
[45] days for marine delay in start-up.

*Premium rates*
Transits – [1.00]‰ per mille on value shipped. MDSU [US$150,000].

**3 Umbrella/excess liability – construction**

*Cover*
Provides coverage excess of underlying third party liability coverage described. Coverages, terms and conditions will be no less broad than these underlying policies.

*Insured*
Owner, contractor and affiliates and lenders and lenders' independent engineer, but only to the extent covered by underlying policies.

*Limits*
US$ [40,000,000] per occurrence and in the aggregate, where applicable, excess of underlying coverage.

*Special provisions*
Worldwide jurisdiction excluding United States and Canada. Insurers to waive all rights of subrogation against each Insured and additional insureds. Subcontractors of every tier added as Additional Insured – but only to the extent covered by underlying policies.

*Premium for period*
US$ [65,000].

**4 Workers' compensation and employer's liability [as required by law]**

*Coverage*
- Workers' compensation as per local law.
- Employers' liability with minimum limits of US$ [1,000,000].

*Insured*
Owner.

*Employees insured*
All permanent, temporary or casual employees of Owner.

*Jurisdiction*
United Kingdom.

*Premium rates*
0.5% of payroll estimated at US$ [2,000,000].

*Premium for period*
US$ [10,000].

**5 Business auto liability** *(if needed)*

*Limits of liability*
US$ [1,000,000] combined single limit [minimum] or statutory for owned automobiles and hired and non-owned auto liability.

*Autos covered*
As required by law – all autos owned by Owner (if any) and hired and non-owned autos.

*Insured*
Owner.

*Deductibles*
US$ [1,000].

*Special provisions*
Lender added as Additional Insured.

*Premium rate*
US$250 per vehicle per annum.

*Premium for period*
US$ [small].

**6 Any other statutorily required coverages**

**7 Force majeure**

*Type*
*Force majeure* insurance.

*Form*
Manuscript wording because *force majeure* insurances can be applied to projects across the whole spectrum of construction and engineering and vary from project to project, policy forms are manuscripted to suit the particular requirements of the client and to reflect the contractual wording.

*Interest*
To protect the Owner for debt service obligations to the lending banks/financial institutions in the event of the late completion or permanent abandonment of the project following the occurrence of force majeure as defined.

*Cover*
The principal force majeure perils will be defined in the contracts and reflected in the policy may include:

- Fire and allied perils occurring on or off-site (including damage in transit and, at the supplier's premises). (Normally provided only to the extent that such coverage is on a 'difference in conditions' basis delay in start-up cover under the builders risk policy.)
- Strikes, lockouts and/or labour disputes (but not between the Owner/Assured and its own employees).
- Change of law, being the adoption, promulgation or modification after the inception date of the policy of any federal, state or municipal legislation which establishes any requirement affecting the project more burdensome than the most stringent requirements contained in existing law.
- Order of any court enforcing a change of law.
- Any other cause beyond the control of the Assured (Owner) the Contractors and other project participants (including, for example, gas suppliers and electricity purchasers).

*Exclusions*
Losses due to insolvency and/or financial default is excluded.

*Premium rate*
3%–5% of policy limit.

**8 Any other elective coverages**

- Keyman;
- Crime;
- Fidelity Guarantee, and so on.

## Section 2: Contractor's insurance requirements – construction phase

**1 Contractors equipment**

Contractor to provide coverage as required to protect its interest in its owned, leased, or rented equipment to be used in the construction of the project but will not be incorporated in the facility.

**2 Marine liability** *(if required)*

*Perils*
'All risks' of physical loss or damage from any external cause.

*Form*
Hull and machinery, protection, and indemnity, and third-party liability.

*Property covered*
All floating craft and plant or marine platform.

*Limits*
US$ [XX,000,000] [hull and machinery value and estimated cost of removal due to sinking].
US$ [XX,000,000] protection and indemnity.

**3 Aircraft liability (owned/non-owned)** *(if required)*

*Limit of liability*
US$ [50,000,000].

**4 Worker's compensation and employer's liability**

*Coverage*
As per local law and the necessary employer's liability coverage US$ [1,000,000 minimum].

*Insured*
Contractor.

*Employees insured*
Permanent, temporary or casual workers.

*Jurisdiction*
'Job site location'.

*Coverage*
Statutory, employer's liability.

*Special provisions*
Project owner and lender added as Additional Insureds.

*Premium rate*
2% of payroll – estimated at US$15,000,000.

*Premium for period*
US$300,000.

**5 Business auto liability**

*Limits*
US$ [1,000,000] combined single limit [minimum] or statutory for owned automobiles and hired and non-owned auto liability.

*Autos covered*
As required by law – all autos owned by Owner (if any) and hired and non-owned autos.

*Insured*
Contractor.

*Special provisions*
Project owner and lender added as Additional Insured.

*Premium rate*
US$250 per vehicle per annum.

*Premium for period*
US$ [small].

**6 Professional errors & omissions (E&O) – design liability**

*Limits*
US$ [10,000,000] per occurrence and aggregate.

*Insured*
Contractor.

*Special provisions*
Dedicated separate limits to project.

*Deductible*
US$ [500,000].

*Premium for period*
US$450,000.

**7 Umbrella excess liability – construction**

*Form*
Provides coverage excess of underlying employer's liability coverage, marine liability coverage aircraft liability and business auto liability coverage. Coverages, terms and conditions will be no less broad than these underlying policies.

*Insured*
Contractor [Bevan International]

*Limits*
US$ [20,000,000] per occurrence and in the aggregate, excess of underlying coverage.

*Special provisions*
Lenders and owner added as Additional Insured.

*Premium for period*
US$40,000.

**8 Liquidated damages/efficacy (to be provided by the equipment supplier)**

*Type*
Liquidated damages/efficacy insurance.

*Form*
Manuscript wording designed to reflect precisely the insured's contractual obligations.

*Interest*
To indemnify the Contractor in respect of his liability under contract to the Owner for delay and/or under performance of the Project caused by technological failure or fault on the part of the Contractor (including its subcontractors and suppliers) and not already covered under the builders risk advance loss of profits (ALOP) insurance.

*Cover*
Late completion payments for each day that final completion of the project is delayed beyond the guaranteed completion date (as defined in the Construction Contract), and (where applicable).

Performance shortfall payments should the Contractor fail to achieve the contracted performance criteria.

*Policy limit*
90% of total LD exposure of US$25,000,000.

*Co-insurance*
10% self-insured retention.

*Premium for period*
US$1,057,500.

**9 Any other statutorily required coverages**

**10 Any other elective coverages**
- Keyman;
- Crime;
- Fidelity guarantee, and so on.

## Section 3: Owner's project company insurance coverages – operational phase

*Period*
Beginning at acceptance and during operations.

**1 Industrial all risk property damage**

*Perils*
'All risks' [except as excluded] of loss or damage to the facility comprising the project.

*Property covered*
All real and personal property, owned, leased or for which the insured is legally liable, comprising the project.

*Limits*
US$ [1,150,000,000] Blanket limit – equivalent to the full replacement value of the property location.

*Coverages and sub-limits*
- Extra expense;
- Service interruption;
- Miscellaneous unnamed locations;
- Newly acquired locations;
- Demolition and increased cost of construction;
- Soft costs;
- Transit – Largest piece of equipment;
- Flood – Full value of facility;
- Earthquake – Full value of facility;
- Volcano – Full value of facility;
- Tsunami/tidal wave – Full value of facility;
- Debris removal – Greater of US$ [5,000,000 or 25%] of the loss.

*Valuation basis*
Property damage – Replacement cost.

*Other conditions*
- Cancellation – ninety [90] days except ten [10] days for non-payment of premium;
- Coinsurance – Agreed amount endorsement;
- Joint loss agreement;
- Electrical apparatus assumption clause.

*Deductible options*
- Major perils (flood/earthquake): US$ [250,000].
- All other perils: US$ [50,000].

*Annual premium rate*
3.5‰ (per mille) on total sum insured.

**2 Operational boiler & machinery coverage**

*Form*
Extended comprehensive.

*Limits*
Limits equivalent to the full replacement value of boilers and machinery.

*Coverages/extensions*
- Policy covers sudden and accidental loss of plant and machinery due to breakdown, explosion, collapse during the course of its normal operations;
- Expediting expense – US$ [5,000,000];
- Extra expense – US$ [5,000,000];
- Hazardous substance cleanup;
- Demolition and increased cost of construction.

*Cancellation*
90 days' notice except 10 days for non-payment of premium.

*Deductible options*
US$ [500,000] for gas turbines, generation and transformers, US$ [150,000] all others.

*Annual premium*
Included in 1 above.

**3 Industrial all risks – loss of profits**

*Form*
Loss of profits insurance – Gross profit basis.

*Limits*
US$ [1,125,000.00] – but would include:
- Interest payments on loans; and
- Fixed overheads such as minimum fuel intake, operators fixed charges, and net profit.

*Indemnity period*
[18] months.

*Coverages and extensions*
- On loss of profits suffered by the insured following loss and or damage to the property insured in the property all risks and boiler and machinery policies.

- Contingent loss of profits – suppliers and receivers extension.
- Denial of access.
- Increase in cost of working.
- Expediting expenses.
- Transit.

*Valuation*
Actual loss sustained.

*Cancellation*
[90] days' notice except [10] days for non-payment of premium.

*Deductibles*
[60] days.

*Annual premium rate*
4.0‰ (per mille) on total sum insured.
Note: Items 1, 2 & 3 above are generally written as a single package.

**4 Business auto liability**

*Limits*
US$ [1,000,000] combined single limits [minimum] or statutory for owned automobiles and hired and non-owned auto-liability [unless insured by the third party liability cover].

*Insured*
Project owner.

