Hydro Finance Handbook

HydroVision 2008

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Prepared as a companion document for
"Hydro Finance Tutorial," Session 1C
of the New Development Track of the
HydroVision 2008 Conference

Published by

HCI Publications

NOTICE

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Preface

The *Hydro Finance Handbook* was prepared as a companion document for the participants of Session 1C, Hydro Finance Tutorial, at the *HydroVision 2008* conference in Sacramento, California, USA. The Handbook discusses the financial aspects involved in the development of hydropower projects, and the background and steps required toward achieving financial closing.

Several books and booklets are available on various technical and financial aspects of hydropower development. The need for a reference document that would more comprehensively cover all of the financial aspects has been recognized by many for a long time. This Handbook is a step toward fulfilling this gap by unraveling the intricacies and issues involved in hydropower financing.

The authors hope the Handbook will be able to serve as a comprehensive reference document for a spectrum of stakeholders involved in hydropower development; namely developers, investors, public and private bankers and financiers, public office holders, contractors, equipment suppliers, insurance brokers, practicing engineers, and consultants.

Contributors

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Chris Head is an independent consultant specializing in contractual, commercial, and regulatory aspects of hydropower and water resources development. He is the author of *"Financing of Private Hydropower Projects"* (published 2000), *"Financing of Water Infrastructure"* (2006), and of many papers on the subject of structuring suitable financing and risk-sharing models. He has a longstanding record of advising utilities, governments, international financing institutions, and developers. Chris has more than 30 years' experience in the industry. By background a civil engineering graduate of King's College, University of London, UK, he also has qualifications in Contract Law and Arbitration from the Chartered Institute of Arbitrators, UK.

Mike McWilliams is director of hydropower at the United Kingdom-based consulting engineering firm Scott Wilson. With some 30 years of experience in the power industry, he has been involved in all stages of project development from identification to commissioning. Mike's speciality is in private power; he has been responsible for project planning, pre-investment studies, project engineering, due diligence, financial modeling, risk assessment, and negotiation of commercial contracts on a wide range of private power projects worldwide.

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Judith Plummer is a financial analyst with the World Bank and she currently has responsibility for the Bank's hydropower program in South Asia and a particular focus on issues of project finance. Most recently, she has been focusing on facilitating hydropower development by reducing the perception of risk and ensuring that all aspects of technical, financial, economic, environmental, and social sustainability gain due consideration in project preparation and implementation. Judith has a Masters in International Public Policy from John's Hopkins and is a qualified chartered accountant with more than 20 years' experience in the improvement of management capabilities within publicly owned organizations and public utilities.

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Brian Tarmey is a financial analyst with Delphos International, Ltd., where he has worked with a range of clients seeking to raise debt and equity financing for infrastructure projects, including power generation. Prior to joining Delphos International, Brian worked at the Overseas Private Investment Corporation and a publicly-traded technology company based in Hong Kong. Brian holds an MA from The George Washington University and a BA from Tufts University.

Bruno Trouille graduated in 1975 with a MS in Engineering from the Institut Catholique des Arts et Métiers of Lille, France. He has also an MS in Industrial Relations from Loyola University, Chicago, USA. He is a vice president at MWH, working in the International Projects Group. He serves as senior project manager or lead economic and financial analyst on hydropower projects, power system expansion studies, regional market analyses, and project financing. He led the efforts by this team to prepare this Handbook and organize/moderate the HydroVision 2008 session.

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Chapter 1

Introduction

Chapter 1

Introduction

By Bruno Trouille and Chris Head

Overview

The prospects of the hydropower industry have dramatically fluctuated over the past 20 years. In the 1990s, hydropower developers were cast in the role of the bad guys who were destroying natural river systems and displacing people without good cause and reason. Several single-issue lobby groups took it upon themselves to oppose hydropower developments on principle, often without regard to the merits of individual schemes and without offering any realistic cost-competitive alternatives. These groups were effective in lobbying in the quarters that mattered, so that many of the international financing institutions simply withdrew support from such developments. As a result, investments in new dams and hydropower projects dropped sharply over a period of about a decade.

However, with the passage of time, a more balanced view has prevailed, and the fortunes of the hydropower industry have changed for the better. In a world that is increasingly concerned about global warming and the security of energy supplies – and with oil at well over US$100 a barrel — hydropower is now again the preferred generating option in many parts of the world. At a higher level, this trend is reinforced by the fact that many dams that are essentially financed through their power benefits are, in fact, multipurpose schemes that also reduce flooding, support irrigation, provide industrial water supply, maintain navigation, etc.

All of these benefits are compounded by the fact that hydropower is actually highly cost effective, in the sense that once the capital expenditure on the project has been amortized, the running costs are very low. It is an asset with an indefinite shelf life that will pass benefits down through the generations. But — and it is a big "but" — it is a very expensive asset to finance in the first instance.

Financing was not so much a problem in the past, when the state usually owned the utility company, which simply financed its new projects from the Government balance sheet with the support of organizations such as the World Bank. But these days have gone, and in a tougher and more commercially orientated world, there is not enough public money go around. So in the 1980s and 1990s, at the same time that hydropower development was facing strong opposition in certain quarters, in other areas it was argued that the power sector should be commercially viable and no longer the responsibility of the public sector. Power should stand on its own feet and use private sector finance. From these ideas there emerged the idea of the Independent Power Producer (IPP), a stand-alone company whose sole business is to generate and sell electricity.

The IPP concept works well for thermal power stations. The only resource the State has to make available is a plot of land; there are few site-specific issues to grapple with, and the engineering inputs — and therefore the construction costs — are reasonably predictable. In countries with few capital resources of their own, the fact that the average thermal power station has a high import content means that such projects are easy to finance using export credits. And because about half of the tariff is a pass-through fuel cost, the amount of capital that has to be raised is proportionally lower.

Hydro shares none of these features. It is capital intensive and highly site-specific to the extent that no two projects are alike. It is often impossible to predict the amount of engineering needed — and therefore the final cost — until construction is well advanced. It is inherently more risky, in terms of cost overruns and delays, than a thermal power station. Furthermore, the award of a hydropower concession is much more complicated than simply making available a plot of land, and many governments struggle with the challenge of awarding the rights for what is seen by some as the exploitation of a unique national resource.

For these and other reasons, there have been relatively few successful IPP hydro projects other than at the smaller end of the spectrum below about 80 MW. Those that have succeeded have usually taken a long time to reach financial closure and incurred heavy upfront costs.

One of the main reasons that private hydropower financing has not always been very successful is illustrated by the graph shown in Figure 1.1. The 100-year time frame reflects the long economic life of civil work costs (typically 60 to 75 percent of the total investment) associated with dams and hydropower facilities. The problem is that hydro can appear expensive in the early years — but it is almost ridiculously cheap thereafter. Examples in the U.S. and around the world show how inexpensive hydropower can be once the initial investment loans have been repaid. Average production costs are often below one U.S. cent per kilowatt-hour (kWh).

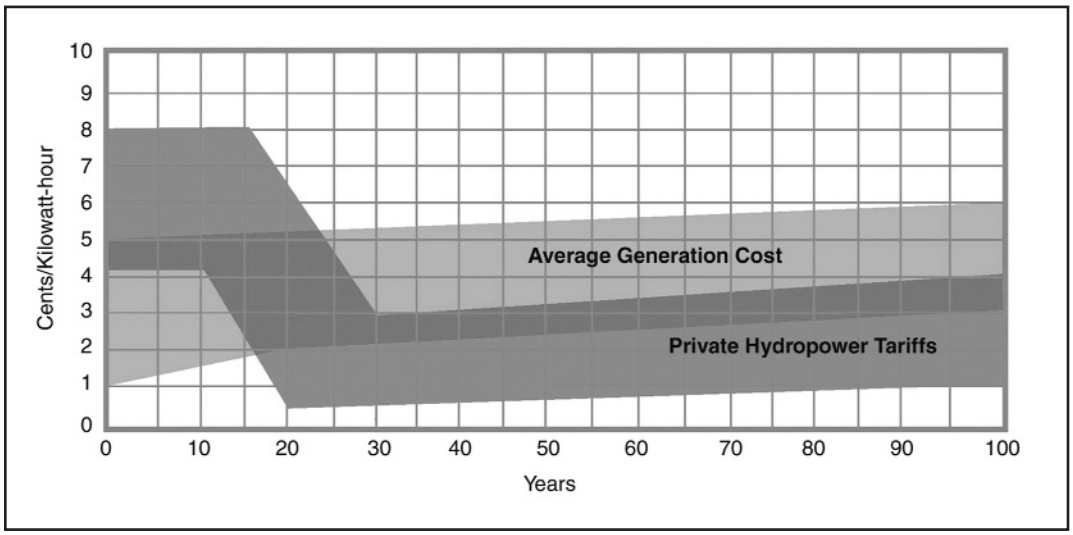

Figure 1.1:
Hydro tariff versus average generation costs (constant 2008$).

Figure 1.1 does not represent all possible scenarios, but rather presents typical ranges of utility and project experience. It compares the average energy tariff required to make private hydropower

financially viable and the average generation or production cost of most electric utilities. For the sake of clarity, cost and tariffs are shown in constant 2008 U.S. dollars.

The heavy initial investment cost associated with hydropower typically requires high tariffs in the first ten to 20 years to repay the loans, satisfy the banks' debt coverage ratios, and provide an acceptable return on equity. Figure 1.1 shows a typical range of 4 to 8 cents per kWh. Once the investment loans are repaid, the cost of hydropower drops dramatically. That's because the project owner needs to pay only for operations and maintenance costs, royalty payments, and regular electro-mechanical refurbishments and upgrades. Unlike thermal power, the cost is very stable over time and not subject to fuel price fluctuations.

In contrast, the average historic cost of production for a utility with a mixed generating portfolio can typically be between 1 and 5 cents per kWh. The low figures of 1 to 2 cents per kWh are found in countries with existing hydropower facilities that have been fully depreciated or where alternative forms of generation have been heavily subsidized. However, these are not repeatable, and as new power plants are built, the lower range of the average generation costs is expected to sharply increase in the next five years.

Figure 1.1 clearly shows the problems facing the private hydropower industry trying to develop projects entirely based on private financing. The high initial tariffs required to make private hydro financially viable in the first ten to 20 years of operation is not always competitive with current bulk power tariffs paid by customers or for alternative thermal options.

The need for new hydropower development

The global energy and electricity demand continues to increase. Such growth in demand is a result of the combination of continued growth in the well-established markets of the developed world and very rapid economic development of countries such as China, India, and Brazil — to name just a few. Traditionally, the bulk of the electricity demand has been met by supply of fossil-fuel-based energy sources. However, prices for oil, gas, and coal have drastically increased over the past two years, making thermal generation much more expensive. As a result, hydropower has again become very attractive.

A vast number of potential hydropower project sites are present in undeveloped countries and in some developed countries. Commercial development of these projects can be a launching pad toward a dynamic national economy, which otherwise might continue to remain stagnant. However, several factors affect the development of hydropower projects:

- The lack of a stable regulatory, legal, and contractual framework in many countries, as well as a lack of well-coordinated efforts from the host government to promote hydropower development
- The changed investment climate in many less developed countries, and liquidity crisis facing some IPPs
- Political turmoil and uncertainties in the rate of currency exchange in several countries with large undeveloped hydropower potential
- The competitive bidding process requested by the multi-lateral development agencies without the completion of extensive feasibility and EIA studies
- The inability of many utilities and consumers to pay market-based tariffs

- The failure of several projects to reach financial closing and the high front-end development costs that have reached a price tag of $40 million or more before financial closing
- Non-power benefits such as flood control, aquaculture, recreation, irrigation, raw water storage, or other purposes are very important but are not bringing any financial revenues to the privately developed projects

Efforts are being made to remedy these negative factors at various international, national, and local levels. International financing institutions are now again actively involved in promoting sound infrastructure development, including hydropower. The hydro industry itself is actively developing and promoting sustainable development, such as the sustainability guidelines prepared by the International Hydropower Association.

Hydropower development involves many branches of engineering; a thorough understanding of each of the technical disciplines is a must. Equally important are the economic and financial aspects of hydropower development. Each hydropower project is unique in its engineering aspects; standardization of engineering design process is somewhat unachievable. Similarly, each hydropower project has unique economic and financial issues that require specific solutions.

Achieving an optimum solution requires applying sophisticated knowledge of economics and finance that are specific to each project environment and navigating through a number of arduous steps. Equally significant is the identification of key issues and stakeholders involved from a financial point of view. Development of an appropriate financial package often involves an optimal balance between public and private parties and a proper mix of equity and debt financing. Finally, identification of possible financial risks involved in various steps of project development and implementation is critical.

The objective of this handbook is to shed light on the financial aspects and issues involved in hydropower development. Overall, the reader will build a better understanding of how projects are financed, learn more about current practices and critical issues, and cut through the confusion surrounding hydro financing terminology.

Content of the Handbook

Chapter 1: Introduction provides a brief overview of the handbook and its objectives.

Chapter 2: Key Issues starts by outlining prominent issues surrounding new hydropower development. Chapter 2 sets the stage for the reader to appreciate and understand the complexity of issues associated with investments in hydropower. It provides an overview of economic and financial viability, environmental and social sustainability, risks allocation and mitigation, regulatory frameworks, credit worthiness, green house gas emissions and carbon credit, and public versus private development.

*Chapter 3: Key Player*s identifies the entire host of players involved in developing and implementing a new hydropower project. Roles of each of the players have been broken down as it pertains to financial, risk sharing, and other responsibilities. The chapter covers the various agencies of the host government, project owner, equity investors, debt financiers, electricity off-takers, construction contractors, insurers, advisors and consultants, project operator, and other project stakeholders.

Chapter 4: Public versus Public-Private Partnership starts by discussing the traditional public approach to developing hydropower. It goes on to describe why hydropower could be a promising opportunity for the private sector to get involved. It highlights the main barriers for private investment but also the opportunities. Public-Private Partnership (PPP) is then discussed as a possible mechanism for a

more productive environment by solving some of the risk issues and easing the financial burden. The chapter concludes by highlighting the role of the international financial institutions as catalysts to ensure successful PPPs.

Chapter 5: The Financing Package expands on the various financial aspects involved in putting together and negotiating a successful package. It first reminds the reader of the need for a realistic estimate of the total amount of finance needed. Aspects related to revenue stream, risk allocation, currency exposure, and guarantees are addressed. Various financial instruments available to the project developer, e.g., debt and equity, are discussed. The chapter elaborates on the importance of developing a sound financial plan from the early phases of project planning, and provides some examples of financing structures.

Chapter 6: Obtaining Equity for Hydropower Projects focuses on issues related to equity investors and equity financing. The chapter first discusses the various types of equity investors from utilities and IPPs to industrial off-takers, strategic investors and financial institutions. The various classes of equity financing (common, preferred and quasi-equity) are then described, with the pros and cons of each type. The importance of defining an exit strategy is highlighted with a description of the main exit options. Finally, the approach and process for the project sponsor to find an appropriate equity investor is discussed.

Chapter 7: Case Studies list five hydropower projects as typical examples. Special emphasis is provided on the specific financial model adopted for each project.

Chapter 2

Key Issues

Chapter 2

Key Issues

By Judith Plummer

Economic and financial viability

Almost all hydropower projects bring with them some measure of benefit and of "public good" — over and above the obvious benefits of power supply. However, the various possible secondary benefits, such as ancillary services to the grid, employment generation, and improved access to markets for local people, are often not easy to quantify and rarely something for which a price can be determined or extra revenues guaranteed. There are also various secondary adverse effects on the area that can only, to varying degrees, be mitigated and are similarly difficult to quantify. Economic analysis considers (where possible) the value of such issues of employment generation and the cost of un-served energy (i.e., the cost to a nation's economy of not providing power supply to support improved lives and livelihoods), but these items do not produce a revenue stream for the project and thus are not part of the financial evaluation. Financial viability is usually based on a 20- to 25-year comparison of the costs and revenues of the projects and values only those costs and benefits for which the monetary impact can be easily assessed. Consequently, it may well be the case that a project is economically viable, but not financially attractive.

Even economic analysis tends to under-state the benefits and costs of a project, because some ancillary benefits or effects are simply too difficult to estimate, although the science of economic valuation is developing all the time. Also, the economic valuation tends to understate the comparison to the effects on a nation of NOT building a project, including issues such as power shortages or increased susceptibility to drought or floods. If these items are fully accounted for in the economic evaluation, the gap between the economics and finance of the project may be even more significant.

Government decision-making is based on the economic value of a project to a nation, but the financing of that project depends on its financial value. This can create a problem for hydropower and multi-purpose dams. Financiers also consider risk as well as financial value and a developing[1] country's risk may not be favourable. Hence, these projects may fall in the "gap" between economic and financial viability and be important to the nation, but not financible as a commercial investment.

When a project falls into the category of "economically but not financially viable," the government has to look for ways to improve the project's financial viability or finance the project itself. For example, the government could introduce a subsidy element to the project, provide equity or low-cost debt (sometimes through development-based finance), or separate out the financial viable aspects from the non-viable aspects of the project (e.g., consider the dam and the power station as two projects).

Environmental and social sustainability

After years of inadequate attention to the environmental and social effects of large infrastructure projects, there is now a clear trend to improved attention to project effects. From a financing point of view, it makes sense to get the environmental and social issues dealt with correctly from the start. There are many projects whose implementation delays (and consequent cost overruns) are related — not to their engineering — but to their lack of attention to mitigating adverse environmental and social effects. It is now accepted practice that people around a project are consulted about the development, compensated for adverse effects, and share in the benefits of the project.

A group of international financing institutions have set out minimum requirements for a project to be financed. These principles, referred to at the "Equator Principles," are now agreed to by more than 50 of the largest finance houses and banks in the world. First designed in 2003 in conjunction with the International Finance Corporation (IFC – the private sector arm of the World Bank), the principles were updated in 2006 following criticism from some non-governmental organizations (NGOs) and an updating of IFC's own environmental and social guidelines.

The Equator Principles

…….Project financiers may encounter social and environmental issues that are both complex and challenging, particularly with respect to projects in the emerging markets.

The Equator Principles Financial Institutions (EPFIs) have consequently adopted these Principles in order to ensure that the projects we finance are developed in a manner that is socially responsible and reflect sound environmental management practices. By doing so, negative impacts on project-affected ecosystems and communities should be avoided where possible, and if these impacts are unavoidable, they should be reduced, mitigated and/or compensated for appropriately. We believe that adoption of and adherence to these Principles offers significant benefits to ourselves, our borrowers and local stakeholders through our borrowers' engagement with locally affected communities. We therefore recognise that our role as financiers affords us opportunities to promote responsible environmental stewardship and socially responsible development. As such, EPFIs will consider reviewing these Principles from time-to-time based on implementation experience, and in order to reflect ongoing learning and emerging good practice.

For details, see www.equator-principles.com

Other initiatives on environmental and social sustainability include the World Bank's own "safeguards" polices and guidelines. These include ten policies covering such issues as: environmental assessments; natural habitats; forests; involuntary resettlement; indigenous peoples; cultural properties; safety of dams; and international waterways (www.worldbank.org). The International Hydropower Association (IHA) also has developed its "sustainability guidelines" and "sustainability assessment protocol" with associated guidance on project assessment and good practice (www.hydropower.org).

Risks allocation and mitigation

A risk is anything that can have a negative effect on the project outcome. Risks may be real or perceived; in other words, some risks depend on an individual's view, while others appear the same to all. An example of a real risk may be of an earthquake if the project lies in an earthquake prone zone. A perceived risk is more subjective; e.g., for an international financier, the political risk (risk of a project being affected by changes imposed by government) of a particular country may appear high, but for that country's government or that of its neighbor, the political risk may not seem so

high. Whether a risk is real or perceived, they can all affect the likelihood of a project being financed. The more risk a financier feels that he/she is taking, the higher the charge will be for accepting that risk. This cost loading may not be acceptable to the project developers. However, at the limit, when the risk profile is too high to be costed, the project may not attract any offers of finance.

Hydropower and multi-purpose infrastructure projects are generally heavily loaded with risk. This is because they are capital intensive, environmentally and socially sensitive, and often built in challenging geographical conditions with limited infrastructure access (sometimes in countries with failing governments). Many projects also suffer from weak financial viability because of:

- Unfunded mandate — high degree of un-remunerative benefits such as flood control (see difference between economic and financial viability above);
- Tariffs below cost — low national electricity tariffs that may not cover the cost of generation in the early years of project operation when the heavy capital debt is being repaid;
- Additional costs of delay — some projects may be forced to agree to a firm power delivery contract, which means if the project is delayed, the developer has to buy power in the market (often at high cost) in order to meet the delivery contract;
- On-time payment — questions as the creditworthiness of the offtaker; and
- Uncertainty of market price development and unstable regulatory regime.

The attitude to risk of the various partners in a project will depend on their position and their perception of risk. Those providing debt are only interested in the security of their repayment and tend to be risk averse, whereas equity partners take a share in the profits and thus may be prepared to accept a little more risk in return for the prospect of higher returns.

Lenders and equity investors have different attitudes to risk

Lenders include commercial bankers and other corporate entities and bondholders who are all lending at defined interest rates for specified periods. They have no stake in the profitability of the project, and their only real concern is the security of repayment. For this reason, lenders are usually highly risk averse and naturally adopt a conservative stance on any matters relating to risk.

Equity Investors include the sponsors who actively manage the project, and any others — such as the Host Government or a multilateral development bank — who might sometimes choose to take a minority shareholding. Unlike the interest paid to Lenders, the returns on equity are not fixed; they rise if the project is profitable and decline if it is not. For this reason, Equity Investors may sometimes be prepared to assume more risk in return for the prospect of higher rewards.

Broadly speaking there are three categories of project risk, any one of which can affect a project's financial viability and therefore the financiers' prospects for recovering their money. They are described in the table on the next page.

