

The World Bank

The Financing of Water Infrastructure
A Review of Case Studies

by
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Preface

This report was commissioned with the intention of producing a document that would provide guidance for those concerned with the challenging task of financing new water infrastructure. The content has been based upon Case Studies of the financing arrangements for actual projects, from which it will hopefully be possible to draw generic lessons that might be applied to other projects in the future.

A number of messages emerge and these are described in the final chapter. But long before reaching this point, the reader will have realised that successful financing of such projects is a multi-faceted exercise, shaped by a number of sometimes divergent influences. Above all, at a time when there is likely to be much more private involvement in the future, there is the over-arching need to reconcile the expectations of the public sector with the very real constraints under which the private sector has to operate.

This is not a business in which there are clear boundaries and rigid models. In the interest of getting some structure into the report it has been necessary to generalise - and when one does so there will always be the exception to the rule. Also, it has been necessary to assume an audience drawn from a wide background, which means that in some cases the reader may feel that the report contains statements and definitions with which he or she is already more than familiar. I apologise if either of these potential shortcomings causes any irritation.

The information given here on the individual projects that form the basis of the Case Studies has been gathered from a number of sources. In some cases it has been easy to obtain authoritative documents, but in others it has been necessary to resort to a number of different sources that are not always consistent in the information they give. While the data given is to the best of my knowledge correct, it is obviously not possible to accept responsibility for its complete accuracy and it should not be interpreted as being a definitive statement on which other actions relating to the named projects can be based.

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Abbreviations

ADB	Asian Development Bank
BOOT	Build-Own-Operate-Transfer
BTO	Build-Transfer-Operate
CDC	Commonwealth Development Corporation of UK (now CDC Capital)
EBRD	European Bank for Reconstruction and Development
ECA	Export Credit Agency
EPC	Engineering, Procurement, and Construction (Turnkey)
IBRD	International Bank for Reconstruction and Development (IBRD)*
IDA	International Development Association*
IFC	International Finance Corporation*
IHA	International Hydropower Association
IPP	Independent Power Producer
IUCN	The World Conservation Union
JEXIM	Export-Import Bank of Japan (now JBIC)
KfW	Kreditanstalt für Wiederaufbau of Germany (now KfW Förderbank)
MDB	Multilateral Development Bank
MIGA	Multilateral Investment Guarantee Agency*
MOU	Memorandum of Understanding
NGO	Non Governmental Organization
O&M	Operation and Maintenance
OBA	Output Based Aid
ODA	Official Development Assistance
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
ROM	Rehabilitate-Operate-Maintain

* Member of the World Bank Group

EXECUTIVE SUMMARY

Introduction

1. Throughout the world water resources are coming under serious pressure. In some cases the pressure is so severe that it can become a source of political tension between countries, and between regions within countries. It is nothing new to have disputes over water resources, but in the future they are likely to become more widespread and more intense as the global community struggles to meet ever increasing demands on an essential but strictly finite resource – fresh water.
2. Although public and industrial water supplies are the most visible demands on our water resources, in most countries they represent only a small proportion of total consumption. Irrigation now accounts for nearly three-quarters of global water consumption, and it produces 40% of all agricultural production... These percentages will inevitably rise in future as the world is required to sustain an ever increasing population. Hydropower is another very important water user, which supplies about one-fifth of the world's electricity and 93% of its current renewable energy production. Most of the planet's vast untapped hydropower potential lies in the developing world.
3. Apart from these more obvious demands on water resources, there is a pressing need to manage river systems for ecological and other purposes. The means mitigating floods as population pressures lead to more settlement in the flood plains; and it means sustaining minimum flows for navigation and the dilution of effluent wastes. The situation is not static because in many river basins changing land-use practices – and, arguably, also long-term climatic change - are affecting the natural hydrology and tending to drive it into a more extreme mode. Water resources management is increasingly becoming a matter of balancing the often conflicting demands of different stakeholders; and in order to do this it is sometimes necessary to regulate natural river flows through the use of dams and water transfer works.
4. The objectives of sustaining food production and economic development, while at the same time protecting the environment, are not always in competition. They can sometimes be achieved through a single “multipurpose” project which might, for example, generate hydro-electricity and provide a secure supply of water for irrigation, while at the same time maintaining minimum down-stream flows for ecological and other purposes. Multipurpose water resources management can bring benefits to many sectors, but it often depends upon the construction of new infrastructure to ensure that the water is reliably available when required.
5. New water infrastructure project will inevitably be more closely scrutinised than they have been in the past. They will have to satisfy a wide range of acceptability criteria to ensure that they are socially, environmentally, and economically sustainable. But having passed these tests, they will still face what is probably the most serious challenge of all - the need to find the necessary financing for projects that are, by their nature, capital intensive and yet commercially fragile. This paper specifically addresses the financing issue.

The gap between economics and finance

6. In the past major works, such as dams and water transfer schemes, have traditionally been developed and financed by the public sector. However, the availability of public funds is reducing, and it is evident that in future private money will have to be mobilised for this purpose. This presents a serious challenge, because such projects often have weak financial returns and many of the benefits cannot readily be monetised. A project may be economically attractive and clearly the preferred option when seen from the long-term national perspective, but when considered as a commercial investment it might be unable to generate adequate financial returns to be of interest to a private investor. In short, there is often a gap between the economic necessity for such projects, and their ability to recoup the cost of their financing.

7. Economic viability should be the basis on which strategically important projects are selected and optimised, and filtered for environmental and social considerations. However it is their financial viability and risk profile that will ultimately determine how they might be financed. When the gap between economic and financial viability is too large, the position may sometimes be rectified by either:

- (i) Introducing public subsidies in one form or another to close the gap (probably by using concessionary finance); or
- (ii) Restructuring the project by separating out the financially viable elements and allowing these to be developed in the private sector.

In the event of neither of these being possible, it will have to be developed as a public project with the public sector bearing all the risks and taking responsibility for the financing. However, as the case studies reveal, even a public sector project can access private finance.

The importance of risk

8. Financial viability remains a fundamentally important consideration when contemplating the involvement of the private sector. However it is not the only factor that will determine “bankability” because the private investor will be strongly influenced by the perception of the risk associated with financing the project – and, ultimately, by the balance between risks and reward. Shareholders in the project company will be prepared to take some exposure to risk for the possibility of higher returns, but for the Lenders there is no prospect of sharing in the profits and their motivation is to protect their money. For this reason Lenders are highly risk averse and, as they typically provide between 60% and 80% of the total funding for a private project, their views of what is acceptable will usually prevail.

9. Water infrastructure projects are inherently risky. Construction costs and completion dates are uncertain; there is exposure to local currency devaluation if the financing is predominantly in hard currency; social and environmental issues can seriously disrupt projects if not properly handled; and there is always the prospect of government default or interference. Some of these risks can be mitigated by insurance or guarantees from the international financing institutions, but many cannot and they have to be apportioned between the host government, its utility, the concessionaire, and the contractors.

10. The allocation of risk between the parties - and especially between the public and private sectors - needs careful consideration. The assumption of risk always comes with a price tag, and the way in which it is allocated has cost implications for both the party assuming the exposure, and for the project as a whole. Governments often try to offload risks onto the private sector, without always understanding that in certain circumstances this can be detrimental to their own interests. Wherever possible risk should be allocated in a manner that reduces the overall cost to the project. Pooled risk, which is shared amongst a number of projects, can be borne relatively inexpensively, whereas it can be very costly to

make provision for the same risk if it is “ring fenced” within a single-project company as is normal under the BOOT model.

11. A project is considered to be bankable in the private sector if it is financially viable and sufficiently robust to survive a downside risk scenario without the financiers losing their money. If either of these requirements is not met, private finance will not be forthcoming and the project will have to be developed using public funding.

Project finance models

12. In future many infrastructure projects will be developed as Public-Private Partnerships. Although widely used, this generic term does not define any particular project structure, other than one in which the two sectors co-operate in one way or another in the financing, management, and/or the ownership of a project. There is no “one-size-fits-all” solution, and each financing model has to be structured to suit the specific circumstances. This is particularly the case for water infrastructure, where individual projects are highly site-specific and often involve a number of stakeholders.

13. Responsibility for determining the most appropriate project financing model rests with the Host Government which, amongst other things, will need to decide at an early stage of project preparation whether:

- the project is suitable for private sector participation;
- the physical assets should be in public or private ownership;
- there should be a public shareholding (in the event of using a private company); or
- private funding (in the event of it being a public project).

These key issues need to be addressed at an early stage, and certainly long before the solicitation of interest from prospective private partners.

14. Preparatory (pre-investment) studies are very important. Whatever the model, the Host Government and its agencies should take the primary role in:

- i) Technical and economic optimisation studies.
- ii) Environmental and social impact assessment and licensing.
- iii) Defining the project structure, financing, and procurement arrangements.

Careful analysis of these factors at an early stage reduces the overall risk and increases the prospects of a getting a meaningful response from the private sector. There is a strong consensus of opinion that this is not happening at present, and that one reason is the lack of adequate seed funding.

The case studies

15. The financing arrangements were studied for eight projects. They represented a broad spectrum of water infrastructure schemes, both in terms of their size and the prevailing economic environment. They ranged from a totally privately-owned project at one end of the spectrum, to a public sector project at the other end. Between these two extreme, the other projects were all structured under the auspices of a private company but with varying degrees of public participation, and in respect they are all Public-Private Partnerships. The table overleaf provides a brief overview.

Project	Purpose	Cost (\$)	Comment	Model
Allain-Duhangan, India	Hydro-power	191m	Medium-sized private project being developed by local and foreign sponsors on a merchant plant basis without a long-term sales agreement.	BOOT
Izmit, Turkey	Bulk water supply	960m	A major dam, 140 km of trunk and distribution pipelines, eventually implemented by a private company after the public sector had failed to finance it.	BOOT
Theun Hinboun, Laos	Hydro-power	270m	Early example of a private hydro project in a weak economy exporting power to a larger neighbour. Majority public holding. Recently been successfully refinanced	BOOT
Guerdane, Morocco	Irrigation	85m	Construction and operation of a new water supply to an existing irrigation scheme. Private concession awarded, but with large public sector subsidy to keep tariffs affordable.	BTO
San Roque, Philippines	Multi-purpose	1,200m	One of the few examples of a "Split Ownership", where the project is divided into public and private parts in order to facilitate financing. It allowed approximately half of the cost to be met by private funding.	BOOT/ Public
Nam Theun 2, Laos	Hydro-power	1,450m	One of the largest privately financed hydro projects to have reached financial closure. An export project involving a mix of commercial loans, guarantees, private equity, and concessionary funding.	BOOT
Pamir, Tajikistan	Hydro-power	26m	An example of a very small but socially essential infrastructure project developed in a very weak economic environment, using a mix of commercial and concessionary funding.	BTO
Lesotho Highlands, Africa	Multi-purpose	2,800m	A very large water bi-national water transfer project, with a small hydropower element. A good example of how essential public infrastructure can be financed from private sources.	Parastatal

16. The case studies illustrate a wide range of financing models. All of the models are different, but collectively they show the dependence that such projects have on public support in one form or another - in terms of either direct or indirect investment, loans or guarantees. Furthermore the case studies demonstrate that the distinction between private and public projects is becoming very blurred. For example, they show projects being developed under the auspices of private companies that have substantial public shareholdings, and conversely they include a large public project that relied heavily for its financing on private funding. It is therefore increasingly misleading to speak of "public" or "private" projects, because most fall in the grey area between.

17. Notwithstanding the above comment, seven out of the eight projects studied involved the project being undertaken under the auspices of a locally registered, special-purpose private company. The Lead Sponsor and majority shareholders were generally foreign, and on average foreign investors provided the greater portion of the equity, but in nearly all cases there was also a local shareholding. Public participation (by the Host Government or the utility) in the project companies ranged from zero to a majority holding of 60%; although the latter is unusually high and, where there is a public holding, it is typically in the range 15% to 25% of the total equity.

18. The lessons to be drawn from the Case Studies are summarised in Chapter 6, but the following are arguably the most significant:

- For private projects it is **essential to have a strong sponsor** who understands the business and has the financial resources and determination to persevere when the going gets difficult. Many of the projects took years to negotiate and the costs ran into some tens of millions of dollars. Several ran into cash flow and other problems during implementation, and were only able to continue through the financial strength of the sponsors. It is not clear where such sponsors will be found in the future as many international players have transferred their attentions to other markets.
- **The private sector can succeed where the public sector has failed.** Several of the projects (San Roque, Izmit, Pamir) had initially been attempted in the public sector but implementation had been halted through lack of adequate public funds or other problems. It is apparent that under certain circumstances private sector funding may be the only way of implementing a project.
- **Exchange rate fluctuations remain a particular concern.** The tariff will have to be structured to reflect the financing, which will often mean that it is either totally or partially in hard currency. As the offtaker's revenue stream is in local currency he carries the exposure. The solution is to use local currency financing wherever possible, although this tends to be very limited in many countries (and there is still a risk if the local banks default, as happened on Theun Hinboun).
- The projects were **typically financed on an equity/debt ratio of about 30/70**, although in the Case Studies the actual percentage of equity ranged from 15% to 40%. Lenders, who are typically commercial banks, will expect to see a relatively high proportion of equity for what they regard as the more risky projects. Most water infrastructure projects will require a minimum of 30% equity to be bankable.
- Debt was mainly provided by **international or regional commercial banks**. Much of the debt was in foreign currency, although the regional export projects (Nam Theun 2, Theun Hinboun and Lesotho Highlands) had a strong element of local financing raised on the strength of the offtake economy. In some cases **export credits** were an important source of debt financing, although the scope is limited for most water projects. However the Izmit scheme showed how a deliberate policy of sourcing materials from abroad can help financing through export credits.
- One case study (Theun Hinboun) demonstrated how **refinancing after a project is completed is beneficial** and can result in improved loan terms. Financiers are more comfortable with a project that has an operational record and an existing revenue stream. This point was also demonstrated when the Lesotho Highlands project financed the second phase development on more favourable terms, following the successful completion of the first phase.
- The **Multilateral Development Banks (MDBs) are also a valuable source of finance**, either through direct loans to the project company on commercial terms, or indirectly through the host government on concessionary terms. In some cases MDBs have taken minority shareholding in the project company (AD Hydro, Pamir) which assists financing and increases confidence on the part of other shareholders.

- In certain circumstances *loans from the MDBs have been made in local currencies* to avoid any party having to carry the risk of devaluation. This was the case for AD Hydro where IFC has made a commercial loan denominated in Rupees to the project company.
- The Pamir project demonstrates that it is possible to introduce *commercial disciplines in the most unpromising economic environment*. However it requires much support from the international financing institutions, and a benevolent sponsor – in this case an NGO. It may be difficult to replicate this for anything other than small projects.
- *A regional market (for power or water) can make an export project bankable*, where it would not be viable in the domestic situation alone. Projects developed in economically weak countries for export to stronger economies can attract both debt and equity finance from the offtaker country, as shown on Nam Theun 2 where Thai entities contributed nearly half of both the debt and the equity.

19. The report describes eight very different financing arrangements. This is not by any means a comprehensive list, and new projects will require their own carefully tailored arrangement, but the common elements show that:

- a) Support of the international financing agencies, and in particular the Multilateral Development Banks, is often crucial.
- b) Host governments have a proactive role to play in project preparation, by putting in place the enabling environment, and as a partner during the implementation.
- c) The confidence of the private sector has to be won by putting forward well structured and financially sound projects.

Finally, innovative financing using the full panoply of financing instruments available has to be tailored to the country concerned, and to the specific project, to ensure the maximum development gain.

Chapter 1: The Need for Water Infrastructure

“There is widespread agreement that the flow of funds for water infrastructure has to roughly double, with the increase to come from all source.”

Financing Water for All. Report of the World Panel 2003

“The importance of water development as a source of growth orientated sustainable poverty alleviation was highlighted in the 2002 World Summit on sustainable Development”

Water Resources Sector Strategy, World Bank

“Since the (water) infrastructure is a necessary element to support poverty alleviation and quality of life, the challenge is not to refrain from badly needed reservoirs but to find how negative impacts can best be managed.”

Water Front, Stockholm International Water Institute.

Chapter 1: THE NEED FOR WATER INFRASTRUCTURE

1 WATER RESOURCES AND SOCIO-ECONOMIC DEVELOPMENT

Throughout the world, water resources are coming under serious pressure. In some cases the pressure is so severe that it can become a source of political tension between countries, and between regions within countries. It is nothing new to have disputes over water resources, but in the future they are likely to become more widespread and more intense as the global community struggles to meet ever increasing demands on what is a strictly finite resource – fresh water.

At present 26 countries with an aggregate population of 230 million are classified as “water deficient”. A number of others face severe water shortages, particularly on a regional basis, that will increase dramatically over the next few decades. This already challenging situation is complicated by the fact that many of the world’s water resources cross international boundaries, and over 200 major rivers are shared by two or more countries.

The problem is particularly acute in the developing world, where rapid population growth and economic development are placing heavy demands on water resources for a variety of purposes. These include energy and food production, water supply, flood attenuation, and transportation – to name but a few of the often conflicting demands on our water resources. The situation is exacerbated by a rapid move towards urbanisation in the developing world, which creates concentrated points of demand and pollution that are often difficult to handle. Under these pressures water resource are being degraded in terms of both quantity and quality.

Both surface and groundwater resources are affected, but as groundwater is ultimately replenished from the surface the challenge is essentially one of how we manage our surface waters. There are a number of responses to this problem, including more efficient water use, but the ability to control the occurrence of water in both temporal and spatial terms lies at the heart of the process. In many situations it is no longer sufficient to trust the supply of such a vital commodity to the vicissitudes of the hydrological cycle - particularly at a time when it appears that climate patterns are changing.

The efficient use of water resources requires sustainable practice in both land and water management, and it starts at the watershed boundary. In particular there is a strong link between agricultural practices in any catchment and the behaviour of its rivers. There are many routes to sustainable water resources management, but for most river basins in the developing world it will eventually become necessary to build more infrastructure, in the form of storage reservoirs and transfer works, at some stage or another. Such projects have far reaching consequences as they are not always devoid of negative impacts that have to be carefully mitigating or managed – and they are costly. But despite these challenges, for many countries the improvement of water infrastructure remains an essential instrument in the increasingly demanding task of raising living conditions and protecting the environment.

Although public and industrial water supplies are the most visible demands on our water resources, in most countries they represent only a small proportion of total consumption. At a global level, over 70% of consumptive water demand is for irrigation which now accounts for some 40% of all agricultural production. These percentages are likely to rise in future as the need for farmed commodities increases. Another very important, but non-consumptive water user is hydropower, which currently accounts for about one-fifth of the world’s electricity and over 90% of all renewable energy production. The vast majority of the world’s unused hydropower potential is in developing countries.

Apart from these more obvious demands on water resources, there is growing pressure to manage river systems for ecological and other purposes. The need arises at both ends of the hydrological spectrum. There is a growing need to mitigate floods as population pressures lead to more settlement in the flood plains while, at the other extreme, minimum flows must be maintained for the dilution of effluent wastes and for navigation. This is not a static situation, as the natural hydrology of many river basins is becoming more polarised as a result of watershed development, increasing abstractions and effluent discharges - and possibly changing climatic patterns.