*Deductibles*
US$ [1,000].

*Special provisions*
Lender added as Additional Named Insured.

*Premium rate*
US$250 per vehicle per annum.

**5 Third-party liability primary cover**

*Form*
Third party liability subject to the terms, exceptions and conditions of the policy will indemnify the Insured[s] against all sums of which the Insured[s] shall become legally liable to pay in respect of:

- Accidental death of, or bodily injury, or illness of any person; and

- Accidental loss of, or damage to, property arising out of the performance of the works by the Insured[s] at the project site, and during operations for which the Insured[s] is legally liable.

*Limits of liability*
US$ [10,000,000] per occurrence/annual aggregate.

*Insureds*
Owner.

*Inclusions*
- Premises and operations;
- Personal injury; and
- Blanket contractual liability.

*Deductibles*
US$ [5,000] each and every loss – property and damage only.

*Extensions*
- Additional insured where required by contract;
- Designated project location;
- Employees as additional insured;
- Unintentional errors and omissions;
- 60 days' notice of cancellation;
- Waiver of subrogation;
- Hired and non-owned auto liability;
- Sudden and accidental pollution included;
- Broad from property damage;
- Products/completed operations;
- Independent contractors.

*Special provisions*
- Claims brought in the United States not excluded.
- Project owner and lender are added as Additional Named Insureds.
- Dedicated separate limits to operations.

*Annual premium*
US$ [50,000].

**6 Umbrella/excess liabilities**

*Form*
Umbrella liability provides coverage excess of scheduled operator's underlying policies for third party liability for bodily injury and property damage, operator's business auto liability and operator's employer's liability arising out of the operations of the Named Insureds.

*Insured*
Owner.

*Limits*
US$ [40,000,000] per occurrence and in the aggregate where applicable.

*Special provisions*
- Delete care, custody, and control exclusion – Real and personal property;
- operator and lender added as Additional Insureds; and
- amend other insurance provision in the policy to be primary and non-contributory to any similar coverage carried by project owner.

*Annual premium*
US$ [35,000].

**7 Any other statutorily required insurance coverages**

**8 Any other elective coverages**
- Keyman;
- Crime;
- Fidelity guarantee, and so on.

---

*Source:* Michael W Good, Managing Partner, Project Risk Advisors Ltd.

# Glossary

**A$** Australian dollars; AUD.
**Acceleration** After a default, the loan is fully due and payable. Repayments are accelerated to the present. Sometimes the loan is 'Recalled'.
**Accelerate** All principal repayments become due and payable.
**ACF** Available cashflow, the cash available to pay debt service (P+I) in each period. NNCF+P+I per period. Sometimes confusingly labelled 'cashflow available for debt service' (CFADS).
**Accreting swap** Part of the early interest expense is rolled into later interest payments. A back-ended repayment technique via a swap.
**Adjudication bond** Under an adjudication process, a bond/LC payable whether or not the contractor challenges the (adjudication) decision in court. Sometimes contingent on insolvency or other recourse or security having been exhausted.
**Ad valorem** Off the gross or stated value; usually a percentage.
**ADB** Asian Development Bank. Headquarters: Manila, Philippines.
**ADR** American Depositary Receipt where a non-US company's equity can be 'listed' on an US stock exchange.
**Advance** A loan drawdown is advanced by the funder.
**Advanced loss of profits** Advanced business interruption insurance where foregone revenues are insured once the business/cashflows commence. ALOP insurance.
**Aeroderivative** A power-plant engine/turbomachinery, based on an aircraft jet engine.
**AFC** Africa Finance Corp. An African hybrid development bank, mainly West Africa. Formed 2007; headquarters: Lagos.
**AfDB** African Development Bank, the MLA for Africa. Headquarters: Tunis. In Africa, usually referenced as ADB.
**Affermage** A leasing transaction in the PPP arena where the operator has no obligation to make capital improvements.
**Affordability** The service/project outcome must have a cost/tariff that is affordable by its users. A common term in PPP evaluation.
**Agent** The bank charged with administering the project financing. Generic A party appointed to act on behalf of a principal entity/person.
**Aid** The granting of money or soft loans (long maturities and low/concessional interest rates) usually to a government or government agency.
**Airside** An airport's compensation from landing/take-off fess, parking, fuels services, and so on. May be called 'aeronautical' fees/revenues.
**Alliance contract** The contractor is eligible for a share of the upside/savings whenever it is early or the contractor works safely. The contractor may lose its entire margin if working unsafely or there is a delay.
**All-in** Interest rate which includes margin, commitment fees, up-front fees.
**ALOP** Advanced loss of profits, a name for advanced business interruption insurance.

**Amortisation** Reduction of capital or up-front expenses (capitalised) over time, often an equal amount per annum. Sometimes means repayments.

**Annuity** The sum of principal and interest is equal for each period.

**arbitrage** Take advantage of discrepancies in price or yields in different markets.

**Arranger** The senior tier of a syndication. This implies the entity that agreed and negotiated the project finance structure. Also refers to the bank/underwriter entitled to syndicate the loan/bond issue.

**As** Chemical symbol for arsenic.

**Asset** The physical project and its associated contracts, rights, and interests of every kind, in the present or future, which can be valued or used to repay debt.

**Asset beta** The unlevered beta of an industry/sector; often derived by unleveraging the Equity beta (assumes the beta of debt is zero).

**Assignment** Grant of the right to step in to the position of a party to a contract or legal agreement.

**ATI** Africa Trade Insurance, an African multilateral PRI provider. Headquarters: Nairobi, Kenya.

**Au** Chemical symbol for gold.

**Audit** An independent examination of the financial statements or project studies/projections, with a view to checking financial accuracy/compliance or best-practice.

**Availability** The project financing is available for drawdown. A period prior to financial close may also be included. In PPP structures, the contract by the concessioning authority to make payments if the facility is operational/available for use at a contracted standard (whether or not it is actually/fully used).

**Available cashflow** Total cash sources less total cash uses before payment of debt service. ACF. Cash available for debt service (CFADS) sometimes used.

**Average life** Average for all repayments, usually weighted by amounts outstanding.

**Avoided cost** The capital and expense that would otherwise have to be spent if the project did not proceed. Sometimes a contract-price basis.

**Back-ended** A deliberate structuring to have large(r)-than-usual parts of the loan/bond repaid/amortised towards the end of the term.

**BAFO** Best and Final Offer used to narrow the bidders to select the preferred one. Used often in PPP processes.

**Balance sheet** The accounts which show assets, liabilities, net worth/shareholders' equity.

**Balloon** A large single repayment of principal, usually the final payment.

**Bankruptcy** A court official is administering the company's assets/operations to repay creditors in a repayment hierarchy which it determines.

**BAR** Builders' All Risk, a standard construction insurance. CAR.

**Barter** The physical form of countertrade.

**Basel** Basel Capital Accord for capital adequacy (of banks) agreed by the BIS.

**Basis** The benchmark interest rate or level such a US Prime or Libor.

**Basis point (bp)** One hundred bp equals 1 percentage point.

**BATRI** Borrower, amount, term, repayment method, interest basis + margins. A way of summarising the term sheet.

**BCIE** Central American Bank for Economic Integration (Spanish initials). Headquarters: Tegucigalpa, Honduras.

**BDEAC** Development Bank of Central African States. Headquarters: Brazzaville, Congo.

**Benchmark** A level of service or activity. In a PPP transaction, the reasonable price for services, usually determined by an independent technical adviser.

**BEE** Black Economic Empowerment (South Africa); sometimes expanded into broad-based BEE (BBBEE).

**Benefit-cost analysis** A formal calculation of the monetary (and sometimes non-monetary) benefits and costs of a project's development. Often expressed as a ratio, benefit-cost ratio (BCR) which obviously must be greater than 1.

**Bearer bond** The Bond certificate is itself negotiable. (It is not recorded as being owned by any particular investor.)

**Berne Union** Established in 1934, it coordinates export credit agencies/PRI terms and conditions. It has 54 members from 33 countries.

**Best efforts** A very high standard of undertaking, nevertheless excusable in the event of *force majeure* or failure to execute the matter in question after trying to do so on a sustained, dedicated basis. Under English law, 'best endeavours' is a preferable term.

**BI** Business interruption insurance available once the project is in business.

**Bid bond** A small percentage (1% to 3%) of the tender contract price is established as a bid 'performance' bond. Once the contract is awarded, bid bonds are refunded to the losers. Should a bidder withdraw its lodged bid, this bond will not be returned.

**BIS** Bank for International Settlements. Headquarters: Basel/Basle, Switzerland.

**Blocked currency** Due to inconvertibility or transfer risk, a currency cannot be moved out of the country. It is blocked in a local/domestic bank account.

**Bond** The paper evidence of a legal promise by the issuer to pay the investor on the declared terms. Bond are usually negotiable. Bonds are customarily longer-term, say 5 to 25 years. Short-term (series of) bonds are usually referred to as notes.

**BOO** Build own operate (and maintain).

**Book runner** The arranger or bank extending the invitations for a syndication and tallying final take.

**Borrower** Usually an SPV in project financing. It could be a company, trust, partnership, cost corporation, charity, or (rarely) the sponsor itself.

**BOOT/BOT** Build own (operate) transfer where the project is transferred back to the party granting the concession. The transfer may be for value (at a hand-back standard) or at no cost.

**Break even** The reduction of a project finance net net cashflow to zero by changing an input variable such as price or costs. The DSCR is 1.00.

**Broker** A party which brings together sponsors, finance, or insurances but is not acting as a principal.

**BTO** Build transfer operate; the project finance will then rely heavily on the operating concession.

**Builders all risk** BAR – the standard (physical) insurance package during construction. Also called contractor's all risk (CAR).