Although some of these risks are insurable, many others are not. Even the cost of insurance may vary according to which entity is taking the risk. When it comes to Public-Private Partnerships, careful thought has to be given to the allocation of risk between the public and private sectors to ensure that risk is handled in the most effective way possible and at least cost. It is usually recommended that risk is allocated to the parties most able to control the risk parameters. But if control (or mitigation) is not possible, then the risk must be "born" by one of the parties.

Type of Risk	*Example*	*Insurable?*
Country Risk (or Political Risk)	• Risk of nationalization • Changes in law affecting status or financial position of project company	May be insurable through guarantees (e.g., MIGA)
Commercial Risks	• Risk to revenue such as change in regulation or difficulties in enforcing payment	Partially insurable
Project Risks	• Site-specific risks such as cost and time overruns during construction • Difficulties in obtaining necessary environmental permits and clearances • Uncertainty of addressing social issues which may arise • Hydrological risk • Transmission interconnection	Not usually insurable

There is often a tendency for the public sector to expect the private sector to take a larger share of the risk of the project than is feasible. The private sector will always seek a cost compensation for risk, so the more risk it has to bear, the higher its price. At a limit, if the risk is too high, the private sector will not participate. The "cost" of trying to off-load risk should be carefully considered; the public sector is often better off bearing a risk if it makes the project financeable. A well-prepared analysis of financing options will include a risk analysis, which gives consideration of each risk; the degree to which it is capable of being mitigated, insured, or guaranteed; the likely effect on the financial viability and the financing of the project; and which party should bear the risk.

Risks can be aggregated by a country's own portfolio of projects — e.g., a country with a range of fuel options for power generation has effectively limited the effect of hydrological risk on its overall generation profile. Beyond aggregation, various types of risk mitigation instruments exist. These are variously referred to as guarantees or insurance, and often with a confusing mixture of definition of the terms. Broadly, a guarantee covers specific, mainly financial events, such as timely payment of debt service and has clear terms of default under which it is invoked. Insurance covers a wider range of events and has a time-limited process for claim against that event, which is subject to various exclusions.

Credit Guarantees — cover losses in the event of a debt service default regardless of whether the cause is a political or commercial risk.

- **Partial credit guarantee** — covers "part" of the debt service and are largely offered by international finance institutions such as a multilateral development bank. The purpose of such guarantees is to improve the terms (reduced interest and extended maturity) and increase the availability of debt finance to the borrower by sharing the risk between the guarantor and the lenders.
- **Full credit guarantee** — sometimes referred to as a "wrap" guarantee; covers the entire debt service in the event of default. This can be used, for example, to improve the credit risk rating of a bond issue. This type of guarantee is largely provided by private companies and is only available where the country's underlying risk rating is substantially better than the project for which finance is being raised.
- **Export credit guarantee** — i.e., insurance; covers losses for lenders or exporters where the aspect of the project concerned is tied to export of goods or services. This is offered by export

credit agencies (ECA) and supported by the country interested in promoting its exports. Such a guarantee occasionally is provided by bilateral development agencies. (ECAs may also effectively provide finance for export-related transactions).

Political Risk Guarantees (or Partial Risk Guarantees) — cover losses to commercial lenders caused by specific political events. **Political Risk Insurance** covers losses to equity investors for political events such as war, expropriation of assets, or lack of convertibility of currency.

Regulatory frameworks

"Regulatory" risk — or the risk of losses caused by adverse regulatory actions on such issues as tariffs, tax payments, or expatriating profits is often cited by the private sector as one of its most significant investment concerns. This perception of risk is heightened by the company's belief that this is an area in which they have no control over the outcome. In order to encourage private participation, governments need to put in place a sound and predictable regulatory framework. However, while this framework is being tried and tested, it may be necessary to define some aspects, such as the rate of tariff fixation in the contract for an infrastructure project, and protect these aspects from future regulatory changes.

To reduce the perception of regulatory risk, governments need to ensure that there is a clear and enforceable procedure for the regulatory process. This should include:

- *A legal framework:*
  - published policies and laws as well as procedures for their revision;
  - an independent regulator; and
  - a quick and effective dispute resolution system, such as an independent tribunal.
- *A clear strategy:*
  - an articulated government strategy for promotion of infrastructure development, including private participation;
  - in situations where incentives (e.g., tax holidays) are provided, these need to be transparent, easily accessible, and consistently applied; and
  - where possible, the administrative burden on the private sector (and opportunities for corruption) should be reduced by implementing initiatives such as "single window" clearance procedures.
- *Transparent approach:*
  - Public planning and procurement procedures need to be fair, transparent, and accountable.

While the reputation and consistency of the regulatory framework is being built, it is possible to employ partial risk guarantee, from a multilateral development bank (MDB), to reduce the regulatory risk.[2]

Credit worthiness

An assessment of all the above issues (i.e., economic and financial analysis, assessment of environmental and social effects, and risk assessment and regulatory issues) will combine to give a picture of the "creditworthiness" of the project. Ultimately, it is this creditworthiness that will determine which players are interested in participating in the project and, in particular, whether the project proponent will be able to raise international or local private equity or debt or even parastatal equity or debt. Creditworthiness may be expressed as a credit rating, although this really only takes into account certain types of risk and financial returns. If the project is not deemed "credit worthy," it may be necessary for the government to take action to support the project through a sovereign

guarantee to underwrite the payment obligation of the power off-taker. If the sovereign guarantee is not considered enforceable, then a guarantee from a multilateral development bank may be required to enhance credibility.

Greenhouse gas emissions and carbon credit

All major infrastructure projects can be said to be causes of greenhouse gas emissions since they use steel and concrete, all of which has to be transported (usually by road) to a project site. However, projects vary in their lifetime emissions; for example, hydropower projects generally have lower lifetime emissions than thermal power plants as they do not, by their nature, produce greenhouse gas emissions. The only exception to this is concern that has been expressed is the possible greenhouse gas emissions from reservoirs. There is evidence that, under certain conditions of stratification, light, and temperature, methane emissions may occur from freshwater reservoirs as a result of the anaerobic decomposition of organic matter in plants and soils flooded during reservoir impoundment or other organic matter that arrives in the reservoir from its catchment. The conditions required for the necessary anaerobic decomposition are such that it appears the majority of reservoirs are not at risk of producing these emissions, but the science is new and an accurate methodology for estimating emissions is still under preparation. Conversely, there are circumstances where a reservoir can act as a methane sink. In all cases, it is necessary to consider the net emissions (i.e., the change in emissions from those inherent to the project site before and after the project construction).

In many countries it is possible to obtain "carbon finance" for renewable power projects (i.e., funds for reducing carbon emissions by avoiding the need for more grid-based thermal power or use of diesel generation). This is assessed on the basis of carbon emissions avoided, and quantified using Certified Emission Reductions (CERs). The amounts concerned are generally not sufficient, in the case of hydropower, to make a radical difference to the project's finances. Typically, a project's incremental internal rate of return may be 2 or 3 percent from carbon finance. Thus, carbon finance can make a good project more attractive, but it is unlikely to make an un-financable project bankable. To some projects, the opportunity to have even a small revenue stream denominated in hard currency can be significant and can reduce risk.

Carbon finance is not strictly a financing instrument; it generates a stream of revenues (in foreign currency) to the project only when the plant begins generating such that the level or carbon emissions avoided can be calculated. Recent initiatives are in place to try to capitalize this future revenue stream into a form of upfront financing for infrastructure projects that qualify, but the estimates used for capitalization have to be conservative so as not to overstate the amount or value of the CERs.

The rules by which a project is assessed for carbon finance make it more difficult for large hydropower projects to qualify. First, while awaiting a scientific method for accurately estimating the GHG emissions from reservoirs, the United Nations Framework Convention on Climate Change (UNFCC), who determines the regulations for carbon finance, set a limit on the hydropower projects that the ratio of the megawatts to the area of the dam cannot be greater than 4. This rules out particularly large multipurpose projects where the area of the reservoir is large compared to the size of the powerhouse. Hydropower projects must also demonstrate "additionality" (i.e., that the project would not have been built in any case) or that there are significant barriers to hydropower development. The current clean development mechanism arrangements are valid until the end of the current

Kyoto protocol, i.e., 2012, and it remains to be seen what will change thereafter.

Many governments are yet to produce regulations on whether the carbon finance entitlement remains with the project or with the government and for what these funds should be used (e.g., reducing financing costs, lowering project tariff, or setting up an environmental fund). In the absence of such regulations, the funds are currently at the discretion of the developer.

Public versus private development

Once a project has been assessed as to its creditworthiness and risk, it is possible to begin to design a structure for it and assess the extent to which it is either a mainly private or mainly public project or a public/private partnership. The degree to which the various risks can be mitigated will have a strong influence on the choice of project structure. If the risk is substantial and cannot be mitigated to any significant degree, then the project will be unlikely to attract private participation and will need to be developed in the public sector. However, even in a public sector project there may be opportunities for private participation in carefully structured areas where the risk is not transferred to the private player.

The following diagram illustrates the decision-making process for assessing the appropriate project structure.[3]

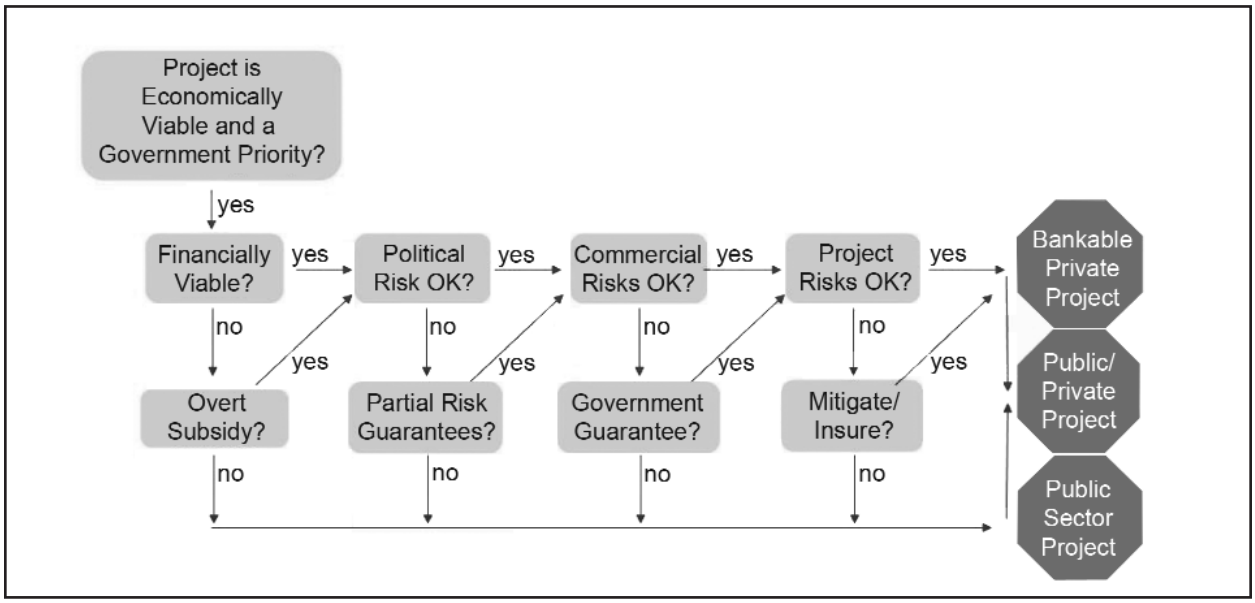

Figure 2.1:
A private or a public project?

The choice of project structure is covered in more detail in Chapter 4.

Notes:

[1]The developing countries are currently utilizing only a small portion of their potential; Asia (20 percent), South America (19 percent), and Africa (7 percent), compared to 60 percent for Europe and North America.

[2]"Mitigating Regulatory Risk for Distribution Privatisation – The World Bank Partial Risk Guarantee" Gupta, Lamech, Mazhar, and Wright, World Bank 2002.

[3]Figure 2.1 from "The Financing of Water Infrastructure, A Review of Case Studies"

Chapter 3

Key Players

Chapter 3

Key Players

By Mike McWilliams and Chris Grant

Overview

There are potentially a great number of parties involved in a hydropower development, whether it is public, private, or a public-private partnership. In the same way that every project is technically unique, the organizational structure of each project is unique. There is no single structure applicable to all projects.

Some of the key players to project development are shown in Figure 3.1. The roles of these parties and the players undertaking these roles are discussed in this chapter. It is not uncommon for one player, such as a government, utility, contractor, or consultant, to perform several roles simultaneously. Sometimes there are clear organizational and contractual distinctions between the roles and parties; on other projects, the relationships are more blurred. It is important to note that the figure does not show all the parties involved in hydropower development; each legislative structure and concession arrangement introduces its own cast of players, and many other parties are involved in minor but potentially important roles on the periphery of the core structure.

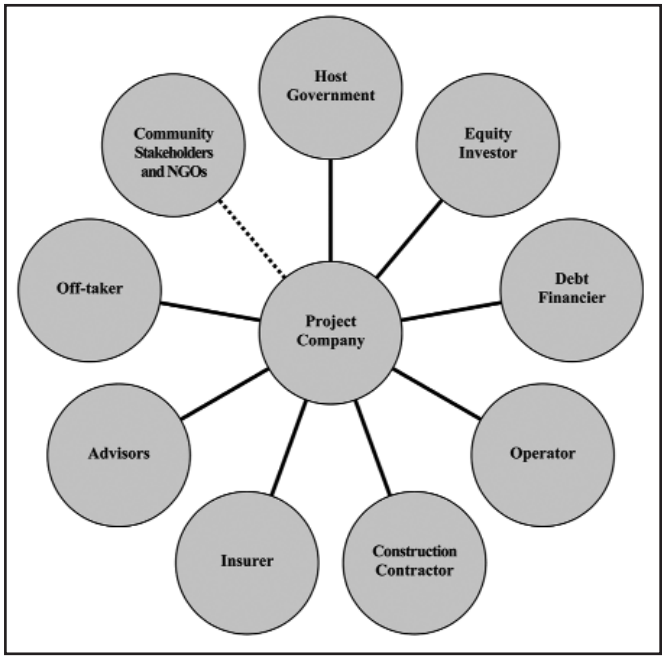

Figure 3.1:
Key parties in a typical hydropower development.

Host Government

The Host Government undertakes the largest number of roles in most hydropower projects. Some of these roles, such as that of Concession Awarder or Regulator, are specific to the hydropower development or electricity sector. Other wider functions of the Host Government happen to affect the project as part of its legislative function or its regulation of industry, the environment, or economic policy.

As hydropower sites are unique natural resources of the host country, it is not surprising that most governments wish to exercise some control over the exploitation of the resource and to ensure adequate public revenue from the project.

In some countries, a "one-stop" agency has been established with the objective of undertaking many of the Host Government functions, or at least coordinating between the Owner and the government agencies.

Concession Awarder

Under most regulatory frameworks, the Host Government plays the primary role in the allocation of hydropower concessions. A wide range of procedures exist for allocation of concessions, ranging from monopoly allocation to public sector utilities to auctions open to all qualified promoters.

Among the functions of the Concession Awarder are typically:

- Identification of projects for development;
- Approval of the concessionaire's credentials;
- Conducting the allocation process;
- Agreeing to the key characteristics of the project;
- Defining the principal terms of the concession including: term, start date, transfer arrangements, royalty payments, and compliance requirements;
- Monitoring the study, construction, and operation of the project;
- Defining the risk sharing between the Government and the Owner.

An increasing number of countries with hydropower resources have established formal policies for concession allocation, and have established dedicated agencies for managing the process. Examples of these include the Office for Promoting Power Investment (OPPPI) in Zambia, the Private Power and Infrastructure Board (PPIB) in Pakistan, and Agência Nacional de Energia Electrica (ANEEL) in Brazil.

Regulator

In most countries where there has been a move toward deregulation of the electricity industry, an Electricity Regulator has been established. The functions and role of the Regulator vary according to the regulatory frameworks and the degree of centralized control and planning of the electricity industry. In some countries, the Electricity Regulator is also responsible for the allocation of concessions.

Functions of the Electricity Regulator in relation to hydropower projects may include:

- Issue of generation licenses;
- Definition of the grid code;
- Tariff setting;
- Managing security of supply;
- Monitoring operation and electricity production.

In some countries, some of the functions of the Electricity Regulator are undertaken by public utilities or other government agencies or ministries.

Environmental Licenser

In general, the Host Government has responsibility for management of the environmental resources of its nation and for ensuring the health and safety of the population. The Government also has responsibility for international relations and for management of cross-border effects. Hence, government environmental agencies are typically responsible for licensing hydropower projects, with respect to environment, water rights, health, and safety.

National environmental policies vary, but typically the agency responsible for issuing environ-

mental licenses undertakes the following functions in relation to hydropower projects:

- Drafting of environmental legislation;
- Setting of environmental standards and establishment of environmental procedures;
- Review and approval of plans for resettlement and mitigation of environmental and social effects;
- Issue of environmental permits; and
- Monitoring of environmental management during construction and operation of the project.

Organizations such as the World Bank, International Finance Corporation (IFC), International Commission on Large Dams (ICOLD), International Hydropower Association (IHA), World Commission on Dams (WCD), and NGOs have produced various guidelines and standards, which are often incorporated into the requirements for environmental, health, and safety conditions for environmental licensing. There may also be a requirement to pay into an environmental fund for compensatory environmental works carried out in the project region.

Issuer of other Licenses and Permits

Host Governments typically are responsible through their various agencies for issuing a plethora of licenses and permits, which are required prior to development of a hydropower project. In some counties, each individual agency has its own procedures, and the project owner must deal directly with each agency. In other countries, attempts have been made to create "one-stop" agencies to coordinate the licensing and permitting process.

Among the various permits which may be required are:

- Planning permission and building regulations approval;
- Construction licenses;
- Security clearance;
- Water rights;
- Way leaves and rights-of-way;
- Company registration;
- Licensing of designers, contractors, and manufacturers;
- Licensing of plant operators and skilled labor;
- Investment licenses;
- Foreign exchange purchase and remittance licenses; and
- Import licenses.

Obtaining all the necessary licenses and permits is often one of the major challenges facing project developers, and key licenses often feature as conditions precedent to financial close.

Legislation

Host Governments, either directly or through their legal institutions, are responsible for formulating and ensuring compliance with national legislation. All parties to hydropower development working in the host country are subject to this legislation, and it needs to be taken into account when developing all aspects of the project, including commercial documentation, which may be subject to host country law.

In many countries, regional government legislation, in addition to federal government law, will affect the project.

Areas of host country legislation with particular effects on hydropower developments include:

- Environmental, health, and safety legislation;

- Construction industry codes and standards;
- Commercial and company law;
- Financial regulation;
- Investment law;
- Labor law; and
- Arbitration law.

In addition to host country legislation, hydropower development is frequently affected by legislation of other countries by design through nomination of third country jurisdiction, by default through the procurement of goods and services from third countries, or as a result of cross-border power sales or water rights issues.

Development of some projects may also by affected by existing international water treaties that have specific requirements on water release and water quality.

Fiscal Incentive Provider

Host Government's keen interests to attract foreign investment and private sector participation or wishing to promote development of the hydropower sector may lead to provision of fiscal incentives. Such incentives may also be provided at a regional level, such as in the European Union.

Among the fiscal incentives which may be provided are:

- Relief from taxes (corporation tax "holidays" or VAT exemptions)
- Relief from duties, such as import duties;
- Grants or loans on preferential terms;
- Accelerated depreciation;
- Subsidies relating to environmental performance;
- Subsidized power grid access through reduced cost access to transmission or Government funding for the construction of the transmission interconnections; and
- Capital cost contributions (where a project has non-power benefits).

The agency of government responsible will depend on the type of incentive being provided. However, the incentives are usually defined in the national power legislation or, where negotiated for an individual project, incorporated in the Concession Agreement. Ministry of Finance approval is usually required for project-specific fiscal incentives.

Sovereign Guarantor

As part of the financial security package for hydropower projects, the Host Government may offer sovereign guarantees to underwrite the obligations of public sector agencies, particularly where the off-taker (purchaser of electricity generated by the project) is a Host Government agency. Such guarantees are typically provided by the Ministry of Finance or the Treasury.

Where the hydropower project is being developed for cross-border sale of electricity, a sovereign guarantee may be available from the recipient country, either direct or though the Host Government under bi-national power trading agreements. Where the Government concerned does not have a good credit rating for issuing guarantees, it may be backed by an international finance institution (see Chapter 5).

Other Host Government Involvement

Most governments may affect hydropower development in many other ways including:

- Regional development agencies may influence the project development;

• River basin authorities may have a major influence on the design and operation of projects to suit multi-purpose requirements such as irrigation, water supply, navigation, and environmental management on water sharing agreements;

• Participation in trans-national water agreements, such as the Nile Basin Treaty and the Indus Water Treaty, may influence the Host Government requirements for the project, particularly the need to notify and liaise with upstream and downstream riparians;

• Politicians may exert influence on the award, location, characteristics, or operation of projects to suit their personal or political ambitions;

• Government agencies are typically the main providers of data on which a hydropower project is based. Such data include hydrology, meteorological data, geological data, topographic mapping, and power system and network details.

Project Owner

The Project Owner is the single most important party in a hydropower development. As can be seen from Figure 3.1, most of the top-level relationships and contracts are between the Project Owner and the other Key Parties.

Traditionally, the owners of hydropower projects were electricity utilities, who most commonly were government-owned agencies. However, this is not exclusively the case. Since the earliest days of the hydropower industry, companies with large electricity requirements operating in remote areas have erected and operated their own hydropower projects. This has most commonly been the case with mining companies, who continue to be major developers of hydropower projects.

Since the international move toward private ownership of hydropower facilities started in the 1980s, an increasing number of owners and prospective developers are private companies. It is common for a Special Purpose Company (SPC) to be established to develop and own the project, and this may comprise a consortium of interests, sometimes including government, although in the early stages the main sponsor or promoter may undertake preparatory work in his own name. Other sponsors may use a single company to own a portfolio of projects.