The multiple objectives of sustaining food production and economic development, while at the same time protecting the environment, need not always be in conflict. They can sometimes be achieved through a single “multipurpose” project which might, for example, generate hydroelectricity, provide water for irrigation and maintain minimum downstream flows. Such projects bring benefits to many sectors – but they all require water infrastructure, and in particular dams, to exercise some control over the natural hydrology.

Irrespective of the nature of new projects - whether they are single or multiple-purpose – the proposals will inevitably be more closely scrutinised than they have been in the past. New water infrastructure projects will have to satisfy a wide range of acceptability criteria – and, having passed these, they will still face what is probably their most serious challenge: the need to arrange the necessary financing.

2 HISTORICAL OVERVIEW

2.1 Emergence of the Private Sector

In recent years there have been several critical developments in the financing of dams and similar works. Until the early-1990s such projects were built almost exclusively by the public sector, using financing that was usually sourced from the multilateral development banks (MDBs) such as the World Bank and the Asian Development Bank. The projects were developed in an essentially non-commercial environment, and when it came to their evaluation they tended to be judged on relatively narrow economic criteria, without due attention being given to the wider social and environmental aspects.

Then in the 1990s a number of things changed. To begin with, the international financing community began to question whether the public sector could - or should - continue to support infrastructure projects against a background of escalating demand in the emerging economies. It was becoming clear that there would not be adequate public funding available to meet all the future infrastructure needs of the developing world and, furthermore, there was a growing body of opinion which argued that such projects would be more efficiently handled by the private sector.

The corollary of this change in attitude was the widespread unbundling and partial privatisation of the state-owned utilities in many countries. The process started in the power sector, but quickly moved on to other areas of infrastructure including water. The idea of the special purpose project company emerged, as being a private company that would contract to supply infrastructure services. Most commonly, the 1990s saw the rise of the Independent Power Producer (IPP) who supplied electrical energy to the grid under a long-term Power Purchase Agreement (PPA). In theory this model shifted the responsibilities and the risk to a private company, so that the public sector had no role in the project other than to grant the Concession and enter into a contract to buy the output. In practice it was not always as simple as that.

At the outset a considerable number of foreign utilities and private corporations stepped forward and began to prepare projects under these arrangements. In the water sector they were mainly hydropower projects, because of their relatively strong revenue potential. Some were successfully implemented, but

a significant number failed to reach financial closure and collapsed, often losing their private sponsors large sums of money in the process. Water projects, in particular, were proving difficult to finance because the balance between risks and returns was often not attractive enough for the private investor. It gradually became evident that the private development of water infrastructure projects was proving to be much more difficult than other forms of infrastructure such as thermal power stations or telecommunications.

There are no definitive estimates of the amount of money that will be needed in the future to finance water infrastructure, but there is wide consensus of agreement that the sums involved lie far beyond the reach of the public sector alone. Difficult as it may be, private sector involvement in the financing of water infrastructure is essential to the long-term sustainability to the power and water sectors in many countries. This paper examines some of the implications and the options for private sector involvement in the financing of such projects.

2.2 The Dams Debate

At about the same time that these fundamental structural changes were occurring, large water projects involving dams were beginning to attract criticism. The main objection, voiced by a number of non-government organisations (NGOs), was that the promoters of such projects were failing to adequately address social and environmental issues. A number of high profile schemes met with serious opposition, and were either delayed or abandoned. The climate of opinion shifted so that the international financial community was conditioned to regard dams in a less positive light, with the result that there was a substantial drop of lending for water infrastructure projects.

The combination of NGO opposition and a lack of financing seriously affected the development of new dams throughout the 1990s. But the pressure on water resources continued and, if anything, the inequalities between the developed and developing worlds were reinforced by demographic trends. By the turn of the century water storage per capita in the USA and Australia was 100 times more than for Ethiopia. And while over 70% of hydropower potential has been developed in Europe and North America, the comparable figure in Africa was under 5% despite the fact that the continent is endemically short of both electricity and water.

Many developing countries resented what they saw as a prohibition on the exploitation of their water resources, imposed by rich nations who had already developed their own resources. In order to overcome this impasse, the World Bank and IUCN (the World Conservation Union) launched a World Commission on Dams in 1998. This international body, representing all stakeholders in what had become known as the “Dams Debate”, was charged with finding a way forward on social and environmental issues that would be acceptable to the wider community.

The World Commission on Dams finally reported at the end of 2000. It examined the impact and benefits of past projects and consulted widely before finally making its recommendations in a report^{1/} that received a mixed reception. While there was wide agreement on the Core Values and Strategic Priorities it espoused, there was also concern in many quarters that the Guidelines proposed in the report would be interpreted as being a binding set of rules that would effectively represent an embargo on all new dam projects. This interpretation was disputed by the members of the Commission, who made it clear that they expected dam construction to continue, but in a more carefully regulated form than in the past.

^{1/} World Commission on Dams. Final Report Earthscan Publications Ltd. Nov 2000.

In response to the report the World Bank implemented a “Dams Planning and Management Action Plan” to further improve the quality of its work in this area. The Action Plan is intended to improve Environmental and Social Outcomes of Bank Supported Operations, and to strengthened Country Capacity and Ownership.

2.3 Water Resources Sector Strategy (World Bank)

In 2002 the World Bank published a draft report reviewing its Water Resources Sector Strategy^{2/}. This was eventually approved by the Board in 2003 after an intensive period of stakeholder consultation, and formally published the following year. The Strategy Paper makes it clear that the Bank will re-engage in the financing of what it refers to as hydraulic infrastructure, subject to suitable safeguards, and that it sees its role as assisting in mobilising both public and private funds for this purpose.

The Water Resources Sector Strategy document sets out the Bank’s guidelines for its future involvement in the water sector, based upon the Dublin Principles^{3/}, which advocate:

- Integrated water resources management on a catchment basis.
- Participation of all stakeholders likely to be affected by a project.
- Greater use of incentives and economic principles in water management.

It emphasises that the new business model puts development considerations first, by assessing not only the direct impact of the project but also the consequences of non-engagement by the Bank. It stresses the need to protect the rights of those directly and indirectly affected, and the importance of meeting adequate social and environmental standards (see box).

**World Bank Water Resources Sector Strategy (published 2002)
Strategic Directions for World Bank Engagement in the Future**

The document sets out the principles on which the World Bank will re-engage with water infrastructure projects. The following are extracts:

“Many developing countries face daunting water resources challenges.....”

“Water resources management and development are central to sustainable growth and poverty reduction and therefore of central importance to the mission of the World Bank.”

“The World Bank needs to assist countries in developing and maintaining appropriate stocks of well performing hydraulic infrastructure an in mobilising public and private financing...”

“The World Bank will re-engage with high reward, high risk hydraulic infrastructure using a more effective business model.”

“The Bank is perceived ...to have a major comparative advantage in the water sector and there isa strong demand for Bank services, and a strong demand that the Bank engage”.

“The Bank’s water assistance must be tailored to country circumstances...”

The WRSS document was widely interpreted as a turning point, in the sense that it signalled the Bank’s determination to re-engage with difficult but essential water infrastructure projects, but with increasing reliance on private sector involvement where possible.

Ref: www.worldbank.org

^{2/} World Bank: Water Resources Sector Strategy. Strategic Directions for World Bank Engagement. 2004. .

^{3/} First set out at the International Conference on Water and the Environment in Dublin, Ireland, in 1992, and subsequently endorsed by the UNCED Rio Conference in June 1992. Ref: www.wmo.ch

The new Water Resources Sector Strategy was widely welcomed, in particular by the developing world. However it is important to stress that while attitudes may have changed the availability of the softest concessionary funds, on which the poorer developing countries traditionally relied in the past, has not dramatically improved. Thus the emphasis remains focussed on increasing the amount of funding from the private sector wherever possible.

Therefore, while the MDBs remain an important source of funding in their own right, their role has now expanded to being a facilitator of financing in addition to being a provider. An important additional task of most of the multilateral and regional development banks is now to leverage development funds from a much wider spectrum of sources than was the case in the past.

3 STAKEHOLDER CONSULTATION

Prior to the preparation of this paper, two stakeholder consultations were held in 2004. The first was a seminar, organised jointly by the World Bank and the Stockholm International Water Institute at the World Water Week in Stockholm, which focussed on the linkages between water resources management and the development of the different sectors that fuel the economy. The second was a roundtable consultation on Hydropower Project Financing organised by the World Bank at the Hydro 2004 International Conferences held at Porto, Portugal in October 2004. The general conclusions are summarised below:

- i) There are strong linkages between economic development and the effective management of water resources. Countries that lack the infrastructure to manage their water resources suffer economically, socially and environmentally.
- ii) In many situations there is no “business-as-usual” option, as the infrastructure is often needed to prevent an inadequate situation deteriorating further. The cost of inaction can be very high, both directly in terms of those communities immediately affected and more widely because economic and social deprivation can impact whole regions and countries.
- iii) New water infrastructure will have to be built to ensure security of supply and prevent the negative impact of extreme hydrological events. Demand-side management can mitigate the rate of increase in water demand, but it is not a long-term solution.
- iv) Water infrastructure is a long-term investment, which generally has weak financial returns and an uncomfortable risk profile. For these reasons the sector is not attractive to private financiers, and there has been little private involvement to date other than in hydropower
- v) There is no fundamental shortage of private money for infrastructure projects provided the risk profile is acceptable. However, following unfavourable experiences on a number of high-profile projects, there is a lack of credible sponsors willing to undertake such projects
- vi) The traditional BOOT model is proving difficult to apply to hydropower and multipurpose schemes. It requires complex and costly contract arrangements, and the private ownership of the infrastructure can cause difficulties. There is a need to develop alternative models.
- vii) For many projects the future will lie in Public-Private Partnerships (PPP) with finance being sourced from both public and private sources. Due to the individual nature of water projects, there is no single prescriptive formula for the structuring of a PPP.
- viii) There is a need to examine more closely the sharing of risk between the parties, and in particular between the public and private sectors. It was suggested that under some arrangements the cost of risk can add as much as 50% to the tariff for the service provided.

- ix) PPP require the sharing of Responsibilities, Risks and Rewards (three “R”s) between the public and private sectors. Cost and risk are inextricably linked. Under the existing BOOT model the industry is paying a high price for “ring-fenced” risk, which is inhibiting projects.
- x) Private ownership of certain types of project is difficult, especially large projects of national importance and also those that are in a poor economic or natural environment where the risks are high. To date private developers have mostly concentrated their interests on small run-of-river hydropower projects.
- xi) While there is no single financing model that will suit all projects, there are certain common features that will enhance the prospect of securing finance in most circumstances:
 - Projects need to be better prepared by the public sector at the pre-investment stage.
 - Increased use of local funding to reduce exposure to the risk of currency devaluation.
 - Improved mechanisms for facilitating the refinancing of projects after completion.
 - Wider use of Guarantees and similar facilities provide by the MDBs.
- xii) The public sector had to do more before soliciting support from a private partner. In the past the private sector had been left to make the running, but this had not been satisfactory from the viewpoint of either party, and it had resulted in costly failures that had created a negative perception on the part of private companies.

In summary, there was a recognition that dams, hydro and multipurpose projects pose special challenges when it comes to financing, particularly in the private sector. The sites for the larger projects are unique assets, and the granting of a concession to develop them is a licence to exploit the national resources of land and water. Sometimes, for a variety of reasons, such sites might be difficult to develop in the private sector, in which case people should perhaps be thinking in terms of securing private debt for public projects. More often, though, it is likely that projects will be developed under the auspices of a private company, or through a combination of private and public sector ownership.

Against this background it was decided that the financing of a number of water infrastructure schemes should be studied to determine what lessons could be learned for the financing of future projects. The report which follows considers the findings of this review of Case Studies under the following headings:-

- Key issues
- Policy matters
- Financing instruments
- Case studies
- Observations and conclusions

Chapter 2: Key Issues in Financing Water Infrastructure

“Private financial institutions hold a consistent attitude towards approving funding for energy and infrastructure projects.....the primary issues are the prospective return on the investment and the risks associated with the development and operation of the project

Financing Oil and Hydro: The Banker's Perspective
Andrew Porter, Director, Pricewaterhouse Coopers.

“It is unlikely that investors will quickly forget recent difficulties in merging markets and be as willing to provide funding for below-investment grade countries (as they were in the past)”

Capital Market Financing for Developing Country Infrastructure Projects
United Nations, DESA Discussion Paper No. 28

“Wherever possible mechanisms should be implemented to reconcile the gap between short-term price competitiveness and long-term wealth creation. Multilateral development banks should be encouraged to play their full part in this process”

Sustainability Guidelines, International Hydropower Association

Chapter 2: KEY ISSUES IN THE FINANCING OF WATER INFRASTRUCTURE

In determining the optimum means of financing any project there are a number of issues that should be addressed at an early stage. They particularly concern the following features of the project:

- Economic and financial viability;
- Risk profile; and
- Environmental and social sustainability.

If the project is to attract private sector participation, there is also the question of whether a suitable enabling environment exists to give private promoters and investors confidence.

These issues need to be critically reviewed before any definitive financing plan can be developed. They are, in fact, the key issues in the financing of any form of infrastructure project, but this chapter discusses them specifically in the context of water infrastructure.

1 ECONOMIC AND FINANCIAL VIABILITY

1.1 Gap between Economic and Financial Viability

Water infrastructure projects often fall in the gap between economic and financial viability. A project can be economically attractive and clearly the preferred option when seen from the long-term national perspective, but when considered as a commercial investment it may be unable to generate adequate financial returns to be of interest to a private investor.

Economic viability should be the basis on which strategically important projects are selected and optimised. But financial viability will ultimately determine how they might be funded.

In practice the economic value of water infrastructure is often underestimated because the traditional analysis invariably includes secondary costs such as environmental control measures and resettlement, but it seldom credits the project with the value of secondary benefits. The secondary benefits from a dam, for example, might involve flood attenuation and improved downstream water quality in the dry season, but the economic (and financial) values will usually be ignored because they are too difficult to quantify.

Another deficiency in the traditional approach to economic evaluation is that it usually underestimates the “No Action” scenario. For many projects the consequences of the project not proceeding can be far wider than has normally been taken into account. This is particularly the case in the water sector, where lack of suitable infrastructure can lead to increased water stress over a large area. Under this scenario a true economic appraisal should include the wider costs of taking no action, which might lead to lost food production through lack of irrigation, diminished employment opportunities, and a general lowering in the level of economic activity across many industries. To these consequential losses there must be added the indirect costs arising from environmental degradation as abstractions are pushed beyond their naturally sustainable limits.

If the eventual cost of inaction becomes high enough, most Governments will determine to proceed with essential projects irrespective of the surrounding circumstances. Where the project is too large or too difficult for the private sector, it will have to be promoted in the public sector. For example, the highly ambitious Lesotho Highlands Water Project in southern Africa was successfully implemented against a very unpromising political and economic background because the consequences of not doing so were unacceptably high (see box).

Lesotho Highlands Water Project, southern Africa
An essential project developed against the odds

Amongst the projects examined in the study, several have been driven by the need to prevent serious consequences of water shortages blighting an entire region. The most obvious of these is the Lesotho Highlands Water Project (LHWP) in southern Africa.

LHWP is a trans-national scheme that brings water from the remote mountainous areas of Lesotho to the industrial heartlands of South Africa, where it supplies an area that accounts for 60% GNP and a population of 10 million. Prior to the project, chronic water shortages posed a serious threat to the whole region. In addition to supplying South Africa, the project is a catalyst for development in Lesotho which benefits from hydro-electricity for domestic consumption and royalties of \$35m/year (10% of total Government revenue) from the export of water.

Costing \$2.8 billion to date, this hugely ambitious project was planned during the apartheid regime when South Africa was short of foreign exchange and subjected to international trade boycotts. Despite the unfavourable economic and political climate, the project was successfully financed and implemented, because it was in the interest of both countries and "no action" option was untenable.

Ref: www.lhwp.org.ls

Financial viability is a measure of the commercial strength of a project, judged typically over a period of 15 to 20 years which is the normal time-horizon for most private investors. It determines whether the project is robust enough to be able to repay loans at commercial rates of interest, even under a downside scenario, and whether it is likely to provide a sufficiently high return on equity to attract private investors.

It is not unusual to find economically attractive projects that are not financially viable. And even those that are viable may not be as attractive as a competing project. If an alternative project offers the prospect of higher financial returns or greater security, it is reasonable to anticipate that any private developer would opt for the alternative if given the free choice. The consequence of this is that the project that might be preferred by the Government, on economic or other grounds, is not necessarily the one that a private sponsor would select.

There is therefore a danger that if financial viability is allowed to become the over-riding criteria in the search for private financing, it may distort priorities when it comes to the selection of projects. This issue is explored in some detail in the context of hydropower in *Financing of Private Hydropower Projects*^{4/}, a World Bank discussion paper published in year 2000 (see box below).

1.2 Closing the Gap

In situations where there is an intention to involve the private sector but the gap between economic and financial viability is too large, the position may be rectified by either:

- i) Introducing subsidies in one form or another to close the gap; or
- ii) Restructuring the project by separating out the financially viable elements

Examples of both of these will be found later in this document. In the event of neither option being possible, the project will have to be developed in the public sector using concessionary finance.

^{4/} Chris Head. "Financing of Private Hydropower Projects". World Bank Discussion Paper 420. Published 2000 and available in hard copy or on the web at www.worldbank.org

**The danger of selecting projects using financial criteria alone.
Choice between hydroelectric and thermal power stations.**

The World Bank Discussion Paper "*Financing of Private Hydropower Projects*" analyses the tariffs needed by a private developer choosing between alternative (hypothetical) power stations. As the two projects show the same economic rate of return, there is apparently no economic case for favouring one over the other. The choice lies between a capital intensive hydro plant with low running costs, and a relatively inexpensive thermal power station with high running cost

Analysis revealed that, in the first twelve years of operation, the tariffs for the hydro plant would have had to be 40% higher than the thermal tariffs to achieve the same financial returns. The analysis showed that unless a hydro project is significantly better in economic terms than its thermal alternate, it will appear uncompetitive when judged on the short-term financial criteria alone.

In the longer term the hydro tariff will be much lower than that of its thermal competitor. In practice it may even be lower in the short-term because oil price volatility can raise thermal tariffs to higher levels than originally anticipated. However, at the time the choice is made the thermal alternative is likely to be selected on the grounds that it offers the lower "headline tariff". The analysis demonstrates the importance of avoiding selecting long-term infrastructure projects only on the basis of their apparent short-term financial viability.

Ref: World Bank Discussion Paper 420.

Subsidies sourced from the public sector are the most common way of closing the gap between economic and financial viability. This is obviously a matter that has to be handled with care if there is a private company involved, as any subsidy involves publicly supported "aid" in one form or another. For the purposes of accountability it is therefore important that the aid component is clearly seen to bring public benefits. In some cases this requirement will be satisfied by the simple fact that the project would not have proceeded without external financial support, and that under this "No Action" scenario the economic disbenefit would have been unacceptably high.

Public subsidy can be introduced in a number of ways, either:

- **At the financing stage** in the form of grants or soft loans. These may sometimes be blended with commercial funds to produce an overall financing package that makes the project financially viable. An example of this is the Guerdane Irrigation scheme in Morocco, where the need to maintain affordable irrigation tariffs motivated the Government to contribute a substantial proportion of the financing on concessionary terms (see first box below);or
- **At delivery of the service** in the form of Output-Based Aid, where the disbursement of public funding is linked to the delivery of a service (e.g. water or electricity). An example of this is the Pamir Hydropower Project in Tajikistan, where a bilateral grant was used to limit the impact of the tariff increases that were needed to achieve the (marginally) viable returns that were required to allow the project to be developed and operated as a commercial entity (see second box below).