**Bullet** A one-time repayment (therefore at the end of the loan/at maturity), often after no/little amortisation of the loan. A balloon of 100%.

**Bundling** Grouping services or features of a project, usually in the payment/tariff.

**Buy-back** A promise to repurchase unsold production or services. Alternatively, a promise to repay a financial obligation.

**Buydown** A once-off payment out of LDs to reflect cashflow losses from sustained under-performance. Often used to 'buy' down the project finance loan.

**Buyer credit** A financing provided to a buyer to pay for the supply of goods or services usually by an exporting country or the supplier company.

**BVI** British Virgin Islands, which has a double-tax treaty with the US.

**CA** Concession agreement, usually from a government authority. A common form of PPP projects.

**CAR** Contractors all risk, a standard construction insurance. BAR.

**Call** An option to buy a security or commodity for a set price at a given time in the future.

**Cap** A ceiling on an interest or FX rate through a swap, options, or by agreement.

**Capex** Capital expenditures usually by way of direct investment.

**Capital markets** A broad term to include tradeable debt, securities, and equity as distinct from private markets or banks.

**Capitalised interest** Prior to completion, the convention is to capitalise interest into the project financing, that is, to borrow to pay interest. IDC.

**Cashflow** The generation of cash by a project.

**Cash sweep** When net net cashflow (after payment of interest, opex, and taxes) is all taken as a principal repayment, in percentages up to 100%. Prepayment is made in inverse order of scheduled maturity.

**Cash trap** When net net cashflow (after payment of opex and taxes) is trapped into an escrow account for debt service (in inverse order of maturity). Sometimes referred to as equity 'lockup' or an equity/dividend blocker.

**CDC** CDC Corp, formerly Commonwealth Development Corp, a British development finance institution; now more venture capitalist/equity.

**CDMA** Code-Division Multiple Access form of digital usage of frequency for mobile/cell phones (more efficient than GSM/TDMA).

**CExim** The Export-Import Bank of China is regarded as a 'policy bank' providing support (in the form of direct funding) to the economic/political policies of the PRC. It is not an official ECA.

**Charge** Under Crown Law, the document evidencing mortgage security. A fixed charge refers to a defined set of assets and is usually registered. A floating charge refers to other assets which change over time, for example, cash, inventory, which become a fixed charge after a default.

**CGT** Capital gains tax.

**CIRR** Commercial Interest Reference Rate set by the Berne Union for ECA financings; the 'Consensus Rate.' The CIRR is published monthly based on the country's domestic marker, for example, US Treasury bond rate plus a margin of, say, 1%. It varies for different loan terms/life.

**Claw back** The ability to recover prior project cashflow that may have been distributed/paid away as dividends to the sponsors.

**Club** A group of underwriters who do not need to proceed to syndication.

**CN** Chemical symbol for cyanide; used for extracting gold.

**CNG** Compressed natural gas.

**Co-financing** Usually where an MLA acts as the lender of record under the A tranche while the banks enter via the MLA's B tranche. Sometimes used (confused?) with complementary financing.

**Co-manager** A lower-tier participant, ranked by size of participation.

**Coface** The French ECA. Headquarters: Paris.

**Co-generation** Besides electricity, another energy is produced and sold from the waste heat from a power plant, for example, steam, hot air, refrigeration, hot water.

**Collar** A ceiling and floor to an interest or FX rate structured through swaps, options, hedging, or by agreement.

**Collateral** Additional security pledged to support a project financing.

**Combined cycle** The waste heat from an electric generation unit is recovered as steam which is used to generate more electricity through a steam turbine.

**Commitment fee** A per annum fee applied to the portion of the unused project financing (the amount not yet drawn down) until the end of the availability period.

**Commitment letter** A formal letter offering an underwriting on a given set of terms and conditions, including interest basis/margin and fees.

**Compensation trade** The form of countertrade where an incoming investment is repaid from the units/revenues generated by that investment.

**Complementary financing** Where different lenders agree to fund under similar yet parallel documentation and a pro-rata security package.

**Completion** In a project financing, when the project's cashflows become the primary method of repayment. It occurs after a completion test; usually for a Type 1 project finance. Prior to completion, the primary source of repayment is usually from the sponsors (Type 1) or from the turnkey contractor (Type 2).

**Completion risk** Construction, development, or cost overrun risk. The risk that a project will not be able to pass its completion test.

**Completion test** A test of the project's ability to perform as planned and generate the expected cashflows. The time when the project can move from recourse to a project financing. Used especially for Type 1 project finance.

**Compound** Interest is reinvested to earn additional interest in the following period.

**Concession** Usually granted by a government entity which grants some level of exclusivity/operating or access right for a defined period.

**Consensus** The agreement among OECD ECAs concerning loan currency, interest rates, and repayment/term.

**Consortium** All of the Participants or developers. For the early stages of a project, it may be a loose association, not a legal or contractual entity/JV.

**Contingency** An additional amount/percentage to any cashflow item, for example, capex. Care is needed to ensure it is either 'to be spent' or a cushion.

**Contingent** For liabilities, those that do not yet appear on the balance sheet – guarantees, supports, lawsuit settlements. For support or recourse, the trigger may occur at any time in the future.

**Contract for Differences** Swapped from a floating price (typically an electricity or gas market/pool price) to a fixed-price contract; CFD.

**Convertible** A financial instrument that can be exchanged for another security or equity interest at a pre-agreed time and exchange ratio.

**Constant dollar** Inflation or escalation is not applicable. Prices and costs are de-escalated/re-escalated to a single point in time.

**Cost corporation** The SPV is established to derive revenues equal to opex and debt service; thus it has no profits and, hopefully, pays no taxes.

**Counterparty** The other participant, usually in a swap or contract and includes intermediaries.

**Countertrade** One party supplies a unit/funding in return for other material/funding. See Barter.

**Country risk** Includes sovereign risk but usually an estimate of the likelihood of a country debt rescheduling which will prompt currency Inconvertibility. Sometimes referred to as sovereign risk.

**Coupon** The Interest amount or rate payable on a bond. A coupon may be physically attached to the bond certificate.

**Covenant** An agreed action to be undertaken (positive) or not done (negative). A breach of a covenant is a default.

**Cover** The amount above unity of a debt service ratio; the cushion.

**COx** Carbon dioxide (or monoxide)

**CPI** Consumer price index, a measure of inflation at the consumer level.

**Crack spread** A refinery hedging the oil intake and product (mix) of output results in a crack spread roughly equivalent to the gross refinery margin.

**Credit derivative** An option is sold to another party to either opt to buy a loan or it must buy a loan upon a default.

**Credit enhancement** The issuance of a guarantee, L/C, or additional collateral to reinforce the credit strength of a project financing.

**Creditworthy** The risk of default on a debt obligation by that entity is deemed low.

**Cross charge** The parties have agreed that each may have a charge on the other's position in the project (revenues, cash, collateral); usual in a UJV.

**Cross default** A default by another project participant or by the sponsor (other than the project financing) triggers a default.

**Cross-collateral** Project participants agree to pool collateral, that is, allow recourse to each other's collateral.

**Crown law** Law derived from English law, eg. England, Ireland, Canada, PNG, Australia, Hong Kong, Singapore, India, Malaysia.

**Cu** Chemical symbol for copper.

**Cure** Make good a default.

**Current asset** Cash or assets that can be converted to cash within one year.

**Current dollar** Actual or real prices and costs. Escalation/inflation effects are included.

**Current liabilities** Liabilities payable within one year.

**Current ratio** Current assets divided by current liabilities (a liquidity ratio).
**Cushion** The extra amount of net cashflow remaining after expected debt service. NNCF.
**Cut-off grade** It is not economically possible to extract Ore below this grade, often expressed in the 'equivalent grade.'

**DBA** Design-build agreement; a form of construction contract.
**DBFO** Design build finance and operate, a common UK PFI approach.
**DE ratio** The amount of debt as a ratio of equity, often expressed as a percentage.
**DCF** Discounted cashflow where net cashflow is brought to a present value using a given percentage discount rate.
**DCMF** Design construct manage finance, a DBFO variant for PPP (projects).
**DDB** Deep-discount bonds where the amount of the discount equals the yield to redemption.
**DDS/DDOS** Distributed denial of (internet) service, where the internet is no longer accessible.
**Deal breaker** A point which will cause each side to terminate negotiations, usually concerning a cost or legal/security issue.
**Debenture** A legal security over the issuer's general credit/balance sheet.
**Debottle-necking** Each transition of a project's flow sheet or sequence is optimised to increase output. This may require minimal capex.
**Debt service** Principal repayments plus interest payable; usually expressed as the dollar/currency amount per period, calendar or financial year.
**Debt** The obligation to repay an agreed amount of money with interest.
**D:E swap** Debt in a blocked currency is swapped for equity in a local company/project, usually at a discount.
**Deductible** An amount or period which must be deducted before an insurance payout or settlement is calculated.
**Deep-discount** An issue/loan is made at a deep discount such that when later paid in full (at no discount), the investor/lender, respectively, receives a time-equivalent return/yield.
**Default interest** A higher interest rate payable after default. Sometimes (inadvisedly if under English Law) called 'penalty' interest. Delay interest.
**Default** A covenant has been broken or an adverse event has occurred. A money default means a repayment was not made on time. A technical default means a project parameter is outside defined/agreed limits or a legal matter is not yet resolved.
**Defeasance** Some or all of the debt is cash collateralised, usually indirectly or via zero-coupon structures and often in an offshore jurisdiction.
**Deficiency agreement** Where cashflow, working capital, or revenues are below agreed levels or are insufficient to meet debt service, then a deficiency or make-up agreement provides the shortfall to be provided by the sponsor or another party, sometimes to a cumulative limit.
**Deficiency** The amount by which project cashflow is not adequate for debt service.
**Defined event** The definition applicable to the trigger of a loss in an insurance policy, particularly PRI.
**DEG** The German government project aid agency, currently within KfW – Ipex.
**Degradation** Regular deterioration in output and heat rate from turbine operations. Mainly recoverable through turbine maintenance.