Since the owners of the "Project Owner" are the equity investors, the types of investors participating in this role are discussed in the section titled "Equity Investor" below.

Project Planner

The degree of involvement of the Owner in planning a hydropower project depends on the stage at which he becomes involved. In the days before Independent Power Producers (IPPs), the Owner (often a public entity) would typically start with initial identification of the hydropower resource, and carry out all the studies and project planning throughout the construction of the project. Such planning might start with a river basin development study to identify and rank potential projects, followed by pre-feasibility and then feasibility studies. This process tends still to be followed in countries where the public sector develops projects.

Where IPPs are the project owners, the involvement in the planning process may be less. In many countries, identification and conceptual studies are carried out in the public sector before a project is offered to IPPs for development. From the perspective of the Owner, the greater the level of study which has been carried out before his involvement, the lower the level of risk there is of the project not reaching financial close. From the perspective of the Host Government, the better defined the project is before it is handed to the private developer, the more it can be sure that

the unique resource is designed to benefit the nation and the national power system. Some IPPs are required to pay a fee as part of their concession agreement toward the cost of the advance studies prepared by the public sector.

However, there are arguments against full definition of the project before it is given to the IPP. Private developers typically have a lesser ability to absorb risk than the public sector, and hence it is appropriate to design out as much risk as possible for the private owner. Also, the cost of capital for a private owner is typically higher than for the public sector, and hence the balance between capital expenditure and operating cost tends to sway toward the latter for a private owner.

Promoter

The Promoter is the party who takes on the project and drives it toward financial closure. He will typically become part of the ownership team, although some promoters specialize in the front-end development of projects and aim to sell the project prior to financial closure or following the start of commercial operation.

In the public sector, the Promoter will typically be an electricity utility or a national hydropower agency. In the private sector, the Promoter tends to be an entrepreneurial organization or individual with an appetite for the risks involved in the early stages of projects.

Functions undertaken by the Promoter typically include:

- Identify the project;
- Secure rights to the project, culminating in a Concession Agreement;
- Commission project studies (technical, environmental, economic, and commercial);
- Procure contractors and suppliers;
- Establish electricity sales agreement;
- Develop corporate structure, bringing in partners as required;
- Locate sources of funding for equity and debt;
- Procure operation and maintenance contractor;
- Manage and administer construction contracts up to commercial operation;
- Manage and administer project finances;
- Verify completion of the project with the contractor.

The Promoter typically becomes part of the long-term ownership consortium, although often the parties who are prepared to take on the high-risk/high-return development phase of projects are less suited for the long-term/low-risk operating phase, and hence seek to exit the project shortly after commissioning.

In carrying out the functions detailed above, the Promoter is generally assisted by his advisors and equity partners.

Owner Operator

Following the completion of the development phase of the hydropower project, the functions of the Project Owner reverts to a more pedestrian role of Owner Operator. Typically, once a hydroelectric scheme has been commissioned and any teething troubles have been overcome, the project enters a low-risk and low-input stage. The owner operator must ensure that routine maintenance is undertaken, and that the scheme is operated to maximize the revenue in accordance with the load dispatch instructions of the off-taker or specified in the concession agreement.

Ownership of a project may change within the first two or three years after commercial operation, subject to the constraints of the concession agreement. The types of organisations prepared to take the risks of the development phase may not be satisfied with the lower potential for capital appreciation in the operating phase, and therefore may seek to exit the project and crystalize their capital growth.

Parties who are most suited for ownership throughout the operating phase of project are those with a long-term revenue horizon with a requirement for a steady income stream but little need for capital growth. Hence, organizations such as pension funds and sovereign wealth funds are attracted to such investments.

A potential constraint on ownership by such long-term investment funds is the requirement of transfer of ownership on expiration of the concession. The consequent loss of value on this transfer limits the attraction of BOT/BOOT projects to parties with very long-term investment horizons.

Equity Investor

The equity investor at the development phase of a hydroelectric project may be the Promoter, with an active role in the project development, or else a more passive investor. The types of organization likely to be involved as equity investors include:

Public Sector Development:

- Public utilities (e.g., the Ethiopian Electric Power Company (EEPCO) in Ethiopia; the Zambia Electricity Supply Corporation (ZESCO) in Zambia)
- Power Development Authorities (e.g., the National Hydroelectric Power Corporation (NHPC) in India; and the Water And Power Development Authority (WAPDA) in Pakistan)
- River Basin Authorities (e.g., the Khuzestan Water and Power Authority (KWPA) in Iran; the Zambezi River Authority (ZRA) in Zambia/Zimbabwe)
- Corporatized Utilities and Generating Companies (e.g., in Korea, Turkey, and Russia)
- Regional Power Companies (e.g., in United States, Canada, and China)

Private Sector Development:

- Power Developers (e.g., AES, Pacific Hydro, Sithe, SN Power)
- "Captive" Generators who need power for own consumption (e.g., mining companies, industrial conglomerates)
- Regulated Utilities branching into overseas markets (e.g., Electrabel, Electricite de France, National Power, Statkraft)
- Manufacturers, Contractors, and Consultants (e.g., Jaiprakash, VA Tech, Ranhill, Italian-Thai)
- Investment Funds (e.g., Blackstone, Algonquin, Globelec, Reservoir Capital, Nomura)
- Sovereign Wealth Funds (e.g., Kuwait, Singapore, China, Russia)
- Social Welfare Funds (e.g., AKFED)
- Bilateral Development Banks (e.g., DBSA, BNDES, KfW)
- Commercial Banks (e.g., Santander, Barclays)
- Bilateral Aid Agencies (e.g., Norfund, Finnfund)
- Multilateral Aid Agencies (e.g., IFC, InfraCo, ADB, AfDB, IADB)
- Environmental Funds (e.g., GEF)
- Governments (e.g., Laos, Uganda, Zambia)

- Pension Funds (e.g., CALPERS, EPF Malaysia)
- Socially Responsible Investment Funds [SRIs] (e.g. Allianz, F&C, Dexia, Sarasin)

Debt Financier

Providers of debt finance play a critical role in the development of hydroelectric projects, both in public and private sector developments. In this context, debt may be regarded as long and short-term loans, mezzanine finance, bond finance, Islamic finance instruments (Instalment Sales, Redeemable Leases and Sukuk Bonds), and grant funds (often provided as soft loans or mixed credits).

As with equity, there is a wide range of parties participating in the debt financing of hydroelectric projects. These include:

- Multilateral Development Banks (e.g., IBRD, EBRD, AfDB, ADB, IADB, IFC, IIC, EIB)
- Bilateral Development Banks (e.g., KfW, Proparco, FMO, DBSA, DEG, NIB)
- Development Agencies (e.g., Jica, Sida, Cida, USAid, GTZ)
- National Development Banks and Funds (e.g., BNDES, Banobras, Power Finance Corporation)
- National-backed funds (e.g., EAIF, Nadbank, Tacis)
- Export Credit Agencies (e.g., OPIC, Jexim, ECGD, COFACE, HERMES, ABSEK)
- Commercial Banks (e.g., CitiGroup, HSBC, RBS, Santander, SocGen)
- Islamic Banks (e.g., Islamic Development Bank, Maybank, Meezan, Bank Islam)
- Bond Underwriters (e.g., CSFB, Barcap, JP Morgan, Goldman Sachs)

There is considerable overlap between the providers of equity and debt, and, in particular with providers of mezzanine finance using instruments such as subordinated debt, preference shares, and convertible bonds.

Off-Taker

The off-taker is the party that purchases the output of the hydroelectric project: predominantly energy, but also non-energy benefits.

Quite often, there will be a Grid Operator/Load Dispatcher between the Operator and the Off-taker. Adherence to the Grid Code will be another mandatory requirement.

Electricity Sales

Hydroelectric projects are typically financed on the basis of the sale of electricity production, either using long-term power purchase agreements (PPAs) or on a merchant basis.

Among the parties participating in the purchase of electricity are the following:

- Electricity Utilities (e.g., BC Hydro, WAPDA, EdF, Iberdrola, Scottish & Southern, TEPSCO, AEP, Tenaga Nasional, Eskom, ZESCO)
- Industrial Consumers (e.g., aluminium smelters, transportation companies)
- Self-consumers, who also own the hydro scheme (e.g., mining companies, industrial consumers, transportation companies).
- Electricity Pools/Power-Trading Entities (e.g., UK, Turkey, SADP, Nord Pool, California, PTC India)
- Cross-Border Utilities (e.g., Laos - Thailand, Mozambique - South Africa)

Non-Energy Benefits

In addition to the sales of electrical energy, hydroelectric projects are able to deliver non-energy

benefits to power systems. In sophisticated markets, these benefits can be sold to generate revenue. These benefits are available from both conventional hydro and from pumped-storage schemes.

Among the non-energy benefits which may be delivered are:

- Firm capacity/energy guarantees;
- Rapid response services (for load following, pick-ups, and standby);
- Power factor corrections;
- Frequency control;
- Voltage stabilization.

The beneficiaries of such services tend to be the electrical networks, and hence the primary purchasers of such services are typically the network operators (e.g., National Grid in UK). However, there is also potential for sales to third parties, including industries reliant on constant power supplies.

Multi-purpose Benefits

Many hydroelectric schemes, predominantly those in the public sector, have significant multi-purpose benefits. These benefits may include:

- Irrigation regulation;
- Water supply regulation;
- Maintenance of navigation flows;
- Maintenance of water quality and environmental flows;
- Reduction in saline intrusion; and
- Tourism and leisure facilities.

The beneficiaries of such multi-purpose benefits may be regarded as off-takers from the project, whether the benefits are "sold" or provided as an incidental service. Some of these aspects are effectively part of the "public good" aspect of the project and are thus a form of royalty to the nation/government.

Emissions Reduction Sales

Increasingly, the Emissions Reduction Units (ERUs) from hydroelectric schemes are being sold to generate revenue. The form of ERUs varies from country to country, but can be construed to include carbon emission reductions (CERs) under the Kyoto Protocol's Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanisms, ROCs and LECs in United Kingdom, and greenhouse gas (GHG) offset products. More details on carbon finance are given in Chapter 2.

The parties involved in ERU purchases include:

- National governments;
- Emission traders;
- Industrial and transportation companies; and
- Individuals and cooperatives.

In addition to the purchasers themselves, there are many other parties involved in carbon finance transactions, including:

- ERU certifiers/auditors;
- Carbon finance advisors;
- Government environmental agencies;
- CDM Executive Board.

Construction Contractor

The Construction Contractor arguably has the largest role in development of a hydroelectric scheme. Included under this category are civil works contractors; mechanical, electrical, and hydro-mechanical equipment suppliers; and designers, sub-contractors, and suppliers that are part of the contractor's team.

The traditional approach to construction involved the award of split-package contracts, with different elements of the work being awarded to contractors specializing in the appropriate discipline. A typical large hydro project might be split into four or five main contract packages, although in some cases the number of contracts may be greater. This approach is still commonly employed on public sector projects, and a few private sector projects currently follow this route.

For private sector projects, particularly those developed under non-recourse finance, it is more common to award a single-point responsibility Engineering, Procurement, and Construction (EPC) contract (also referred to as a turnkey contract). Under this arrangement, the contractor takes responsibility for the design, construction, supply, and installation of equipment and commissioning of the scheme to meet the owner's requirements.

It is becoming apparent that fewer and fewer contractors are prepared to take on the risks inherent in an EPC contract, especially outside the comfort of their home markets. Hence, the response to international competitive bidding of hydroelectric projects is becoming sparse, and new approaches to the management of construction risk will be required if the industry is going to prosper.

Among the parties involved in construction of hydroelectric projects are:

- EPC (lead) contractors (e.g., Salini, Kiewit, Odebrecht, Sino Hydro, Jaiprakash)
- Civil Works Contractors (e.g., Skanska, Balfour Beatty, Zublin, Daewoo)
- Turbine Manufacturers (e.g., Alstom, Andritz VA Tech, GE, Impsa, Toshiba, Voith Siemens)
- Electrical and Control Equipment Suppliers (e.g., ABB, Andritz VA Tech, BHE, GE, Hitachi, Voith Siemens)
- Designers of civil, structural, mechanical, and electrical (engineering consultants).
- Specialist suppliers of:
  - penstocks;
  - valves and gates;
  - cranes;
  - compressors and pumps;
  - cooling systems;
  - bearings;
  - transformers;
  - switchgear;
  - instrumentation;
  - SCADA systems;
  - desilting arrangements;
  - dam liners;
  - building services.

Insurers

Insurance providers play significant roles in a number of areas of hydropower development, providing services to many of the other parties involved in the project.

Construction Insurance

The construction of the project is typically covered by contractors' all-risk policies, as well as third-party, transport, employees, and vehicle coverage. The designers are typically covered by professional indemnity insurance, as well as other normal business insurances.

Parties involved in the provision of such coverage include:

- Insurance companies (e.g., AIG, Allianz)
- Insurance advisors and brokers (e.g., Marsh, AON)
- Re-insurers (e.g., SwissRE, MunichRE)

Bonds and Sureties

Construction contractors are typically required to submit bonds to cover various activities within the project schedule from the "bid bond" to the project completion. Particularly, sureties are required for advance payments and project completion.

Owners are sometimes required to issue performance bonds or other sureties in order to secure the project finance.

The parties involved in providing such insurance are typically the same as those providing construction insurance.

Political Risk Insurance

Political Risk coverage is commonly taken out to cover the obligations of the host nation, and can provide a cost-effective element of the security package, especially where a sovereign guarantee is available to cover the obligations of the power purchaser.

Parties providing political risk cover include:

- MIGA (part of World Bank Group)
- Export credit agencies
- Commercial insurers (e.g., AIG, Lloyds of London)

Financial Insurance Instruments

Increasingly, financial insurance instruments, such as partial credit guarantees, are being used to secure the project revenue stream and facilitate project finance and improve the credit terms. The instruments are similar to traditional political risk insurance, but do not necessarily require a Host Government counter guarantee.

Parties providing partial credit guarantees include:

- Multilateral Development Banks/Funding Agencies (e.g., MIGA, IDA, IBRD, IFC, ADB)
- Bilateral Aid Agencies (e.g., USAID, OPIC, MITI, ECGD, COFACE)

Operation

Project owners and operators require insurance for their projects from start of construction and throughout the operating phase of the project. In addition to normal business insurances, it is common to take out ALOP (Advance Loss of Profit) insurance to cover losses due to insurable

events during construction and business interruption insurance to protect the revenue stream during operation.

The parties involved in providing such coverage are typically the same ones involved in providing construction insurance.

Advisors and Consultants

The development of hydroelectric schemes involves a plethora of advisors and consultants. The project owner will typically require advisors on the following disciplines:

- Technical/engineering: study and design of the project
- Environment: preparation of Environmental and Social Impact Assessments (ESIAs), EMPs, monitoring, resettlement
- Legal: contracts, corporate structures, claims, and arbitration
- Financial: viability, financial structuring, loan arrangement, disbursement
- Accounting: corporate finance, taxation, auditing
- Insurance: insurances, bonds, and sureties
- Political: local and regional politic
- Risks: risk management
- Communications: stakeholders and wider public

Other parties involved in the project may also require advisors for due diligence and negotiation of contracts and agreements.

Common roles include:

- Lender's technical/legal advisor
- Government's technical/legal/financial advisor
- Contractor's legal advisor
- Due diligence advisors to Equity Investors
- Technical/legal/financial advisors to off-takers

Operator

The project operator may be the Owner of the project or can be a stand-alone contractor.

If the project company undertakes the role of operator, it will typically carry out all the roles involved in the operation and maintenance. However some or all of these functions may be contracted to a stand-alone operator under an Operations and Maintenance (O&M) Agreement. Among the functions involved are:

- **Operation:** day-to-day operation and control of the plant, including control of the reservoir and spillways, flow through the power conduits, production of electricity, and all associated functions. The instruction to produce electricity is usually given by the grid operator/load dispatch, who is commonly the national or regional power utility.
- **Commercial Management:** a significant function of the operator is to manage the notification, metering, and invoicing of the electricity sales, as well as commercial management of the company. It is common for the operator to notify the system dispatcher and, if different, the power off-taker of the power available from the project in hourly or half-hourly blocks at least 24 hours in advance, as well as providing earlier forecasts of scheme availability and maintenance outages.

- **Maintenance:** The operator undertakes the routine maintenance of the scheme, including:
  - routine inspections
  - recording of instruments
  - clearance of trash from intakes
  - management of sediment and de-sanders
  - testing, checking, and adjustments of equipment
  - replacement of lubricants
  - repair and replacement of damaged or defective equipment or structure
  - inspection and monitoring of transmission line and way leaves
  - health and safety inspections
  - environmental monitoring
  - catchment management
- **Overhaul and Refurbishment:** Irregular overhauls and refurbishments are normally contracted out to specialists, since the project operator is not usually equipped or experienced in carrying out this major work. However, where the operator is a major utility or power company, it may also be able to undertake some of this work.
- **Dispatch:** The timing and level of generation is normally instructed by the system controller, who has responsibility for balancing the supply and demand on the power system.

Community Stakeholders

Discussion of the parties involved in hydroelectric development would not be complete without inclusion of the community stakeholders. These are the people who are directly or indirectly affected by the project, either positively or negatively, and others who have an interest in its development.

Directly Affected Population

Included under this classification are members of the local population who suffer a direct physical, social, or economic loss as a result of development of the project, and who should receive compensation for their losses. The loss may occur due to construction of the project components, inundation of the reservoir basin, the need for temporary works areas, and construction of project ancillary works such as access roads, transmission lines, and substations. These include people who:

- lose domestic dwellings;
- lose land, sometimes affecting their livelihood from agriculture or commercial activities;
- lose commercial premises;
- have cultural property, such as graves, historic artifacts, religious and community buildings, and community land affected;
- have livelihoods based on the affected reach of river, which is no longer viable;
- have water supplies affected by the project, either from changes in the river flows or effects on local wells of underground works; or
- suffer a range of other effects, such as effects on crops from dust related to construction activities.

The guidelines of the international lending agencies, the Equator Principles, the International Hydropower Association, and most national legislation require such people to be compensated and livelihood restitution programs to be implemented. Increasingly, it is accepted that these effects can create an opportunity for benefit sharing and development in the project-affected area.

Indirectly Affected Population

In addition to the people directly affected by the development of the project, there is a wider community of people who may be indirectly affected. The adverse effects of the project on these people may be quite significant, and again compensation may be due for losses incurred. Among these people are those who:

- have livelihoods or leisure activities based on the ecology of the area, which may be temporarily or permanently affected (e.g., hunting and fishing);
- may be affected by health problems introduced to the area during construction or operation of the scheme, particularly by migrant workers;
- may be affected by changes to the hydrological regimes of the rivers (e.g., regulations, flow surges, sediment loads, etc.);
- suffer noise and pollution during project construction; and
- use transportation routes that are blocked or re-routed due to the project.

Project Beneficiaries

In addition to those adversely affected by hydroelectric projects, there is generally a wide community that derives benefits from the construction and operation of the project, including (some may also be those who are adversely affected in other ways):

- construction workers employed on the project;
- operation staff with long-term employment;
- commercial enterprises supplying services to the contractors and operators of the project;
- retail establishments benefiting from increased income levels as a result of the project;
- beneficiaries of the electricity produced;
- beneficiaries from the regulation of the river (irrigation, navigation, reduced flooding, etc.); or
- commercial and leisure users of the reservoir (fisheries, tourism, water sports, etc.).

The main beneficiaries of a hydroelectric development often are remote from the project area, whereas those adversely affected tend to be the local population. Increasing attention is being focused on ensuring that the local population also becomes beneficiaries, with some projects reserving petty contracts for locally affected people and providing school and training opportunities and community development programs.

Other Interested Parties

In addition to those actually affected either positively or negatively by hydroelectric projects, there are many parties, often remote from the project area, interested in such projects. These include:

- International and national NGOs;
- Environmental lobby groups;
- GHG and climate change organisations; and
- Civil society organisations.

Such organizations often participate in stakeholder consultations or support local groups in their dealings with the project proponents.

Chapter 4

Public versus Public-Private Partnership

Chapter 4

Public versus Public-Private Partnership

By Jean-Michel Devernay

The traditional public approach to developing hydropower

Hydropower projects are fundamentally of a public nature, in the sense that they exploit the natural potential offered by the land and water resources of the country. They bring about political benefits such as reduced import dependency. Even more important is the fact that they are long-term infrastructure projects, which can provide a unique role in the global development of the country. For instance, what would the economic situation of Norway, New Zealand, or the Canadian province of Québec be today if their hydro potential would have been left untapped?

This explains why the vast majority of existing hydro schemes have been developed under the traditional model of a utility (either public or, if not, closely regulated) or a governmental agency managing the various phases of the project life cycle: planning, design, construction, operation, as well as rehabilitation and upgrading when the time comes. Therefore, existing hydro projects have been largely funded by public resources, drawing on multilateral or bilateral aid when needed.

The public sector track record in developing hydro

Even though cost overrun and schedule delays have been observed, the 2000 report by the World Commission on Dams acknowledges that "cost recovery has not been a substantial problem for hydropower projects." Indeed, the well-known long-term benefits of hydro (practically indefinite service life, extremely low operating costs, highly sustainable and reliable performance, substantial greenhouse gas emissions avoided, etc.) often made hydro the preferred option when the public sector was entrusted with the task of developing generation facilities.

Undoubtedly, those involved in this undertaking were conscientiously working with the aim to provide wealth to future generations, above and beyond the short-term return on their investment.