Guerdane Irrigation Project, Morocco
An example of concessionary capital financing

The Guerdane Project will provide new surface water supplies to citrus farmers affected by the over-exploitation of the aquifer on which they have historically depended. A private consortium has entered into a contract to provide the additional supplies and to manage the irrigation network for a 30 year concession period. The total cost of the capital works is \$85m

In structuring the project a major concern was that the water tariffs should be affordable. To achieve this, the Government providing \$50m towards the capital cost, half as a loan and half as a grant. The resulting tariff was lower than many of the farmers would have had to pay for pumping the depleted groundwater resource, and therefore it ensured they used the new supply.

Ref: Annex 1. Case Study 4

Pamir Hydropower Project, Tajikistan
An example of output based aid and concessionary capital financing.

The Pamir project is an example of how a commercial wrap can be put around a quasi-private project, even in the most unpromising economic environment.. It is located in a remote area of Tajikistan where electricity sells at under 1c/kWh and the average income is \$27/month.

The project involves the upgrading and rehabilitation of a 28 MW hydro scheme and other works. Although not bankable in a strictly commercial sense, it has been made viable by combining concessionary financing with commercial loans..

To ensure that tariffs remain affordable, and to cushion the effect of the inevitable tariff increases, a bilateral grant in the form of Output Based Aid is being used to subsidise revenue income for the first ten years. This gives the project an additional (guaranteed) revenue stream to support the capital financing.

Ref: Annex 1. Case Study 7

As an alternative to the direct subsidies described above, it may be possible to restructure the project in a geographical sense, into private and public portions. By doing this the private sector part can stand alone as commercially viable entity in its own right. This leaves the financially weaker or particularly risky elements, which are not suitable for private sector financing, to be developed in the public sector. The San Roque Multipurpose Project in the Philippines is one of the few examples of such a split project that was successfully financed on this basis, as if the two parts were separate projects, although they were implemented as a single entity (see box below).

Although financial viability remains a fundamentally important consideration when contemplating the involvement of the private sector, it is not the only issue that will determine whether or not private financing is possible. The cash flows may be adequate, but there still remains the overriding issue of whether or not it is possible to raise the finance in the first place. As we shall see later, bankability is a measure of the financial robustness of a project – and its risk profile.

San Roque Multipurpose Project, Philippine
A Public-Private partnership based on split ownership

This project involves a large dam that supplies around 87,000 ha of irrigation and a 345 MW power complex. In addition to providing power and water for irrigation, the scheme has flood mitigation and water quality benefits.

The project has been successfully developed as a public-private partnership under split ownership. The power complex was developed by a private company on a BOOT arrangement, and financed on a commercial basis. The dam and ancillary structures were treated as public projects and financed publicly, although their implementation was managed by the private sector.

Although there was a strong economic case for the project, it was not financially viable in its entirety due to the weak financial returns from irrigation and secondary benefits, and the risks associated with building the dam. By moving the dam into the public sector these problems were overcome and approximately half of the project was funded from private sector.

Ref: Annex 1. Case Study 5

Bankers do not have any preconceived notions about the type of project in which they invest. They certainly have no fundamental objection to lending money for water infrastructure projects, but they do have a strong aversion to risk. For this reason the issue of risk always features prominently when it comes to consider different financing options. In fact, in many respects risk is the overriding consideration when it comes to accessing private capital, and for this reason we need to look at it in more detail.

2 PROJECT RISK

2.1 Perceptions of Risk

Anything that can impact on the financial returns of a project is perceived as a risk. All risks ultimately translate into financial terms, and an investor will tend to judge his risk exposure by the amount he stands to lose compared with the amount he expects to gain at any particular stage in the lifecycle of the project.

Being capital intensive and with low running costs, water projects unfortunately tend to have a heavily front-end loaded risk profile because an investor is exposed to the full cost of the project - and, in particular, all of the construction risk - before the revenue stream begins to flow. This is in contrast to most other types of project, like thermal power stations where there is a better balance between capital and running costs, and the risks are more evenly distributed over the full life of the scheme.

The fact that there has been little private financing in the water sector, is partially due to inherently weak financial viability of many projects. But is also due to the perception that water infrastructure has an unacceptably high risk profile for the financial returns on offer. In order to attract the private financier, it will be necessary to address these concerns.

Private financiers tend to have different attitude to risk, depending upon whether they are Lenders or Investors. Although both have a common interest in reducing risk as far as possible, investors (i.e. shareholders in the project company) are more ready to countenance some risks, whereas lenders are usually very risk averse and therefore tend to dictate the security package upon which the financing is predicated (see box below).

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 like the Host Government and the MDBs 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.

When evaluating the prospects of attracting private finance, it is important that public policy makers appreciate the perceptions of the different types of financiers, and the overarching importance that risk will play in the evaluation of any project being considered for funding by the private sector.

2.2 Types of Risk

Broadly speaking there are three categories of project risk, any one of which can impact on its financial viability and therefore the financiers' prospects for recovering their money. They are:

i) ***Political Risk***

Sometimes referred to as Country Risk, this includes the failure of the Host Government to fulfil its obligations under the project agreements. It might include, for example, the sequestration of the assets, or failure to provide the site, or failure to recompense the project company for any adverse changes in legislation. Such risks are normally insurable under guarantees.

ii) ***Commercial Risks***

These are the risks that might threaten the anticipated revenue stream, despite the fact that the project is operating correctly and the Host Government is honouring its agreements. They include, for example, business interruption through unforeseen stoppages, or the lack of a market for the services provided, an enforced change in tariffs or, most commonly, the default of the offtaker in respect of his payment obligations. Such risks are partially insurable.

iii) ***Project Risks***

These cover a wide range of site-specific risks that can occur during implementation and in the operational stages. They include cost and time overruns during construction, reduced output from lower flows than anticipated (hydrological risk), and performance shortfalls due to design or construction problems. Another important consideration is the risk that the project may be delayed or cancelled for environmental or social reasons. These risks are usually not insurable.

Although some of these risks are insurable, many others are not and they have to be allocated between the parties involved in the project. 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. This requires an understanding of the implications and cost of allocating risk between the various parties.

2.3 Allocation of Risk

Traditionally the theory is 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, and this approach is often an expensive and unsatisfactory way of tackling the problem. Furthermore it may not always be in the best interests of the long-term integrity of the project: for example, it may be unwise to allow a geological problem to be “controlled” by the contractor, whose primary concern will be to get on with the works with minimum delay and at least cost.

People are now beginning to recognise that the best way of allocating risk is in a manner that results in the least overall cost to the project, consistent with maintaining integrity of design and construction standards. In considering these objectives it is important to appreciate the difference between “ring-fenced” and “pooled” risk (see box below).

The cost of risk, and the difference between “Ring-Fenced” and “Pooled” risk

If a project 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 will be of little assistance if a rare, but extremely severe event, materialises and the company is unable to spread its losses. Most special project companies that depend upon a single scheme for their revenue will fall into this category.

The cost of risk depends upon whether it is “Ring-Fenced” or “Pooled”. If, for example, a hydro IPP company is required to assume the risk of under-delivery of electricity due to low flows, the company would have to add a premium to its price to reflect the fact that in the event of drought it would lose revenue and also probably have to pay a penalty to the offtaker. But if the event actually occurs, the utility offtaker would normally be in a position to mitigate the impact relatively inexpensively, by calling on alternative generation or load shedding.

The actual cost to the utility is likely to be far lower than the supplier’s risk premium, and in the long run it would have been cheaper for the utility 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 assume than risk that is “Ring-Fenced” within the project company. Under the BOOT model any risks left with the project company tends to be ring-fenced unless they are insurable, and therefore an allowance has to be made in the selling price of the commodity.

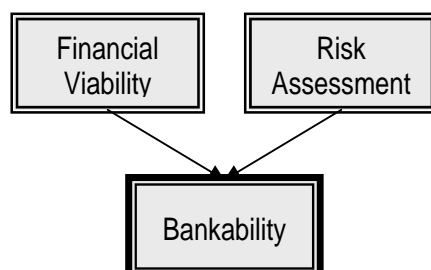
It will be noted from the above that there are several important facts to be borne in mind when allocating risk:

- **Risk comes with a price attached.** When an organisation is required to assume a risk it has to evaluate the probability of that risk materialising and at the consequent cost. Therefore moving risk between the parties affects both their individual costs, and the overall cost of the project.
- **The price is not fixed.** It does not follow that the cost of a risk remains unchanged irrespective of which party bears it. The party that can pool the risk will always be in a position to bear it more cheaply than one which treats it as being ring-fenced. The public sector will sometimes be in a better position to pool risks than the private project company.
- **Certain risks cannot be assumed by the private sector.** Some rare but extremely costly (and uninsurable) risks simply cannot be economically borne by the private sector operating under a BOOT arrangement. In such circumstance it will be necessary, and more economical, for the risks to be carried by the public partner.

The allocation of risk on a project eventually culminates in the preparation of a Security Package 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”.

3 THE CONCEPT OF BANKABILITY

The combination of a project's financial viability and risk profile ultimately determines whether it will be able to attract the necessary finance. In some markets bankability is measured through a formal system of credit ratings that can extend from AAA (triple A) downwards.



A rating of BBB+ is generally regarded as the threshold for an Investment Grade project. This rating is unlikely to be achieved by many infrastructure projects in the developing world without external support, which invariably has to come from the public sector in one form or another. However robust a project might be, it cannot have a higher investment rating than that of the country in which it is located. In the case of projects involving two or more countries, it is necessary to consider both the credit rating of the host Government where the main physical assets are to be built, and the credit ratings of the other countries in which the offtakers are located.

One of the most common forms of support is the Sovereign Guarantee issued by the host Government, for example to underwrite the payment obligations of the public utility buying the water or power. However a Sovereign Guarantee may not be of Investment Grade, and hence there is a need for it to be backed by international guarantees from organisations such as the MDBs.

Bankability will not only determine whether it is possible to raise finance, but it will also set the terms on which it is likely to be secured – in particular, the interest rate and the tenor of the loans. Prospective lenders will judge the project on a number of factors, including:

- i) **The strength of the revenue stream.** Is the offtaker creditworthy, and is the income likely to be sufficient to service debts with an adequate degree of security?
- ii) **The currency of the revenue stream** in relation to the currency of financing. Is there exposure to devaluation of local currency, and if so who carries it?
- iii) **The amount of equity** that the sponsors are prepared to provide. Low-g geared projects with a sizeable proportion of equity require less debt, and create confidence amongst lenders.
- iv) **The allocation of risks** and the financial security package, which will need to offer protection against all the foreseeable factors that could adversely affect the financial performance.
- v) The existence of a **transparent and enforceable framework of legislation**, with provision for the impartial settlement of any disputes that might arise.

One potentially very important factor is whether the project meets acceptable standards in terms of its environmental and social sustainability. As this is an area that is especially critical for dams, hydropower and multipurpose projects, this aspect is covered in a separate section below.

4 ENVIRONMENTAL AND SOCIAL SUSTAINABILITY

4.1 International Criteria for Acceptability

Over the past few years the threshold of environmental and social acceptability for large projects has been significantly raised, and it would be very unwise to attempt to finance any scheme where these aspects have not been fully addressed. The debate over dams has been particularly difficult, and this has prompted the preparation of various guidelines setting out procedures and criteria for judging and mitigating environmental and social impacts.

The importance of addressing these issues from the outset is that if they are not adequately covered at the financing stage there is a danger that the project will be delayed, or in extreme circumstances even abandoned at a later stage. Even if it is only a delay, the cost can be very high, to the extent that the financial viability of project may be jeopardised, and its overall justification eroded by negative ecological, social or economic consequences.

In response to the report of the World Commission on Dams most of the international financing institutions have clarified their position, setting out minimum requirements to be satisfied before they support a project. Amongst these is the “Dams Planning and Management Action Plan” of the World Bank, which now forms part of its portfolio of “Safeguard Policies” that have to be applied to every project the Bank supports.

The World Bank has ten environmental, social and legal Safeguard Policies, of which the following are of most relevance to the financing of water infrastructure:

- Environmental Assessments
- Natural habitats
- Forests
- Involuntary resettlement
- Indigenous Peoples
- Cultural Properties
- Safety of dams
- International waterways

Large water infrastructure projects usually trigger most of these, and so demand a high degree of assessment. Each policy describes the operational procedures to be followed, and lays down guidelines for the identification and implementation of the necessary actions.

In a separate initiative the International Hydropower Association published its “Sustainability Guidelines” in 2004 after wide international consultation. IHA is a non-governmental mutual association of organisations and individuals working in the hydropower sector, and its role is to advance knowledge and promote good practice in the development and operation of hydro-power projects.

The IHA guidelines are intended to promote greater consideration of environmental, social and economic aspects in the assessment of new hydro projects, and in the management of existing schemes. The objective is to ensure that detrimental environmental and social impacts are either avoided or mitigated, or adequately compensated where unavoidable, so that positive outcomes are maximised.

Still in their early days, the IHA Sustainability Guidelines are increasingly being seen as a reasonable basis for developers and operators to manage the often competing pressures arising in the hydropower sector. Although they were developed in the context of hydropower, the Guidelines could be used for most other types of water infrastructure project.

The World Bank Safeguard Policies are only mandatory for projects where the Bank is involved, and the IHA Guidelines are only advisory, but between them they provide a benchmark against which any public international financing institution is likely to judge a project.

4.2 The Equator Principles

In the past private financiers have not been required to address environmental and social aspects, on the grounds that such matters lay outside their scope of competence and were the responsibility of others. However this situation has changed in recent years following a number of high-profile cases where commercial lenders have been heavily criticised for financing projects, mainly in the petro-chemical industry, that were considered to have not met adequate environmental guidelines.

The Export Credit Agencies came under similar pressure. Suddenly commercial lenders and ECAS have found themselves uncomfortably in the limelight, facing adverse publicity from NGOs. This new phenomenon has become known as “Reputational Risk”. Today most commercial bankers will not consider a project unless they are satisfied that it meets the Equator Principles^{5/}, which were established in 2003 as a set for Guidelines for the financial services sector (see box).

The Equator Principles
Sustainability standards for the financial services sector

Launched in 2003 by the IFC and an international group of investment banks, the Equator Principles are intended to offset criticism that commercial lenders were not subjected to public scrutiny in the projects that they supported.

The Principles apply to all project financing deals greater than \$50m. Projects are placed into one of three categories, depending on their anticipated environmental impact. Category A, the highest, requires a full environmental impact assessment (EIA) involving local stakeholder consultation, followed by an environmental management programme to address compliance issues. Lower categories of project require less extensive EIAs, or none at all.

Within a year of launching, a total of 27 banks, representing more than 75% of global financing funds, had signed up to the Equator Principles. There are still a number of issues outstanding including the finalisation of policy issues, transparency and accountability.

Ref: www.equator-principles.com

Although not formally members of the Equator group, the Export Credit Agencies will also require to be satisfied that the project has been thoroughly and impartially appraised for its environmental and social sustainability. Even non-Equator Banks are unlikely to risk becoming involved with projects that might fall short on acceptable environmental or social criteria. This is only partially through fear of adverse publicity, the main reason is that no Lender wants to become involved with a project where there is still a residual risk of it being seriously delayed or abandoned as a result of opposition.

5 ENABLING ENVIRONMENT

In addition to the need for economic and financial viability, and confirmation that a project meets sustainability criteria, there are a number of other preconditions that have to be satisfied in order to attract private sector participation. There are many specific requirements for the public sector and the Host Government in particular, which include:

- The provision of sufficient funding for the project to be adequately prepared under the auspices of the public sector;
- The arrangement of an efficient “one window” facility through which the different branches of government can negotiate with prospective private partners.

^{5/} See www.equator-principles.com

Details of these and other project-specific public obligations are provided in the following Chapter 3. However there is an over-arching general requirement on the part of the Government to ensure that the business environment is right for private sector participation by removing obstacles such as inappropriate legislation, institutional obstructions and market deficiencies. This is sometimes said to exist when there is an adequate “Enabling Environment”, which should broadly cover the following aspects:

Legal and regulatory framework

- Clear and enforceable published laws to reassure private investors that they are on a level playing field.
- A legal regime that allows any disputes to be resolved quickly and in a cost-effective manner through an impartial tribunal.
- An established independent regulator working to the underlying principle of equal regulatory treatment between the utility and the private sector.
- A clear water resources development strategy and water policy defining the roles and respective powers and responsibilities of the various parties in the water sector.

Policy framework for business development

- Fiscal incentives to be clearly defined, for example tax breaks and the right of local companies to have access to foreign currency and hold foreign currency bank accounts.
- Government policies and actions need to demonstrate positive support for private sector participation, and this needs to be reflected at the utility level.
- Consistency of policies between different arms of Government.
- A coordinated strategy is needed for private sector involved in infrastructure projects.

Institutional and Organisational Framework

- Adequate public sector capacity and resources to undertake the preparation of projects for both private and public sector implementation.
- Clearly defined and delineated roles and responsibilities for the Government organisations involved, with adequate provision for coordination.
- Provision for managing the procurement of private sector involvement in a manner that satisfies the requirements of the international financing institutions whose support will almost certainly be needed for the larger projects.

In most countries private sector involvement will already have taken place in other more commercial sectors, such as telecoms and electricity distribution, before the water sector. It is reasonable to assume therefore that in most cases an Enabling Environment will either already exist, or that there will be an understanding of the necessity for it.

6 SUMMARY

In summary, it can be observed that:

- i) To secure support for a project it will be necessary firstly to demonstrate that it is economically the preferred option. This will involve the evaluation of alternatives including the consequences of not proceeding with the project. Economic studies should, as far as possible, consider secondary benefits as well as secondary costs.
- ii) Financial viability is the key to private sector involvement. Private financiers will only invest if the returns are adequate and in proportion to the risk. Many water infrastructure projects will require some form of public subsidy to be viable in the private sector.
- iii) Risk is a major issue for the private sector. To be bankable a project has to have a security package in which all of the financial risks are identified and addressed, so that it is clear which party is carrying them and what the fall-back position is in the event of default.
- iv) In most cases Lenders, as opposed to Equity holders, will ultimately dictate the acceptability or otherwise of the security arrangements. Shareholders may be prepared to carry more risk for a higher return.
- v) The allocation of risk between the public and the private sectors needs careful consideration. The private sector needs to be fully motivated by assuming its fair share of risk, but there is a price associated with this and in the case of some unavoidable risks it may be less costly to allocate them to the public sector.
- vi) It is essential that projects meet internationally acceptable standards in terms of social and environmental sustainability. This is primarily, although not entirely, a public sector responsibility that needs to be addressed early in the project cycle.
- vii) A prerequisite for private sector participation is a favourable enabling environment with positive Governments policies backed by clear and enforceable legislation.

Chapter 3: Policy Matters

“It is important for Governments to understand the different perspectives and constraints under which a private company has to operate.”

*Report on Seminar on Financing Water infrastructure
Stockholm World Water Week, 2004*

“The possibility of divesting equity holdings in infrastructure projects in developing countries is limited, which implies that project promoters are committed to a project, a country and a sponsor for many years.”