**Demurrage** For shipping (primarily), the daily charge payable for standby/late loading of a vessel. It can also apply to late unloading of a rail wagon.

**Depreciation** Amortisation for accounting (book), tax calculations, or Income calculations. A regular reduction in asset value over time.

**Derivative** A financial instrument based on an underlying contract or funding such as a swap, option, or hedge.

**Devaluation** Either a formal reduction in the FX rate or gradually according to FX market forces.

**Direct agreement** An agreement linking parties outside the normal contracting arrangements to bind in (the outside) support/obligations to the benefit of those contracting parties. If linking three parties, a tripartite agreement.

**DIS** Delay in startup insurances, a hybrid policy which can cover all non-site force majeures, change in a law, and contingent contractor liability (efficacy). Acronym sometimes is DSU.

**Discount rate** The annual percentage applied to NPV or PV calculations (and is often the all-in interest rate or the interest rate plus margin for project financing). The discount rate may be the WACC.

**Dividend** The amount paid out per share, usually once or twice a year, by a company from its profits as decided by the board of directors.

**Double dip** Tax depreciation/deductions are accessed in two countries concurrently.

**Drawdown** The borrower obtains some of the project financing, usually progressively according to construction expenditures plus IDC.

**Draw stop** Further drawdowns are prohibited until a breached condition precedent (to drawdowns) is restored/corrected. Until then no further drawdown notices/certificates can be tendered by the borrower.

**DRI** Direct-reduced iron, the product of processing 58% to 64% iron ore up to an iron content of 90%+ iron. Called 'HBI' if in the hot-briquetted form.

**Drop-dead** A fee payable when the underlying transaction does not proceed.

**DS** Debt service, the sum of P + I in a period.

**DSCR** Debt service cover ratio per period, usually annual.

**DSR** Debt service reserve; usually expressed in months.

**DSRA** Debt service reserve account; used interchangeably with DSR.

**DSU** Delay in start-up (insurance); DIS.

**Due diligence** The process of examination of assumptions, calculations, design, and credit-worthiness of the project and its participants; usually implying a through, comprehensive, complete, and careful process. DD.

**EAD** Exposure at default.

**EAF** Electric arc furnace method of steelmaking (which can take scrap as feed).

**Earnings** Net income, net profit.

**EBITDA** Earnings before interest, tax, depreciation, and amortisation.

**EBRD** European Bank for Reconstruction and Development targeted at Eastern Europe and the former Soviet Union, an MLA.

**ECA** Export credit agency established by a country to finance its national's goods, investment, and services. They usually offer PRI.

**ECGD** Export credit guarantee department, the UK ECA.

**Econometric** The use of interlinking statistical equations for a forecasting model.

**EDC** Export Development Corporation, Canada's ECA; headquarters: Ottawa.

**EDD** Environmental 'defence' document – more than EIS is required.

**EFIC** Export Finance Insurance Corporation, Australia's ECA; headquarters: Sydney.

**Efficacy** The ability to do/perform.

**EIA/EIS** Environmental impact assessment/statement, which may have been subject to public comment.

**EIB** European Investment Bank, supported by the European Union nations; acts like an MLA but requires(?) a link to the EU. Headquarters: Luxembourg.

**EIRR** Economic internal rate of return, where the extra benefits – direct and indirect – are added in to the FIRR.

**EKN** Exportkreditnämnden, the Swedish ECA.

**Embargo** In the PF sense, blocking/freezing of monies/bank accounts and a strict prohibition on commercial/financial relationships.

**Engineering risk** Design risk. The impact on project cashflow from deficiencies in design or engineering.

**Enthalpy** Energy content of thermal cashflow, for example, steam. Expressed in the same units as the price for fuel. So enthalpy X Fuel Price = fuel cost in steam.

**Environmental risk** Economic or administrative consequence of slow or catastrophic environmental pollution.

**EPC** 'Engineer, procure, construct' form of construction contract.

**EQ** Equal quarterly principal payments.

**Equator Principles** The IFC environmental guidelines for assessing project financings have been adopted by a number of PF banks ('Equator banks').

**Equity** In a project financing, the cash or assets contributed by the sponsors. For accounting, it is the net worth or total assets minus liabilities.

**Equity kicker** A higher return is made possible from direct payments or from participation in profits/link to the project's financial performance. Often seen as providing the higher return to mezzanine debt.

**EIRR** Economic internal rate of return, often shortened to ERR. The other benefits from a project such as taxes, infrastructure, economic multipliers, and non-user benefits (offset by, say, pollution and congestion/extra costs) are added to the IRR or FIRR.

**ERR** EIRR (As above).

**ESA** Equal semi-annual principal repayments.

**Escalated** Inflation adjustment is made; expressed in nominal/inflated terms.

**Escrow** Where documents or dollar accounts are put beyond the reach of the parties.

**EU** European Union of Nations; headquarters: Brussels.

**Eurobonds** Bonds issued in any currency and are commonly listed in Luxembourg. They cannot be traded in the USA. Eurobonds are often bearer bonds.

**Eurodollar** US$ deposited with banks outside the US.

**Evergreen** A contract that rolls over after each agreed (short-term) period until cancelled by one party.

**Exceedance** For wind studies, the availability (of wind) that is exceeded (expressed as a % of the time).

**Execute** Formal signing of documentation. Implement an action required under the documentation.

**Expropriation** The state has taken over a company or project, implying compensation will be underpaid/insufficient (or the payment is zero). Creeping expropriation occurs when a government squeezes a project by discriminatory taxes, regulation, physical threats, or changes in law.

**FBC** Full Business Case when the project is getting to the BAFO stage. By now, affordability and VfM/PSC are clearly enunciated.

**FCD** Fully-convertible debentures where the conversion (usually into a share) is mandatory at defined redemption times and yields.

**FDI** Foreign direct investment, usually the annual inbound number.

**Fe** Chemical symbol for iron.

**Feathering** When a wind turbine is slowed down in high-velocity winds.

**Featherweight charge** A type of floating charge which is triggered by the appointment of an administrator.

**Fee** A fixed amount or a percentage of an underwriting or principal.

**FID** Financial instrument's duty, a very-small Australian tax on all cash payments in the economy, for example, bank transactions, credit-card payments, cheques.

**Fidelity** The insurance industry's word for 'theft.'

**Final take** The final participation – in a syndication.

**Finance lease** The lessor receives lease payments to cover its ownership costs. The lessee is responsible for maintenance, insurance, and taxes. Some finance leases are conditional sales or hire purchase agreements.

**Financial close** When the documentation has been executed and conditions precedent have been satisfied or waived. Drawdowns are now permissible.

**Financing agreements** The documents which provide the project financing and sponsor support for the project as defined in the project contracts.

**FIRR** Financial internal rate of return, often shortened to IRR. The discount rate to reduce the NPV of a project's cashflows to zero.

**Fixed charge** English law security for full legal security position; often lodged on a register. The borrower cannot deal with the charged assets.

**Fixed cost** Operating cost which does not vary per unit of output.

**Fixed rate** Interest rate that is fixed for a defined period.

**FM** Force majeure. In PPP deals, the facility(ies) manager/management. Soft FM is services such as cleaning, hotelling. Hard FM means maintenance of the hard assets, such as buildings/equipment.

**FMO** Nederlanse Financierings-Maatschappij Voor Ontwikkelingslanden NV, Netherlands development finance company for private-sector entities.

**Float** See IPO.

**Floating charge** English law concept where assets not yet known (for example, cash in bank accounts, inventories/work in progress) become fixed immediately upon a default. Prior to a default, the borrower can deal with the assets.

**Floating rate** Interest rate that is reset periodically, usually every couple of months or sometimes daily.

**Floor** A level which an interest rate, currency exchange rate, or market price is structured not to go below.

**Force majeure** Events outside the control of the parties. These events are acts of man, nature, governments/regulators, or impersonal events. Contract performance is forgiven or extended by the period of *force majeure*.

**F.o.b.** Free on board (ship); the infrastructure/freight component is met after that point.

**Foreign exchange** The conversion of one currency into another, usually at a market/quoted FX Rate.

**Forex** FX; foreign exchange.

**Forward contract** Forwards. An agreement to exchange currency or interest obligations in the future. For tradeable commodities or securities, an agreement to buy or sell at a future date.

**FPSO** Floating production storage offloading vessel for offshore oil production.

**Fracking** Fracturing a reservoir (physically) to enhance recovery (of oil or gas).

**Fratar** Traffic modelling technique, which successively applies growth factors until the origin-destination matrix is balanced.

**Front-end fee** Usually a percentage of the total funds committed, paid (once) when money is first disbursed. Sometimes called an establishment fee.

**FRNs** Floating rate notes where the interest is reset periodically by a panel or by reference to a market floating rate.

**FSA** Dexia's monoline; now sold to Assured Guaranty.

**FSRU** Floating storage regasification unit (for LNG).

**Full recourse** No matter what risk event occurs, the borrower/sponsor/contractor/government or its guarantors guarantee to repay the debt. By definition, this is not a project financing unless the borrower's sole asset is the project.

**Funding risk** The impact on project cashflow from higher funding costs or lack of availability of funds. Interest risk.

**Futures market** A market where forward contracts can be traded before their maturity.

**Futures** Agreements to purchase a commodity or financial instrument at a price agreed today. These are usually tradeable on exchanges or computer trading screens.