Difficulties now faced by some countries (the poorest ones)

Lack of finance is now often put forward as one of the main factors hindering the development of sustainable hydropower projects. This is particularly the case in many poor countries where public funds are scarce and private investors and lenders tend to consider that the relative country risk is high. Indeed, in many instances, securing the financing for a large hydro project has proven to be a daunting task. On a worldwide scale, it is estimated that to harness most of the remaining realistic hydro potential during the 21st century will require sustainable funding of $10 billion to $20 billion per year.

For instance, for Africa alone, where more than 90 percent of the realistic potential remains to be exploited, this would mean more than $2 billion per year would need to be mobilized.

Those funding difficulties are not the result of reduced benefits. On the contrary:

- In new deregulated markets, existing hydro is demonstrating more than ever its unique value in terms of flexibility and reliability, and storage (or pumped storage) is offering the owner the possibility of optimizing generation in line with real-time market conditions.
- Hydro is the most industrially mature and commercially viable contributor to achieve the goals of the 2002 implementation plan of the World Summit on Sustainable Development regarding the urgent need to increase the share of renewable energy in the world energy mix (item 19e). Here again, hydro's storage ability represents the necessary back up that most other renewable sources need.

Hydro as an opportunity for private sector involvement

Marked by the scarcity of public funds and the intrinsic attractiveness of hydropower, there is obviously an opportunity for the private sector to catch the ball and participate in the development of the vast hydropower potential (about twice what is existing), especially in emerging and developing economies.

While this may concern the equipment suppliers, the civil contractors, the local private entrepreneurs, or the electricity consumers themselves, the main type of private players likely to be involved are the international operators in the power sector with some interest in a long-term business. Most of them want to ensure asset-based revenues, and need to manage profit and risks across a diversified project portfolio.

The first reason why a private company would be willing to invest in a hydro project is a rewarding return on its equity. But most of the time, other reasons also trigger such a decision. These include: the opportunity to obtain profit margins on the supply of goods and services related to the project; the need to ensure asset-based, long-term revenues; the need to hedge rocketing fuel prices; the willingness to expand geographically and/or increase a portfolio of renewable energy sources; and, more recently, the ambition to be a successful player in the "green market."

In the 1990s, it was expected that the private sector would step in and that the public sector would simply set the rules and rely on market mechanisms for projects to be developed, funded, constructed, and operated. In the case of hydro (but, more surprisingly, to a large extent also in the case of thermal) this has proven to be an unrealistic expectation. Even though a few success stories of purely private hydro development have been recorded, most recent hydro projects, especially large ones, have continued to rely on public funds, while many others have been dramatically delayed, with serious negative implications in terms of sustainable development and climate change mitigation.

Main barriers for private investment

There are three main reasons why hydro has not been favored by the private sector:

Insufficient recognition of (and reward for) all benefits

Hydro projects don't usually get full credit for all the benefits they deliver. In addition to the mere generation of kilowatt-hours, they contribute significant ancillary services to power systems (black start, spinning reserve, synchronous condenser, steady-state operation of thermal units, etc.), which rarely get a fair recognition, if any. Moreover, most hydro projects offer important non-power ben-

efits such as flood control, recreation, fishing opportunities, irrigation, and water supply. Most of those are not easily marketable products and don't bring revenues to private developers.

Last but not least, despite its key role in reducing global warming, up to now hydro has hardly benefitted from any environmental premium in the market.

The gap between economic and financial viability (long-term/short-term issue)

A hydro project selected as a "best option" on economic, social, and environmental grounds (for instance in the framework of a least-cost development plan) cannot be readily transformed into a viable financial product.This gap between economic and financial viability reflects the divorce between long-term and short-term interests over the project's lifetime, and, provided that reasonable discount rates are being used, hydro has excellent economic payback levels thanks to the high amounts of energy generated and services rendered to the system, compared to the discounted construction and operation costs.

Nevertheless, the rather high initial investment costs require high revenues in the first ten to 15 years to satisfy the lenders' debt coverage ratio, and the corresponding tariff structure may not be easily accommodated by market conditions (where, in some cases, prices are driven down by existing hydropower plants which have been in operation for decades, and are therefore fully depreciated!). In fact, over its (indefinitely long) lifetime, hydro is usually highly profitable — but the real benefits come too late for most private investors.

Perceived hydro risk profile

The risk profile of hydro, which is perceived as very high by private investors during the planning, design, and construction phase, is acting as a deterrent — or at least leading to unrealistically high expectations in terms of Internal Rate of Return (IRR). Here again, there is obviously a short-term/long-term issue. Most of the risks associated with hydro projects can materialize either during the development phase or the construction phase. But, once those crucial phases have been passed, most hydro projects enjoy a very long and virtually risk-free life, while their thermal competitors will still have to face a much more rapid aging process and fuel price variations largely driven by political uncertainties, which can exceed the hydrological risk of most hydro projects.

For those reasons, it is likely that hydro projects developed exclusively by the private sector will remain the exception and will concern projects with a low risk profile and readily marketable benefits.

What can the private sector do? Cannot do?

The above discussion is not to say that the private sector is unable to participate in the funding of hydro projects. But, in order to avoid unrealistic expectations regarding private sector investment, it is necessary to identify what the private sector can actually bring to the project, and what is out of its remit.

In broad terms, it may be considered that private money is available today and that equity could actually be provided by private investors should the project bring about competitive balance between risk level and return on equity, compared to alternative investments. The private investor is a "natural" player on deregulated markets. It may reduce construction and operation costs, and expedite construction time through a sound industrial approach. The private investor may also be in a good position to secure commercial loans for the foreign component of the project (for instance, the electromechanical equipment).

But, in most cases, the private investor must be a patient one and be interested in long-term cash flows, as hydro projects have a tariff profile that becomes highly profitable only after the high initial costs have been significantly discounted.

On the other hand, a private company is usually not in a position to cope with political difficulties. Most of the time, a private party will not have access to all the beneficiaries of the project, and therefore may be unable to transform all economic benefits into financial revenues, which means that it might be able to bear only part of the associated construction and operation costs.

In many cases, a responsible private investor may accept to be involved in dealing with social issues, to the extent that it becomes an integrated component of its corporate social responsibility policy. However, it is unlikely that a private investor would be able to do it alone. A strong involvement of the host government will always be needed. The same may apply to the implementation of sustainable environmental mitigation plans.

Combining public and private funds: The PPP approach

While purely private projects may prove difficult to develop, there is room and need for private involvement in partnership with the public sector in hydro projects where an acceptable balance between risks and rewards can be achieved between the various stakeholders. A possible arrangement for such a Public-Private Partnership (PPP) can be designed along the following principles:

- The public sector takes responsibility for those works that utilize natural elements to create storage and potential for generation (for instance, the dam), while the private sector is in charge of developing this potential by investing in the power plant.
- The public sector takes the natural risks that it would have carried anyway, such as the hydrological risk and any significant geological risk, and the private investor is held responsible for plant performance.
- The public sector puts in place the necessary tools and mechanisms to flatten the tariff profile in the early years (for instance, through a specific energy fund), while the private investor pays higher royalties after debt repayment (which can be used to replenish the energy fund for other projects).

Through this combination of public and private funds and sharing of risks, a win-win situation can be created:

- The Public Sector achieves debt reduction, which puts it in a better position to control issues of national interest such as safety, water rights, and resettlement, and gets full ownership of relatively new hydro at the end of the concession period. It is also a chance for the public sector to promote competition and market discipline, and to stimulate a dynamic and innovative local industry.
- The Private Sector gets access to the project with an acceptable level of risk, can provide efficient funding, and can add industrial value while getting rewarded for its performance.

If a climate of mutual confidence can be created, it will generate a higher attractiveness for the private sector, which, in turn, will result in increased competition and ultimately lower electricity prices.

At a time when large private power operators have learned the lessons of the "Enron days," there might be a new chance for involving the private sector in the funding of hydro projects in a more realistic way. But, in all cases, it must be kept in mind that any private investor always has the choice to put his money on another project. A hydro project will attract a serious and competent private investor, within the framework of a Public-Private Partnership, only if the risk issue can be properly solved.

The need to properly allocate risks and rewards between partners

In order for investors and lenders to be willing to engage in the funding of a hydro project, it is essential that:

- All risks be properly identified and as much as possible quantified,
- All efforts be made to reduce or mitigate them,
- All residual risks be properly allocated and managed.

The main risks associated with hydro projects may arise:

- during the development period if financial closure is not reached and development costs are lost,
- during the construction period if the project is not completed according to schedule, within the budget and with the required performance,
- during the operation period, if for any reason the project is unable to generate revenues in accordance with the assumptions made in the financial model or must bear higher operating costs.
- at any point in time under the effect of events beyond the control of any party to the various project agreements, including Force Majeure events.

Solving the risk issue

Development phase

The front-end development costs for a hydro project (i.e., the costs incurred before financial closure) are definitely on the high side, typically between $30 million and $100 million for a major project involving the creation of a reservoir. This is due in particular to the fact that each project is site-specific and therefore will require extensive technical, social, and environmental studies. A number of complex agreements are usually required in addition to the construction contracts.

Very few investors, if any, will be ready for that kind of expense, even if they have entered the project on a negotiated basis, while they remain exposed to a significant risk of the project never being signed.

For those reasons:

- A hydro project should be undertaken only after a full assessment of the options, which should be the prime responsibility of the host government, in order to firm up its status as the best choice to meet the demand.
- NGOs, affected people, and representatives of the main beneficiaries should be engaged in a transparent consultation process as early as possible, so that potential social or environmental difficulties be addressed in due time, thus reducing the risk of stopping the project when large development costs have already been spent.
- The host government should be strongly involved in the funding of studies (technical, social, and environmental) and site investigations during the project preparation phase, either directly or with the help of international financing institutions (IFIs). These costs may eventually be recovered from the private investor group selected to implement the project at a later stage.

It should also be emphasized that defining the main characteristics of the project (general layout, installed capacity, size of reservoir, etc.) and evaluating its environmental and social effects is a responsibility that should not be left exclusively to any private party. These formative activities involve the long-term utilization of a country's natural resources which must be examined on the basis of social, environmental, and economic (not financial) optimization, and the host country will

inherit the project at the end of the concession period.

Construction phase

Regarding construction, over the past decade there has been a definite trend to move toward turnkey or EPC-type contracts where most, if not all, of the risks associated with design and construction are under a single point of responsibility, namely the EPC contractor.

Such an arrangement is often used for small privately developed projects, since it is usually required by the lenders in an attempt to reach maximum clarity in the allocation of responsibilities. But EPC contracts have also been considered by some public owners, especially after experiencing delays and cost overruns on previous projects.

Indeed, it can be quite tempting for any owner to push all the construction risks on to the contractor and give him full responsibility for overall construction management. But that same owner should not delude himself about the fact that:

- Any serious and reputable contractor will only accept to bear those risks that he can actually manage or be insured for. This may not be the case for all construction risks, for instance, unforeseen ground conditions.
- The contractor will include in his price a provision for risk, which the owner will have to pay for, even if the project is constructed smoothly without significant risk materializing.
- Even then, only financially strong contractors will be able to take such risks. That may not be the case for local contractors, who would be in the best position to construct the project, especially the civil works, with payments in local currency. Large international equipment suppliers are often reluctant to take joint and several liabilities with such local civil contractors.
- The EPC Contract gives the contractor a lot of control over the design of the project because major civil works cannot be precisely defined and specified in advanced in the way that equipment can. Few hydro projects actually finish as they were originally designed, because inevitably the design is adjusted to reflect revealed site conditions. If the contractor gets into difficulties, it is a natural commercial decision for him to try to design his way out of the (loss making) in the cheapest way possible, which may not always be in the long-term interest of the project.

As a result of the above, it appears that the full turnkey approach, largely derived from thermal project practice, should be carefully qualified when applied to hydro projects. While the overall pattern may work, the owner, and possibly the host government in case of a private project, will generally find it to their own interest to retain some construction risks, including for instance all or part of the geological risks, or specific adverse events such as leakage of the reservoir outside the work area, unexploded war ordinance, unavailability of transmission line at the time of commissioning, political or social turmoil during construction, floods beyond a certain discharge, etc.

Generally speaking, it would make sense that those risks with a very low probability of occurrence but very high impact be borne by the public sector, while the private sector would absorb the risks for which the impact remains under a certain threshold, even if the probability for those risks to materialize is rather high.

An example of such a risk-sharing principle applied to construction cost overrun is illustrated in Figure 4.1.

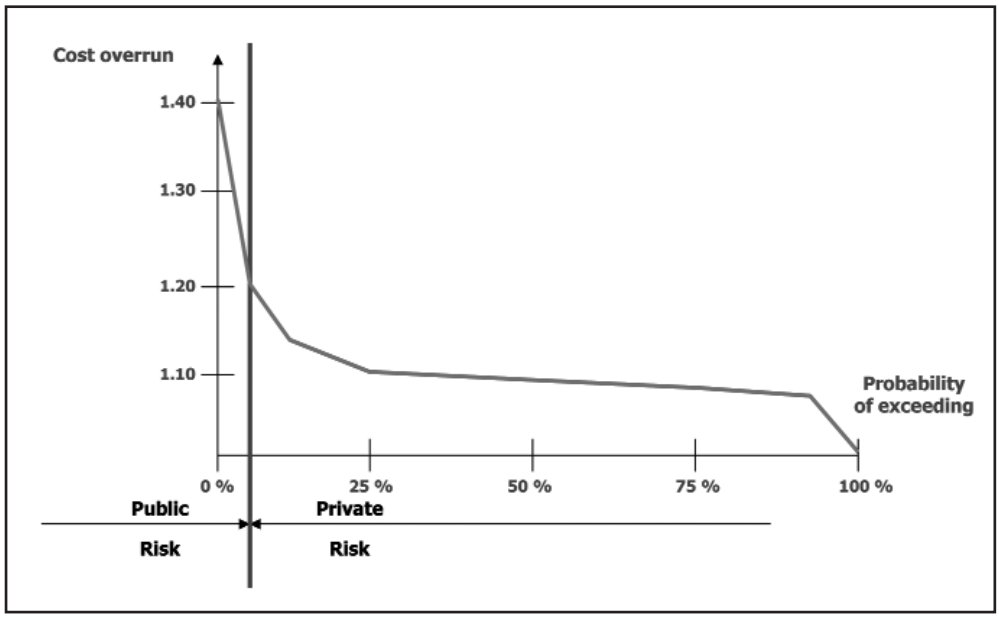

Figure 4.1:
Sharing the construction risk in a Public-Private Partnership.

When the owner has its own proven capacity in construction management and the necessary financial strength, substantial savings can be obtained by accepting to bear the risk of overall completion by coordinating a number of construction packages, possibly at the cost of giving up the sacrosanct project financing approach. In such cases, the EPC approach is often not the most cost-effective solution. Current trends in other industries show a return toward more conventional construction contract structures.

Operation phase

During the operation period, the main risk to be addressed is the water supply risk. Whether for public or private projects, it is essential that hydrological conditions be extensively studied at the feasibility stage, and, as much as possible, based on long-term rainfall and discharge records so as to get a robust estimate of the average annual flow, its distribution over the year, and a statistical knowledge of inter-annual variations. The only realistic way to handle the risk of such hydrological variations is to pool it within a larger portfolio of projects in order to dilute its impact. A single project company, which is a frequent case for an Independent Power Producer (IPP), is not able to do that.

Therefore, in the case of a private project, or a PPP engaging in a power purchase agreement (PPA) with a utility, the payment mechanism put in place in the agreement between the owner and the purchaser of the electricity must attenuate the inter-annual variations of project revenues and mitigate the impact of dry years.

It may be of mutual interest to both the owner and the off-taker to depart from the traditional format of a thermal PPA and elaborate a remuneration mechanism mostly based on capacity charge, or even a "lease" payment, where revenues would be guaranteed to the owner, provided that he keeps the plant available, while the off-taker would gain the freedom to use the plant and dispatch generation to best meet his real-time needs. Obviously, this model would be particularly appropriate in the case of a pumped-storage plant.

The host government can also play a role by putting in place special "energy funds," to which hydro plant owners can be required to contribute when they receive wet year extra revenues, while being compensated for dry years through that same fund. IFIs can assist in the development and implementation of such funds.

In all cases, revenue stability is a key component of a hydro project's bank ability. This revenue stability is also ensured by:

- Obtaining from the host government the necessary guarantees regarding the consequences of an eventual construction of any other dam or irrigation project that could artificially impact the flow regime.
- Entrusting Operation and Maintenance (O&M) responsibility to an experienced operator. If this operator is also a member of the ownership company, he will naturally be motivated to secure the performance level of the plant over the whole concession period. If not, some incentive mechanism has to be included in the O&M contract.
- Strictly complying with all social and environmental commitments made at the time of project development and construction throughout the life of the project. This is an absolute prerequisite for building up a long-term partnership with the local population and NGOs, which is the basis for a sustainable positive climate around the project.

Easing the financial burden

In addition to solving the risk issue, reducing the need for capital and/or increasing the project revenues is another key step toward making a Public-Private Partnership work. Avenues for easing the financial burden include cost reduction, local involvement in construction, identification and valuation of all benefits, staged development, rehabilitation and upgrading, and longer repayment terms.

Cost reduction

Development costs can be reduced if standard documentation is developed and a rational step-by-step approach is adopted. Excellent project preparation, including proper site investigations, imaginative design, and value engineering are important factors in reducing construction costs and uncertainties. It should be stressed again that EPC or turnkey contracts may not always be the least expensive contractual approach for constructing a hydro project even when a "project finance" approach is adopted. In most cases, however, ensuring fair and transparent competition among contractors and equipment suppliers, as well as top-of-the-line project management, can help minimize the final construction cost.

Operation and Maintenance costs, even through a relatively modest component of the overall cost of a hydro project, can be efficiently optimized by implementation of modern techniques, such as fiber optic monitoring or a troubleshooting hot line.

Local involvement in construction

The funds needed for construction should ideally be borrowed in the same currency as the future revenue stream in order to minimize devaluation concerns. In turn, it means that there is a clear advantage in utilizing local or regional resources for the construction of the project. Hydro projects often offer such possibility, since the amount of imported equipment is often comparatively lower than for thermal projects. In particular, local or regional contractors can be mobilized at an attractive price for the construction of the civil works, possibly as partners or subcontractors of larger international firms. The Concession Agreement may stipulate an obligation for "local preference,"

but keep in mind that such a clause must remain realistic and consistent with the actual availability of proper local resources. Development of local capital market also needs to be favored.

Identification and valuation of all benefits

Efforts should be made to provide financial reward for the many benefits that hydro projects bring about in addition to the mere generation of electricity. This includes other services rendered to the power system (dynamic benefits), but also social and environmental benefits such as improvement of roads and bridges, recreational activities, local or regional job opportunities, flood protection, water supply, irrigation, fishery, navigation, etc.

Not all of those benefits are easily marketable, but all efforts should be made to internalize them in the economic analysis when setting up investment priorities. Political benefits, such as reduced import dependency, should also be taken into account.

A specific example of environmental benefits generated by hydro projects is the reduction of greenhouse gas emissions. The current payments made under the nascent European carbon emission market are about 20 Euros per ton of CO_2 equivalent. Up to now, mostly small, run-of-river hydro projects have had access to carbon finance under the Kyoto Protocol mechanisms (CDM and JI). The deals have been concluded on a basis of approximately US$5 per ton of CO_2 equivalent, resulting in an increase in revenues in the range of 5 to 10 percent. In other words, the carbon finance is a "sweetener, not a honey pot," according to the World Bank's Judith Plummer (see Chapter 2). The somewhat theoretical restriction imposed by the UNFCCC that projects have to be "additional" to what would have happened anyway is currently hindering the implementation of CDM and JI for hydro projects, along with the issue of methane emissions by large reservoirs in tropical areas. The International Hydropower Association (IHA) is currently working with other key partners to solve these various issues. Should these efforts be successful, the environmental value of the investment (carbon credits) could become a more systematic complement to the traditional electricity scale.

Staged development

Hydro projects may often be constructed in several phases, and planned as such from the start. This brings the obvious advantage of better matching the evolution of the electricity demand over time. It can also greatly reduce the need for external funds, as the revenues from the early phases of the project may be a significant source of finance for the construction of the subsequent stages. This approach has been applied with success for large projects such as Three Gorges in China, Tehri HPP and PSP in India, and for cascade schemes and rehabilitation projects.

Rehabilitation and uprating (R&U)

The lifetime of a hydro project can be extended almost indefinitely if it is properly maintained and if rehabilitation is undertaken at the adequate time. Rehabilitation projects are often an opportunity to increase the performance of the original scheme and modify its characteristics in order to better respond to changing needs.

Improved performance is often obtained at a reduced cost compared to a totally new project. The associated risk profile is usually very favorable, including a nominal environmental footprint. In 2004, the World Bank entrusted Electricité de France with the task of elaborating a Framework for Policy and Decision-Making on Dam and Hydro Plant Rehabilitation and Uprating, which is now available for decision-makers when engaging in such projects.

Longer repayment terms

Hydro projects require relatively high upfront investment costs, but deliver a sustainable attractive cash flow in the long term. Therefore, long repayment periods can be decisive for the financial viability of a hydro project. OECD recently decided to extend the allowed loan tenors from 12 to 15 years for renewable energy projects. It was confirmed in November 2005 that this applies to all hydro projects developed according to proper sustainability principles.

IFIs as catalysts for making PPPs happen

In addition to the risks discussed earlier in this chapter, there are other risks to be dealt with that are less specific to hydro projects and would have to be addressed for most large infrastructure projects. They include:

- Commercial risks
- Regulatory risks, such as change in laws
- Macro-economic risks, such as local currency, devaluation, inflation, or interest rate increases
- Political risks, such as political violence, expropriation, or convertibility
- Natural Force Majeure events

The above risks can hardly be assumed by a private investor or a commercial lender. Therefore, those risks must be taken on by other key stakeholders, including:

- The Host Government, which is chiefly responsible for creating the proper legal and institutional environment in which developers will feel reasonably protected;
- The international financing institutions (IFIs) and especially the World Bank Group, which can help in different ways: by lending to the project while taking political risk, by providing partial risk guarantee (PRG) products, or by providing political risk insurance cover (from MIGA, for instance); and
- Export Credit Agencies (ECAs), which can cover part of the commercial risk.