*Alternative loan guarantee mechanisms and project finance
Griffiths-Jones, Institute of Development Studies, UK*

“Governments should create an enabling environment for the participation of the private sector in the delivery of infrastructure services”

Financing Water for All. Report of the World Panel , 2003

Chapter 3: POLICY MATTERS

1 ROLE OF THE PRIVATE SECTOR

Having considered the requirements set out in Chapter 2, it is now appropriate to review the financing options that might exist for any particular project. There are a number of basic policy decisions to be taken that will influence the ultimate financing plan, and they hinge around determining the respective roles to be played by the public and private sectors.

1.1 Key Decisions

In considering the role of the public and private sectors there are four key questions to be answered:

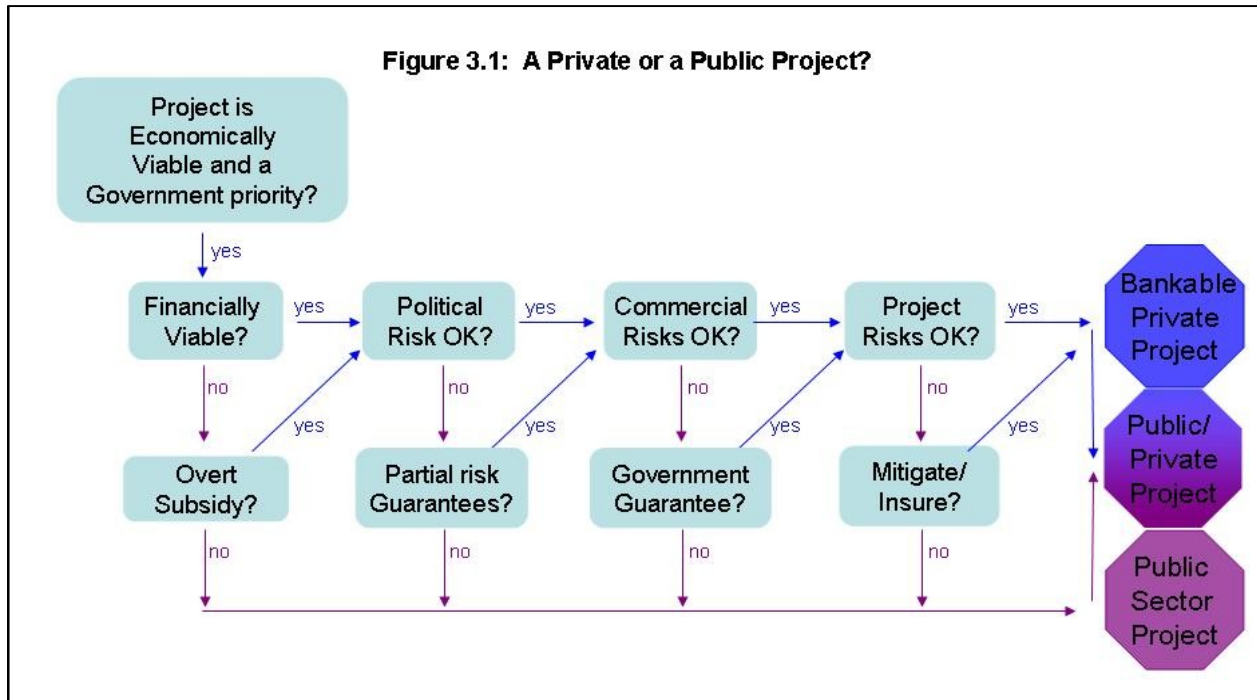
- **Public or private development?** Is the project sufficiently viable for private development, and is it likely to be bankable when the risks are balanced against the likely rewards?
- **Ownership of the physical assets?** Assuming that the project is to be developed in the private sector, is it advantageous to retain the physical assets in public ownership?
- **Public shareholding?** If the concession is awarded to a special purpose project company, is it appropriate that there should be a public shareholding in the private company?
- **Private financing for public projects?** If the project is to be developed in the public sector, can it still be financed from private sources?

Issue	Comment
Public or private development?	Limitations on public funding and the general move towards privatisation will tend to push the decision towards the infrastructure being provided by a private entity. However some projects are simply not suitable for private development, and will have to remain in the public sector.
Ownership of the physical assets?	It is not necessary for the private company to own the physical assets. In some respects it is less complicated and politically less contentious if it does not own them. But under a project financing scenario it will normally be necessary for the project company to own the physical assets to preserve the Lenders' step-in rights ^{6/} .
Public shareholding?	There may be advantages in the public sector taking an equity stake in the private project company. A public holding aligns the interests of the parties, improves transparency and provides access to funds that would not otherwise be available. However the public share-holding has to be purchased and the State needs funds for this.
Private financing for public projects?	Public projects can also access private finance in the form of debt, provided the responsible executing agency is authorised to enter into the necessary financial commitments, and its repayment obligations are backed by an organisation with an Investment Grade credit rating, normally the Government.

^{6/} "Step in" rights are a contractual requirement imposed by the Lenders, which allows them to step in and take control of the company if they consider that their loans are at risk.

1.2 The Route Map

The decision on whether or not a project might be bankable in the private sector will largely be determined by the balance between risk and reward, seen from the perspective of the private investor. Figure 3.1 shows the chain of decisions that will need to be addressed in arriving at a resolution of this question.



It is important to emphasise that many projects will be Public-Private Partnerships (PPP), and that they may therefore have components that fall within both the public and private categories, as shown in Fig 3.1. For example, a geographically split project such as San Roque (Case study 5), has public and private sector components as separate stand-alone entities. Others, like Theun Hinboun (Case study 3), are theoretically “private” projects, but nevertheless have a large public sector shareholding in the project company. At the other end of the spectrum, publicly owned projects can still be privately financed, as shown by the Lesotho Highlands project (Case study 8). All of these are different types of PPP; they come in many forms, but ultimately all are drawn together from the basic building blocks shown in the above Figure.

Private investors will not all view a project in the same light. Some will be prepared to contemplate higher risks than others, but they will all go through the same process of evaluating financial viability and risk. If either of these reveals serious deficiencies that cannot be mitigated, the project is unlikely to be a suitable candidate for implementation as a private project. Most water infrastructure is likely to be initially deficient in one or both of these areas, in which case:

Lack of **financial viability** can be corrected by:

- i) **Fiscal support** in the form of tax breaks of one sort or another. Typically this will include relief from import duties and a moratorium on company tax for the early years of the project when cash flow are largely absorbed by debt servicing obligations.

- ii) **Subsidies** at the financing stage or on delivery of the service, as described in Section 1.3. Concessionary financing cannot usually be made available direct to a private company, but there are other ways in which it can support a project sufficiently to make it viable in the private sector.

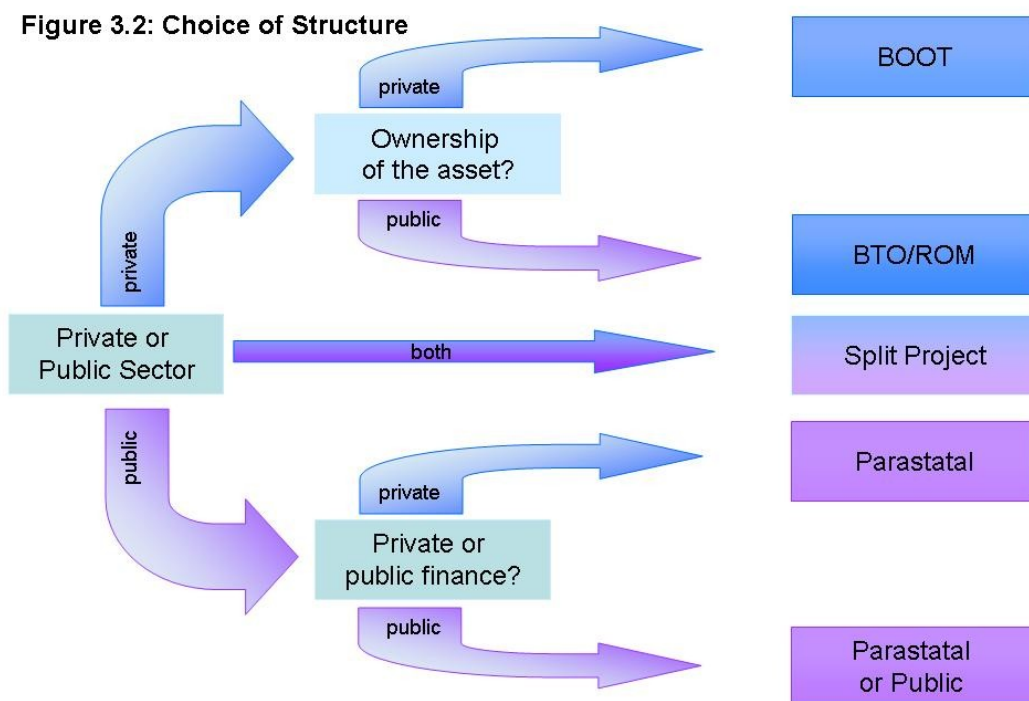
An **unacceptable risk profile** can be corrected by:

- i) **Guarantees** and other forms of credit enhancement from the international financing institutions, and insurance from the commercial market. Guarantees tend to be focussed on protecting the Lenders from political risk.
- ii) **Rearrangement of risk** between the parties: the owner, the contractor, the offtaker and the host Government. The overriding consideration should be to produce an allocation that minimises the overall cost and is bankable, while at the same time protecting the integrity of the project.

Having determined whether the project is to be implemented in the public or private sector, it is then necessary to consider the second tier issues, which are;

- **Ownership of the physical assets?** In the case of private implementation; and
- **Private or public financing?** In the case of a public project.

Figure 3.2 shows how these factors combine to lead to a financing model, bearing in mind the fact that PPPs can involve a combination of public and private options.



There are a number of points to make in respect of Fig 3.2. The first is that it is inevitably a generalisation, intended only to highlight the implications of selecting certain routes in terms of ownership of the assets and financing options.

Ownership of the physical assets can be a contentious issue. It may be controversial to award a private company - that is anyway probably foreign controlled - the exclusive rights to exploit nationally owned land and water resources at what is inevitably a unique site. The situation is made more sensitive by the fact that the concession is likely to have been directly negotiated, and there may be other stakeholders who will have to be satisfied that they will not be disadvantaged. However, although it might be easier for the public sector to own the assets, the financing arrangements will often preclude this.

It is important to reiterate that public projects can be financed using private debt, provided there is a creditworthy and accountable project entity to which the loans can be made. This is usually accomplished by establishing a special-purpose Parastatal Company that operates in almost all respects as a normal corporate entity, but whose shareholders happen to be the Government. This was the situation on the Lesotho Highlands Water Project in southern Africa (Case study 8). However experience on that project demonstrated that the parastatal needed a lot of institutional and financial support in order to fulfil its role effectively, and it is unlikely to be a cost-effective option for anything other than a very large and complex project.

2 PRIVATE SECTOR DEVELOPMENT

The private sector can participate in the management of infrastructure in various ways that do not contribute directly to the raising of finance. This can involve Service Contracts, Management Contracts or Leases. Such arrangements are common in the water supply and sanitation sector, where the emphasis is on the need to manage existing assets rather than the financing of new works. Amongst the projects studied, only two - Guerdane (Case study 4) and Pamir (Case study 7) - approach this category, and in both cases the amount of finance raised by the private sector was relatively small. They are included because they demonstrate the way in which finance can be raised on the back of an existing scheme, and concessionary and commercial funds have been used to produce a viable project.

In general, Service and Management Contracts are not appropriate vehicles for the implementation of new water infrastructure like dams and transfer works, where the financing requirements are the overriding consideration. Once completed, such projects have relatively undemanding management requirements but their financing is very challenging. Therefore this paper does not explore these models any further, other than in the context of them being a part of the two projects already mentioned above. When financing is a critical issue, the principal private sector models currently in use are BOOT, BTO and ROM, as described below.

2.1 BOOT: Private Sector Option with Assets in Private Ownership

In recent years the BOOT model (Build-Own-Operate-Transfer) has been one of the most widely used vehicles for private sector participation in infrastructure development. It brings private money and management into the construction and operation of new works, under the aegis of a project company that is set up specially for the purpose of providing the service.

As the name suggests, the company owns the project for the duration of the concession, at the end of which it is usually transferred back at the host government free of charge. The concession period has to be long enough to recover the initial investment with interest, and provide an adequate Return on Equity. It is typically between 15 and 25 years.

The principal *advantages* of this model are:

- It relieves the government of any direct responsibility for financing, and the cost does not appear as public debt (unless indirectly through the provision of Sovereign Guarantees).
- All of the risks theoretically rest with the private developer, although in practice experience has shown that to make the project bankable some risks have to borne by the public sector.
- The private owner is highly motivated to commission the project on time and within cost, and to manage it profitably. The downside of this is that the public sector inevitably has little scope for changing operating priorities at a later stage.
- The risk of political interference and bureaucratic delays is substantially less than for a public project, once the leading agreements have been signed – although this can take a long time.

The principal *disadvantages* of this model are:

- There is no exit route through which an equity holder can recover value for the physical assets that he is handing over free of charge at the end of the concession, despite the fact that most projects will still have an indefinitely long working life ahead of them.
- There is a shortage of suitable sponsors with an appetite for projects of this sort, and those that are around do not always have the experience or the financial resources.
- It is difficult to competitively bid a BOOT concession due to the complexity of the contract arrangements and the large number of parties involved. In consequence most Concession Agreements are negotiated, which inevitably raises concerns over pricing levels and transparency.
- By its nature BOOT is a long-term commitment involving complex contractual arrangements that are costly to set up. For this reason it is unsuitable for smaller projects.
- From the viewpoint of the Government, it can lack flexibility when it comes to having access and control over projects that might have a number of stakeholders whose priorities may change with time.
- The cost to the end-user is invariably higher than it would have been if the project had been developed and financed entirely in the public sector using public funds.

Although the BOOT model has been widely used in the power sector, it has been mainly for thermal power stations. The model is proving difficult to apply to hydropower because the long-term, capital intensive nature of the investment makes it expensive to finance.

Despite these problems hydro projects continue to be developed using the BOOT model. There are very water infrastructure projects without hydro that have been financed this way, because they generally fall short on financial viability. However, one exception is the Izmit Bulk Water Supply Project in Turkey (Case study 2) which is described later.

BOOT is a suitable model to be used alongside the public sector part of a split ownership project, such as the San Roque multipurpose project in the Philippines (Case study 5). In this case the power complex is totally privately owned under a BOOT time-limited concession of 25 years, while the dam was in public ownership from the outset. Under a separate agreement the BOOT Company implemented the whole project and also operated the dam once it was completed.

2.2 BTO or ROM: Private Sector Option with Assets in Public Ownership

BTO (Build-Transfer-Operate) and ROM (Rehabilitate-Operate-Maintain) are similar financing models. Both are based upon a private company being contracted to provide a service (e.g. building and operating a new water supply) while the infrastructure remains in public ownership. Under the public ownership scenario:

- i) The State assumes a greater responsibility because if anything happens to the works that is not directly the fault of the private operator, it becomes a public liability.
- ii) The public sector will have more influence over the project, and usually more flexibility to respond to changing priorities that might emerge over the concession period.

BTO is relatively rare in the water sector but it has been used where there is an existing scheme that needs further investment, such as the Guerdane Irrigation Project in Morocco (Case study 4). The ROM model has traditionally been used for the rehabilitation or upgrading of old hydropower projects; as it is usually focused on the electro-mechanical equipment it is therefore relatively easy to finance using export credits.

In both cases the chosen vehicle is normally a Special-Purpose Company, established specifically to undertake the project. The arrangements are a combination of those to be found under a Contractor-financing, and an Operating Concession where the costs are usually recovered direct from the end-user.

The principal *advantages* of the BTO/ROM model are:

- It relieves the government of direct responsibility for financing, and the cost will not usually appear as public debt (unless through the provision of Sovereign Guarantees).
- As the infrastructure lies in the hands of the public sector, the Government and its agencies have more access and control over the scheme than under the BOOT model.
- Financing is generally easier, particularly when there is an existing project to be upgraded and therefore the prospect of a revenue stream from the outset to support the debt servicing.
- Contractual arrangements tend to be simpler than for BOOT; they are less expensive to establish and for this reason the model is more suitable for smaller and short-term projects.

The principal *disadvantages* of the model are:

- It leaves an untidy situation where one party is responsible for routine O&M, whereas another actually owns the infrastructure and may be required to pay for its repair.
- The concessionaire is unlikely to assume responsibility for existing works, and therefore the public partner will have to assume that risk.
- The Company will require a guaranteed revenue stream, which might mean that the public sector may have to assign the output of the existing scheme to concessionaire.
- The cost to the end-user should be less than under a BOOT arrangement, but higher than if the project had been developed and financed entirely in the public sector using public funds (had this been possible).

Both models are suitable for projects where the amount of money involved is relatively small and where it can be raised without resorting to a full Project Financing arrangement. The model is not suitable where larger sums need to be raised using commercial lending on a non-recourse basis, because the Lenders would be unlikely to forego the step-in rights that allow them to take over the assets and appoint a new management team in the event of the project failing^{2/}.

^{2/} For a further explanation of non recourse lending and step-in rights, see Chapter 4, Section 6)

3 PUBLIC SECTOR DEVELOPMENT

Certain types of water infrastructure projects will continue to be implemented in the public sector because they are not suitable for development under the auspices of a private company. This will apply in situations where:

- i) The project is particularly large and complex.
- ii) The physical environment means that the site risks are unacceptably high.
- iii) There are commercial risks that cannot be mitigated.
- iv) An appropriate Enabling Environment is not present.

Under any of these situations the only solution is to leave the primary responsibility for developing and managing the project to the public sector, which must then also assume the lead role in raising the finance. Where the public sector does not have this institutional or financial capacity, it may be bolstered by buying in support from private institutions, but ultimately the responsibilities and risks of a public project must rest primarily with the public sector.

3.1 Parastatal Projects

In the past public projects have traditionally been financed from public sources, usually from central government or the international financing institutions. However in the right circumstance public projects can be financed by private debt using a parastatal company as the responsible borrowing entity, supported by Sovereign Guarantees. The guarantees are necessary because at the outset the parastatal company will usually have no trading record or assets of its own, against which it could pledge its repayment obligations.

The principal *advantages* of this model are:

- The public sector remains firmly in control of the conceptualisation and planning of the project, without any conflict between the requirements of economic and financial viability.
- A parastatal project is free to access both public and private finance, provided creditworthy guarantees are in place.
- The model is likely to provide access to financing that would not be available to a private company, particularly concessionary financing in the poorer countries..
- Procurement of construction is normally through international competitive bidding, so construction costs tend to be lower and it is easier to demonstrate transparency.
- Where important and politically sensitive projects are concerned it is less contentious than private ownership, and it is flexible in the sense that the State is unencumbered if there is a need to re-order operational priorities amongst the different categories of water-user.

The principal *disadvantages* of this model are:

- All of the risks and responsibilities rest on the public sector, and the project may be prone to political interference and bureaucratic delay.
- The arrangement is unsuitable for small projects, as it generally requires capacity building and institutional arrangements that can be expensive and time-consuming to establish.
- The parastatal will need to be backed by Sovereign Guarantees or similar, which count as public debt and may be difficult to obtain for all but the most nationally important projects.

Although the parastatal model has not been widely used for financing water infrastructure in the past, it may become more common in the future in view of the difficulties being experienced with BOOT and the limitations of the BTO/ROM model.