**FX rate** One currency unit expressed in terms of another. Foreign exchange rate.

**FX risk** The effect on project cashflow or debt service from a movement in the FX Rate for revenue, costs, capex, or debt service.

**FX** Foreign exchange; Forex.

**GAAP** Generally accepted accounting principles, applied consistently.

**Gas turbine** Electricity generation by way of a turbine (style of jet engine) from burning natural gas or liquid fuels; GT.

**GDR** Global depositary receipt; an acronym for an equity in a foreign-based corporation traded in capital markets around the world.

**Gearing** The level of debt equity. Interest bearing debt divided by shareholders' equity.

**General partner** The partner with unlimited liability, usually the operator/manager.

**Geostationary** Satellite orbit at a fixed position 35,780 km above the equator.

**Gilts** UK government bond, issued in sterling (?). It is the equivalent of 'T' for the US Treasury.

**GOCO** Government-owned, contract out, a PPP variation.

**GIEK** Garanti-Instituttet for Eksportkreditt, Norway's ECA; headquarters: Oslo.

**GFC** Global financial crisis = post Lehman Brothers counterparty 'nerves'.

**Goodwill** The amount paid in excess of book value on the balance sheet, usually for intangible assets, such as trademarks or licences.

**Grace** After a default, days of grace may be stated within which the cure is effected. A period when interest or principal is not yet payable, usually a period after startup/commissioning/completion in a project financing.

**Gravity** Traffic modelling technique with the idea that the relative attractiveness of an origin-destination relate to the (Newton/Einstein) law of gravity.

**Gross refinery margin (GRM)** The difference between the product revenues and the crude purchases for an oil refinery. This includes the freight component.

**GSM** Global system for mobiles, a mobile phone standard. TDMA.

**Guarantee** An undertaking to repay in the event of a default. It may be limited in time and amount.

**Guarantor** A party who will guarantee repayment or performance of a covenant.

**GW** Gigawatt; 1,000MW of power capacity/generation.

**Hand back** The physical performance standard of a project at the end of a concession when the concessionaire transfers the project back to the government. The T in BO(O)T.

**Hard facilities management** Maintenance of assets and replacement as necessary; used in PPPs; hard FM.

**Heat rate** The amount of fuel required to generate a kilowatt hr ('kwh') of electricity, usually expressed as an energy value such as kilojoules (kJ).

**HBI** The hot-briquetted form of DRI.

**Hedge** To take a forward contract or option to effect an anticipated change in a currency, commodity, interest rate, or security, so that gains or losses are offset.

**Hedge fund** An unregulated investor pool which can act in any way to fund a company (takeover) or a project. Usually it is chasing the efficiency 'arbitrage' of new owner.

**Hell or high water** An absolute commitment, with no contractual defence.

**Hermes** Euler Hermes, the main trade-finance/ECA for Germany. A merger with an Allianz company; so now owned 90% by Allianz. Headquarters: Paris.

**Hg** Chemical symbol for mercury.

**HH** Henry Hub, the intersection of nine interstate and four intrastate natural-gas pipelines in Erath, Louisiana, US. The New York Mercantile Exchange (NYMEX) price basis for trading natural gas.

**HHV** Higher heating value (used in heat-rate/efficiency calculations for power generation) includes the water content, inerts, and so on.

**Hire purchase** The user of the asset is entitled to purchase the asset according to a pre-agreed method. The user may be the owner for tax purposes.

**Hurdle rate** A minimum IRR or, sometimes, DSCR.

**Hypothecation** Akin to a mortgage in code law jurisdictions. A security preference.

**I** Interest payment amount.

**IAF** International Advisory & Finance, an international PF network.

**IASB** International Accounting Standards Board. Headquarters: London, England.

**ICD** Islamic Corporation for the Development of the Private Sector. An arm of IsDB. 55 member countries. Headquarters: Jeddah.

**ICIEC** The Islamic Corporation for the insurance of investments and export credits; a member of the IsDB Group. It has 40 member states. Able to reinsure ECAs. Headquarters: Jeddah. (Pronounced 'Eye'-'Sekh'.)

**ICR** Interest cover ratio expressed as a decimal of ACF/I.

**IDC** Interest during construction. It usually equals capitalised interest.

**IE** Independent engineer; ITE (independent technical engineer).

**IFC** International Finance Corporation, the private enterprise arm of the World Bank.

**IFRS** International Financial Reporting Standards, as set by IASB.

**Illiquid** Not easily traded or not readily converted to cash.

**Incipient default** Potential default.

**Income** Operating cashflows less overheads and depreciation, either before tax (BT) or after tax (AT). Earnings.

**Inconvertibility** Where a local currency cannot be exchanged for another currency. Often includes Transfer Risk.

**Indemnity** A legal obligation to cover a liability, however arising.

**Indexed rate** An interest rate linked to an index, usually the CPI.

**Inflated** Inflation adjustment is made to the forecast; escalated. The forecast is in nominal terms.

**Information memorandum** A document detailing the project and project financing usually in connection with a syndication.

**Infrastructure risk** The impact on project cashflows from infrastructure problems. Sometimes labelled transportation risk.

**Insolvency** The entity is bankrupt and cannot pay its debts when due.

**Instalments** The periodic repayments of the loan. Alternatively, the amounts of principal (plus interest). Principal instalments are scheduled as repayments to (regularly) reduce the outstanding loan.

**Institutions** Insurance companies, pension funds, trusts, foundations, mutual funds, funds managers, bank investment departments.

**Instrument** A financial tool. Sometimes a discrete type of funding or a security.

**Intangible assets** Goodwill; patents and trademark valuations deferred charges and share/bond premiums.

**Interest rate** The percentage payable to the lender calculated at an annual rate on the principal outstanding. May be all-in.

**Interest risk** The impact on project cashflow from higher interest costs or lack of availability of funds. Funding risk.

**Intermediary** An entity standing between parties to funding or a swap. An intermediary may be at risk.

**Inverse order** Applied to the periodic repayment schedule and means from the end, the last expected maturity is repaid first. 'Current order' means the next periodic principal repayment.

**Investment bank** The US term for a merchant bank.

**Investment grade** For a rating, the rating level above which institutional investors have been authorised to invest.

**I/O** Input output matrix form of economic model.

**IPO** An initial public offering of shares. A float.

**IPP** Independent power plant, a BOO development.

**IRR** The discount rate to make the NPV zero. Multiple IRR's occur mathematically if the periodic cashflows change sign more than once.

**ISDA** Institute of Swap Dealers' Association. Headquarters: New York, US.

**IsDB** Islamic Development Bank, which has 56 member countries. Headquarters: Jeddah, Saudi Arabia.

**Islamic loan** Interest cannot be charged. Rather the loan is structured using discounts, sale/lease, profit participation, or repurchase agreements.

**Issuer** The borrower of a bond/notes issue. In a project finance/PPP, the SPV.

**ITE** Independent technical engineer. Sometimes referred to as lender's technical engineer (LTE).

**J&S** Joint and several, meaning the parties are individually and collectively responsible for performance/payments.

**JBIC** Japan Bank for International Cooperation, which includes (former) Japan Eximbank. Headquarters: Tokyo.

**JICA** Japan International Cooperation Agency. As of April 2012, the development/Aid efforts have been transferred from JBIC.

**Joint Venture** (JV) The legal means of dividing the Project's equity either by shareholdings in a company (incorporated JV) or by way of a contract (unincorporated JV).

**JORC** Mining classification system for resources and reserves jointly issued by The Australasian Institute of Mining & Metallurgy (TheAusIMM) and the Australian Stock Exchange (ASX); Joint Ore Reserves Code.

**Junk** A high-yield bond of speculative grade.

**Kexim** Korean Eximbank, the Korean ECA, established in 1976. Headquarters: Seoul, Korea.

**K-sure** Korea Trade Insurance Corp which as of July 2010 can now cover import transactions as well as ECA deals. Headquarters: Seoul, Korea.

**KfW-Ipex** Kreditanstalt fur Weideraufbrau (translation 'bank for reconstruction'), a major German project funder; a listed entity as KfW-Ipex. Headquarters: Frankfurt.

**kg** Kilogram; 1,000 grams.

**kJ** Kilojoule, a measure of energy.

**kwh** Kilowatt hour, a common unit of electricity. One thousand watts delivered for one hour.

**Landside** An airport's cashflow derived from parking, duty-free/concessions, hotelling, and so on; in contrast to airside.

**L/C** Letter of credit, a guarantee to pay limited to an amount and time triggered by defined events or exchange of agreed documents. Used for credit enhancement.

**Latent default** A potential default that may have always been present but unidentified. Incipient default.

**Latent geology** A hidden geological problem, not yet known.

**LDs** Liquidated damages. The amount payable for delays and sub-standard performance under a construction, equipment supply, or O&M contract, as capped by a (negotiated) ceiling (% of EPC price).

**LDC** Lesser-developed country/developing country.

**Lead arranger** The senior tier of arranger.

**Lead bank** A senior bank involved in the negotiations for a project financing. Subordinate to an arranger. Lead manager.

**Lead manager** Senior tier of lender in a loan syndication.

**League tables** A ranking of lenders and advisers according to the underwriting, final take, or number of project finance loans or advisory mandates.

**Lease rate** The equivalent interest rate calculated from a stream of lease payments.

**Lease term** The life of a lease including any renewal options.

**Lease** The owner of an asset (lessor) agrees to receive lease payments/rentals from the user (lessee), usually at a fixed rental level. The lessor/owner takes the benefit of depreciation as a tax deduction. Its primary security is the asset.

**Legal risk** A risk that a defect in the documentation will affect cashflow or debt service.

**LEO** Low-earth orbit; some 200 to 300km above the earth's surface.

**Lessee** The user who pays lease rentals to the owner/lessor.

**Lessor** The owner of a leased asset.

**Leverage** The level of debt expressed as a percentage of equity or as a ratio to equity. The US/Canadian word for gearing.