Among those listed above, the IFIs have an essential role to play in providing risk mitigation and, therefore, in stimulating the involvement of the private capital in countries or sectors with perceived high risks.

Indeed, many developing countries, especially the poorest ones, do not have the necessary resources, whether human or financial, required from the public sector either to develop a project on their own or to make a successful public-private partnership happen. The IFIs have a crucial role in filling this gap by providing technical and financial assistance to their developing member countries. This assistance is needed on three different levels:

- IFIs should help to "set the scene" and assist governments in creating an attractive environment for the private sector to step in. In particular, they should mobilize grant assistance for capacity building; support base line studies; encourage development of local capital market; promote trans-boundary and regional opportunities; and collaborate with professional organizations such as the International Hydropower Association in progressing hydropower sustainability.
- IFIs should help to prepare and develop projects by assisting in setting up a realistic option assessment process, funding bankable feasibility studies, and contributing toward simplifying and standardizing documentation to make projects easier to close.
- IFIs should contribute directly to solve the financial challenge, by means of providing loans which are attune with the creation of long-term infrastructure assets; lending more at a decentral-

ized level; providing insurance and guarantees for risks that neither the private sector nor the government can handle; providing refinancing facilities to allow commercial banks to extend loan tenors; assisting government authorities in raising their share of equity; and mobilizing international co-financing.

There is some good news regarding this necessary involvement of the IFIs. After a decade of declined support to water infrastructure in general and hydro projects in particular, the World Bank adopted in February 2003 a Water Resources Strategy that commits the World Bank to re-engage with such projects, considering that all hydropower projects are providers of renewable energy, regardless of scale.

During the Bonn conference on Renewables in 2004, the World Bank Group committed to increase its funding for renewable energy — including hydropower — by an average of 20 percent a year over the next five years.

In 2005, the World Bank officially decided to support the construction of the 1,070-MW Nam Theun 2 project in Laos, which is the largest public-private hydro project to date, and one of the largest internationally financed IPPs in Asia since the 1997 financial crisis. The construction of this project is well advanced, and full commissioning is expected before the end of 2009.

Chapter 5

The Financing Package

Chapter 5

The Financing Package

By Chris Head

Financing requirements

Overall costs

It is important to distinguish between the total financing requirement and construction cost. Although construction will represent a large part of the sum that will have to be raised for any scheme, the actual amount of money that will be needed for the financing package will be significantly more because it will have to include all expenditure up to the Commercial Operating Date (COD). It is from that point onward that the project creates its own revenue stream and what has previously been a negative cash flow becomes positive for the first time.

The total financing requirement should include:

- The fully escalated construction cost with some allowance for contingencies.
- Front-end costs incurred by the Sponsors on project development, including third-party costs relating to legal, technical, other advisory services and upfront charges from the concession agreement (e.g., royalty payments or refunding cost of studies carried out by the public sector).
- All financing charges, including commitment fees, guarantees, interest during construction, VAT, and the cost of the Lenders' professional advisors.
- The Owner's direct costs relating to the management and supervision of construction, and any third-party costs, such as lawyers and engineers.
- Other project-related costs that lie outside the main construction contract(s), such as environmental mitigation, resettlement, access roads, working capital, etc.

The effect of these additional items, sometimes referred to as the "soft" costs, is often underestimated. Soft costs will vary greatly from project to project, but in an earlier report[1] an analysis of ten private hydro projects revealed that they added, on average, 45 percent over and above the actual construction cost.

Contingencies

The costs described above are the clearly recognizable elements that make up the anticipated overall cost of the project. However, this is not in itself sufficient, because financiers will have to be convinced that there are adequate reserve funds available to cover any contingencies that might arise during the development phase should things not go as planned. This is money that the Owner hopes not to spend, but which must have readily accessible from the outset in the event that it is needed.

Contingencies are often described as being either Financial of Physical, so for convenience we will list some of the main items under those headings:

Financial contingencies

- lost revenue due to late commissioning
- increased interest during construction due to late commissioning
- payment default by the Offtaker
- adverse currency movements
- market disruption, non-availability of funds, changes in interest rates, etc.
- financial losses arising from a force-majeure situation

Physical contingencies

- conditions causing increased costs/delays/loss of revenue (e.g., disruption of construction supplies, floods, access problems, geology, etc)
- non-performance of works due to design or construction deficiencies
- default of the construction contractor
- delays and disruptions due to force-majeure situations (e.g. landslides)

From the viewpoint of the Owner, some of these items may be covered by third parties, such as the contractor, and certain risks may be covered by insurance and guarantees. However, in many cases, insurance cover will be restricted, and other forms of offloading risk will have limitations, with the result that the balance of any exposure becomes a contingent liability on the project company (the Owner). There will inevitably be some potential exposure for the Owner, and the question is how much contingency should be included for this within the overall financing plan?

There is no standard formula for determining the sum to be made available for contingencies, but it will be strongly influenced by the financiers' perception of the risks of the project. No project — particularly a hydro project — is without risk. It might be mitigated through the project's Financial Security Plan, but it cannot be eliminated. So, the amount of contingency that will need to be included will be influenced by the strength of security arrangements.

Currency

During the financial crises that shook parts of Asia and South America in the late-1990s, there were payment defaults on a number of high-profile power projects. They all suffered a common problem: local currency devaluation meant that the project was unable to service payment obligations in hard currency.

As a result of this experience, currency exposure is one of the risks that the international financier fears most. It will be one of the first issues they look at. For this reason, the estimation of the Financing Package should always include an appreciation of the total cost broken down, as far as possible, into Onshore (local currency) and Offshore (foreign currency) costs.

Currency exposure is a particular risk for countries that have to borrow heavily on the international markets to finance their infrastructure projects. It is the poorest countries that get hit hardest, because there is inevitable exposure when a revenue stream in local currency is used to repay creditors in hard currency. If the economy is weak, as is often the case, the local currency will devalue with time and place a serious strain on the ability to service the debt. This is a risk that has to be assumed by one party or another — or shared. It is not a risk that can be covered by hedging or

insurance. In the end, it usually rests with the Offtaker, as the Lenders will require the Owner to minimize his exposure by ensuring that the currency mix of the Power Purchase Agreement (PPA) matches that of the company's obligations. Failure to achieve this is likely to render the project unbankable. As there will be a hard currency element in the financing of most projects (for imported plant), this implies that PPAs are usually denominated in hard currency, or in a mix of local and hard currencies. For example, payment may be 55 percent in local currency and 45 percent in US$ or €.

The obvious way of avoiding currency exposure is to maximize the amount of local financing. While the opportunity for this is limited in most developing countries, it exists in certain emerging markets where the economy is more stable; in these countries, there is a trend toward certain financiers, like the multilateral development banks (MDBs) and the export credit agencies, denominating debt in local currency. Although the interest rates may be higher, this approach removes the serious obstacle created by the risk of local currency devaluation.

Basic considerations

Having made a realistic estimate of the total amount of finance needed, and the currency in which it is required, there are a number of other issues to be addressed.

Revenue stream

Any financing package will ultimately depend upon having an assured revenue stream to repay the loans with interest, and provide the Owner with an adequate return on the investment in the form of dividends. As we have already seen in Chapter 2, this can be a difficult area because, although many projects may be economically sound and financially viable in the long term, their short-term financial strength can be fragile.

The problem is not a fundamental lack of profitability, because, in the long run, hydro projects are usually very profitable. It is more a question of timing, as there is a mismatch between the time horizon of the typical commercial investor, who is often expecting to see good returns on his investment in ten years, and the productive life cycle of a hydro asset, which can be 40 or more years. There is an anomaly in the fact that, whereas old hydro schemes can be money spinners, new ones can struggle to meet their debt servicing obligations (financing charges) the first few years. This delays the onset of the Owner's dividend stream, and makes hydro less attractive as a commercial venture in the short term.

It is therefore important to develop a simple financial model at an early stage to determine whether the revenue stream is likely to be able to service the financing, and the approximate tariff that will be needed to make the project viable.

In the past, hydro projects have relied totally on power revenues from the sale of energy or capacity (depending on the PPA), while other benefits (such as the provision of ancillary services and flow regulation) have been taken for free. People are beginning to look at these additional benefits as potential sources of revenue, although it is often difficult to monetize them.

It is also necessary to consider the security of the revenue stream, and whether the Offtaker who will be buying the power is creditworthy. Where this is not the case, which is usual, the payment obligations will have to be backed by a third party such as the government and probably by international guarantors such as the MDBs.

Financiers are also endeavoring to provide finance of longer tenure so that the debt servicing is better spread over the life of the project and better matched by the revenue streams.

The issue of risk

After an assured revenue stream, the next most important factor in raising finance is risk. Contrary to some views, there is no shortage of finance for hydro projects. The only reason that Owners find it difficult to raise money for this type of scheme is that hydropower is perceived to have an unfavorable risk profile, with all of the potential pitfalls upfront at the project development stage.

As there is no way that risk can be totally eliminated, it has to be mitigated as far as possible, and then managed in the most effective way by:

- Committing adequate time and resources for front-end studies
- Allocating risk among the parties
- Using insurance and guarantees

The importance of adequately resourcing front-end studies cannot be overestimated, but unfortunately today there is seldom sufficient budget or time to carry out the detailed investigations and optimization that would have been considered normal in the past. However, any money spent at this stage is likely to show a healthy return later.

The Security Plan is an essential part of the financing package. It starts with a listing of the potential threats that could threaten the financial security of the project, and their possible effects. Most Sovereign risks (e.g., Government default) and some of the commercial risks may be covered by guarantees from the MDBs, but many of the development risks (with the possible exception of geological and hydrological risk) are likely to rest with the Owner or his contractor.

It is important to remember that delayed commissioning is usually financially more damaging than cost overruns, and therefore special attention needs to be given to potential threats to the project schedule. Also, it is important to bear in mind that there is a limit to the amount of risk that a contractor can economically assume, and that to put him into a position where his best option is to default is not a productive solution. The default of a contractor is usually a very expensive business for all concerned, especially the Owner.

There are several important facts to be borne in mind when allocating risk:

- The assumption of risk is a commercial decision, and it comes with an attached price. Moving risk between the parties not only affects their individual costs, but it may well affect the overall cost of the project.
- The price of any particular risk is not fixed. It depends upon who bears it, as some parties who can pool the risk will be able to bear it more cheaply than others who cannot.
- Certain risks cannot be economically borne by the private sector under a typical BOOT model. For this reason, if is often more economical for the public sector to carry certain (rare but potentially costly) risks.

The allocation of risk on a project eventually culminates in the preparation of the financial Security Plan, which identifies every risk that could threaten the financial viability of the project. This, in turn, leads to an assessment of its credit rating for the purposes of raising finance, sometimes referred to as a project's Bankability.

Real and virtual money

Having established the quantum of financing required, and given some thought to the issue of risk, and in particular currency exposure, it is necessary to begin to assemble the Financing Package. In

practice there are many instruments available, but all can ultimately be categorized either as Debt or Equity. The basic differences are shown below:

Debt	Provided by third parties (international or local Lenders) who are not owners of the scheme and therefore do not share in its risks or profits.
	As they do not share in the profitability of the scheme, Lenders tend to be highly risk-averse and are focused exclusively on protecting their loans
	Debt is usually less expensive than equity due to the lower exposure to risk (as, legally, debt must be serviced before profits are used for paying equity returns). Loans are for set periods of typically 12 to 15-plus years, depending on the Lender.
Equity	Provided by the Owners (foreign or local) who will share in the project risks and profits according to their shareholding. If the project experiences losses, shareholders get no dividends (returns).
	Owners have a strong interest in the profitability of the project, and may be prepared to take larger risks for potentially larger profits.
	Equity is more expensive than debt, because it carries more risk, and there is often no repayment of principal as most BOOT Agreements call for the free transfer of assets at the end of the concession period.

Debt/Equity (D/E) ratios (the proportion of equity and debt in the financing plan) vary according to the circumstances, but most private hydro projects are financed using D/E ratios of around 70/30 (70 percent debt and 30 percent equity). Shareholders will try to put up as little equity as possible, because this reduces the amount they have at risk and increases the potential gearing on dividend returns if the venture is profitable. Lenders will want the opposite (more equity and less debt) if they perceive a project is risky, because equity is forfeited first in the event of the project failing.

In the case of publicly financed projects, the Debt/Equity ratios can be very different, as they tend to be influenced by different criteria, such as the availability of public funds and the amount of debt that the State is able to access.

Guarantees are sometimes presented as being the third form of financing, alongside debt and equity. However this is incorrect as they are "virtual" money in the sense that guarantees are actually a form of insurance that facilitates financing from other sources that would otherwise not be available, or only at considerably greater cost. For this reason, they are often referred to as "Credit Enhancement" instruments. Guarantees are an increasingly important component of project financing, but it is important to recognize that they are not, in themselves, hard cash.

Financing instruments

When it comes to determining the optimum financing plan, there is wide range of financing instruments available. They extend from concessionary aid funds (bilateral or multilateral aid, available only to the poorest countries) through to fully commercial financing. Some of these instruments provide hard cash, whereas others are strictly credit enhancement facilities. Each has its own characteristics, constraints, and costs — and the objective of any financing plan is to combine them in the most effective manner from the viewpoint of the Owner.

The different financing instruments can be broadly categorized under the five headings shown in the table on the next page.

Instrument	*Comment**
Concessionary Finance	Concessionary finance can include everything from grants to soft loans. It is mainly provided by bilateral donors and MDBs as a form of external support for public benefits that cannot easily be monetized. Carbon credits fall into this category. Concessionary finance is unlikely to be available is sufficient quantities to finance complete hydro projects, but it plays an important role by leveraging other forms of financing and funding front-end project preparation studies.
Credit Enhancement Facilities (Guarantees)	Provided mainly by the MDBs, Credit Enhancement Facilities comprise a range of financial instruments that convert sub-investment grade projects to investment grade, and thereby facilitate private financing. They cover risk that the market cannot assume and by doing so improve loan terms and provide wider access to funds. They can also be used to extend the tenor of loans.
Export Credits (ECAs)	Export credits are a form of official debt financing provided by Export Credit Agencies (ECAs) in support of national exporters. The terms are more favorable than for normal commercial lending, but it is restricted to the export value plus 15 percent, and is not widely used for hydropower projects. Funding is usually in hard currency, but some local currency financing is possible in the stronger emerging economies.
Commercial Lending	Commercial lending consists primarily of bank loans or bonds raised on the capital markets. Islamic instruments such as shukuk can sometimes be used. Lending is normally made on a non-recourse basis where repayment relies entirely on the revenue of the project company. It is difficult and expensive to set up and therefore not cost-effective for smaller loans. Terms depend upon the perception of risk, and can be relatively expensive and of short tenor if not under-written by Guarantees.
Equity (private or public)	More expensive than loans because equity holders are prepared to assume some risk in return for higher rewards. Typical Returns on Equity (ROE) for greenfield private hydro schemes in the developing world are around 15 to 20 percent p.a., but they can range outside these figures (below and above), depending on the risk. ROE includes recovery of the original investment as there is generally no asset value when the project is transferred. Equity can be provided from private or public sources.

*A more detailed description of each of these can be found in Note 2.

In most developing countries, the MDBs will be involved in one capacity or another — as advisors, lenders, guarantors, and sometimes as investors. They offer financing through a variety of instruments depending on the nature of the project and the country where it is located. Although the terms and conditions vary from organization to organization, most of the major MDBs offer broadly similar packages to that provided by the World Bank Group (see box on the next page).

The financing plan

The primary objective of the Financing Plan is to obtain firm commitments for the full financing requirement, including an adequate sum to cover contingencies, at the time of financial closure. There can be no question of embarking on a project with the financing only partially secured, because it is most unlikely that any financier would lend under such circumstances. There have to be sufficient resources available at the outset to bring the project to fruition under all reasonably anticipated scenarios.

The secondary objective, from the viewpoint of the Owner, is to raise the least expensive money on the most favorable terms to the company. The Lenders will, of course, be looking at things from a different viewpoint. In particular, they will be concerned that the project company will have

World Bank Group: Principal terms for financing

IDA credits (for the poorest countries) are provided on very soft terms direct to the Government, which may then pass them on to the utility at commercial interest rates and maturities. There are strict limits to the amount of IDA funding available and a lot of competition from other sectors.

IBRD loans are provided either to Government or direct to any public sector client with a Government guarantee, at near-market rates but with longer maturities than would be achievable in the commercial sector — even if the loans were available, which is usually not be the case.

Guarantees can be mobilized through IBRD or IDA, depending on the country. Their objective is to leverage private financing that would not otherwise be available by protecting lenders against political and certain other risks. When Guarantees are made available, the Host Government is required to make provision for only 25 percent of the amount of commercial lending covered (as opposed to 100 percent for conventional IDA credit or IBRD loan; this reduces the pressure on the public budget and raises the ceiling on IDA lending for that country.

IFC provides commercial loans to private companies and takes equity in private projects on essentially the same terms as any commercial company in the private sector. "A" loans are made from its own resources and are therefore relatively limited, but it can also act as the Lead Lender and syndicate "B" Loans amongst commercial banks. MIGA, another part of the World Bank Group, offers insurance for investors in developing world projects.

enough revenue to service the debt with an adequate margin of security.

This is measured by the Debt Service Cover Ratio (DSCR). Through financial modeling, the Lenders will need to be satisfied that the DSCR does not drop below a specified level (typically 1.3) even under various downside scenarios such as late commissioning. If this level of security is not achieved, the plan is probably not viable.

Project Structure

In order to arrive at a financing plan, there has to be a project structure that determines the relationship between the principal parties from the Host Government downward. It is necessary to define the roles, responsibilities, and risks (the three "R"s) assumed by the parties to the various contracts. There can be a large number of parties, but the main ones are specifically the:

- Government who grant the concession
- Offtaker who buys the power
- Concessionaire who becomes the Owner of the project

This is particularly important in the case of Public-Private Partnerships, where it is necessary to address at an early stage the issue of participation of the public and private sectors, and risk-sharing between them.

The construction contractor works for the Owner, and although in theory this relationship should be of no direct concern to those higher in the project hierarchy, in practice this is usually not the case. Frequently, both the Government and the Offtaker have a direct interest in the construction contracts because the tariff is determined on a cost-plus formula and therefore they are involved in risk-sharing arrangements with the contractor.

The negotiation of the financing package involves a large number of parties linked together by a series of inter-related agreements. The diagram on the following page shows a typical arrangement for financing a project being developed by a "special purpose" Project Company following a typical BOOT structure where the only security that the company can offer its financiers is its future revenue stream.

The diagram on the following page shows the main elements that one finds in a project financing:

- The loans will usually be syndicated amongst a number of lenders

- Loans may be supported by guarantees
- Shareholders may also take out insurance against specified risks
- Imported equipment is likely to be support with Export Credits

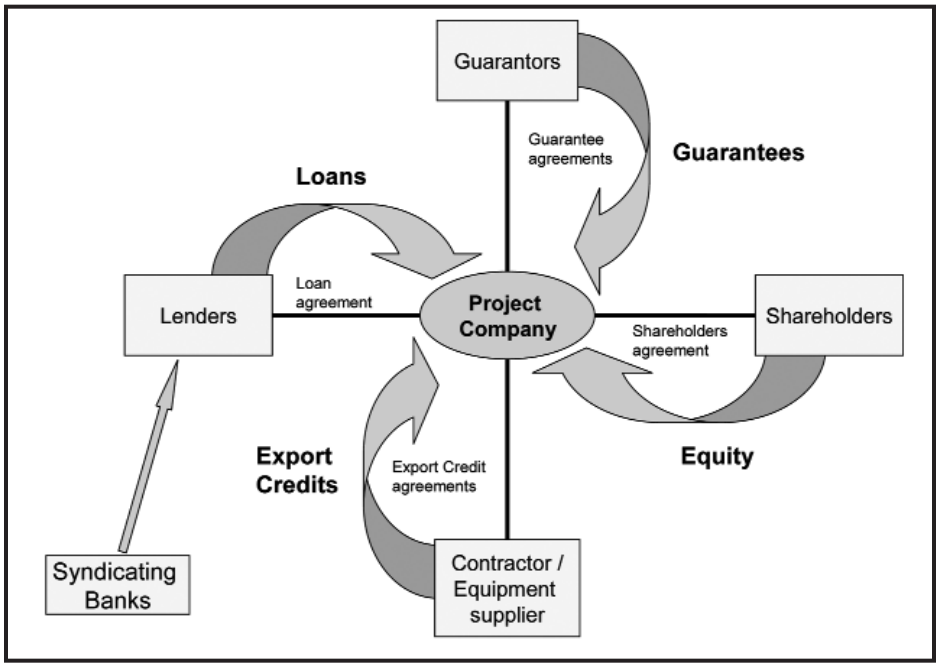

Figure 5.1:
Main elements of a project financing.

Financing Agreements

There are a number of key agreements, all of which have to be entirely compatible with each other. They include:

- Loan Agreement between the Lenders and the Project Company
- Shareholders Agreement between the owners of the Project Company
- Loan Syndication Agreement between the banks
- Guarantees to Lenders
- Guarantees to Shareholders
- Export Credit Financing Agreement
- Concession Agreement
- Power Purchase Agreement

The lenders will generally employ a number of advisors, including lawyers and engineers, who will often be retained throughout the project in an ongoing monitoring role. The lenders need this level of advice as the finance is "non-recourse." The essential feature about non-recourse financing is that the Shareholders and the Lenders have to commit their funds in the expectation that the project will deliver the revenue predicted, but with no recourse to, for example, a parent company of the project company if things go wrong. In view of the many things that can go wrong, the Lenders (who provide most of the money) are naturally very cautious, and they will want a thorough Due Diligence study by their own experts. These fees are also part of the project costs.