3.2 Public Projects in the Traditional Mode

Public projects that are not suitable for implementation under the auspices of a parastatal company will continue to have to be funded in the traditional manner by the public sector. In the poorer countries these projects will qualify for concessionary funding in the form of grants and credits, and for long-term loans on terms that would not normally be available in the open market (Chapter 4).

As such projects are developed in a non-commercial environment, they are likely to be schemes that have a strong economic or social justification, but only weak financial viability. It is, for example, often very difficult to develop a strong financial case out of flood mitigation or ecological benefits arising from improved river management – and many irrigation schemes are simply not profitable enough to carry the full commercial cost of the supporting water infrastructure.

Although in principle it would still be possible to arrange this type of project on the parastatal model in order to access private funds, it is unlikely that this would prove to be worthwhile unless there was the prospect of substantial revenue which, in the circumstances, is unlikely as it is the reason for the project remaining in the public sector. The alternative is for Governments to borrow on the private market, but as the terms will be harder than those obtainable through the MDBs normal loan facilities this is not an attractive option. Therefore traditional public sector financing is still likely to remain the only option for a sizeable number of infrastructure projects in the developing world unless new financing mechanisms are found.

4 PUBLIC-PRIVATE PARTNERSHIPS

4.1 General

Public-Private Partnerships involve the sharing of risks and responsibilities between the two sectors. It is important to emphasize that the term does not imply any specific financing model, and the actual arrangements have to be developed on a project-by-project basis.

In most cases PPPs are structured either as a private company with a public shareholding, as in Nam Theun 2 (Case study 6) or Theun Hinboun (Case study 3). Alternatively they may be structured as a publicly owned parastatal company, which might choose to access private funds as in the Lesotho Highlands Water Project (Case study 8). In rare cases both models may be found where a project has been geographically split into public and private elements, as in the San Roque project (Case study 5).

In any PPP the sharing of Risks, Responsibilities and Returns (the three “Rs”) between the public and private sectors needs to be very carefully considered. As previously indicated, there will be some risks that the private sector cannot economically bear, and it would be counterproductive for the public sector to force such risks onto the private partner. Equally there will be other risks and responsibilities particularly concerned with the implementation of the project, that the private sector can and should assume. As negotiations on such matters are likely to be complex, it is important that the public sector has a clear understanding of the role that it wants the private partner to play before inviting proposals.

One way of ensuring that the interests of the two sectors are aligned is for the host government or its utility to hold shares in the project company.

4.2 Public Shareholding in a Private Company

In several of the Case Studies described in Chapter 5 it will be seen that there is a public sector shareholding in the private company responsible for executing the project. There can bring both advantages and disadvantages, but it is particularly useful in the context of export projects where it is easier to see a common interest.

The *advantages* of such an arrangement are:

- The injection of public equity into a project eases the financing problem and reduces the amount of equity that the private partner has to find.
- Public equity will often provide access to funds that would not otherwise be available to a totally private project, for example through loans from the international financing institutions.
- Money to purchase the public equity is often made available to the Government on soft terms and on-lent to the state entity concerned at commercial rates. The on-lending margin creates a revenue stream that can be used to finance expenditure in other sectors.
- The presence of a public holding aligns the interest of the public and private partners, and ensures that the Government has access to information on an equal basis with other shareholders.

The *disadvantages* of such an arrangement are:

- The State needs to purchase its shareholding and has to be able to assume the same exposure to risks as the private shareholders, including raising contingent equity if costs overrun or taking losses if things go wrong.
- The inclusion of a public shareholding will dilute the Return on Equity and may lower it to the point where the private partner loses interest in the project.
- Some private Sponsors might not be prepared to include a public partner on commercial grounds, or from a fear that the public partner might not be in a position to assume its full responsibilities as a shareholder.

The argument in favour of a public shareholding is particularly persuasive when it comes to export projects, because there is a significant difference between export and domestic arrangements from the viewpoint of the host Government.

For domestic projects the State's primary interest will be the delivery of water or electricity at the minimum cost, and with the highest standards of reliability. The Government is not concerned with the profitability of the project company and will, if anything, seek to drive it as low as possible by negotiating hard on the tariff. There is relatively little convergence of interest between the public and private sectors, and the concession is basically a commercial bargain to be struck between two independent parties.

However for an export project, the position changes: The host Government is now interested in achieving the highest tariff possible, because the only source of royalty from the exploitation of its natural resources is the headroom that exists between the revenue income and the cost of delivery. In an export the host Government interests are more closely aligned with those of the project company, and if it is to participate in the profitability of the project this can most effectively be achieved by taking a shareholding in the company.

Amongst the case studies there are two private projects exporting electrical energy to a neighbouring country (Nam Theun 2 and Theun Hinboun) and it is notable that both of them involve a significant public holding on behalf of the Host Government of the country in which the project is located. It is likely that this will become normal practice in the future, at least for other projects in the region.

An alternative form of State participation is seen in the AD Hydropower project in Himachal Pradesh, India, where a specified percentage of the deliverable electricity (12% for the first 12 years, rising to 18% for the next 28 years) is given free of charge to the State electricity utility as a form of in-kind royalty. Although not the same as a public shareholding, it does provide a return to the Government and this form of arrangement is now being standardised in India.

5 RESPONSIBILITIES OF THE PUBLIC SECTOR

The public sector will have an important role to play in the financing of most water infrastructure projects, irrespective of whether the scheme is eventually implemented in the public or the private sector. These responsibilities start with the preparation of the project, and will then almost certainly involve a number of mainstream or support activities depending on the actual arrangements adopted

5.1 Preparatory Studies

It is widely reported that preparatory studies are being under-resourced, and that much of the negative view that the private sector has is directly attributable to inadequately prepared projects. It is the responsibility of the public sector to prepare a project thoroughly before soliciting any financial or other form of support from the private sector, because:

- i) The formulation of the project should be guided primarily by economic, social and environmental principles, rather than the narrower financial considerations that will influence the thinking of a private sponsor.
- ii) The private sector is no longer willing to look at projects that are not properly prepared because of the time and cost it takes to bring them to financial closure, and the risk that they might fail before reaching that stage.
- iii) It is necessary for the Government have a financing model in mind, and a clearly defined procurement strategy, before inviting partners to join in the financing or implementation of the project.

The requirements are more demanding than they were in the past. The studies that previously focussed mainly on engineering and economic aspects now need to satisfy very stringent environmental and social criteria. They should address the issue of how the project is to be financed, and how it might be structured for private participation.

All aspects of the project need to be formulated in sufficient detail to satisfy prospective partners that the risks and rewards have been reasonably evaluated and, most importantly, that all the potential obstacles to implementation have been identified and addressed. This means undertaking the following tasks:

- **Engineering studies** including site investigations and other field surveys, to an acceptable international standard so that sensible cost estimates can be established and the principal site risks identified.
- **Environmental and social impact studies**, so that any potential problems are identified at an early stage, mitigation measures planned, with the objective of achieving the necessary consents as early as practical and if possible before the solicitation of private participation.
- **Economic studies** to optimise the project and demonstrate its priority relative to alternatives. It will be necessary to establish that the project is consistent with the wider development strategy for the river basin as a whole.
- **Project structure** options need to be formally identified and studied to determine what financing models might be possible, their relative merits, and the procurement arrangements that would be associated with each.

Once these tasks have been completed, the Government is then in a position to consider moving the project forward to the financing and implementation stage.

5.2 Role of the Host Government and its Agencies

Although the role of the Host Government and its agencies will vary considerably from project to project, it will inevitably include some of the following:

- **Structuring of the project.** The host Government will need to be proactive in structuring the project, and in defining the role that any prospective private partner might play in the implementation and/or the financing of the project.
- **Obtain clearances.** Any potential obstacles that could delay the project at a later stage (for example, the approval of the environmental and social management plan) should be advanced as far as possible before third parties become involved.
- **Risk sharing.** The Government will have to define its position with regard to the sharing of risks amongst the parties to the project, and in particular between the public and the private sectors. The public sector may have to bear some risk as a condition of private participation.
- **Procurement.** The public sector will need to manage the procurement process in a manner that is acceptable to any international financing institutions that might be required to give support.
- **Documentation** (for the private sector involvement). The public sector should ideally take the initiative in the preparation of the key documents such as the Concession and Purchase Agreements, although in practice this seldom happens for financial reasons.
- **Project related activities.** The public partner is likely to be responsible for the procurement of the site and wayleaves, and other project related activities such as resettlement and the environmental and social management programme.
- **Guarantees and Financing.** The host Government may be required to provide Guarantees, or Counter-guarantees to MDBs, in respect of its obligations under the Project Agreements. It may also be required to finance any public equity holding in the project company.
- **Partner in development.** In many projects the public sector will need to be an active partner in development, either as the Owner in the case of a public project, or as one half of a Public-Private Partnership, or as an Equity Holder in the case of a private company.

In most circumstances there will be a need for on-going Government support throughout the life of the project, even if it is only in a monitoring and surveillance role, and this aspect should not be overlooked.

5.3 Institutional Arrangements and Capacity Building

In a number of the Case Studies there was specific mention of the fact that the financing arrangements were addressed early, and often with the assistance of external advisors. This was especially true in the case of projects that were particularly challenging to finance because they were either very large (Lesotho Highlands, Nam Theun 2) or financially weak (Guerdane, Pamir). In each case it appears to have been a beneficial move.

In parallel with the need to address the financing issues at an early stage, there is a need to ensure that the public sector carries out its wider role as efficiently as possible. A large water project will inevitably involve interacting with a number of branches of government, and a prospective private partner will quickly lose interest if he finds himself being passed around from one department to another in a situation where different parts of government may not always be following the same line. The private sector will expect consistency and continuity in its dealings with government and this is usually most effectively achieved through a “one window” operation, where a single agency acts as the conduit for all dealings with the State.

The first step in financing of any significant project must be to ensure that the necessary institutional arrangements are in place, and that there is enough capacity on the Government side to handle the project in terms of both trained manpower and financial resources. This does not necessarily imply a specially-convened organisation, but it does mean that there has to be a public entity with some devolved responsibility that allows it to coordinate the work of the different government departments involved.

Finally, it has to be recognised that the activities described above go far beyond the traditional public sector role as it would have been in the past when projects were implemented under public funding in a non-commercial environment. Many new skills will be needed, and in many countries there is likely to be a requirement for capacity building in this area.

Chapter 4: Financing Instruments

“To be a more effective partner, the World Bank will re-engage with high-reward, high-risk hydraulic infrastructure, using a more effective business model”

Water Resources Sector Strategy, World Bank

“The cost and availability of private financing is inextricably linked with the financier’s perception of risk.”

Report on Seminar on Financing Water infrastructure
Stockholm World Water Week, 2004

“Local capital markets represent an essentially untapped source of funds for infrastructure project.”

Capital Market Financing for Developing Country Infrastructure Projects
United Nations, DESA Discussion Paper No. 28.

Chapter 4: FINANCING INSTRUMENTS

This Chapter is intended to provide an overview of the sources of finance that can be considered, and the circumstances in which they might be used. The range is wide, extending from concessionary funds at one end of the spectrum through to fully commercial financing at the other. The situation is complicated by the fact that while some of the instruments actually provide hard cash, others merely act as conduits; these “credit enhancement mechanisms” make it possible to borrow from other sources on more favourable terms, or access funds that would not otherwise have been available.

The primary objective of any Financing Plan is to combine these instruments in a manner that gives the lowest overall cost, with a repayment schedule that matches the income stream with adequate security. The different types of financing available can be broadly categorised under the five headings shown in the table below.

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 monetised. Carbon credits fall into this category. It is unlikely to be available in sufficient quantities to finance complete water infrastructure projects, but it plays an important role by leveraging other forms of financing and funding 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 commercial financing. Also known as “Guarantees” they cover risk that the market cannot assume, and by doing so improve loan terms and provide wider access to funds.
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 favourable than for normal commercial lending, but it is restricted to the export value plus 15%, and is not widely used for water projects. Funding is usually in hard currency, but some local currency financing is possible. Difficult to obtain for the poorest countries.
Commercial lending	Commercial lending consists primarily of bank loans or bonds raised on the capital markets. 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 softened 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 Return on Equity 15% to 20% p.a. or more depending on the risk. This includes recovery of the original investment as there is generally no asset value when the project is transferred back. Equity can be provided from private or public sources.

1 CONCESSIONARY FINANCING

The rationale behind Concessionary Financing is that additional money is made available to pay for benefits that have high economic value, in terms of “Public Good”, but no direct market value and therefore cannot be monetised in the conventional manner. The commonest form of Concessionary Financing is Official Development Assistance (ODA) which comprises grants, or loans at low interest rates and with long maturities. Carbon Credits fall under the same category, in the sense that they are external payments predicated on the public benefit that the project provides. For the purposes of this document they will therefore be considered under the same heading.

1.1 Official Development Assistance

More commonly known as aid, Official Development Assistance (ODA) is the formal term for the Concessionary Financing provided by a broad spectrum of international financing institutions, including Multilateral Development Banks, Regional Development Banks, bilateral agencies, the various aid funds of the European Union and the United Nations, as well as charitable foundations. The finance is invariably publicly sourced, and is Concessionary because the money is made available free or at less than the full market rate that would be charged by a commercial bank to the country concerned.

The softest terms (“Grants” where no repayment is required, or “Credits” which are zero interest loans) are only available to the poorest countries, which are mainly to be found in Africa, or East and Central Asia. These very soft funds are unlikely to be able to provide the level of finance necessary for major water infrastructure projects, because their quantum is strictly limited and there will always be competition for resources from other financially weak but socially important parts of the economy.

Concessionary finance can play a useful role in making marginally viable projects more attractive to the private sector in a number of ways, including:

- Supporting Technical Assistance studies during the project preparation stage
- Lending for projects at less than fully commercial rates
- Funding parts of projects that are economically important but not commercially viable
- Lending money to Governments for the public equity in private companies
- Through the provision of “Output Based Aid” (to improve project revenue streams)
- By financially supporting Government obligations directly arising from private projects (such as downstream impacts).

Where Concessionary Finance is used in conjunction with other forms of financing to leverage a private project there is likely to be a requirement that, for the purposes of accountability and transparency, the aid should be demonstrably for public benefit.

1.2 Carbon Credits

Carbon credits are not strictly a financing instrument, and are obviously only applicable in certain cases like hydropower where a demonstrable reduction in greenhouse gas emissions can be claimed as a result of the project. Most other forms water infrastructure will not be eligible.

In order to qualify a project has to cross a number of hurdles, in particular by proving additionality^{8/} and quantifying the benefit in terms of avoided emissions. Once the credits are confirmed, it is necessary to trade them through one of the Carbon Funds to convert them into a hard currency revenue stream from the start of commercial operations. By creating an assured revenue stream carbon credits can indirectly assist financing by improving the project’s debt servicing capability.

^{8/} Additionality is a measure of the benefits that the project brings that would not have been available in its absence.

The trading of carbon is still in its infancy and the market has yet to settle at a long-run price. There are wide fluctuations in the market price, with short term contracts ranging up to \$15/tonne (CO₂ equivalent), but this level cannot be assured as the basis for a long-term financing operation. As an indication of the potential, assuming a conservative value of \$5/tonne, carbon credits on a hydro project could be worth between 0.25 USc/kWh and 0.7 USc/kWh, depending on the fuel it is replacing. This is likely to represent between 5% and 10% of the selling price of electricity.

Carbon credits are paid in hard currency on an on-going basis. Given that a typical private hydro concession is 20 to 25 years, at present it is not practical to capitalise them in order to make a direct contribution to the capital financing, although this situation may change in the future. Therefore, while carbon credits can be a useful addition to the project revenue, they are unlikely to dramatically alter the financing position unless the price of carbon increases substantially. In the words of one commentator, they are “*a sweetener, but not the honey pot*”.

2 CREDIT ENHANCEMENT FACILITIES

Credit Enhancement Facilities, or guarantees as they are more commonly known, are intended to improve the terms upon which private finance can be raised for projects in the developing world. By mitigating the risks that the private sector finds difficult to assume, these facilities make it possible to:

- Access new sources of funding
- Reduce borrowing costs
- Extend loan maturities.

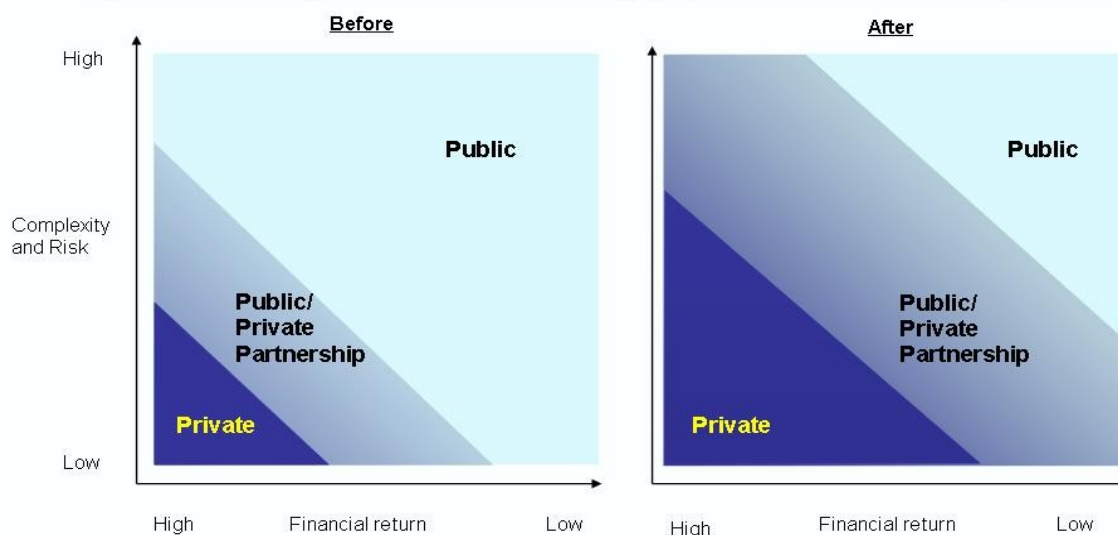
The MDBs are the main sources of Guarantees, and their focus is specifically to protect private debt against a government’s failure to meet its obligations in respect of either private or public projects. Guarantees generally do not cover equity investment or risks of a purely commercial nature. They come in a number of different forms that are tailored to match individual project requirements, but the two basic instruments are:

- i) **Partial Credit Guarantees**, which provides cover against all risks for a specified portion of the commercial debt, so that repayments in respect of that portion are assured whatever the cause. These guarantees have been used to encourage extensions of maturity by covering the debt service obligations in the period of the extension beyond what is normally attainable in the market.
- ii) **Partial or Political Risk Guarantees**, which cover debt service defaults on loans to private sector projects arising as a result of the failure of the government (or any State entity) to honour its obligations under the project agreements. These guarantees usually cover direct sovereign risks such as expropriation, changes in law, war and civil strife.

Credit enhancement facilities are available for projects in all member countries of the issuing bank. The rules vary amongst the MDBs; in some cases they will require counter-guarantees from the host government, and in others guarantees will only be available in conjunction with loans provided by other parts of the same organisation. Irrespective of the type of guarantee, the project will be required to meet all the bank’s normal environmental and social acceptability criteria.

The effect of guarantees is to widen the range of projects that can be financed entirely in the private sector, or as Public-Private Partnerships, as shown in Figure 4.1 overleaf.