**Leveraged finance** Although finance is obviously leverage or gearing, this term is used to describe lending to entities which are below investment grade or 'junk.

**Leveraged lease** A lessor borrows to finance a leased asset. Recourse may be limited to the lease rentals or the asset.

**LHV** Net energy content of a fossil fuel – used in heat-rate/efficiency calculations for a power plant. Care is needed that the fuel price (usually paid for in HHV terms) is the same units as the heat rate. The energy required to vaporise any moisture content is excluded.

**LGD** Loss given default. LGD=PD times EAD.

**Liability** The obligation to repay a defined amount or to perform a service.

**Libor** London Interbank Offered Rate, often quoted as a 1,3,6-month rate for US$.

**Lien** A legal security interest in an asset.

**Life-cycle** The consideration of the maintenance and investment required to keep the project up to a standard (of operation) for the life of the project or the project financing/PPP concession.

**Limited-recourse** Under certain conditions (legal or financial), there is access to the sponsor(s)' credit or other legal security for repayment (besides the project's cashflows).

There is usually recourse in the event of fraud or misrepresentation/non-disclosure – thus 'non-recourse' is better described as 'limited-recourse.'

**Liquid** Easily traded or converted to cash.

**Liquidation** The process of disposal or sale of the project or project Assets with the proceeds used to repay the project financing.

**LLR** Loan life ratio of the PV of ACFs over the life of the loan expressed as a ratio to the loan amount or the loan outstanding. The PV discount rate is interest rate plus margin/spread.

**Loan** The sum of money advanced which is the debt repayable in instalments of principal. The outstanding loan is the amount on which Interest is payable/calculated.

**Long-term** 3 years or more. For accounting purposes more than 1 year.

**Loss payee** A party to whom an insurance loss payment or settlement may be paid directly.

**LP** Limited partner who is not liable for the debts of the partnership beyond the funds contributed.

**LW** Latham & Watkins, 'The Book of Jargon PF' 2nd edition; www.lw.com.

**MAE** Material adverse event (also in the context of MAGA).

**MAGA** Material adverse government action, a government-caused MAE.

**Maglev** Magnetic levitation, a way to support a railway.

**Make-up** Where a cashflow or capital item is deficient, the amount of such deficiency, for example, an interest make-up relates to the interest amount above a ceiling percentage.

**Manager** A medium-level participant established according to final take.

**Mandate** The formal appointment to advise on or arrange a project financing.

**Mandatory prepayment** In addition to regularly scheduled repayment of principal, an extra amount of principal is required to be repaid (usually out of better than expected cash-flows). This usually prepays the loan in inverse order of maturity.

**Margin** The amount expressed in % per annum above the interest rate basis or cost of funds. For hedging and futures contracts, the cash collateral deposited with a trader or exchange as insurance against default.

**M&A** Mergers and acquisitions.

**Market risk** Changes to the amounts sold or the price received which impacts on gross revenue. Sometimes called sales or revenue risk.

**Maturity** The final date a project finance loan is repayable. The end of the term.

**MBIA** A US publicly-listed financial guarantor/monoline.

**MCE** Mass coronal event where the intense solar winds melt long power transmission lines.

**MDB** Multilateral development bank; alternative acronym is MLA.

**Medium term** One to six years.

**Merchant** No sales or revenue certainty because there is no contracted offtake agreement, such as a PPA. A trader/trading company.

**Merchant bank** A bank which, besides lending and deposit taking (usually not from the public), engages in trading, advisory services, and as an underwriter and funds manager of securities.

**METI** Ministry of Economy, Trade, and Industry of Japan.

**MExim** Malaysian Export Import Bank; headquarters: Kuala Lumpur.

**Mezzanine debt** Monies raised usually prior to settling the senior debt/project financing, which will expect (i) a high yield; (ii) one or two take-out/repayment methods (other than from project cashflows); and (iii) is relatively short-term, 12 months to 5 years.

**MIGA** Multilateral Investment Guaranty Agency, the PRI arm of the World Bank.

**MITI** The former name of METI.

**Mine-mouth** The coal mine is beside the power station; a dedicated coal mine.

**MLA** Multilateral agency such as IFC, ADB, owned by many countries. Sometimes referred to as an MDB. In syndications, mandated lead arranger.

**MMR** Major maintenance reserve.

**Monte Carlo** Simulations; random numbers to allocate to a frequency (distribution).

**Monetisation** Securitisation of the gross revenues of a contract.

**Monoline** Monoline insurance or credit wrap where a financial guarantor (usually rated AA of AAA) guarantees debt service from a project.

**Moratorium** Used by some banks to signal the grace period. Alternatively, debt is not being paid for an indeterminate or agreed period.

**Mortgage** A registered security interest, usually expressing a preference in security over physical assets, rights, and interests. A style of annuity repayment of principal and interest. A charge.

**MW** Megawatts, one thousand kw or one million watts; the measure of a power plant's electricity generation capacity. 1,000MW=1GW.

**Nacs** Nominal annual, compounded semi-annual (interest %).

**Negative pledge** The borrower agrees not to pledge any of its assets as security and/or not to incur further indebtedness.

**Negotiable** A financial instrument can be bought or sold by another investor, privately or via a stock exchange /computer trading.

**NEXI** Nippon Export and Investment Insurance, a PRI agency of the Japanese government, formed in April 2001. Headquarters: Tokyo.

**NGO** Non-government organisation, often social or charitable in nature.

**Ni** Chemical symbol for nickel.

**NIMBY** Not in my back yard; not near me (please!).

**NNCF** Net net cashflow. Total sources (per period) minus total; Uses. Often mentioned as 'free cashflow' but this is an M&A metric.

**Nominal** The forecast is expressed in current dollar, escalated, inflated terms. In contrast, constant dollars means no inflation and no escalation have been assumed.

**Non-Recourse** The financiers rely on the project's cashflows and collateral security over the project as the only means to repay debt service. This usually occurs after completion. The financiers do not then have further financial recourse to the owner/sponsor/contractor balance sheet(s).

**Novate** To transfer rights and obligations to another party. The existing/prior documentary position is released/substituted.

**NOx** Nitrogen oxides; the 'brown' visible part of smog.

**NPA** Non-performing asset (in a bank); NPL; struggling/defaulting on debt service repayments.

**NPC** Net present/project cost when used to compute the position from a PPP (project) or CA. Usually refers to service-contract costs.

**NPL** Non-performing loan; NPA.

**NPV** The periodic net cashflows are each discounted by the discount rate to a present date and the appropriate cash outflows/investment for construction or acquisition are deducted from the total.

**NRW** Non-revenue water; UAW; water that is not paid for/lost/stolen – expressed as a % of water input.

**$O_2$** Chemical formula for oxygen.

**OBC** Outline business case, usually prepared by a government authority seeking to develop a PPP (project) giving its case on affordability, business/development plan, and overall objectives (and VfM analysis).

**O&D** Origin-destination, an important part of airport traffic studies.

**O&M** Operations and maintenance. The main use is an O&M Contract.

**ODA** Official development assistance organised by many nations and NGOs in support of developing countries.

**OECD** Organisation for Economic Development, a developed-country block.

**OECF** Overseas Economic Cooperation Fund, now part of JICA.

**Offtake(r)** The purchase(r) of the project's output/services.

**OPEC** Organisation of Petroleum Exporting Countries.

**Open-cycle** The waste energy/exhausted from a power plant is not captured.

**Operating cashflow** Project (cash) revenues less (cash) opex.

**Operating risk** Cost, technology, and management components which impact opex and project output/throughput. Costs includes inflation. The opex line in a cashflow model.

**Opex** Operating expenses, always expressed as cash. Therefore, depletion and depreciation are excluded.

**Optimism bias** The tendency for a project's costs and duration (of construction) to be underestimated and/or the benefits to be overestimated (adjusted from Mott MacDonald definition).

**Ore** A reserve material that is economic to extract. Used in mining.

**Output specification** The desire to express a project's performance by measuring performance/results (rather than specifying inputs), a tool in PPP project design. The bidder/contractor can then decide how to deliver the project, hopefully increasing VfM and encouraging innovation.

**Outstanding** The total amount of the loan for the given interest period. The loan amount on which interest is calculated.

**Overrun** The amount of capex or funding above the original estimate to complete the project.

**Oversubscription** Underwriting commitments from a syndication exceeds the amount sought by the amount of oversubscription.

**P** Principal repayment amount per period.

**P.a.** Per annum, yearly.

**Pari passu** Equal ranking of security pro-rata to the amount owed.

**Partial risk** Where part of a commitment/risk is covered by another party by way of a credit enhancement/guarantee. A World Bank program to backstop government commitments to a project.

**Partial credit** Where one party takes all the risks for a period of time. World Bank to take the later project finance loan maturities.

**Participant risk** The credit of the participants and the risk of non-performance under the project contracts or financing agreements.

**Participant** A party to a funding. It usually refers to the lowest rank/smallest level of funding. Alternatively, it is one of the parties to the project financing or the project documents. A counterparty.

**Participation** The amount of loan/bond issue taken directly or from another direct lender/underwriter.

**Partnership** The partners agree to a proportional share of profits and losses and thus can have the same tax treatment (like a corporation) or are treated on a pass-through basis for tax (individually), depending on how they are set up for example, general, limited, or limited liability partnership.

**Pax** Passenger, used by airlines.

**Payback** The period in years to recover the investment or loan. It may be calculated on a discounted, non-discounted, leveraged, or unleveraged basis.