These arrangements are clearly expensive to establish and, for this reason, conventional project financing tends to become uneconomic for smaller projects below about US$150 million. At the

lower end of the spectrum, alternative arrangements have to be found for smaller projects. This generally means that they have to be financed on the balance sheet of a larger organization or, where appropriate, through using concessionary funds. At the other end of the spectrum, unusually large and complex projects may have to remain in the public sector because the amount of equity required and the risk profile simply make them unsuitable for private developers.[3]

Negotiating the financing package

The complexities described above make the process of putting the finance package together a long one and the message for project owners is clear: begin planning (the financing) early. This work should run in parallel with the technical feasibility studies. There needs to be close linkage between the two because some engineering layouts are more bankable than others. Sponsors of large and complex projects sometimes use Transaction Advisors to analyze the structuring and financing options that might be considered, and to advise on related issues such as risk sharing and procurement.

At a later stage, when the project is better defined, the Owner may bring in Financial Advisors to assist in arranging the commercial loans. Where the Financial Advisors are themselves commercial banks, it is necessary to establish at the outset whether the bank is anticipating being mandated to syndicate the loans, or whether it is acting in purely an advisory capacity and is therefore precluded from acting as a Lender. The bank will advise on the Financial Security Plan and investigate the likely response of the market.

The negotiation of the financing package ultimately centers on the allocation of risk. In the past, the theory was that risk should be borne by the party best able to control it, but in practice many risks lie outside the control of any of the parties. This approach is often an expensive and unsatisfactory way of tackling the problem. The trend now is toward allocating risk in a manner that makes it easiest to finance and which results in the least overall cost to the project. This means that sometimes it will be to the advantage of the Offtaker to assume a specific risk (e.g., geology) because it can be pooled, rather than ring-fencing it within the Project Company with the consequence that the tariff will be higher [see below].

The Cost of Risk, and the Difference between "Ring-Fenced" and "Pooled" Risk

If a company assumes risk, it has to make some provision in its price. The provision will be calculated on a probability basis, but the concept of an "average" loss is of little assistance if a rare but extremely severe event materializes, unless the company is able to spread its losses. Under the BOOT model, the project risks are ring-fenced within the Project Company, and a serious loss would probably collapse the company.

The cost of risk depends upon whether it is "Ring-Fenced" or "Pooled." For example, if a project company is required to assume the risk of failure to deliver electricity due to low flows, it would have to add a premium to its price to reflect the fact that inevitably a drought will eventually occur, so that it would lose revenue and also possibly have to pay a penalty. In this event,the impact on the project company could be very high, and the Owner will have to make provision for this risk in his price, irrespective of whether it occurs or not.

However, the Offtaker would normally be in a position to mitigate the impact relatively inexpensively, by calling on alternative generating sources. The actual cost to the Offtaker is likely to be far lower than the company's risk premium, and in the long run it would have been cheaper for the Offtaker to have assumed the risk itself. This illustrates the principle that underlies all insurance, namely that risk which is shared or "Pooled" is much cheaper to bear.

The negotiations on the financing package are likely to involve the trading of risk between the parties. In order to do this, it is necessary to quantify the cost using a probabilistic (Monte-Carlo type)

analysis based on the probability of the event occurring and the damages that would ensue if it happened. In the end, the perception of risk will determine the availability and cost of finance, and an iterative process has to be undertaken to arrive at an optimum balance that is acceptable to all parties.

Examples of financing structures

There is no single financing format that can be applied to all projects. In the end, each financing package has to be tailored to meet the specific circumstances of each individual project, as illustrated in the case studies that follow.

Project	*Comment*
Allain-Duhangan Hydropower **India** **120 MW**	This is an example of a medium-sized private project (US$191million) being developed by local and foreign sponsors on a merchant plant basis without a long-term power purchase agreement or any other form of public support, which is very unusual. The project was financed on a nominal Debt/Equity ratio of 65/35, with US$40 millionof debt being provided by an IFC A Loan (denominated in Rupees) which allowed a further US$75 million to be raised from local banks.
Theun Hinboun Hydropower **Lao PDR** **120 MW**	An export project that benefited from a high level of public support from the outset. It has been financially very successful with the original shareholders recovering their initial outlay in only a few years. The project has recently been refinanced, and is now being extended. The originally planned 65/35 D/E ratio became 55/45 after the Asian currency crisis seriously disrupted financing during construction. The 60 percent Government shareholding was funded through an ADB soft loan. Refinancing after several years' operation released capital for expansion.
San Roque Multipurpose **Philippines** **345 MW**	This US$1.19 billion multipurpose project failed to be financed in the public sector, and was then successfully implemented as Pubic-Private Partnership. It is one of the few examples of a "Split Ownership," where the project is geographically divided into public and private parts – although both were implemented under a single contract by the private partner. The dam (US$610 million) was financed in the public sector using a bilateral soft loan (65 percent) and domestic funds. The power complex (US$580 million) was financed on a 75/25 D/E ratio, with 52 percent of the total cost derived from Export Credits. The rest of the debt came from Japanese Government loans and commercial banks. The utility payment obligations were backed by Sovereign Guarantees.
Nam Theun 2 Hydropower **Lao PDR** **1,070 MW**	Recently achieved financial closure after 12 years preparation, it is one of the largest private financings of any hydro project. The total cost of $1.45 billion.was financed through a complex mix of commercial loans backed by guarantees, private equity, and aid. The project was financed on a 72/28 D/E ratio. The Lao Government holds 25 percent of the equity, for which the necessary funding was supplied through international donors. The sponsors provided the balance. About US$500 million of debt was raised from international banks on the basis of guarantees from the World Bank and other MDBs, and US$500 million from Thai Banks on the creditworthiness of the Thai utility power as PPA offtaker.

Notes:

[1]Head, Chris, "Financing of Private Hydropower Projects," World Bank Discussion Paper 420, 2000.
[2]Head, Chris, "The Financing of Water Infrastructure: A Review of Case Studies," World Bank, 2006.
[3]Although public projects can still access private finance in the form of loans if the right securities are in place.

Chapter 6

Obtaining Equity for Hydropower Projects

Chapter 6

Obtaining Equity for Hydropower Projects

By Mark Mondik and Brian Tarmey

If arranging debt financing for hydropower projects — with all of its financial ratios, sensitivity analysis, and documentation — could be called a science, then obtaining equity for these projects might be called an art. Both are equally important to capital-intensive industries such as power generation. But the process for securing each type of financing, and the type of people who are responsible for providing it, can be very different. Some project developers will bring all the equity investment required for project development, but others will seek equity investment from other players. This chapter explores the various options and conditions.

Types of equity investors

One of the most important elements of a successful fundraising approach is to know your audience. Most equity investors have an uncommonly short attention span when it comes to looking at new deals, primarily because of the large volume of opportunities that they see relative to the number they actually fund. For example, one equity fund that opened up in an emerging market in the mid-1990s received more than 200 investment proposals in its first year of operations alone. Of this amount, it seriously considered about 20, and ultimately funded only two.[1] Therefore, it is critical to understand the nature and motives of a prospective investor even before presenting an initial proposal or project summary.

The motives of equity investors can vary significantly. As outlined below, potential equity investors for hydropower projects can broadly be divided into two main groups:

1) strategic investors, which consist mainly of organizations with substantial power or hydropower operations and investment experience and an aim of taking an active role in the management and oversight of the projects in which they invest, and

2) financial investors, which have varying degrees of familiarity with the hydropower industry and tend to take a more passive approach to day-to-day management of investment projects.

Each of these groups can be further broken down into subcategories. Following is a description of each subcategory.

Strategic investors: utilities and IPPs

The most common type of strategic investor consists of companies already engaged in the ownership and day-to-day operation of power generation facilities, such as public utilities and independent power producers (IPPs). Most of these companies are publicly traded and, hence, have an ample supply of capital available for investment (although some may from time to time be considered over-

leveraged if they have significant amounts of debt on their corporate balance sheets). In addition to capital, such partners also typically offer strong strategic and technical support at both the level of oversight (i.e., Board) and day-to-day operations. For example, a corporate strategic investor can lend credibility and expertise to support the negotiation of power purchase agreements, engineer-procure-construct (EPC) contracts, and debt financing. In addition, they can often also assist in managing operational activities (e.g., maintenance programs, employee training, etc.).

While large utilities and IPPs can add significant capital and value to a project, they are not the ideal partner in all instances. Because they can manage most aspects of a hydropower project on their own (and, in fact, are specifically in the business of doing so), they typically require a majority or controlling interest or otherwise expect to capture a substantial portion of the economic value of a particular project. There are some exceptions to this, as well as other scenarios, in which such corporate strategic investors would be an ideal investor. For example, a utility or IPP might be an appropriate investor where:

- The project is located in a country or region in which the utility or IPP has little or no experience, while the initial project sponsor has strong experience in and ties to the country, especially if the country in question is generally considered risky or of strategic value (or both);
- The initial project sponsor is a small- to mid-sized company whose financial and operational resources are not large enough to provide sufficient comfort to the proposed project lenders; and/or
- The initial project sponsor is a small- to mid-sized developer that does not have a robust, experienced technical staff to operate and maintain the facility.

On the other hand, and unlike other kinds of equity investors, utilities and IPPs usually have a long-term investment horizon, which reduces pressure on project sponsors to detail and develop a medium-term exit strategy (see section below). In fact, the inverse can be true: an IPP or public utility may provide an exit strategy for a project developer or promoter that wishes to benefit from the economic value of a project in the short to medium term but doesn't want to hold an investment (particularly a minority interest) in the project indefinitely.

Strategic investors: offtakers and other industrials

Another type of corporate strategic investor (but one that is very different than those described above) includes industrial companies whose principal business is not power generation per se, but whose business may be closely related to or be dependent upon electricity production. Primary examples would include hydropower project suppliers (such as large engineering and construction companies and hydroelectric equipment manufacturers), as well as large industrial power consumers that may be willing to co-sponsor captive or "inside-the-fence" projects as a means of ensuring a reliable and affordable supply of electricity for operations.

While project sponsors in need of equity should consider a broad range of possible sources, potential investors that can be classified in this group should be considered carefully. On one hand, this type of investor usually has a vested interest in a project beyond simple financial return on investment ("ROI") that might make it easier to negotiate an equity investment with better-than-average terms and conditions. Conversely, the ulterior motives of such investors can also produce conflicts of interest that reduce instead of enhance the overall profitability and financeability of a particular project. For example, an equipment supplier who is also an equity investor may be inclined to resist negotiating prices or supply contracts, or an industrial offtaker may expect prefer-

ential pricing or indexation terms in exchange for its equity.

While such issues can usually be addressed with structural or contractual fixes (e.g., "arms-length" tests, market-based indexation, etc.), as a general rule it is best to limit the participation of such investors to small minority or non-voting equity participations.[2] Provided that the right protections and alignment of interests are achieved, however, equity from such sources may also be viewed by other financing parties — most importantly, lenders — as beneficial toward reducing project risk by increasing the commitment of key suppliers and customers.

Strategic investors: sector-focused investment funds

A third type of strategic investor includes private equity funds that have a specific focus on hydropower, renewable energy, or power generation overall. Such funds are often managed by former power industry executives with decades of experience in many or all aspects of power project development, finance, and operation. As such, they often have the ability to add strategic guidance and industry contacts to support the project. In addition, they also typically hold large stakes in a few investments, which allows them to devote time to assisting each project investment at a strategic (i.e., Board) level. Conversely, such fund managers are often thinly staffed, meaning that they rarely have the resources (or desire) to become involved in the day-to-day operations of the company.

Such characteristics make this type of investor ideal for certain kinds of project sponsors, such as companies or developers with strong project-level operating staff but a lack of sufficient capital resources. Such an investor may also be beneficial to companies seeking to bolster sponsorship credentials (both in terms of industry track record and overall financial resources) for purposes of obtaining project debt financing. The existing knowledge and experience of these fund managers can also make it easier to (a) engage their interest in a particular project, (b) get through the investment review and due diligence process, and (c) maintain the project-investor relationship after they have made an investment.

There are some drawbacks to working with these funds, however. The most prominent of these arises from their very nature: as a "fund," rather than a regular operating company, fund managers are typically forced to operate under certain constraints imposed by their investors (which are typically large, passive, institutional investors, such as pension funds or insurance companies). For example, many funds have a finite "term" or life that effectively requires that investments can only be held for a defined period of time (e.g., five to ten years), meaning that an "exit strategy" (see section below) must be very well defined in advance of financial closing.

In addition, such funds are typically raised by fund managers promising rather aggressive returns to their ultimate investors. Since returns to the ultimate investors are net of the often-sizeable fees charged by the fund managers themselves, the return on investment expectations that fund managers have for the particular projects in which they invest can, in the worst cases, soar beyond the realm of economic viability, and, in the best cases, dilute the economic interest of the primary project sponsors to a very uncomfortable degree. Fortunately, there are a number of solutions to this latter problem (see section below).

Financial investors

The key features distinguishing "strategic" investors from "financial" investors tends to be the level of intended involvement of the investor in the project enterprise and, to a lesser extent, the level of knowledge or familiarity of the investor in the project's industry. As with many labels or generaliza-

tions, the terms "strategic" and "financial" can sometimes be applied in an arbitrary fashion. For example, while there are significant differences in the investment strategy between an IPP and a pension fund that has earmarked a percentage of its capital for infrastructure projects (including energy generation), the line distinguishing a private equity fund focused on the power industry (which might be called "strategic") and a global infrastructure investment fund that happens to hold one or two hydropower investments in its portfolio (which could be termed "financial") can become rather blurry. For purposes of this discussion, "financial" investors shall be described more by their motive and intent rather than the nature of their organization.

With that in mind, the most common financial investors include institutional groups such as pension funds and insurance companies, as well as more general private equity funds (such as a global infrastructure fund). A key driver for most financial investors is diversification—spreading risk across a relatively large number of industries and/or geographies (whereas sector-focused funds seek a strategic concentration in renewables or power). This means that financial investors tend to hold a relatively large number of investments that do not require a significant amount of oversight or strategic guidance—they expect such contributions to come from the project sponsors or other equity co-investors.

This has several implications for project sponsors seeking equity. First, a more passive and diversified approach by financial investors — as compared to a energy-focused fund, for example — should equate to lower target returns sought from an individual project (which, in turn, equates to less dilution for project sponsors). On the other hand, a financial investor will not have the same level of understanding of a hydropower project and its risks, meaning that (i) it is not likely to be the first/lead party to commit a substantial amount of capital to the project, (ii) it may require more time to understand the risks and, thus, to make an investment decision related to the project, and (iii) should the project run into difficulties post-investment, it is less likely to be helpful in finding a solution.

It is also important to note that while many financial investors have flexibility in their investment horizon, some (primarily the ones organized as equity funds) have some limitations in terms of holding periods, thus raising the profile of a viable exit strategy. Also, many financial investors are geared toward larger investment amounts (e.g., $20 million may be considered too small) which represent a minority of the total equity required for the project, meaning that the proposed projects should be of some scale.As a result, investment opportunities that are best suited to financial investors are usually larger projects that already have a strong, well-established project sponsor with ample operational resources and a substantial amount of the required equity already committed to the project. For example, a financial investor would be an ideal partner for a large-scale project developed by an IPP where the IPP is seeking to limit its own financial exposure to support its own diversification and risk management objectives.

International financial institutions

International financial institutions (IFIs) are defined as the multilateral or bilateral institutions providing the risk capital or risk mitigation support to help catalyze the flow of foreign direct investment into private hydropower projects in less-developed or emerging markets. For most IFIs, the provision of risk capital can include equity or quasi-equity (as well as loans and loan guarantees). Risk mitigation support from some IFIs includes, among other things, political risk insurance that can protect a private equity investor from losses due to expropriation, political violence, currency

inconvertibility, breach of contract, and other related risks. In this sense, the IFIs are, by design, playing a catalytic role — investing the first dollar (or peso or baht), guaranteeing against political risks, and being paid back last so that the private sector is making cross-border investments rather than leaving their money in safer jurisdictions.

While most IFIs have similar objectives in mind, not all have the same policy or program guidelines and not all provide equity capital. Generally, the scope of a IFI's programs is determined by whether its charter restricts it to focusing on particular countries and whether its membership (or ownership) restricts it to considering only "member-sponsored" or "member-benefiting" projects. Therefore, sponsors seeking support from these institutions must make sure that they approach the correct organization in terms of region, sponsor nationality, and other factors.

IFIs have traditionally been focused on financing infrastructure projects with developmental and/or environmental benefits. Given that much of the world's untapped hydropower potential is located in emerging markets, IFIs are thus an ideal funding source (for both debt and equity) for most hydropower projects. This is particularly true when a project sponsor is seeking to raise equity co-financing from other investors as well, since the presence of an IFI in a project is sometimes viewed as implicit protection with respect to host country political risk.

Categorically, IFIs behave more like financial investors than strategic investors. While some IFIs have significant experience investing in hydropower projects, there is a variable level of knowledge and understanding of hydropower among most. In addition, they generally do not get involved in the management of projects in which they invest. Most IFIs have flexibility with respect to investment holding period, and ownership stakes are usually small minorities (e.g., less than 20 percent). IFIs generally seek to price their investments in accordance with the private market, but in practice these institutions are often prepared to absorb more country risk than the private sector without a corresponding increase in expected rates of return (and thus dilution).

Examples of IFIs that Provide Equity Financing

International Finance Corporation (IFC)
Asian Development Bank (ADB)
European Bank for Reconstruction & Development (EBRD)
German Investment and Development Company (DEG)
Japan Bank for International Cooperation (JBIC)
Netherlands Development Finance Company (FMO)

However, non-financial terms and conditions imposed by IFIs can sometimes be onerous. These are largely related to the many environmental and policy regulations involved. In some cases, IFIs may reject an economically viable project on marginal policy grounds that may be perfectly acceptable to private sector investors. Also, some IFIs have earned a reputation for making investment decisions at a slow pace, in part because of the many environmental and policy regulations involved. Whether or not this generalization is true, the benefits of IFI involvement can often outweigh the costs.

Classes of equity financing

While paid-in capital from shareholders often shows up on a project balance sheet in a single line item, not all equity is created equal. However, when it comes to financing a hydropower project, there is one critical feature that should be common to all equity (and here we are including quasi-equity as well): that it provides a plain and solid capital base upon which to layer debt financing. Said another way, the capital-intensive nature of hydropower projects usually demands long-term, low-cost debt capital for economic viability, and providers of debt capital usually demand a certain

amount of equity or equity-like capital in any given project.

Notwithstanding this, investor appetite for risk and project sponsor appetite for dilution can vary from project to project. To address this while still maintaining the ability to secure project debt, there are different options with respect to the type or class of equity, each of which has its own advantages depending on the financing goals for a particular project.

Common equity

As the name implies, common equity is the most popular and fundamental form of equity ownership. Notwithstanding legal distinctions applicable to classes of equity (which may vary between countries), common shares effectively confer upon their holder the rights associated to the net profits of a project — after all of the other holders of securities in the project (e.g., lenders, preferred equity investors, etc.) have been paid, of course. Since the returns associated with most other classes of securities are generally fixed, it can be said that common shares typically retain the full profit potential associated with a project. This profit potential is often referred to by investors as "upside."

Conversely, common equity can also be considered the riskiest type of capital in a project. Since it stands in line behind all other classes of capital in terms of cash proceeds — regardless of whether those proceeds are derived from regular operating cash flow or from a sale of a project — returns to common shareholders are less certain and more variable. In a bad hydrological year, for example, common shareholders may get no dividends, whereas other investors may get paid in full. In a foreclosure and liquidation of the project, common owners are not likely to get much, if any, proceeds (depending on the debt load, of course).

Common shareholders usually distribute profits or proceeds amongst themselves on a pro rata basis. In many jurisdictions, it is possible to confer differing rights on shares of common stock, such as creating voting versus non-voting shares. Separating voting versus economic interests can be useful in situations where a project sponsor seeks to maintain control of a project but most of the capital is being provided by a passive outside investor.

Project sponsors and promoters almost always hold ownership at the common level. Corporate strategic investors usually hold common shares as well, whereas private equity funds and financial investors sometimes seek preferred equity (which is often convertible into common equity at a later date).

Preferred equity

Many investors not involved in the day-to-day operations of a project seek preferred equity because of the extra protections it provides. Preferred stock still preserves a claim on the ownership of a company, though, in many cases, the investor is entitled to receive a "preferred dividend" that takes priority over dividends to common shareholders. Preferred dividends are usually computed as an annual percentage return on investment and payable subject to available cash flow (with compounding if sufficient cash flow is not available). Preferred equity investors also stand in line before common shareholders in an event of liquidation, thus making it more likely that preferred shareholders will get their original investment principal returned to them.

Preferred shares are often convertible into common shares, either as a predetermined number of shares or under a conversion ratio of preferred to common. In this way, preferred equity investors can preserve all of the upside associated with common equity (particularly in the case of an IPO or sale of a project company) while maintaining all the protections afforded by the pre-

ferred dividend and liquidation preference. Convertible preferred shares often carry a lower preferred dividend rate (usually a "hurdle" rate that might be in the range of 6 to 8 percent per annum), whereas non-convertible preferred shares may require preferred dividends well into the double-digits per annum or more.

Quasi-equity

Perhaps the most controversial form of equity may not, in fact, be equity at all. But for project sponsors seeking to obtain non- or limited-recourse senior debt financing for a hydropower project while minimizing the dilution of their own equity interest, quasi-equity might be the most effective solution.