Figure 4.1 Financing interest before and after applying credit enhancements and guarantees



New credit enhancement instruments are being developed to reflect a market that is constantly changing. Two recent examples are local currency guarantees in support of local borrowings, and guarantees to cover Host Government obligations (performance risk) associated with Output Based Aid^{9/} when the external aid subsidies have ceased.

From the borrower's perspective guarantees are not an easy option. They can take a long time to establish while the project is being appraised, and they are relatively expensive. They have not been widely used in the water infrastructure sector to date, although a notable recent achievement was the provision of guarantees totalling \$126m in support of lending for the Nam Theun 2 hydro project in Lao PDR.

3 EXPORT CREDITS

Governments provide official financing in support of national exporters through their Export Credit Agencies (ECAs), and they therefore tend to be limited to equipment. The credits made available to foreign buyers are either sourced directly from the ECA concerned, or indirectly from commercial banks under cover of guarantees provided by the agency. The ECAs themselves are either public institutions or private companies operating on behalf of the Government, but irrespective of their constitution the terms under which they all lend are strictly governed by international agreements to ensure a level playing field between exporters.

The advantage of ECA financing is that it is relatively cheap and accessible. At the time of writing (November 2005) the defined Commercial Interest Reference Rates, which are the minimum that can be used in structuring a financing package are about 5.3% for both the USD and GBP^{10/}, and 4.1% for the Euro. Maximum maturity periods depend on the type of project, and are currently 10 years for water schemes and 12 years for conventional power stations - although there are moves to increase this to 15 years for both renewable energy and water projects, in line with the maturities available for nuclear power.

^{9/} As described in Chapter 2, OBA is disbursed on the delivery of the service to improve project revenue streams and mitigate the need for sharp tariff increases.

^{10/} As a point of comparison, current UK Bank Rate at the time was 4.5% and US 4-month LIBOR 4.3%.

The main disadvantage of ECA financing is that it is currently limited to the cost of the exported goods plus a further 15% to cover local costs. For the typical water storage or transfer project, with high civil works content, this leaves a large gap that cannot be covered by ECA funding. There have been moves to raise the limit on local costs for certain types of project, but at the moment this has not received sufficient support. A further problem with ECA funding is that it is generally hard currency lending, although facilities for local currency funding are now being introduced by some ECAs.

Export credits are particularly important in certain sectors. During the 1990s when the level of project financing activity was high, multilateral banks accounted for roughly 17% of developing country debt whereas ECA accounted for over 30%. However most of the ECA lending was in the oil and gas sector, or for thermal power stations, and very little of it was directed towards water projects. The Johannesburg World Summit of 2002 identified water and renewable energy as two priority areas of development where the ECAs could play a larger role, although this has yet to materialise.

4 COMMERCIAL LENDING

Commercial lending will generally be loans from private commercial banks or the publicly owned international financing institutions, or fixed-interest bonds raised on the capital markets. The essential difference between bank lending and bonds is that bank lending is corporate loan, whereas bonds are tradable debt where the risk is carried by the individual bondholder. Commercial lending can be from international or local sources, although in practice local resources are very limited market in most developing countries. The most common form of commercial borrowing for projects is through international bank loans, which are normally syndicated amongst a number of participating banks.

The commercial arm of the MDBs are all important commercial Lenders, either directly from their own resources ("A" Loans) or indirectly through syndication amongst private banks ("B" Loans). While their loans are at market rates, the tenors are often longer than would be obtainable from a purely private transaction and the presence of an MDB as the "Lender of Record" adds confidence.

In theory commercial lending can be on either a "recourse" or "non-recourse" basis. The former involves lending to corporations which then choose to invest in projects, whereas non-recourse financing involves lending directly to the project itself through a special-purpose company. Almost all infrastructure projects are financed on a non-recourse (or limited-recourse^{11/}) basis, which means that the only security for the loans is the project revenue stream. This arrangement is often referred to as "project financing".

The difficulty with project financing is that when the money needs to be raised, the special-purpose company will have no assets and no revenue. In the case of hydropower and similar projects where running costs are low, all of the investment has to be made before the first income is received. In the event of things going wrong, the company has no other resources to draw upon and the lender has no recourse to any other organisation to recover his money.

Given this situation, it is easy to see why commercial Lenders are high risk-averse. As the security of their loan depends on the income from the project, they need to be assured that it is protected under all circumstances. To satisfy themselves they will have to carry out a detailed due diligence analysis, which is a time consuming and expensive exercise. For this reason most commercial Lenders will not contemplate project financing for sums of much less than about \$100m. unless a project is particularly straightforward.

^{11/} In some cases the parent company of the promoter may take a limited exposure to certain risks, in which case the financing arrangement is described as being "limited recourse"

The project financing industry suffered a serious loss of confidence as a result of the financial crises in Asia and South America in the late 1990s, when defaults became commonplace. This was followed by the failure of a number of high profile private infrastructure companies such as Enron, which further damaged confidence. Against this background, anyone seeking to raise commercial loans for anything other than a thoroughly well prepared and robust project will be facing an uphill task.

The Lender's perception of the risks associated with the project will have a strong bearing on the cost and tenor of the loans, and the amount of money that can be raised. Without guarantees, private commercial loans can be expensive and maturities may only be for few years. The other drawbacks are that it is uneconomic to arrange for smaller projects, and mainly in hard currency - although this is now changing, and more local currency financing is becoming available.

5 EQUITY (PRIVATE AND PUBLIC)

Typically between 15% and 40% of the total cost of a private infrastructure project will be subscribed as equity. It will come from the Sponsors and from other investors who are prepared to assume the same risks and rewards, including sometimes the host Government and the MDBs..

The relative proportions of debt and equity is an important consideration when it comes to financing. It not only defines the amount of debt to be raised but, in the eyes of the Lenders who provide the balance of the finance, it is also a measure of the amount of exposure that the owners of the company are prepared to assume.

Projects are described as being highly geared if the debt-equity ratio is high – say 85/15 or more. The share-holders will usually opt for the highest gearing that they can achieve as it will provide the best returns if things go well, and the smallest loss if they go badly. In contrast the Lenders will generally want to see a low-g geared financing plan where there is plenty of the owner's money at risk before the loans are in jeopardy, as in the event of there being financial shortfalls equity will always be forfeited before debt.

It may be necessary to increase the amount of equity simply to reach the total funding requirement, particularly in a situation where project debt is expensive or difficult to obtain. This gap may be closed by taking in other private investors, or by involving the Government as a shareholder which can have other advantages as already described in Chapter 3, Section 4 above.

Equity is usually a more expensive form of financing than loans. Most equity holders investing in developing world infrastructure will expect returns of around 15 to 20% p.a. or more depending on the perceived risks. However it is not possible to make a direct comparison between the cost of loans and equity, because the return on equity has to reflect the assumed risk and the fact that the investor's original capital outlay is not recovered through a sale of shares if (as is usual) the assets are transferred back free of charge at the end of the concession.

Historically most private equity has been provided by foreign companies, but some negative experiences have resulted in there being fewer credible players in this market than there were. A lot has changed since the heady days of the early-1990s when western utilities and private corporations saw infrastructure in the developing world as major new market opportunity. Reorganisation at home, combined with a series of expensive failures on overseas projects, has led many international companies to refocus their business priorities on more secure markets in the developed economies.

This decline has being partially offset by the increasing involvement of local companies acting both as project sponsors and providers of equity. Most major concessions are now based on joint-ventures between international and local firms. Of the seven private projects studied for this report, five included equity from local or regional companies. If the holdings by the Host Government are excluded, local equity typically accounted for only 15% to 20% of the total equity raised, although if regional funds are

included this goes up to maximum of 40% (Nam Theun 2 – Case study 6). Locally sourced equity will therefore make a contribution in many cases, but in the poorest countries it will still be limited and there will continue to be a heavy reliance on foreign sponsors and the public international financing institutions.

Most international financing institutions (such as IFC, ADB, EBRD and some bilateral agencies like CDC and KfW) will also make direct equity investments in private projects. They will normally only take a minority shareholding and usually do not expect to play an active role in managing the project company. Their participation is primarily intended to act as a catalyst by providing confidence to other investors.

6 THE FINANCING PLAN

The financing plan for any project is a combination of the financing instruments described above. The underlying objective will be to raise the money at the least cost and with a repayment profile that matches the revenue stream. In practice a large number of factors will determine the optimum plan, and it can be a time-consuming and costly process putting all of the component parts into place. For this reason most sponsors of large projects involve advisors at an early stage to assist in the financial structuring of the project.

In some cases, where the sponsor is well informed and experienced, Financial Advisors are appointed to assist in the arrangement of the commercial loans. They will act only in an advisory role, and will generally be precluded from actually acting as Lenders to avoid any conflict of interest. However it is often necessary to step further back from this, and to address the issue of the structuring of the project as a whole with a view to achieving a bankable project which might require a mix of various types of Concessionary finance, export credits, equity and commercial lending. In these circumstances the MDBs are well placed to provide the necessary advice and assistance, as they did on five of the eight Case Studies examined.

Where projects are particularly complex the MDBs can play a number of roles, and can offer financing through a variety of instruments depending on the nature of the project and the country in which it is located. Although the detailed terms and conditions vary from organisation to organisation, most of the major MDBs are able to draw upon a similar array of financing instruments. It is important to understand the terms applicable to each instrument. As an example a summary of the terms associated with the main financing instruments offered by the World Bank Group is given below (see box).

World Bank Group: Principal terms for financing

IDA credits (for the poorest countries) are provided on very soft terms (e.g. 3/4% with 40 year maturity) direct to the Government, which may then pass on the credit to the utility at commercial interest rates and maturities. There are limits on the amount of IDA funding available to each country each year. The spread between the terms of the IDA credit to the Government and the on-lending rate can be used to subsidise the project itself (Pamir – Case study 7) or to generate revenue for the other sectors (Nam Theun 2 – Case study 6).

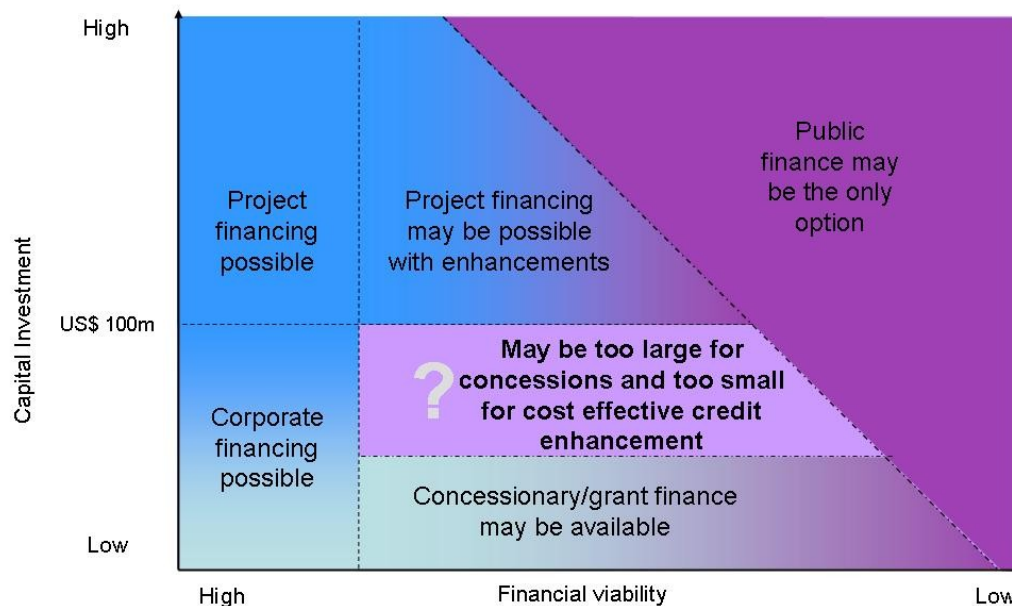
IBRD loans can be provided either to Government or direct to the public sector client (in which case a Government guarantee is required) at near-market rates, but with longer maturities that would be available in the commercial sector (even if they were available, which will often not be the case).

When IBRD/IDA provides Guarantees under the credit enhancement program, the Host Government is only required to make provision for 25% of the amount of commercial lending covered. This reduces the pressure on the public budget and raises the ceiling on IDA allocations.

IFC provides commercial loans to private companies and takes equity in private projects on essentially the same terms as the private commercial sector.

One factor that will have a strong bearing on the financing arrangements is the size of the project. It has already been noted that very large and complex projects may have to remain in the public sector, although they can still be privately financed. At the other end of the spectrum, projects that are too small for project financing arrangements, and too risky for direct corporate financing, may require more money than is available from concessionary financing alone. This creates a potential financing gap, which is difficult to fill. The problem is illustrated in Figure 4.2.

Figure 4-2 Financing Options – and the gap?



When smaller projects are financially viable, and have an acceptable risks profile, they might be financed in the corporate sector on the strength of the balance sheet of a larger organisation, but this will be very rare in the case of most water infrastructure schemes.

Two of the Case Studies fall within this gap. Both Guerdane (Case study 4) and Pamir (Case study 7) illustrate the difficulty that occurs when projects are too small for conventional project financing arrangements supported by guarantees, yet too large to be developed entirely under concessionary funding. In each case the problem was solved by innovative financing which ultimately rests on large subsidies. The motivation in implementing the projects using a commercial company was to impose the disciplines of the private sector, rather than specifically to access private finance. The models used are effectively placing a private wrap around what are essentially still publicly financed projects.

Guerdane and Pamir are in some respects true Public-Private Partnerships because they both required a heavy mix of concessionary funding and commercial money, assembled in a package which had to be specifically tailored to suit the situation. Although most dam and multipurpose projects will be above this minimum financing threshold, the financing gap for smaller projects is likely to remain a difficult area when it comes to accessing private funds.

Chapter 5: Case Studies

“The reliance on private project sponsors to develop hydropower projects in developing countries has not worked as had been anticipated”

*Hon. Daudi Migereko, Minister of State for Energy, Uganda
Speech at Stockholm conference, 2004*

“Amongst the multilateral PRI (Political Risk Insurance) institutions, MIGA has made only one payment since starting operations in 1990. Few countries are willing to default on an exposure to a multilateral institution....”

Review of Political Risk Guarantees, Asian Development Bank, 2000

“No single model is likely to be applicable to all situations but the lack of established precedents means that much time and money is being wasted in abortive bids and protracted negotiations leading to high transaction costs. Governments need guidanceaimed at a higher success rate based on a well prepared solicitation process”

*Financing of Private Hydropower Projects
World Bank Discussion Paper 420*

Chapter 5: CASE STUDIES

Eight case studies have been selected to illustrate the issues raised in the previous chapters. Amongst the selected projects there is a wide spectrum of financing models, ranging from a private project that is being funded entirely in the private sector without any public support, through to a large public water transfer scheme being developed using mainly private finance. The key features of the candidate projects are outlined in the table below.

Project	Comment
Allain-Duhangan Hydropower, India	This is an example of a medium-sized private project (\$191m) 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
Izmit Bulk Water Supply Turkey	Involving a large dam and over 100km of trunk mains and other works, this \$960m project was eventually implemented by a private company after the public sector had failed to finance it. One of the few examples of a BOOT bulk water supply project
Theun Hinboun Hydropower Lao PDR	An early example of a private hydro project exporting power to a larger neighbour. It benefited from a high level of public support, and there is a majority public holding. This project has recently been successfully refinanced, and is being extended.
Guerdane Irrigation Supply Morocco	This involves the construction and operation of a new water supply to an existing irrigation scheme. The concession was awarded to a private company, but in order to keep tariffs within acceptable limits there has been an injection of public financing.
San Roque Multipurpose Philippines	Another project that failed in the public sector, and was then successfully implemented as Public-Private Partnership. One of the few examples of a "Split Ownership", where the project is geographically divided into public and private parts.
Nam Theun 2 Hydropower Lao PDR	Recently achieved financial closure after 12 years preparation, it is one of the largest private financings of any hydro project. The total cost of \$1,400m. was financed through a complex mix of commercial loans, guarantees, private equity and aid.
Pamir Rural Hydropower Tajikistan	Although only a small project, this is an example of how socially essential infrastructure can be developed under the aegis of the private sector in a weak economic environment, by mixing commercial and concessionary funding, and Output Based Aid.
Lesotho Highlands Water Southern Africa	This huge water transfer and hydro project, costing \$2,800 in the first phase alone, shows how public infrastructure can be financed from private sources. It is also an example of how large and complex projects can be financed under very difficult conditions.

The features of each of the candidate projects is shown in Table 5.1 below, and the salient characteristics surrounding the financing of each are described in this Chapter in the same order. More general information on each of the projects studied is provided in Annex A.

Table 5.1: Candidate Projects: Showing Size and Financing Models Used

Project	Purpose	Cost (\$)	Model
Allain-Duhangan, India	Hydropower	191m	BOOT
Izmit, Turkey	Bulk water supply	960m	BOOT
Theun Hinboun, Laos	Hydropower	270m	BOOT
Guerdane, Morocco	Irrigation	85m	BTO
San Roque, Philippines	Multi-purpose	1,200m	BOOT/Public
Nam Then 2, Laos	Hydropower	1,250m	BOOT
Pamir, Tajikistan	Hydropower	26m	BTO
Lesotho Highlands, Africa	Multi-purpose	2,800m	Parastatal

1. PRIVATE PROJECT WITHOUT ANY PUBLIC SECTOR SUPPORT

Allain-Duhangan HEP, Himachal Pradesh, India

Key features

This \$191m (120 MW) project is being developed under BOOT arrangements by a sponsor who is a joint-venture of Indian and European companies. Both companies have established track records in private hydro development. The Indian partner is an industrial conglomerate, which first developed a 13.5 MW run of river project in the early 1990s and then went on to an 86 MW project. The international partner, Statkraft Norfund Power (SNP), is a joint venture between the Norwegian power utility Statkraft SF and the Norwegian Investment fund for Developing Countries.

- The project is being developed by companies who have an established track record in private hydropower development. The local partner brings a captive market for some of the output if it cannot be sold on the open market. SNP brings international credibility and strength.
- IFC is involved, both as a lender and as a minority equity holder. This is an important factor in the financing, as it was proving difficult to obtain long-term financing in the local capital markets at competitive rates.
- The project is being financed on a notional 65/35 debt-equity ratio, comprising 60% senior debt provided by IFC and local banks, and 5% subordinated debt put up by the sponsor to cover cost overruns. In effect this results in a relatively conservative 60/40 debt-equity ratio.
- The project will be largely built by local contractors and suppliers, and will incur most of its costs in local currency. It is being financed mainly in local currency, as the IFC debt is denominated in rupees. In this way currency devaluation risk is largely eliminated.

- Financing has been arranged without any long-term offtake agreement, which is very unusual. This is only possible because there are a number of potential buyers, including a captive offtaker, and the price is competitive in a power hungry market. Due to the poor credit-worthiness of the State Electricity Boards, the sponsor expects to sell most of the electricity to the Power Trading Corporation.
- Under the standard arrangements, the State Government will receive as a royalty-in-kind 12% of the deliverable energy for the first 12 years, and 18% for the following 28 years. The Government of India will receive income tax from the project company. The present value of these fiscal impacts is estimated to be \$41m.
- Financing was not dependent on external guarantees, because the project was considered to be robust enough to survive on its own merits, and the cost of guarantees was therefore eliminated.
- Whilst there was initial opposition to the project, the sponsor responded by taking care in handling community relations and getting local support based on benefit sharing. As there is no dam involved the impact is relatively limited.
- IFC played a leading role by developing a credible financing structure and lending the equivalent of \$40m in local currency as an “A” Loan. On the basis of this it was possible to arrange other loans equivalent to a further \$75 from local banks.