**Pb** Chemical symbol for lead.

**PD** Probability of default.

**PCI** Pulverised coal injection; where a lower grade coal can substitute for coke addition in steelmaking.

**Penalties** Payments made because of unsatisfactory construction or operating performance, which lead to a monetary payment. However, a true ‘penalty’ is void under English law.

**Percentage dedication** An agreed percentage of cashflow, usually after payment of Interest, is dedicated to repay the loan outstanding. A method of principal repayment.

**Performance bond** A bond of 5% to 10% of a contract payable if a project is not completed as specified. Usually part of a construction contract or supply agreement.

**Performance regime** A set of standards is established in a contract or concession. This might include the payment of bonuses or penalties based on performance.

**PF** Project finance.

**PFI** Private finance initiative, the original PPP name used in the UK; often used to mean PPP. This has now been replaced by PF2. Alternatively, the magazine *Project Finance International.*

**PF2** The UK PPP program (PFI) whereby the UK government holds 49% of the SPV.

**Physical completion** The project is physically functioning, but not yet (fully) generating cashflow.

**PI** Profitability index where the NPV of the inflows is divided by the NPV of the outflows (to develop a project), usually computed at the time of project completion. In UK PFI deals, performance indicator.

**PIM** Preliminary information memorandum, a tool for sounding the appetite for a PF.

**Placement** Securities are placed with a small group of investors.

**PLR** Project life ratio is the PV of ACFs and residual cashflows until the end of the project/concession life divided by the amount of the PF debt or the loan outstanding. The discount rate is the interest rate plus margin.

**Point** One percentage point on a note or bond.

**Post-Panamax** A container vessel that is too large to go through the Panama Canal (until it is widened); usually capable of taking 5,000 to 9,000 containers – up to 17 or more across the breadth/top layer (of containers).

**Political risk** 30+ risks usually comprising currency inconvertibility; expropriation; war and insurrection; terrorism; environmental activities; landowner actions; non-government activists; legal; and bureaucratic/approvals. The first three are insurable. It overlaps with the political component of *force majeure* risk.

**Potential default** A condition where a default would occur in time or where a notice or default event has not yet been formalised.

**PPA** Power purchase agreement, a long-term power supply contract.

**PPP** Public-private projects; sometimes labelled public private partnerships (although a legal partnership may not be present). In the UK, where the government is contracting out, it is called PFI, private finance initiative (project).

**Praecipium** The amount of the front-end fee not distributed to the joining members of a syndication.

**Premium** The cost of an insurance policy. The price of an option. An extra margin payable with prepayment of principal.

**Prepayment** Repayment of greater than the scheduled amount. If forced, it is referred to as a mandatory prepayment.

**PRI** Political risk insurance.

**Price/pricing** In project finance, such a wording means the spread or margin on the deal (above the interest-rate basis, such as Libor).

**Prime rate** A (US) bank interest rate charged to prime customers for loans (in excess of $100,000).

**Principal** The quantity of the outstanding project financing due to be paid. Generic. A principal is a party bearing an obligation or responsibility directly (as distinct from an agent).

**Private placement** The placement of debt or equity investment is not publicised and may not be tradeable.

**Pro rata** Shared or divided according to a ratio or in proportion to participation.

**Production loan** A project financing where the repayment is linked to the production, often on a dollar/unit basis.

**Production payment** A defined portion of the proceeds of production up to a dollar amount. The amount is that required to repay a loan with interest and fees.

**Proforma** A financial projection based on assumptions.

**Project contracts** The suite of agreements underlying the project.

**Project financing** A loan structure which relies for its repayment primarily on the project's cashflow with the project's assets, rights, and interests held as secondary security or collateral.

**Project** The asset constructed with or owned via a project financing which is expected to produce cashflow at a debt service cover ratio sufficient to repay the project financing.

**Prospectus** A formally approved document describing the business and affairs of the issuer and the terms and conditions of the security. An offering circular in the US filed with the SEC, for example, for an IPO or a Rule 144A bond issue.

**PSC** Public sector comparator, the calculation of what it would have cost the government to build a project against which a PPP project will be compared. If the NPC of the PPP is less than the PSC, then it is said to have value for money, VfM.

**PSP** Private sector participation/participant/'partner'/provision, another way of saying PPP. Sometimes confused with private-sector investment (which may have no character of PPP).

**Pt** Chemical symbol for platinum.

**Public sector comparator** PSC. The means to compare a private sector/PPP proposal from what the public sector/government would otherwise do. Usually done by way of an NPV/CAPM or NPC analysis to establish the VfM.

**PUK** Partnerships UK, itself a public-private entity set up to advise on UK PFI deals.

**Purchasing power parity** A view that differential escalation or interest rates (in different countries) determines the systematic change in FX rates.

**Put** An option to sell (back) a security or commodity at a set price at a given time in the future.

**PV** Present value where a stream of cashflows or accounting flows are discounted to the present at a discount rate. The investment required is not considered/deducted.

**Quarantine** Isolate; remove from access; usually into an escrow (bank) account.

**Ramp-up** At the start-up of a project, output/traffic does not reach full capacity/projections immediately. It starts low and grows to the expected level over the ramp-up period.

**Rating** The ranking, usually grades of A to E, of the creditworthiness/ability to repay. The ranking of bonds is related to its estimated percentage default rate. Countries are similarly ranked and may include an estimation of political risk.

**Real tolls** Where the project's cashflows are fully derived from traffic payments/tolls.

**Recall** Another word to accelerate a loan.

**Receiver** A person/entity appointed under the legal security documents to administer the security on behalf of the project financiers.

**Recourse** In the event that the project (and its associated escrows, sinking funds, or reserves/standby facilities) cannot service the financing or completion cannot be achieved, then the financiers have recourse to either cash or other sponsor/corporate sources or other non-project security.

**Reinsurance** Some or all of the risks insured are taken/reinsured by another party.

**Representations** A series of statements about a project, a sponsor, or the obligations under the project contracts or the financing agreements.

**Reserve** The highest standard of certainty under an ore classification code, such as JORC. Economic to extract.

**Reserve account** A separate amount of cash or L/C to service a payment requirement such as debt service or maintenance. Usually an escrow account.

**Residual cover** The cashflow remaining after a project financing has been repaid expressed as a percentage of the original loan.

**Residual cushion** The amount of net cashflow from the project after the project financing has been repaid. If it is expressed as a percentage of the original loan amount, it is the 'residual cover'.

**Residual** Short form of residual cushion (also called the 'tail'). Alternatively, the assumed value of an asset at the end of a loan, lease, or proforma cashflow. (It is sometimes insured.)

**Resource** The preliminary indications of ore are in evidence, geologically; but are not yet in the measured/proven reserve category. Usage under JORC is inferred and indicated resources (not ore reserves yet).

**Retention** An amount held back from construction contract payments to ensure the contractor completes the construction before the retention (5% to 15% of the contract price) is returned to the contractor.

**Revenues** Sales or royalty proceeds. Quantity times price realised.

**Revolver** The financing amount can be (re)borrowed and repaid (at any time) up to the limit. Often the limit is reassessed periodically.

**RFT** Repeat formation test to see whether an oil reservoir is continuous/connected.

**Risk** The event which can change the expected cashflow forecast for the project financing. 'At risk' means the cash or loan. For insurance, it means the total amount or type of event insured.

**RO** Reverse-osmosis method of water desalination.

**RLR** Residual life ratio equals PLR-LLR, a PV expression of residual cashflows. Sometimes expressed in cash terms (undiscounted) as the cumulative residual cash divided by the sum of all principal and interest applied to debt service.

**Royalty** A share of revenue or cashflow to the government or grantor of the concession or licence.

**RTL** Rupee term lender/loan.

**Rule 144A** Under US SEC regulations, a Rule 144A security (usually bonds, but can be equity/shares) can be placed with professional investors who are prequalified/registered and take minimum US$250,000 amounts. Less strict documentation/disclosure/due diligence is permitted than a full prospectus/(bond) offering circular.

**S** Chemical symbol for sulphur.

**SACE** The Italian ECA. Headquarters: Rome.

**Sales completion** The project has reached physical completion and has delivered product or generated revenues in satisfaction of a sales completion test.

**SCADA** Supervisory Control And Data Acquisition, the software used to control power plants (despatch)/transmission lines and pipelines.

**SEC** Securities & Exchange Commission which regulates disclosure and practices for companies and public issues of debt and equity in the USA. Headquarters: Washington, DC.

**Security** A legal right of access to value through mortgages, charges, contracts, cash accounts, guarantees, insurances, pledges, or cashflow including licences, concessions, and other assets. A negotiable certificate evidencing a debt or equity obligation/shareholding.

**Securitisation** Packaging up a stream of receivables or assets to fund via a capital markets, tradeable funding. The default risk is usually collateralised in some manner.

**Senior** Ranking for repayment, security, or action. Most project financings are senior debt obligations with first, senior security.

**Sensitivity** A change to a cashflow input to determine the change to DSCR.

**Setoff** Money held on behalf of a borrower may be applied to repay the loan. It usually implies without the permission of the borrower.

**Shadow tolls** The government pays the toll by way of a traffic counter. The infrastructure user (usually of a toll road) pays nothing directly.

**Shareholders' equity** Net worth. Book value of total assets less total liabilities.

**Short term** Up to 12 months.

**Sinking fund** A regular payment is set aside in anticipation of a future payment.

**Sinosure** The official export credit agency of the People's Republic of China (PRC). It was established in 2001 and took over roles previously filled by People's Insurance Company of China and The Export-Import Bank of China (C-Exim).