Quasi-equity typically consists of debt that is deeply subordinated to debt provided by senior project finance lenders — both in terms of cash flow and security. The term "deeply" here is essential: subordinated debt will only be viewed as quasi-equity by a senior lender if it is devoid of many of the rights commonly associated with debt instruments, such as the right to foreclosure on project assets in an event of default on the subordinated loan, or the right to demand regular, scheduled payments of interest and/or principal. This is not to suggest that quasi-equity investors cannot receive debt service payments during the operation of the project, but simply that the rights associated with such capital cannot have the possibility of interfering with the value or integrity of the security interests of senior lenders.

The primary advantages of subordinated debt from an investor's perspective are that it:

- Stands in line before both common and preferred equity in terms of cash flow and liquidation;
- Is often easier to meet tests imposed by senior lenders for subordinated debt service payments than those for dividend payments;
- Sometimes has profit-sharing features or is convertible into a pre-defined number of common shares, thus providing some upside potential to enhance total returns. These advantages often translate into a lower overall cost of capital, which is the main benefit of quasi-equity to a project sponsor.[3] A tertiary benefit is that interest on subordinated debt may in some jurisdictions be tax-deductible.

IFIs and some financial investors are the most likely providers of subordinated debt. A common approach to sub debt is to structure it as an unsecured loan (though in some cases a junior or second lien interest may be achievable) with little or no principal repayment until the end of the loan term, which should be at least as long as the term of the senior debt. Target returns on subordinated debt may be priced at a premium over the cost of senior debt. Keep in mind that the presence of subordinated debt in a project may prompt senior lenders to introduce additional financial covenants, such as a Total Debt Service Coverage Ratio (to complement a Senior Debt Service Coverage Ratio).

The importance of exit strategy

For most investors considering a long-term, illiquid investment in a capital-intensive industry such as hydropower, one of the first questions to be asked is, "How am I going to get my cash back out of this project?" The answer to this question is what investors call "exit strategy," and it is vital for most. In fact, this issue is so important to some investors that they will insist upon a pre-negotiated "put option" that allows them to sell their shares back to the project sponsor or the project company within a specified timeframe.

As previously discussed, one of the few exceptions to this rule is a strategic partner that is principally engaged in the power generation business. Not only are such partners prepared to hold project investments indefinitely, but they may even ask for a "call option" that allows them to buy out the remaining shareholders after a certain period of time.

The groups for which exit strategy is most critical are private equity funds (both sector-focused and broad strategy) and financial investors. Some groups may seek (or demand) defined exit options within the first five to ten years of a project, which could cause complications with project lenders. Others are more flexible. In either case, almost all investors will want to understand the intention of the project sponsors with respect to medium- and long-term exit possibilities.

Main Exit Options

There is little or no mysticism with respect to exit options: the list of possibilities is more or less the same for most projects, companies, and industries. What tends to differ between given projects and industries is how probable it is that each particular exit window will appear, and within what timeframe. Following is a brief discussion of each:

- *Initial Public Offering (IPO).* Generally speaking, a successful IPO through a local or international exchange (or some combination of both) is typically the most lucrative exit option for a company or project in any industry. However, it is often also the most difficult to achieve. A successful IPO often requires both critical mass (i.e., a minimum amount of revenue) and diversification (i.e., a variety of sources of that revenue), whereas many hydropower projects have a relatively small stream of highly-concentrated revenue. Of course, it may be possible for a company with a single hydropower generating asset to accomplish an IPO on a "hot" local exchange in a market where capitalization thresholds are relatively low and liquidity is high,[4] but given the lead time required to develop and construct hydropower projects, this would be considered a risky exit strategy since a particular local stock market can fall out of favor fairly rapidly. On the other hand, for a company that is being established to own and operate a bundle of hydropower projects (especially if some of these projects are existing and are being acquired or contributed as equity by one of the sponsors) and such bundle creates a critical mass and some diversification of revenue, a future IPO might be considered a viable option. The perceived viability of this option might be further enhanced by the presence of a robust and growing local stock exchange.
- *Sale or Merger.* For investors seeking to hold a hydropower project interest for a finite period of time, the sale of the project at some point in the future to a third-party — most likely one whose principal business is power generation — is a common exit strategy for many hydropower projects. This is a particularly compelling exit strategy in markets where the local industry is experiencing a rapid pace of growth in power demand and supply that is expected to result in a consolidation of the industry at some point in the future, when the market begins to mature and the pace of growth slows, and in markets that are considered highly strategic on a global level and in which many major international IPPs have little or no presence. In this latter case, the acquisition of an existing asset with an installed base of operations, permits, customers, etc. offers a foreign IPP an opportunity to enter the local market without the expensive, time-consuming period commonly required to understand the local market and develop its own projects. In the former case, the identification of one or more indigenous companies as strong, emerging local industry players will help support the perceived viability of this strategy. On an unrelated

note, it should be noted that a merger of the project with another company is technically a different transaction structure, but typically accomplishes the same kind of end result for an outside investor.

• *Recapitalization.* What if neither an IPO nor a sale to a strategic third party materializes as a viable option? A third common strategy is to recapitalize the project company by borrowing additional debt and using it to buy out one of the equity investors. Because of the way most hydropower projects are financed, the senior debt of a project — which is typically the largest portion of the total capital of a project — has normally been substantially paid down after five to seven years of operation,[5] while project revenue and cash flow have remained the constant if not higher due to PPA indexation provisions, or, alternatively, rising spot market prices. This strategy is all the more likely since it is typically easier to obtain debt financing for a project with a long operational track record than for one that is new. There are a few drawbacks to this approach, however. First, recapitalization tends to offer an outside investor less upside than an IPO or sale of a project, and thus it is a less enticing strategy for purposes of attracting outside investor capital at the outset. Second, the availability of debt financing in a particular market, especially an emerging market, may change over time, thus making it more difficult, more expensive, or even impossible to secure project debt at a given point in the future. Third, this approach will defer cash flow to the remaining shareholders, since it normally takes some time to reduce debt balances and the corresponding interest expense to a level that results in sizeable dividend flows. Because of these drawbacks, recapitalization tends to be considered an alternative or "fall back" strategy.

• *Put Option.* As noted above, some investors may wish to ensure the ability to exit an investment by transferring the risk of liquidity to the project company or one of the other shareholders. This usually takes the form of a "put option" that allows the investor to sell its shares back to the project company, the project sponsor, or another investor within a specified timeframe (usually a window of several years that begins at least several years after the start of project operations) at a specified price. The specified price can be a fixed amount, derived in accordance with a formula (e.g., a multiple of EBITDA, or tied to a particular total internal rate of return for the investor), or determined by an independent appraiser. In general, put options are often priced at a discount to what might be considered the anticipated fair market value of the project since the put option represents a valuable right (but not an obligation) for the investor to convert its illiquid investment into cash, and it also may give rise to costs that would not otherwise be incurred by the project company or the other shareholders. Put options can be somewhat controversial depending upon their terms and conditions.[6] In any case, a recapitalization can often be planned as a means of supporting the exercise of a put.

• *Dividends.* Some outside investors may be patient enough to earn their target return the old-fashioned way: annual dividends. The steady stream of reliable cash flow of hydropower projects (despite the hydrology-related variations that may arise) makes this a viable option for investors that prefer a long-term current income or annuity-type approach to investing (e.g., financial investors such as insurance companies) rather than investors focused on a medium-term mix of current income and capital gains (e.g., private equity funds). It should be noted that this strategy may be considered more viable in markets that are perceived to be very stable from a political and regulatory standpoint (i.e., developed markets) since investors will need to rely on a reliable stream of dividends over a period of 15 years or more.

Defining a tailored exit strategy

Given the importance of exit strategy to most investors, it is essential to highlight — even in the very first project proposal shared with a potential investor — at least two probable, well-defined exit windows for the investor. While more than two possibilities can most likely be developed for any given project, the objectives and motivations of the specific audience that is being addressed should be the primary consideration when articulating the primary exit options. For example, a company sale might be highlighted as the primary option to a private equity fund investor, with a recapitalization presented as a second, alternative option. Conversely, dividends and recapitalization might be presented as two primary options to an investor with a long-term investment horizon.

In any case, research and support should be generated to back up claims related to each exit option. A future sale strategy will appear more credible if the project sponsor can point to two emerging indigenous power companies in the local market that have growing financial resources and management capability. An IPO strategy could be compelling if examples of other similar companies can be shown to have completed an IPO on the local exchange and are now trading at high multiples. A dividend strategy would be strengthened by research that shows that the regulatory environment and power pricing mechanisms in the local jurisdiction have not substantially changed in more than a decade. Whichever strategy you plan to present, it should be tailored to your audience and well thought out.

Terms and conditions: maximizing the value of the deal

While documentation requirements for equity investments are generally not as extensive as that for project debt, most deals will involve a long and comprehensive set of terms and conditions. Below are outlined some of the key terms that tend to be of the greatest interest or focus for equity issuers and investors.

Valuation

Valuation is always a key issue for both investors and project sponsors, though at times it can become an almost-blinding obsession for the latter. In simple terms, valuation equates to the share of ownership or upside that an outside investor will receive in exchange for its investment. After the long period of sweat and toil required to bring a hydropower project close to fruition, project developers (like all entrepreneurs) are notoriously stubborn when it comes to negotiating valuation. While this position can be appreciated, project sponsors or developers do not always have a realistic view of the value of their project or the risks associated therewith, and also may not understand that many investors have certain minimum requirements for an investment's internal rate of return (IRR).

Valuation of hydropower projects is most commonly done using discounted cash flow (DCF) methodology, though in some cases (perhaps for an acquisition of an existing hydropower facility, for example) comparable valuations based on EBITDA, cash flow, or net income multiples might also be considered for reference purposes. Completing a DCF analysis, while a scientific in approach, is usually highly subjective. Small changes in key assumptions can yield large swings in metrics like IRR and net present value, and not all assumptions can be clearly established or guaranteed. As a result, there is usually a period of negotiation between the lead sponsor and investor at the beginning of a due diligence process during which the DCF model is discussed and agreed to along with a proposed investment structure that delineates sharing of ownership or upside.

Project sponsors seeking external equity should take caution during this negotiation. First, it is

possible to be so aggressive on initial valuation that a potential investor will decide to devote its limited deal development time pursuing other opportunities. Second, some sponsors are tempted to "oversell" certain project assumptions for the sake of an improved initial valuation, knowing that the investor, who is usually new to the project, does not have the same level of knowledge or understanding with respect to project variables and risks. However, this approach can backfire in some very detrimental ways as the investor goes through its comprehensive due diligence process or, worse, after it has made the investment. Finally, and perhaps most importantly, project sponsors should not become too hung up on initial valuation, as there are a number of ways to maximize the overall value of the deal for sponsors other than initial valuation (described in more detail below).

In any case, the project sponsor or developer should always prepare its own DCF analysis and have rough valuation estimates in mind before approaching a potential investor (though such figures should generally not be shared unless and until requested by a potential investor). Assumptions should be clearly defined and backed up by hard data where possible.

Voting and control

As discussed under "Types of Equity Investors" above, various kinds of investors seek different levels of control or voting rights in a project company. Many strategic investors expect to play an active role in the project company and typically seek multiple seats on the Board of Directors. In some cases, strategic investors may even seek the right to appoint certain members of the management team (such as a Director of Finance). Most significant, minority investors (excluding IFIs)[7] will also seek specific veto rights over major decisions — e.g., a sale or merger of the company, capital expenditures over a certain amount, etc. — and possibly a seat on the project company's Board of Directors, even if they are generally passive in terms of the day-to-day management. Virtually all investors, including IFIs, will at least seek to limit significant deviations to the project company's business plan and will expect regular reporting (see below). It is important to note that in some countries, statutory protections are provided to minority shareholders, regardless of whether such protections are written into the shareholders' agreement. In any case, shareholder agreements can also provide remedies to shareholders so that one minority shareholder cannot prevent necessary actions or decisions indefinitely.

Reporting

Project companies can expect to be required to provide investors with audited financial statements on an annual basis. In addition, the company will provide investors with management-prepared financial statements on a monthly (or in some cases on a quarterly) basis, which should be prepared in accordance the same standards used in the annual audits. Strategic investors, and Boards of Directors more generally, will require a more extensive disclosure of project activities.

Pre-negotiated exit mechanisms

Pre-negotiated share transfer mechanisms, such as put or call options, are usually written into the shareholders' agreement. While some outside investors may require put options associated with their shares (see previous section), project sponsors might counter by proposing a call option — the right to purchase shares at a pre-defined price within a pre-defined period of time — on the same shares. Call options operate essentially as the inverse of a put; most notably, where the share price for a put is normally exercisable at a discount to fair market value, the share price of a call is typically exercised at a premium to fair market value (for inverse but comparable reasons).

Nonetheless, call options can be quite valuable when associated with projects that are performing well or achieve a premium valuation through a purchase offer or IPO. For this reason, they are often difficult to obtain from investors.

Contingent equity

One area of significant value — or contention — related to an outside investor is contingent equity, particularly where a project is being financed with limited-recourse debt. Project lenders may require that contingent equity be available to help meet cost overruns or other project issues, and shareholders might be required to provide several (or perhaps even joint and several) guarantees or contingent equity to support this. Depending upon the type of investor, it may be possible to lay off a disproportionate share of this contingent obligation on an outside investor at an effective cost that is lower than the commensurate value of ensuring an ample supply of senior debt. Conversely, contingent equity or guarantees are complicated for investors such as private equity funds that are working with a finite pool of capital, all of which is expected to be employed productively in generating target returns. A private equity fund that commits but does not actually disburse investment capital usually still needs to achieve its target rate of return, even if there is a relatively low probability of the commitment actually being drawn. In short, contingent equity is a potential problem but also a potential opportunity for project sponsors that is heavily dependent upon context and successful negotiation.

Management contracts and options

Apart from negotiating a favorable initial valuation, perhaps the most effective means of maximizing the value of an investment from an outside investor for a project sponsor/developer is to establish a lucrative management contract for the benefit of such a sponsor/developer. Under such a contract, the sponsor/developer could secure its role in the active day-to-day management of the project on an ongoing basis and thus be entitled to a fixed periodic management fee. Such a contract could also entail cash or stock bonuses for strong project performance. Taken to the extreme, this type of agreement might even include a "management earnback" that enables the lead sponsor to recover some of the ownership initially yielded to the investor in exchange for surpassing budgeted or projected financial results. In this sense, the sponsor may be able to improve upon the initial valuation negotiated at financial closing by demonstrating with historical financial results that its DCF model assumptions were, in fact, more realistic than the outside investor had initially allowed. This approach may be more effective than endless negotiations that sometimes arise from discussions of valuation and differences of opinion with regard to project risk and operating assumptions.

Process and Approach

How to find equity investors

While most sources of senior debt financing for hydropower projects have been in the business for a long time and are well known, the equity market is much more fragmented and variable. Of course, most people engaged in the industry know the large utilities, IPPs, suppliers, and IFIs (in this sense, these categories of investor are similar to the lenders), but a growing percentage of equity available for hydropower projects is under the control of small fund managers that are unknown to many industry veterans.

So what is the best way to find investors who are likely to be interested in a particular project? Just

like making any new professional contact, it is usually best to be introduced to a potential investor by someone who already knows both you and the investor. Unless you are already a large, well-known project sponsor or developer with a global track record of success, this is usually the best way to ensure that your project proposal will be seriously considered. Examples of people in your network that may know potential investors include lenders, suppliers, consultants and advisors, and equity investors that are not a potential fit for your project (as fund managers often know many of their peers who are engaged in industry segments and/or geographic regions apart from their own).

To augment this list of potential investors, it may also be helpful to review recent press to identify who has been investing in hydropower or other energy projects in or around your particular country. These investors have already completed extensive due diligence on the local market and are much more likely to be willing to spend time reviewing a similar or related project proposal. At the very least, they will view it as an opportunity to learn more about the local market in which they have already invested (in this regard, due care should be taken with respect to confidential or competitive information).

Conferences and industry events can also be a good way to meet potential investors. In addition to hydropower industry conferences (such as HydroVision), associations such as the Emerging Markets Private Equity Association (EMPEA) or the Latin American Venture Capital Association (LAVCA) hold regular events to promote networking between investors and industry executives. In this regard, it is worth remembering that potential investors are usually also actively looking for good projects, and some of the larger investor groups have people dedicated to finding new investment opportunities on a full-time basis.

In any case, it is still a good idea to be introduced by a partner, supplier, or advisor who knows the potential investor as this will help accelerate an attitude of trust between the parties. Trust is not only crucial to success in raising equity, but it will also be helpful at later stages of the relationship as well. If you identify a prospective investor for your project, it may be worthwhile to see if anyone in your business network knows (or knows someone who knows) that investor.

Approaching potential investors

As discussed in the early part of this chapter, most potential investors have limited staff resources to review new opportunities and a large number of opportunities to consider. As a result, it is critical to secure an investor's attention surely and quickly with a well-articulated and tailored description of the proposed project. While developers should feel free to highlight the strengths and competitive advantages of their particular project, the initial description should be sure to cover key points such as exit strategy, potential return on investment, and the status of development (i.e., studies completed, permitting, funds invested to date, etc.).

The most commonly used vehicle for this initial project pitch is an executive summary of not more than two to three pages. While a document of this length necessarily omits most of the detail, it is enough for an investor to decide whether or not he/she wants to learn more. It may also trigger a few questions, which are extremely valuable to the project developer as it is often a clear indicator of what is most important to the investor. These indicators can be used to tailor project information memoranda and other follow-up materials to ensure that the investor's interests are properly highlighted and addressed.

Project summaries should only be sent after a prospective investor has indicated an interest in receiving it. A good time to do this would be after a brief initial conversation with the investor

(either on the telephone or in person) since any initial questions from the investor can be used to tailor the executive summary before it is sent. In many cases, it is better to have a third party (e.g., the supplier or advisor who introduced you to the investor) have this initial discussion and send the follow-up summary on your behalf. Under this approach, you will have already secured the investor's attention and have a clear sense of its priorities before your first conversation.

A full project information memorandum and financial model should be available for submission shortly after sending an executive summary. If a potential investor expresses interest, momentum in the investor discussion and review can thus be preserved. It is important to note, however, that this information should not be submitted to potential investors unless and until it is requested, and in general, this metered approach to providing information should be maintained. Some project developers who are anxious to secure financing and meet project timelines may be tempted to try to accelerate the investment review process by burying the potential investor in information, but this often has zero (or occasionally even a negative) result.

On a final note, financial investors tend to be minority co-investors, meaning that they are best approached after a large portion of the equity for the proposed project has already been identified. If you are seeking a large amount of equity that may require multiple outside investors, it probably makes more sense to secure a "lead" investor first, which will make finding co-investment equity that much easier. In fact, it is common practice for investors who enter a transaction at a later stage to "piggy-back" on the due diligence that has been done by those who started earlier.

The investment review process

One of the more refreshing elements of raising equity (as compared to debt financing) is the relative speed and efficiency with which most private-sector investors make investment decisions. While the basic milestones are similar to the debt financing process, the time required to achieve them and the documentation associated with each is generally significantly less.

1) *Initial Screening.* Screening is not a highly formal process for most investors and is usually decided by a small group of managers. It typically follows an initial review of comprehensive information and an assessment of the project's fit with the investor's overall strategy. The review is highly strategic in nature, focusing on items such as general risk/return and exit strategy. The details, while not ignored, are usually left untested at this stage, though the investor may consult outside third parties on an informal and anonymous basis for proof of concept purposes. If the answer is affirmative, initial screening is usually completed rapidly and ends with the issuance of a letter of intent or other document that outlines the key terms and conditions of an investment (in other words, a term sheet). If the answer is negative, this is also normally achieved rapidly, but in some cases may be evidenced by a lack of an end to the screening process rather than an outright "no."

2) *Term Sheet Negotiation.* While the term sheet is usually non-binding on most issues, it is often also detailed and well-defined. Because many deals break down over terms such as valuation or control, most equity investors prefer to reach agreement on key terms and conditions before spending extensive amounts of time reviewing project details. This is particularly important for private investors because they tend not to charge upfront project appraisal or review fees (though term sheets often include breakage fees that are paid by the project sponsor to the investor if they investor decides to move forward but the project sponsor does not). In addition to

valuation and control, term sheets also articulate conditions precedent to disbursement, which will include full due diligence and a detailed review of assumptions to the financial model.

3) *Investor Due Diligence.* Once the term sheet has been agreed, the investor will undertake due diligence on its own or with the support of outside consultants (which is usually paid by the investor itself rather than charged to the project) in order to confirm all material facts that have been provided concerning the project. In most cases, this will be the investor's first real look at the specific project details and assumptions. As a result, this is also where term sheets are sometimes re-traded if a developer has "oversold" certain project assumptions. (Such "overselling" can also undermine the trust relationship between the parties that causes the deal to fall apart entirely.) In any case, equity due diligence can normally completed within a period of 60 days or less,[8] unless delays result from performance required by project third parties.

4) *Documentation.* The main document normally used in an equity transaction is a shareholders' agreement, though ancillary documents such as side letter agreements may be created to cover issues not appropriate for a shareholders' agreement. Depending on the nature of the deal reached with the investor, management contracts and/or stock option agreements may also be drafted and negotiated at this stage. Documentation is normally prepared by outside legal counsel, the cost of which is borne by the project company.

Notes:

[1]This fund did not operate in the hydropower sector specifically, but in our experience similar patterns exist in the equity investment environment across virtually all industries.

[2]Obviously, this does not apply to pure captive or "inside-the-fence" projects. In addition, there have been many cases where a key equipment or technology supplier also successfully served as the majority project owner/operator. Such an integrated approach can complicate risk analysis for lenders and raises governance issues for equity co-investors, but it can also have important benefits (such as reducing perceived construction risk).

[3]Although some project sponsors invest a portion of their own capital as subordinated debt for some of the same reasons that such an instrument is appealing to third-party investors.

[4]As of the time of printing, India might be considered an example of such a market.