Comment

Allain-Duhangan is an example of a project that sits firmly at the private end of the spectrum. It was made bankable through the strength of its sponsors and the involvement of IFC, which made it possible to derive much of the financing in rupee denominated funds and therefore remove the currency devaluation risk.

This is a BOOT arrangement as it was originally envisaged but is seldom achieved. The model places no burdens on the public sector, other than the award of the concession to the site, and all of the risks are assumed by the private developer. If the project fails the public sector is not exposed, although it obviously loses the power supply. However there is no binding obligation on the part of the private developer to provide the supply to a public utility, and this means that the model is only suitable for projects where the output is not vital for the maintenance of an essential service.

The model obviously requires a project that is financially robust and where it is possible to match the financing with the revenue stream, thereby remove the exposure to currency devaluation. It would be difficult to achieve this in a less mature economy.

It is unusual to be able to arrange project financing in the developing world without a revenue stream secured by a long-term offtake agreement. In this case special circumstances applied, which ensured that the project company could sell the power - there was a strong underlying market that could be accessed through a number of routes - but these favourable circumstances are unlikely to be widely repeated for most water infrastructure projects.

In summary, this model has attractions for the government in that it effectively shifts all of the responsibility onto the private sector, but it is unlikely to be widely applicable for the reasons stated above. The model is not suitable for projects where the output has to be assured - for strategic, economic, social or any other reason - because the private company is not bound in any way to provide the service with any degree of reliability or to any particular entity.

2. PRIVATE PROJECT WITH PUBLIC OFFTAKE OBLIGATIONS

Izmit Water Supply Project, Turkey

Key features

This is one of the few examples of private sector bulk water supply project, carried out under BOOT arrangements. The scheme was urgently needed to prevent serious water shortages causing social and economic hardship, and to arrest the ecological degradation of a natural lake which was being overdrawn for industrial water supply in the Izmit area. The State had tried to develop the project in the public sector, but the works had stopped through lack of public finance. The project was taken over by a private consortium lead by Thames Water International (TWI), a leading UK utility company, and it was implemented in the late-1990s.

- Originally conceived as a means of augmenting the water supply to Istanbul as well as Izmit, when the private sector became involved it became necessary to rescope the project and reduced it in size to make it financially more viable.
- Negotiations took seven years, partially as a result of the Turkish Government having an unclear position on the legality of BOOT concessions. In particular there were concerns over such issues as international arbitration and sovereign guarantees.
- Under a concession granted by the Greater Izmit Municipality, a special purpose Project Company was established to finance, develop and operate the project for a period of 15 years after commissioning.
- The shareholders in the Project Company were TWI (56%), Japanese and local contractors engaged on the construction (30%) and the Municipality (14%). In addition to managing implementation, TWI was also contracted to operate and maintain the project. There were therefore a number of potential conflicts of interest arising from the multiple roles of the shareholders.
- The total investment of \$960m was financed on a 15/85 equity-debt split. Debt funding was largely through export credits - principally for imported steel and iron pipes - which accounted for nearly 60% of the total cost. The original plan was to use locally manufactured concrete pipes.
- The actual cost of construction was \$580m, procured through a fixed-price turnkey contract. This was a realistic strategy because site risks were already known through the previous involvement the Turkish contractor (also an equity partner) on the works when they were being publicly funded.
- The project was financially robust enough to allow full recovery of costs and repayment of the equity over a relatively short operating period of 15 years. A significant factor in this was that the relatively large proportion of ECA funding in the financing plan.
- In terms of risk sharing, the Municipality purchased water in bulk on a take-or-pay basis and therefore assumed the full market risk, while the Project Company carried the hydrological risk. The contracting consortium carried the full construction risk.
- The payment obligations of the Municipality are backed by a Turkish Government Sovereign Guarantee, while TWI's obligations under the O&M contract are backed by a Parent Company Guarantee from Thames Water.

Comment

It is not uncommon to find an essential project that has been started in the public sector and then failed through lack of financing, only to be revived later by a private developer. Amongst the eight candidate projects considered, San Roque in the Philippines also falls into this category.

Financing of the Izmit project undoubtedly hinged around the provision of Sovereign Guarantees by the government, without which it would have almost certainly failed. At the time the International Monetary Fund was putting pressure on Turkey to prevent it giving such guarantees for all but essential projects.

Another important factor was the extensive use made of export credits. Again, the project would probably not have been bankable without such financing as the market for commercial project debt in Turkey was almost non-existent at the time, and loan tenors were very short. It was clearly a conscious decision to maximise ECA funding for financing reasons, despite the fact that the pipes could have been manufactured locally and there was no doubt an associated price premium. However any additional cost of sourcing the materials from abroad should be measured against the fact that the alternative would probably have been that the project did not proceed.

The project was financed on a relatively high debt-equity ratio of 85/15, which was only possible because the Project Company as well protected from risk and the high ECA content meant that there was less dependence on commercial credits. If the project had been less highly geared, the Return of Equity - which it is understood was estimated to be 14% - would have been diluted, and might have been unacceptably low.

The contract arrangements are of note because, in common with many similar private projects, there are number of overlapping interests between shareholders and the contractors involved with either the construction or the operation of the plant. This situation always causes concern because there are inevitably potential conflicts of interest, which means that impartial third parties have to be engaged to ensure that the right checks and balances are in place. In this case there was an independent Project Manager involved, and an Owner's Engineer working for the Project Company.

Risks were well distributed amongst the parties. By selling water in bulk on a take-or-pay basis, with the payment guaranteed by the Government, the owner was relieved of all downstream commercial risk. He was able to lay off the construction risk under a fixed-price turnkey contract because the dam, the riskiest part of the works, had already been started by the local civil contractor Gama who was both an owner and a member of the construction consortium. One consequence of the high level of ECA funding was that financing was substantially in hard currency, which obviously exposed the Municipality to devaluation risk.

3. EXPORT PROJECT WITH MAJORITY PUBLIC HOLDING (REFINANCED)

Theun Hinboun HEP, Lao PDR

Key features

Theun Hinboun was the first project built for the export of Lao power to Thailand, under an MOU signed between the two governments in 1993. Completed in 1998, the 120 MW project sells nearly all its output under a long-term PPA to the Electricity Generating Authority of Thailand (EGAT). It was developed under a BOOT model, the Sponsors being two Nordic utilities^{12/} and MDX of Thailand. The public power utility in Laos, EDL, has a 60% shareholding.

^{12/} Statkraft of Norway and Vatenfall of Sweden, although Statkraft later took over the Vatenfall holding.

The project was buffeted by the Asian financial crisis, but its operating performance since completion has been robust and in 2001 the company decided to optimise its financial performance through a refinancing operation that was successfully completed the following year.

- The estimated cost was \$306m but after a saving of \$40m, mainly on the construction, the final cost was \$270m. As a result of this cost saving and the Asian financial crisis, the originally planned debt-equity ratio of 75/35 eventually became 55/45.
- Unlike most private projects, construction was arranged along traditional lines, with the owner managing separate contracts for the different types of work and accepting the overall completion and performance risk. Construction was completed on time and under budget.
- The financial crisis occurred during construction. The Thai banks, which were to supply about half of the debt, were unable to meet their drawdown obligations. In consequence the Sponsors had to find more equity and raise more US\$ funds, so that the baht facility ended up representing less than 30% of the debt.
- The project benefited from a high degree of public support, including soft loans and grants for project preparation. ADB and Nordic aid provided soft loans to government, which were then on-lent to EDL at commercial rates for its equity holding. This created an additional revenue stream for the government.
- Project debt came mainly from the ECAs and commercial loans from international and Thai banks. To reduce exposure to currency fluctuations, the original financing package was structured (at the then prevailing exchange rate) to mirror the PPA tariff, which was denominated 50% in baht and 50% in US\$.
- As a result of currency movements, the tariff for 2002 in US\$ terms was reduced by over 21%, from 5.02c/kwh to 3.94c/kwh. Despite this, the project performed well in financial terms - partially as a result of the delayed start on the Nam Theun 2 project upstream which, when it is eventually commissioned in 2009, will reduce flows at Theun Hinboun.
- Financial restructuring took place after four years of commercial operation, when the project could demonstrate a profitable track record and the construction risk was past. The main purpose was to reduce currency exposure by realigning the currency of the debt to match the revenue, and to achieve a capital reduction through a debt for equity swap.
- The restructuring raised \$152m., mainly in Baht on the local Thai market, on more favourable terms than the original borrowings. The money was used to refinance part of the original debt, and to release \$55m. to the shareholders through a capital reduction that increased the debt-equity ratio to 70/30.
- As a result of the refinancing and the strong dividend stream, the shareholders have recovered the nominal value of their original investment within four years of commercial operation. The project is also producing royalties for the Lao Government currently worth around \$4m/year.
- It is intended to use some of the capital released by the refinancing to upgrade the project, and the Sponsors are looking at other potential IPP hydro projects in the region.

Comment

Theun Hinboun illustrates a number of important points, but perhaps the most significant is the benefit that refinancing can bring in terms of reducing risk, securing better terms and releasing capital for further investment. It also demonstrates the additional support that a large public holding can bring when it comes to raising finance for what are perceived to be risky projects.

The case study also demonstrates how even the best laid plans can go astray when there is serious financial dislocation. Although care had been taken to structure the currency split of the original financing to mirror the tariff, this was thrown into turmoil when the local capital market collapsed and the Thai banks were unable to service the drawdown requests. As a result the Sponsors had to access money from other sources, and the project became exposed to the risk of devaluation that had not previously been present.

The background of the foreign Sponsors played a significant role in the success of the project. Both had extensive experience of hydropower development, and they had sufficient confidence and strength to opt for traditional construction arrangements where the owner assumes more risk (at least theoretically) but retains more control. This appears to have paid off well. And being themselves public entities, they enjoyed a lot of public sector support from ADB and the Nordic aid agencies.

The original financing was greatly helped by the 60% EDL holding, which meant that over one-quarter of the total cost (60% of the 45% equity = 27%) was indirectly sourced by ODA funds, mainly from ADB. From the wider national perspective, these funds created an additional benefit for the Government through the revenue stream created by the on-lending arrangements.

Despite the general loss in confidence caused by the financial crisis, the project was successfully refinanced on more favourable terms than before, and without the need for political risk cover. The refinancing was organised through Thai banks, and the money was mainly raised on the Thai market. As refinancing was undertaken when the project was able to demonstrate a profitable track record, the negotiating position of the Project Company was much stronger than it was at the original financing.

4. PRIVATE OPERATING CONCESSION, SUBSIDISED BY PUBLIC FINANCE

Guerdane Irrigation Project, Morocco

Key features

A private operator has been given a concession for the construction and operation of a water conveyance and distribution system to serve 10,000 ha of irrigated citrus farms, on which about 100,000 people depend for a living. In the past private wells had been the only source of water, but due to over-exploitation groundwater levels were falling at an unsustainable rate. The project is structured as a public-private partnership, and is believed to be the first of its kind in the irrigation sector. In 2004 the concession was awarded to consortium of foreign and local companies led by a Moroccan industrial conglomerate.

- The objective of the project is to delegate public services to a private operator under a 30-year concession. The Government motivation is to decrease public spending, improve water management and remove risk from the public sector, while at the same time ensuring that tariffs remain affordable.
- New works are needed to deliver water from an existing reservoir 90 km away, at a capital cost of \$85m. The principal project components are the trunk pipeline, and the associated distribution network.
- The model selected was BTO (Build-Transfer-Operate) under which the concessionaire is responsible for construction of the works, including their financing, but ownership of the assets transfers to the state on completion.
- Under the concession arrangements all of the financial, operational and commercial risks rest with the private concessionaire - with the exception of the hydrological risk, which is shared by the concessionaire with the farmers and the State.

- The concessionaire recovers his costs through the tariff. He is responsible for collecting the revenue from the farmers, but he has no guaranteed offtake and therefore assumes the full market risk. He is not obliged to start construction until 80% of the farmers have signed up, and has the right to divert flow to other users in the event of the supply not being fully used.
- Affordability was a key issue in structuring the financing model. As the farmers could not have borne the full cost of private financing, there is a substantial public subsidy equivalent to around \$50m, of which half is grant and the remainder a very soft loan (30 year maturity, 1% p.a.). In effect this only leaves the private partner to raise \$35m.
- The government has assigned to the concessionaire the responsibility for design of the project within certain defined parameters which are intended to ensure a good quality of service and minimal environmental impact.
- Projected tariff is \$0.20/m³, which is roughly what the farmers are paying at present to extract groundwater and less than they would have had to pay in the future with water levels are dropping 2.5m/year on average. There is a right to suspend supplies for non-payment.
- Procurement was through a competitive call for tenders, judged on the basis of the lowest tariff required by the private concessionaire for a given level of public sector funding. The first round of bidding failed because the selection criteria was aimed at international operators with high expertise, and the process was conducted shortly after the Argentinean currency crisis when confidence in foreign currency investment in overseas infrastructure was at an all-time low.
- The project was re-bid about two years later, with the prequalification criteria altered to encourage local investors, with less dependence on international foreign currency financing. Two locally led consortia, both with foreign partners, submitted proposals at the next attempt, and a contract was concluded with one of them in 2004 and it is understood that the construction has now started.

Comment

This model illustrates how a project that is not financially strong enough in its own right can be structured for private sector participation by public subsidy. In this case the public came in the form of a capital grant and a soft loan, which together made up nearly 60% of the capital cost. The size of this public contribution clearly greatly eased the problem of raising the rest of the financing

This is one of the few Case Studies in which the concession was competitively procured. It was relatively easy to achieve this because the project is technically straightforward and the public funding element was declared in advance. This meant that the private sector bidders faced few uncertainties.

The other factor that makes this project very bankable is the fact that the revenue stream is relatively large in proportion to the \$35m of additional private funding actually needed. If the full supply of 45Mm³/year is fully taken up by the farmers, the annual revenue will be of the order of \$9m/year.

Although the public sector has effectively transferred most of the project risks to the private sector, from the viewpoint of the private concessionaire they are not large. The hydrological risk is capped at 15%, and the market risk is mitigated by the fact that the citrus farms are well established with a secure market and there are no cheaper alternative water supplies. Furthermore any water that is not subscribed can be reallocated to other farmers in the area. Construction risks are generally not large for pipelines and the Government is responsible for securing the wayleaves.

In summary, this is an effectively a long-term Operating Concession with the obligation to finance and construct new works at the outset. By using this model the Government has relieved itself of the on-going responsibility for the management of the project, although it has still had to make a substantial contribution to the capital cost to keep tariffs affordable. The same objective can be achieved through the use of Output Based Aid, which was used on the Pamir project, as described below.

5. PROJECT UNDER SPLIT PUBLIC-PRIVATE OWNERSHIP

San Roque Multipurpose Project, Philippines

Key features

This large storage project adds 345 MW 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. The project is the third in a series of proposed dams being built under the Agno River Basin Development Plan. It was started in the early-1980s as a public sector project, but stopped when the Government unable to maintain the financing. After several other false starts, the development of the project as a Public-Private Partnership was finally approved in 1997. Under the agreement the overall management of the project was placed in the hands of the private sector, but ownership was geographically split into public and private parts. The project was commissioned in 2003.

- At a cost of about \$1,200m, and with its main component being a 200m high embankment dam, San Roque was too large and risky for the private sector. An added problem was its poor financial viability, as much of the benefit lay in sectors with only weak revenue potential.
- The economic, environmental and social justification for the project was strong because there was an urgent need to increase food production and raise living standards in the region, and the dam was required to mitigate serious siltation and flooding problems downstream.
- In 1996 the national power utility NAPOCOR solicited bids for the development on the basis that the power complex would be treated as a commercially separate BOOT project, while the dam, spillway and transmission line would be treated as public sector works and be financed accordingly. Six consortia pre-qualified but only one actually submitted a bid.
- A special purpose company, the San Roque Power Corporation (SRPC) was established to manage the construction of the whole project, and to undertake the development of the power complex on the basis of a 25 year BOOT concession. At the time SPC was 100% privately owned by Sithe Energy of the USA, and Marubeni and Kansai Electric of Japan^{13/}.
- The power complex, which includes the intake, powerhouse and tailrace, cost \$580m. It was financed on a relatively high debt-equity ratio (77/23) which reflected the fact that by hydro standards the risk was perceived to be small. The bulk of the debt financing was Japanese export credits, and commercial lending from the Export-Import Bank of Japan (JEXIM).
- The dam and associated works were financed as a public sector project that qualified for concessionary funding. This included a \$400m, 15 year loan from JEXIM (now the Japanese Bank for International Cooperation) to the Government, which was raised on behalf of the “non-power” beneficiaries of the project.
- Under the power purchase agreement NAPOCOR assumed the full market risk through a take-or-pay arrangement, denominated in US\$ and Yen. The utility’s payment obligations are backed by Sovereign Guarantee. There is no payment for the water.
- Risk is shared between the public and private partners. SRPC has responsibility for managing the entire project, but hydrological risk is with NAPOCOR and indirectly with the irrigators. Construction risk was entirely passed to the turnkey contractor, who built the complete project, both public and private elements, under as single EPC contract.

^{13/} Since completion of the project Sithe Energy has sold out its holding to Marubeni.

- The project was the subject of considerable opposition, mainly on resettlement and compensation issues. This caused delays during construction, and at one point JEXIM suspended payments for six months pending an examination of the issues. This created a serious cash flow problem which the developer was only able to contain through the cooperation of the contractor and through his own resources.

Comment

This model again illustrates the way in which a project that is not entirely viable in the private sector can be made suitable for private sector participation. In this instance it was achieved by splitting the project into geographically separate sections. The separation was made easier by the fact that it was clearly possible to equate the storage created by the dam as being primarily for the benefit of the financially weak but economically important “non power” benefits.

The private sector financed approximately half of the overall project cost. By excising the main civil works from the private portion, the financing of the BOOT element was made relatively easy because it was possible to finance much of the power complex using export credits.

There was a strong Japanese participation in the project, and this undoubtedly was an important factor in the financing. The bulk of the funding came from Japanese sources, and Japanese firms played a central role at all levels to the extent that it was almost a bilateral project. Their support included soft loans for the public portion as well as commercial lending and export credits for the private part of the project.

With projects where there is split responsibility for different elements, one issue that needs to be carefully addressed is the interfacing between the parts in both technical and contractual terms. In this instance it was successfully resolved by making the private partner responsible for the management of the entire project, and by placing the construction of both parts into the hands of a single contractor.

This is a relatively rare example of a project developed under split ownership, but it is likely to be more widely used in the future where it is not possible, or perhaps desirable, to place the project entirely in the hands of the private sector. However it did rest heavily on bilateral support from Japan, without which the project would probably not have been funded. In the end the suitability of this approach will depend on the nature of the project, and whether it can be convincingly sub-divided so that a commercially viable and bankable component can be separately handled.