**SOE** State-owned enterprise.

**Soft facilities management** Catering, cleaning, hotelling, and routine operations. Used in PPP transactions. Soft FM.

**SME** Small and medium (sized) enterprises.

**SOP** Standard operating procedure.

**Sovereign risk** The government's part of political risk.

**SOx** Sulphur dioxide/trioxide content of emitted gases/emissions.

**Sponsor** A party wishing to develop a project. A developer. A party providing financial support.

**Spread** The margin (above the interest rate basis).

**SPC** The SPV is a company; an 'incorporated joint venture'.

**SPM** Single-point mooring buoy for (floating) load out of liquids.

**SPV** Special purpose vehicle, usually the borrower/bond issuer in a project financing/PPP.

**Steam turbine** Electricity generation from steam pressure.

**Step-in** The right by the lenders or the government to step in to the project arrangements in the event of a default or non-performance. In PF, the funders want the first step-in right.

**Step-out** Where the financiers can insist on removal of the government (who has stepped-in) under pre-set thresholds to gain a second(ary) step-in right.

**Structure** How a project financing is drawn down, repaid, and collateralised/secured. An action is taken to control/address a risk.

**Stuxnet** A virus, thought to have been developed by the CIA, to attack Iran's nuclear enrichment program. Affects Siemens controllers.

**Subordinated** The subordinated party accepts a lower priority of repayment and/or security than senior debt.

**Sunk costs** Capital already spent.

**Supplier credit** The supplier of goods or services agrees to deferred repayment terms.

**Supply risk** The raw materials or input to a project change from those assumed/projected. For a resources production project, this is called reserves risk.

**Swap** An exchange of the basis of obligations to repay principal, interest, or currency. For interest-rate swaps (floating to fixed), the underlying principal may not be exchanged.

**Sweep** All or a percentage of available cashflow less interest (ACF-I) is used for debt service, usually in inverse order of maturity.

**Syndication** The selling of a project finance to a group of prospective participants, the syndicate.

**3G** Third generation (multimedia) mobile/cell technology; minimum of 144 kilobits/second mobile and 2 megabits/second to a fixed location.

**t** Tonne (metric); 1,000kg.

**T** US Treasury bill rate in %; T10 is the 10-year T-bill rate.

**TA** Transaction adviser or technical adviser; an entity which is: (i) appointed by the SPV; (ii) chosen by tender; or (iii) for its independence.

**Tail** The remaining reserves after the project financing has been repaid. Sometimes means the residual and may be expressed as a percentage, currency amount, or in years.

**Take and pay** If the project's output is deliverable and can be taken, it will be paid for.

**Take or pay** In the event the project's output is not taken, payment must be made whether or not the output is deliverable.

**Takeout** A financing to refinance or take out another eg construction loan.

**Tenor** The number of years/periods a loan/bond is outstanding. The term.

**TDMA** Time-division multiple-access, the GSM phone usage of the frequency spectrum.

**Term** The loan/bond life or tenor; the period to a loan's/bond's maturity. Generic. A condition attached.

**Term B** A class of lending with many features akin to project financing from the US markets in which a second, senior-secured tranche of debt is underlain below the main senior tranche (and with a higher margin). These medium-term loans have nominal loan amortisation, perhaps 1% pa of principal. Usually provided by hedge funds.

**Term sheet** A summary of the loan terms and conditions which, when formalised by a bank/underwriter, becomes a commitment letter.

**Termination** An pre-agreed set of conditions which leads to contract or concession termination and may have payment consequences on either party.

**Throughput** A throughput agreement is a hell-or-high-water contract to put and pay for material through a facility. Force majeure gives no relief.

**Ti** Chemical symbol for titanium.

**Toll** In the infrastructure area, a toll payment is paid by a user ('real' tolls means direct cash payment, also labelled the 'fare box') or by the government (shadow tolls).

**Tolling** A contract to process or convert a raw material into a saleable or finished product. The tolling contract does not require the purchase of the raw material or the sale of the output.

**Tombstone** An advertisement listing the sponsor, amount funded, participants, and key roles. 'This advertisement is a matter of record only.'

**TRA** Trust and retention account; usually an escrow(ed) account.

**Tranche** A separate portion of a project financing, perhaps with different financiers, margins, and term. The French word for a 'slice'.

**tpa** Tonnes per annum. If expressed as mtpa, one needs to be certain it is metric tonnes per annum versus million tpa.

**Transfer risk** Currency cannot be sent out of the country, usually due to central bank restrictions or a national debt rescheduling.

**Tripartite agreement** An agreement to bind all three parties to a project financing/concession agreement to ensure privity (legal linkage). These three parties are usually the government, the SPV, and the sponsor/owner. Direct agreement.

**Trustee** An independent or nominated third party who administers corporate or financial arrangements.

**Turnkey** The construction of a project to meet a standard or the completion test where it is ready to produce cashflow. Turnkey contracts usually have LDs and retentions.

**Type 1** Completion support comes from the sponsor/developer whose balance sheet is often at risk. Usually the shift from recourse to non-recourse is tested by way of a completion Test.

**Type 2** The contractor's package is relied upon to achieve project completion.

**UAW** Unaccounted for water – water that is lost or has not been paid for = 'non-technical losses' or theft! NRW.

**Unbundling** Separating service (payments) and facilities.

**Underwriting** The commitment to fund is not contingent on syndication.

**UJV** Unincorporated joint venture where several SPVs contract together to (develop and) operate a project. Capex, opex, and revenues are split severally. Contractual JV.

**Unsecured** The financier has no security, merely the obligation/undertaking to repay.

**$U_3O_8$** Chemical symbol for yellowcake, the main product from uranium mining/processing.

**Unwind** To reverse a swap or hedge.

**v.** Abbreviation for 'very'.

**Value for money** There is a positive outcome from the public sector comparator which demonstrates that the private sector development of a PPP (project) provides a savings/cost benefit. VfM.

**var** Variable reactance, a measure of electricity grid 'stiffness'.

**Variation bond** An amount to allow for agreed changes in design; used in UK PFI.

**VfM** Value for money, a key measure in PPP projects. The difference the agreed costs of a PPP (on a net present cost (NPC) basis) is below the public sector comparator (PSC). If the NPC is more than the PSC, there is no VfM.

**WACC** Weighted average cost of capital calculated from the returns or interest rates payable on the different components of a company's or a project's deemed capital structure.

**Waterfall of accounts** Repayment hierarchy from revenues. In the US, these are formal 'cascading' cash payments through a series of Delaware trust accounts.

**Well** A drill hole in the petroleum industry.

**Withholding** A tax on interest, royalty, or dividend payments, usually those paid overseas. It may be deducted at source.

**Working capital** Cash required to fund inventories and accounts receivable. Accounting definition is current assets less current liabilities. It is recovered entirely when the project ceases.

**Workout** The project financiers are responding to work out a potential problem or have arranged to step-in/take over the operation after a default to attempt to rehabilitate the cashflow-generating capacity of the project.

**World Bank** An MLA based in Washington DC. The International Bank for Reconstruction and Development ('IBRD'). Usually involved in government-related deals.

**Xenophobia** A dislike of dealing with outsiders/foreigners; a preference for dealing with one's own nationals.

**Yield** The financial return, usually expressed as a percentage per annum.

**Zero coupon** No interest is paid. A bond or note is issued at a discount which is calculated to yield a compound interest equivalent return.

**This book deals with:**


The text unites the domain of project financing with a wealth of project management techniques, supported by diagrams and charts and other pictorial features, where appropriate. All these supporting features facilitate a better understanding of the accompanying text for the reader.

In many chapters there are diagrams to clarify the specific transaction structure discussed in the accompanying text. These diagrams enable the reader to get a very clear idea of the transaction structure, which is particularly useful where it is complex or unusual. There are also a number of checklists to assist stakeholders in the project and resource management of complex project financings. The new financial modelling chapters allow exploration of some of the pitfalls project models encounter, challenging the accurate replication of the project cashflows for stakeholders to evaluate. In the later new risk management chapters, worked examples are included to illustrate the techniques in practice. The new public private partnership/private finance initiatives chapter introduces readers to this new approach to public projects. References are made to useful websites throughout the text. Cases are included at the end of the main text to encourage examination of real-life examples of project financing in practice and also highlight specific issues of current interest.

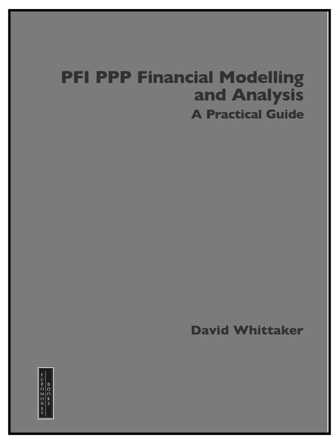
**ISBN:** 978 1 78137 070 4

**Price:** £199/$365/€291

## PFI PPP Financial Modelling and Analysis – A Practical Guide

David Whittaker

**Publication date:** May 2010




This book is a practical guide for those wishing to gain further skills and knowledge in this topical area not only in the UK, but all around the world. It will be of particular interest to investment banks, project sponsors, consultants and players within the PFI/PPP market place. You may be a financial director, a financial controller, a financial analyst, financial modeller, investment banker or a general manager working in the PFI/PPP sector. It covers financial modelling and analysis at the bid or financial close stage, the post financial close stage and other areas such as refinancing and secondary markets. Essentially, this book equips its readers with the skills and knowledge to derive maximum financial value over the life of the concession. It includes over 100 practical examples of excel financial model extracts and VBA/macro code. The reader will complete financial modelling and analysis exercises that will lead up to the completion of 3 different financial models. It is provides an excellent source for self-study which cannot be obtained from training courses and on the job experience alone thus making this book fantastic value for money.

Other topics of interest include financial modelling best practice, IFRS, financial model audits and reviews, project management and the use of generic and template financial models.

**ISBN:** 978 1 84374 754 3

**Price:** £270/$450/€350