[5]For example, a $100 million project that is financed on a 70/30 basis with a ten-year repayment period on principal (with equal principal payments) will have repaid approximately $50 million of senior debt after seven years of operation.

[6]For example, if an investor insists on a put at a fixed price back to the project sponsor and seeks some kind of recourse or guarantee from the project sponsor to support this put, the put — and the investment in general — begins to look more like a full-recourse loan than an equity investment.

[7]IFIs typically hold less than 20% and seek Board meeting visitation rights but not an actual seat on the Board of Directors.

[8]In the case of IFIs, this may be longer due to the additional policy review that must be accomplished

Chapter 7

Case Studies

Chapter 7

Case Studies

This Chapter provides case studies of five hydroelectric projects. Except for the Magat project in the Philippines, the other projects were described in a January 2006 report, "The Financing of Water Infrastructure: A Review of Case Studies," by Chris Head.

- Allain-Duhangan Hydropower, 192 MW, India
- Nam Theun 2 Hydropower, 1,070 MW, Lao PDR
- San Roque Multipurpose, 345 MW, Philippines
- Theun Hinboun Hydropower, 210 MW, Lao PDR
- Magat Hydropower Project, 360 MW, Philippines

Case Study 1
Allain-Duhangan Hydropower Project, India

Nature

Under a concession granted by State Government of Himachal Pradesh, the Malana Power Company Ltd (MPCL) will develop, own, and operate a 192-MW run-or-river hydro project on a merchant plant basis.

Background

The Government of India has been reforming the power sector to encourage more private participation, with the hope of increasing the amount of hydropower in the generating mix. To date, the results have been patchy except at the smaller end of the spectrum, but the 192-MW Allain Hydro Project is an encouraging sign that developers of small private hydro schemes are now moving to larger projects.

The Sponsor MPCL is a joint venture between a local industrial group with diversified interests in a number of industries (turnover US$400 million per year) and international hydropower investor Statkraft Norfund Power (SNP). The local company has already successfully developed two other privately owned hydropower projects of 13.5 MW and 86 MW respectively, the second in conjunction with SNP.

Chronology

The original MOU for the private development of the project was signed with the State Government in 1993. The project was not competitively bid, as at the time the policy was to solicit independent power producers through the MOU route.

In 2001, the original MOU was converted into an Implementation Agreement. The project received clearance from the Central Electricity Authority in August 2002.

Scope of Works

The scope of the works consist of:

- 2 diversion weirs, on the Alain and Duhangan streams;
- 9 kilometers of headrace and tailrace tunnel;
- Underground powerhouse (192 MW)
- 185 kilometers of 220-kV transmission line

Structure

Financing model: BOOT (40-year concession with an option to extend for another 20 years).

A special purpose company, AD Hydro Power Ltd (ADHPL), has been established by MPCL to finance, build, own, and operate the project. Under what is now a standardized arrangement, the State Government will receive free energy in lieu of royalties — 12 percent of the deliverable energy for the first 12 years, and 18 percent for the next 28 years.

The project company will be majority owned by MPLC, with the only other shareholder being the International Finance Corporation, which will take an equity state of up to 10 percent as well as providing commercial debt.

Power Sales

The project is unusual in that it is being developed on a merchant basis without a long-term Power Purchase Agreement. The Company intends to sell the output mainly to privatized distribution companies and to State Electricity Boards (SEBs) through the Power Trading Corporation (PTC) under short-term Power Purchase Agreements. PTC is a power trading company, founded by the Government of India with shareholdings by Government-owned power utilities and some Indian private power companies. Since its foundation, it has made a public offering of shares such that the Government-owned shareholdings are now in a minority.

Although the SEBs are financially weak, PTC is regarded as being credit-worthy. There is an overall power shortage in the northern region with the marginal cost above that at which the project is expected to generate.

In the event of unfavorable market conditions, the project would be able to sell part of its available power (about 40 percent) to an affiliated company. In the longer term, it is anticipated that — with the freeing up of the power market — ADHPL will be able to sell power direct to other large industrial consumers.

Financing

The total investment cost is US$191 million. This figure includes a contingency of US$19 million, equivalent to about 15 percent of the "hard" construction cost.

The project is to be funded through a combination of 60 percent senior debt, 5 percent subordinated debt, and 35 percent equity. The subordinated debt facility is provided by the Sponsors to cover cost overruns and delays. This gives an effective debt-equity ratio of 60/40.

Senior debt financing is being provided by IFC ($40 million equivalent) and by local commercial banks ($75 million equivalent). The IFC loan is denominated in local currency and has a tenor of ten years from the start of commercial operation.

At least 90 percent of the equity financing is to be provided by MPCL and the remainder by IFC (up to US$7 million equivalent). The return on equity is estimated to be 15 percent.

Security

Financing is not dependent on external guarantees, because the project is considered to be robust enough to survive on its own merits and the Government of India commitment to the power sector.

The relatively low equity/debt gearing (35/65) reduced the amount of debt needed and increased lender confidence. This was further enhanced by the fact that the Sponsor will provide an additional 5 percent (US$10 million) of subordinated debt. The present value of the royalty and tax payments to be made over the lifetime of the project to the state and federal governments are US$31 million and US$10 million respectively.

Case Study 2
Nam Theun 2 Hydropower Project, Laos

Implementation

The contract arrangements for construction are complex. In addition to being the Lead Sponsor, EDF is also the Head Contractor, with overall turnkey responsibility for delivering the project. The contract is fixed price with the exception of certain geological risks.

The actual construction is carried out by five subcontractors, also on a turnkey basis. Four of the five contracts were competitively bid, and fifth was benchmarked against the others. In order to satisfy transparency arrangements, the cost of the five sub-contracts passed directly through to the owner.

Financing

The total investment cost, including contingencies of $200 million, is $1.45 billion. The project is financed on a debt-equity ratio of 72/28.

International debt totaling some $350 million has been raised from the ECAs and through using public guarantees for political risk from the multilateral banks. The bulk of the remaining debt is Thai commercial bank lending ($500 million) which is uncovered for both Thai and Lao political risks.

Government equity to the sum of $87 million has been sourced through a mix of concessionary grants and loans from IDA, EIB, ADB, and French aid. The money is made available to the Treasury on soft terms and on-lent to the Lao Holding State Enterprise at commercial rates, thus creating a mark-up for the Government.

About 85 percent of the total cost has been funded from the private sector, a key feature being the use of a relatively small amount of public money to mobilize over $1,000 million of private financing.

Security

EGAT is obliged to purchase power from the project up to the contracted amount (5,636 gigawatt-hours per year) at an agreed tariff on a take-or-pay basis for the duration of the 25-year operating concession. By doing so, it assumes the market risk. The hydrological risk is shared between EGAT and NTPC.

Under a similar agreement, the Lao power utility, EdL, undertakes to buy 200 gigawatt-hours per year at an agreed tariff on a take-or-pay basis.

Construction risk is taken by the Head Contractor, who in turn has passed on a substantial portion to the five subcontractors under fixed price contracts with heavy penalties for late delivery.

Thai political risk associated with the offtake agreement is borne by the Thai Baht commercial lenders, while the international debt is backed by various MDBs and ECAs.

Government obligations under the Concession Agreement are being backed by the World Bank and ADB.

An IDA Partial Risk Guarantee covers a $42 million tranche of debt provided by international dollar lenders, extending the maturity to 16.5 years. The guarantee covers only Lao Sovereign risk and not Thai Sovereign risk as EGAT is considered to have an adequate credit rating on it own.

Case Study 3
San Roque Multipurpose Project, Philippines

Nature

This large storage project adds 345 MW (1,030 gigawatt-hours per year) of peaking power to the Luzon grid, as well as providing water for the irrigation of some 80,000 ha. Secondary benefits include the reduction of floods and the improvement of water quality downstream.

Under the concession, the project is effectively divided geographically into public and private parts, which are treated as separate projects for financing purposes. Overall management of the project is in the hands of the private company that owns and operates the power complex.

Background

The project is the third in a series of proposed dams being built under the Agno River Basin Development Plan, proposed by the Philippines Government from the 1960s onwards as a means of bringing economic development into the region and mitigating a number of adverse environmental trends.

Detailed project studies commenced in 1974 and continued intermittently until the early 1980s, when an attempt was made to develop the project in the public sector failed through lack of financing.

An unsolicited BOOT proposal was made in 1994, but not pursued. In 1996, the national power utility NAPOCOR solicited bids from private firms on the basis of a split project, in which the public sector would own and finance the water storage works. Six consortia were pre-qualified but only one bid was submitted, which was successfully negotiated and signed in October 1997.

The project started in 1998 and, after some delays caused by local protestors, was eventually commissioned in 2003.

Scope of Works

The scope of works comprise:

- 200-meter-high embankment dam and ancillary structures
- Irrigation headworks
- Power intake, tunnels, and underground powerhouse
- 3 x 115 MW power station, transformers, switchyard
- 10 kilometers of 230-kV transmission line

The total cost of construction was $792 million.

Structure

A special purpose project company, the San Roque Power Corporation (SRPC), was formed to undertake the overall management of construction, and to develop the power complex on the basis of a BOOT arrangement. The shareholders in the company were Sithe Energy of the USA and Marubeni of Japan. There was no public sector holding.

The dam, spillway, and related facilities that comprise the non-power elements of the project were developed as a public project and financed by the public sector.

The downstream irrigation component not directly included in the scope of the project was financed and implemented by National Irrigation Administration, who was responsible for the re-regulating pond, the supply canal, and lateral canals.

Financing

The total cost of the project was $1.2 billion, of which the private BOOT element accounted for approximately half ($580 million).

The private sector element was financed under a 75/25 debt-equity ratio, with the debt being a mixture of Japanese export credits and Japanese ten-year commercial loans backed by JEXIM guarantees (for the NAPOCOR payment obligations), which extended the loans to 15 years.

The public sector element was partially financed by a $400 million untied, low-interest loan from JEXIM to the Government, which was on-lent to NAPOCOR at commercial rates. The loan was raised on behalf of a number of government agencies that are perceived to be non-power beneficiaries of the scheme.

Financing of the downstream irrigation developments was provided by Japanese concessionary OECF financing, under a soft loan arrangement.

Tariff

NAPOCOR is obliged to buy all power generated by the project on a take-or-pay basis for the full 25-year concession. The two-part tariff consists of a Capital Recovery Fee denominated in US$ and Yen, and an Operating Fee denominated in local currency.

There is no payment for water as this is derived from the public part of the scheme.

Security

NAPOCOR'S payment obligation is backed by a Sovereign Guarantee.

The utility shares part of the hydrological risk through a minimum payment provision.

SRPC managed the construction of both the public and private portions. The construction risk for the power complex was passed on to the EPC contractor (Raytheon of the USA) under a direct contract with SRPC.

The construction risk for the public portion was ultimately carried by the public sector through an arrangement that allowed for an adjustment of the Capital Recovery Fee in the event of a cost overrun.

Case Study 4
Theun Hinboun Hydropower Project, Laos

Nature

Independent 210-MW run-of-river power project developed under BOOT arrangements for the bulk export of electrical energy to Thailand.

The project was the first IPP resulting from an MOU signed in 1993 between the governments of Laos and Thailand, under which 1,500 MW of Laotian hydropower was to be exported to the Thai power utility EGAT (Electricity Generating Authority of Thailand).

Background

The Lao Peoples Democratic Republic has large hydropower resources and relatively little domestic demand due to its small population and relatively low level of economic activity. There is little opportunity for export industries other than hydropower and some limited mining.

The neighboring countries — Thailand to the west and Vietnam to the east — both have a rapidly growing demand for electrical energy. Thailand, in particular, has few domestic resources and a system heavily dependent on thermal power.

Against this background, the two governments entered into an understanding to foster the export of Lao hydropower to Thailand, using privately owned independent power producers to develop and operate the schemes.

Chronology

The original proponents of the project were Nordic Power Company (NPC), a joint venture company owned by public power utilities in Norway (Statkraft) and Sweden (Vattenfall), together with local company MDX of Thailand. (Vattenfall subsequently sold out its interests in the project to Statkraft; MDX Lao is a wholly owned subsidiary of GMX Power, one of Thailand's leading IPP developers.)

In 1994, the principal project agreements were signed between the Sponsors and the Government. At about the same time, the Sponsors initialed power purchase agreements with EGAT, and with EDL, the Lao power utility, which was to take a small proportion of the output.

Construction started in late 1995, although financing was not finalized until October 1996. Commercial operation commenced in March 1998.

In 2002, after five years of profitable operation, the Owners refinanced the project.

Scope of Works

The project comprises:

- a low diversion dam on the Theun River, downstream of the Nam Theun 2 project currently under construction.
- 10 kilometers of waterway, of which about half is tunnel, leading from the Theun River to the Hinboun River.
- Surface powerhouse (2 x 105 MW) operating under a notional head of 228 meters.
- Switchyard and 100 kilometers of 230-kV transmission line leading to a metering station on the Thai border.

The cost of construction was about US$240 million.

Structure

Financing model: BOOT (30 years from COD, with an option to extend for another ten years thereafter).

The Theun-Hinboun Power Company (THPC) was established to finance build, own, and operate the project for the concession period. The Lao Government has a majority holding through its utility, EDL.

- 20% Nordic Hydropower (Lead Sponsor)
- 20% MDX Lao
- 60% Electricité de Lao (EDL)

Implementation

Construction was arranged along traditional lines, using six separate civil and electromechanical contracts that were competitively bid and coordinated by THPC. External consultants were engaged for design and construction supervision under a separate contract.

By adopting this arrangement, the owner adopted an approach that theoretically left him more exposed to interface risk, but he retained more control over the design and construction — and the project came in ahead of schedule and under budget.

Original Financing

Total investment cost: US$300 million. The project was originally intended to be financed on a debt-equity ratio of 75/35, but due to the invention of the Asian currency crisis this eventually became 55/45.

Under the original plan, the debt was a blend of US$ denominated loans (from Nordic ECAs and multilateral banks) and Thai Baht provided by a syndicate of Thai commercial banks. The debt was arranged to mirror the currency profile of the PPA tariff, which was 50 percent US$ and 50 percent Baht.

The equity portion held by EDL was financed through soft loan from ADB ($58 million) and Nordic aid agencies ($14 million) to the Government, which was then on-lent to EDL at commercial rates.

Refinancing

The floatation of the Baht in July 1997 had a major effect on the project. A liquidity crisis impaired the Thai banks' ability to meet drawdown requests, and, as a result, more than 40 percent of the Baht facility was lost. The deficit had to be made up by US$ denominated funds, which reduced the Baht facility to less than 30 percent of the debt.

In 2002, THPC undertook a financial restructuring with the object of rebalancing the debt currency mix to match the revenue; to reduce borrowing costs and raise capital. THPC signed facilities valued at $152 million, mainly in Baht funds provide by Thai commercial banks.

The new funds were used to replace more expensive commercial loans, and to execute a capital reduction to a 70/30 debt to equity ratio, which raised the equivalent to half the original equity ($55 million). The capital reduction has resulted in the shareholders recovering their original investment within four years of commercial operation.

Case Study 5
Magat Hydropower Project, Philippines

Nature

The Magat Power plant has been in operation since 1984 and is built downstream the Magat dam. The installation of Magat consists of four Francis units of 90 MW each at rated head 81 meters, as well as providing water for the irrigation. Usable storage capacity is 933 MCM or the equivalent of about two months of production. The Magat plant is expected to generate approximately 920 gigawatt-hours in an average year.

The Magat Plant is designed as a peaking plant. The plant also provides auxiliary services such as load following and frequency regulation.

Background

The Seller was Power Sector Assets & Liabilities Management Corporation (PSALM), which is a special-purpose public organization. PSALM's purpose is to privatize most of the generating assets of the National Power Corporation (NPC). The legal basis for the privatization is the Electric Power Industry Reform Act of 2001 (EPIRA).

The partnership SN Aboitiz between the Aboitiz Group and SN Power was declared winning bidder in January 2007 with a price of US$530 million.. SN Aboitiz took over the plant April 25, 2007. The bidding process was transparent, and two eligible bidders bid in December 2006 (First Gen and SN Aboitiz).

The dam and reservoir not part of the purchased asset, as irrigation of farmland is the main purpose of the dam.

The transaction came with no long-term offtake agreements and the company is based on sale through a wholesale spot market (WESM).

On November 28, SN Aboitiz Power placed another successful bid of US$325 million on the 100-MW Binga and the 75-MW Ambuklao plants. This is a rehabilitation project and takeover was expected in June 2008.

Due diligence process

The due diligence was based on following.

- Legal review of permits and local law
  - Puno & Puno
- Environmental review of plant and social issues
  - GHD global engineering company with local presence
- Technical review
  - Internal resources and Norconsult International
- Market analysis / modeling and price forecast
  - Statkraft and local expertise
  - Taste and SHOP (proprietary software to forecast production and price)

Financing
Stage I

PSLAM offered a Deferred Payment of 60 percent over seven years at 12 percent interest. The bid was based on this financing.

Aboitiz provided a corporate bridge loan to SN Aboitiz while SN Power made use of the PSALM offer.

Stage II

The process for refinancing, which closed in October 2007, was as follows: The sponsors invited local and international banks to bid for a role as lenders in a "club deal." Sponsors defined the most important terms and conditions in an RFP. They made no use of financial advisers. The banks committed to the conditions and competed on the terms. It took four months from mandate to closing of the transaction.

Lenders:

USD - 15 years - Floating LIBOR 6 months + spread

- IFC for US$105 million
- NIB for US$47 million

PHP - 10 years reference rate + spread – heavily back-ended

- Total of US$228 million in PHP
- Group of local banks lead by HSBC and BDO

Characteristics for refinancing:

- 40% USD / 60% PHP
  Natural hedge of currency exposure
- 30% floating / 70% fixed rate
  PHP tranche fixed rate
- Interest rate swap for 25% of USD tranche with HSBC

Security

Forward electricity prices – hedging program

SN Aboitiz objective is to stabilize income generation and the value of water. This is done through physical transactions in the spot as well as the bilateral market. Hedging agreements and back-up supply agreements are used extensively. The transactions are based on targeted minimum average price, short limit, and a purchase volume cap.

The security is based on a merchant risk (SN Aboitiz sells most of its production in the spot market). No PRI or Shareholder guarantees are issued.

A debt service coverage ratio focus on cash flow.

Abbreviations and Acronyms

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ADB . . . . . Asian Development Bank
AfDB. . . . . African Development Bank
AKFED. . . . . Aga Khan Fund for Economic Development
BNDES. . . . . Brazilian Development Bank
BOOT . . . . . Build Operate Own and Transfer
BOT. . . . . Build Operate and Transfer
CALPERS. . . . . California Public Employees' Retirement System
CDM . . . . . Clean Development Mechanism
CER. . . . . Certified Emission Reductions
CIDA. . . . . Canadian International Development Agency
COFACE. . . . . Compagnie Française d'Assurance pour le Commerce Extérieur
CSFB . . . . . Credit Suisse First Boston
DBSA . . . . . Development Bank of Southern Africa
DCF. . . . . Discounted Cash Flow
DEG . . . . . German Investment and Development Company
DSCR . . . . . Debt Service Cover Ratio
E&M . . . . . Electro - Mechanical
EAIF . . . . . Emerging Africa Infrastructure Fund
EBITDA . . . . . Earnings Before Interest, Tax, Depreciation, and Amortization
EBRD . . . . . European Bank for Reconstruction and Development
ECA. . . . . Export Credit Agencies
ECGD. . . . . Export Credits Guarantee Department (UK)
EIB . . . . . European Investment Bank
EMP . . . . . Energy Management Program
EMPEA. . . . . Emerging Markets Private Equity Association
EPC. . . . . Engineering, Procurement, and Construction
EPFI . . . . . Equator Principles Financial Institutions
ERU. . . . . Emissions Reduction Unit
ESIA . . . . . Environmental and Social Impact Assessment
FMO . . . . . Netherlands Development Finance Company
GEF. . . . . Global Environment Fund
GHG . . . . . Greenhouse Gas
GTZ . . . . . German Society for Technical Cooperation
IADB. . . . . Inter-American Development Bank
IBRD. . . . . International Bank for Reconstruction and Development
ICOLD . . . . . International Commission on Large Dams
IFC . . . . . International Finance Corporation
IFI . . . . . International Finance Institutions

IHA . . . . . International Hydropower Association
IPO . . . . . Initial Public Offering
IPP. . . . . Independent Power Producers
IRR . . . . . Internal Rate of Return
JBIC. . . . . Japan Bank for International Cooperation
JEXIM . . . . . Japan Export Import Bank
JI . . . . . Joint Implementation
JICA. . . . . Japan International Cooperation Agency
KfW. . . . . Kreditanstalt für Wiederaufbau
MDB . . . . . Multilateral Development Bank
MIGA . . . . . Multilateral Investment Guarantee Agency
MITI . . . . . Ministry of International Trade and Industry (Japan, now METI)
NGO . . . . . Non Government Organization
NIB . . . . . Nordic Investment Bank
OECD . . . . . Organization for Economic and Co-operation Development
OECF . . . . . Overseas Economic Cooperation Fund (Japan)
OPIC . . . . . Overseas Private Investment Corporation
PPA . . . . . Power Purchase Agreement
PPIB . . . . . Private Power and Infrastructure Board (Pakistan)
PPP . . . . . Public-Private Partnership
PRG. . . . . Partial Risk Guarantee
PTC . . . . . Power Trading Corporation (India)
RBS . . . . . Royal Bank of Scotland
ROC. . . . . Return on Capital
ROI . . . . . Return on Investment
SIDA . . . . . Swedish International Development Agency
SPC . . . . . Special Purpose Company
UNFCCC . . . . . United Nations Framework Convention on Climate Change
USAID . . . . . United States Agency for International Development
VAT . . . . . Value Added Tax
WAPDA . . . . . Water And Power Development Authority (Pakistan)
WCD . . . . . World Commission on Dams