6. PRIVATE EXPORT PROJECT WITH A MINORITY PUBLIC HOLDING

Nam Theun 2 HEP, Lao PDR

Key features

In common with Theun Hinboun, this is part of the programme for developing Loai hydropower for export to the Electricity Generating Authority of Thailand (EGAT). In many respects a landmark project, Nam Theun 2 is one of the world’s largest cross-border private power schemes. The project was first assigned for private development to an Australian led group of sponsors in 1993, but before reaching financial closure it was seriously delayed by a combination of opposition from NGOs and the Asian financial crisis.

When the project restarted in 2000, the original Lead Sponsor had withdrawn, and was replaced by the French power utility EDF. Under the changed circumstances EGAT negotiated a lower energy price, but at the same time required more capacity which increased the cost. The 1,070 MW project will now provide 995 MW of power for export, and 75 MW for domestic consumption. When financial closure was eventually achieved in 2005, twelve years after the signing of the MOU granting the private

concession, it was the largest international financing of an independent power project in Asia since the financial crisis.

- The \$1,250m project is being developed on a BOOT basis by a locally registered special purpose company, the Nam Theun 2 Power Company (NTPC), in which the Government of Laos has a 25% holding. NTPC has contracted to finance and develop the project, and to operate it for 25 years after which it will revert free of charge to the State.
- The Government will receive dividends, royalties and taxes that will average \$80m/year over the concession period. This is equivalent to about 60% of the combined national expenditure on health and education.
- Financing hinges around the 25 year PPA signed between NTPC and EGAT. Under the terms of this agreement, NTPC will make available 5,636 GWh/year, to be purchased on a take-or-pay basis at a predefined (energy only) tariff denominated half in US\$ and half in Thai Baht. The financing has been arranged to reflect this 50/50 split between international and local currency to avoid exposure to local currency devaluation.
- Government equity to the sum of \$87m 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 (the Government holding company) at commercial rates, thereby creating an additional revenue stream to be used in other sectors.
- Financing has been arranged on a 72/28 debt-equity ratio at the base cost of \$1,250m. About 85% 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 mobilise over \$1,000m of private debt.
- International debt totalling some \$350m 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 (\$500m) which is uncovered for both Thai and Lao political risks.
- The contract arrangements for construction are complex. The Head Contractor, who has overall turnkey responsibility for delivering the project, actually awards the work to five subcontractors, also on a turnkey basis, whose price is competitively bid^{14/} and passed through directly to the owner. This arrangement has been devised to satisfy the transparency requirements of the MDBs.
- All of the private sponsors in NTPC have other interests in the project. The Lead Sponsor EDF (35% holding) is also acting as the Head Contractor while one of its partners, Italian-Thai (15%) has construction contracts and the other, EGCO (25%), is part-owned by EGAT. To prevent conflicts of interest a number of checks and balances have been put in place.
- Most of the construction risks are borne either by the Head Contractor (EDF) or its five sub-contractors who have fixed-price contracts but with some provision for the sharing of geological risk with the Head Contractor and NTPC. The hydrological risk is shared between NTPC and EGAT. The Government is protected from exposure, except through its 25% holding in NTPC.
- The project is accompanied by extensive social and environmental management programme (EMP), which will be implemented by GOL agencies assisted by NTPC. It includes resettlement, and social services, infrastructure works, environmental protection, wildlife management, water quality monitoring and watershed protection. The project is providing \$49m to cover the cost of the EMP.

^{14/} Four out of the five subcontracts were competitively bid, and the price of the fifth was verified against the others.

Comment

Nam Theun 2 demonstrates that it is possible to privately finance a large and complex project in a small and economically weak country. It also demonstrates how a single project can dramatically improve economic growth, and contribute to poverty reduction and environmental protection^{15/}.

But it took 12 years to reach financial closure, and the Sponsors spent over \$70m of their own money at risk without any guarantee that the project would proceed. On top of this the costs to the MDBs and the other organisations involved in project appraisal and preparation are believed to be approaching \$10m. It is unlikely that private sponsors would be prepared to repeat this level of front-end expenditure in the future.

There are a number of factors that make this a special situation. To start with, the project suffered very badly from being delayed when it was initially moving towards financial closure in 1996/97. The delay was initially caused by NGO opposition that eventually led to the World Bank requiring additional studies, and by the time that these had been completed the region was in the grip of a serious financial crisis. When the project did eventually restart after about three years, the PPA had to be renegotiated on significantly less favourable terms and the cost for the sponsors had continued to escalate.

Although it would have been difficult to have entirely prevented the delays in this case, the experience underlines the importance of the public sector preparing projects as thoroughly as possible before the private sector becomes involved.

Financing was arranged to match the currency split of the revenue stream. Despite the unfortunate experience of Theun Hinboun, when Thai banks failed to meet their drawdown obligations, it was possible to arrange a large tranche of Thai Baht financing as the local capital market had recovered and was becoming more comfortable with the notion of Lao hydro through its experience on the successful refinancing of the Theun Hinboun and Huoy Ho projects.

Nam Theun 2 demonstrates the use of the credit enhancement mechanisms now being offered by the MDBs. In cash terms the public sector provided only 15% of the total project cost, and much of this was concessionary lending for the purchase of the GOL equity. Excluding export credits, the guarantees only covered \$126m., or 10% of the total cost, but they provided sufficient confidence to leverage a much larger sum from international sources. When it came to local funding the Thai banks were prepared to accept both political and commercial risk including EGAT payment obligations without political risk cover.

Being financially viable Nam Theun 2 did not need any direct form of subsidised financing, although the Government benefited from receiving soft loans for the purchase of its equity, and there was a modest amount of downstream concessionary money for related project costs.

The World Bank was involved in the project from the outset, taking a particularly close interest in ensuring that the social and environmental mitigation measures met its Safeguard guidelines. The Bank's presence was regarded as essential in securing investor confidence. Its approval of the project after detailed appraisal paved the way for the involvement of other financiers like ADB and EIB, who both played an important role in contributing to the overall financing package.

^{15/} Although the project initially faced opposition from NGOs, the consensus of opinion following studies was that without its protection the serious environmental degradation of the project area and the headwater catchment would have continued unabated.

7. PRIVATE PROJECT IN A WEAK ECONOMIC ENVIRONMENT

Pamir HEP, Tajikistan

Key features

The purpose of this project is to increase the electricity supply in the Gorno-Badakhshan Autonomous Oblast (GBAO) of Eastern Tajikistan, one of the most isolated and impoverished areas of the world. Due to the climate there is heavy dependence on electricity for heating, and prior to the break-up of the Soviet Union this was mainly provided by diesel generation. After independence fuel deliveries virtually ceased and the situation became very serious, with winter temperatures dropping to -30C and frequent and lengthy power cuts being common. In many areas schools and hospitals were forced to close in the winter months, and 70% of the region's tree cover was cut down for firewood within a decade.

It became imperative to develop local hydro resources quickly and, in particular, to finish the Pamir hydro project which had been abandoned in a partially completed state at the end of the Soviet era. In the mid-1990s two out of the planned four machines were installed under US Aid, but it became evident that this was not enough. It was imperative to upgrade the project and to build an upstream regulating structure to ensure adequate winter flows. IFC were called in to advise on how this might be achieved while, at the same time, injecting an element of commercial rigour into an operation where supply standards were low and there was a poor record of revenue collection.

- The project is being developed and operated under a 25 year private concession granted to the Pamir Energy Company (PEC) which is 70% owned by the Aga Khan Fund for Economic Development (AKFED) and 30% owned by IFC. AKFED is the "for profit" economic development arm of the Aga Khan Development Network, a NGO development agency.
- Under the terms of the concession, PEC is contracted to complete the existing project up the planned design capacity of 28 MW, and to rehabilitate the original units and three other existing small hydro schemes. The company was also required to rehabilitate and reinforce the transmission and distribution network.
- The total cost of the project is \$26m, which is being financed on a 55/45 debt-equity ratio. The \$14.5m of debt is being provided in the form of \$10m soft loan by IDA, and a \$4.5m commercial loan from IFC. The return on equity is reported to be 10%.
- The local administration was insistent that tariffs should be affordable, while recognising that lenders needed a creditworthy project and the owners of PEC needed at least some return on equity - albeit at a lower level than the risks might justify in a normal commercial environment. To achieve these objectives it was necessary to subsidise the project heavily.
- Under the terms of the concession PEC was authorised to raise tariffs to 3.0c/kWh over eight years - a fourfold increase over the prevailing average of 0.75c/kWh. To mitigate the impact all residential customers will qualify for a "lifeline tariff" of 0.25c/kWh for predefined quantity of electricity. The cost of these social protection measures over 10 years is \$9.3m.
- The \$9.3m for social protection measures is being partially funded through the interest rate spread on the IDA loan, and partially through a \$5m grant from the Swiss Government that is being used as Output Based Aid. The OBA will be dispensed over the first ten years.
- The Concession Agreement also contains the following key features: the Government retains ownership of the assets; PEC to maintain minimum levels of service; adherence to World Bank Safeguard policies; exemption from all taxes and duties for ten years; and the Government to underwrite payments due from public sector consumers (who have a bad payment record).

- In the interests of keeping costs low, procurement was limited as far as possible to local contractors, as the cost of bringing in an international firm would have been disproportionate. Project management is being undertaken by an international Consulting Engineers whose contract includes bonuses and penalties to ensure that the works are completed on time and within budget.
- The project carries significant risks, primarily of a commercial and political nature. One of the risks lies in the legal framework, where there are still a number of uncertainties surrounding the commercialisation of the national power utility and the interpretation of the new Energy Law. Also, there is no obvious exit route for the equity holders.

Comment

Although the project is small, it is an example of the way in which a commercial wrap can be put around a quasi-private project in the most unpromising economic environment. In this case the private owner has in effect taken over the role and responsibilities of the utility in an area of the world where the average income is only \$27/month.

This is not a normal commercial venture. The sponsor, AKFED, is an international NGO whose role is to promote sustainable economic development through equity investment. Although it is described as the “for profit” arm of the Aga Khan Network, the prime objective of AKFED is sound development. For this reason it is prepared to venture into projects that other private organisations would shun, and to accept a lower returns than would be normal.

In addition to AKFED, the two other main investors are IDA and IFC, both members of the World Bank Group. This is an example of collaboration between the two ends of the financing spectrum, and it clearly demonstrates how concessionary money can be used in conjunction with commercial loans to encourage private ventures in otherwise unpromising situations.

For a number of reasons the project was not suitable for conventional project financing. The transactional costs would have been disproportionately large relative to the small sums involved, and the risk profile would be unacceptable to the private sector in a strictly commercial environment. Yet there was a strong desire to proceed with the project as an example of privatisation following the enactment of the Energy Law in 2000, which paved the way for the unbundling of the State power utility and for private sector involvement in the energy field.

Furthermore there was wide recognition that any investment made needed the discipline of a private company to be effective, as there was along history of mismanagement and non payment. As some of the worst offenders were government agencies, it was considered unlikely the utility would reform itself if left in public ownership.

There was an overriding pressure to assemble a financing package that met the social objectives of the government while, at the same time, meeting the reasonable requirements of the investors. This was achieved by having financiers who were prepared to provide subsidised capital in the form of soft loans and cheap equity, and by the use of a grant to fund Output Based Aid. OBA funds are made available to a private infrastructure operator on delivery of a service (e.g. supply of electricity) to protect und-users from the full impact of the tariffs that would be needed to service the loans; it is a very effective mechanism for targeting aid for the benefit of the consumer, and ensuring that it is only payable on delivery.

This is not an easy formula to repeat, but it demonstrates what can be achieved when there is a benevolent sponsor, and commercial lending can be combined with aid funds.

8. PUBLIC PROJECT USING PRIVATE FINANCE

Lesotho Highlands Water Project, Southern Africa

Key features

The primary purpose of this very large bi-national project is to transfer water from the mountainous rivers of Lesotho to the industrial heartlands of South Africa. It also provides hydropower for the domestic market within Lesotho. The project was too large and complex - and politically far too difficult - to have been developed in the private sector, so it was implemented as a public project. The cost was so large that it was evident that the project could only be financed on the basis of substantial loans from the private sector. The situation was made more difficult by the fact that, at the time the first phase was being negotiated, the apartheid regime in South Africa was facing international trade boycotts.

Despite these problems the scheme was successfully implemented because it was urgently needed, and the economic, environmental and social cost of not proceeding would have been very high. There were already serious water shortages occurring in the Gauteng-Johannesburg area, where a population of over 10 million creating 60% of GNP was at risk. The first stage of the project, for transferring 29m³/s of water and producing 72 MW of power, was completed in 2004 at a cost of \$2.8 billion. This comprises Phases 1A and 1B.

- Under the terms of the Treaty which set up the project, the main responsibility for executing the project lies with the Lesotho Highland Development Authority, a parastatal body established by the Lesotho Government. LHDA is responsible for raising all of the finance, with South Africa acting as the Guarantor for effectively all of the borrowings..
- Although LHDA is the primary implementing agency, the South African Government has a major role through the Permanent Commission to which LHDA reports. On the South African side of the border another parastatal specifically created for the project, the Trans Caledon Tunnel Authority, manages South Africa's Treaty obligations including paying for the delivered water.
- From the outset it was recognised that financing was going to be a major challenge. A Finance Working Group, comprising Government representatives and private sector specialists, was established at an early stage. The financing strategy for Phase 1A was based upon:
 - The use of concessionary funds where they were available.
 - Maximising foreign borrowings to alleviate stress on foreign reserves.
 - Sovereign Guarantees, provided indirectly by the South African Government through an intermediary trust fund.
 - Contractor-driven financing with the responsibility for finding financiers left to the individual contractors.
- Concessionary finance was made available by various international financing institutions to the Government of Lesotho. It was used for works directly benefiting Lesotho (e.g. Muela Hydro) and for Technical Assistance including institutional strengthening of LHDA.
- Where concessionary financing was made available for the water transfer works, which were of direct benefit to South Africa, the money was paid to the Government of Lesotho and then on-lent at commercial rates.
- The World Bank was called in at an early stage by Lesotho, initially to strengthen its position in negotiations with South Africa and later to act as the coordinator for Fund Mobilisation. Despite the political problems, the Bank supported the project on the grounds that to do otherwise would be damaging to the peoples of the whole region

- About 36% of the cost of Phase 1A was raised from international sources, mainly from donor agencies and export credits using Sovereign Guarantees. The bulk of the local financing came from South African export credits and the local capital markets in the form of Water Bonds.
- When financing Phase 1B the situation had changed, with the demise of the apartheid regime and the fact that the project had an established revenue stream. The strategy was altered to reflect LHDA's stronger bargaining position. Contractor financing was decoupled from commercial funding
- Given the size and complexity of the project the first stage was implemented remarkably quickly, after the signing of the Treaty in 1986. A contributory factor was the decision to address financing issues at an early stage, and the fact that about 85% of the project cost was underwritten by the South African Government.

Comment

LHWP is an example of a project that was successfully implemented against all odds, by two politically opposed sovereign states of widely disparate strengths. To make matters even more difficult, the project required a very large capital investment at a time when the regional economy was extremely fragile, and the main proponent, South Africa, had no direct access to international funds.

LHWP shows that private lending can be used to fund public projects, provided that an appropriate security package is in place with the right guarantees which, in this case, were the Sovereign Guarantees of the South African Government. However the model can be expensive to establish, as it requires the institutional support of an implementing agency like LHDA which needed a lot of capacity building in the early years.

Financing was carefully organised from the start, and a financing strategy was developed by the two governments with advice from the World Bank and the support of private sector consultants. Maximum use was made of concessionary funding. As Lesotho qualified by virtue of its poverty, LHDA was able to access funds that would not have been available to South Africa, and on Concessionary terms. The World Bank presence from an early stage, initially as an advisor and later as a lender on a *parri-passu* basis with other lenders, did much to establish the credibility of the project in the eyes of the financial community..

Financial engineering continued to be an on-going exercise throughout the project. As circumstances changed it played an important role in reducing the cost of borrowing by continually reviewing the pattern of disbursements and commitments. Where concessionary funding was in contemplation, considerable trouble was taken by tailoring packages for soft and hard project elements to suit the requirements of particular donors.

It is of interest to note the change in priorities between Phases 1A and 1B. Whereas in the first phase the priority was to secure maximum funding by almost any means, the approach had moderated by the time the second phase financing was being assembled. The improved political situation in southern Africa, and the fact that the first phase had been successfully completed, meant that LHDA was in a much stronger position to offer guarantees and to bid stand-alone financing in its own right. This reinforces the importance of revisiting the financing once a project is operational and a revenue stream has been established.

The advantage of this model is that it allows projects that would not otherwise be bankable in the private sector to go ahead without having to be financed directly from the public purse. However the time and cost needed for setting up the necessary implementing organisation is significant, and therefore the model is not suitable for anything other than very large and complex projects which need access to private funding but are not directly bankable in the private sector.

Chapter 6: Observations and Conclusions

Chapter 6: OBSERVATIONS AND CONCLUSIONS

1 OBSERVATIONS

1.1 The Financing Matrix

From the Case Studies described in the previous chapter, it is evident that there are many possible combinations of financing models that can be used with different financing instruments. Amongst the eight projects examined, it is possible to detect six basic financing models, as listed in Table 6.1 below:

Table 6.1: The Financing Models in the Case Studies

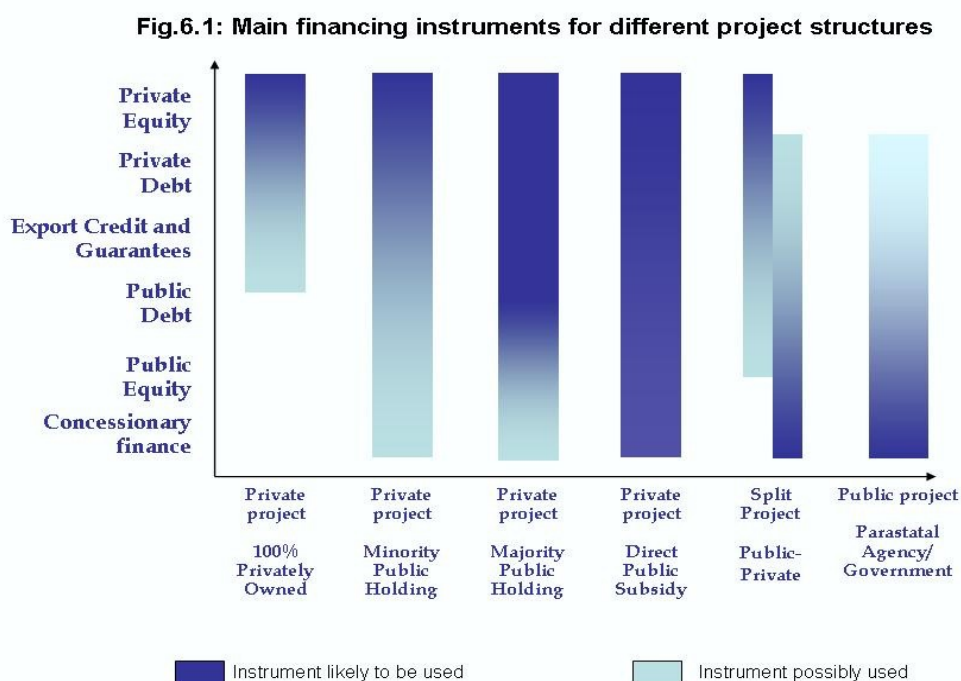
Financing Model	Examples
Private project (100% privately owned)	Allain-Duhangan
Private project with minority public holding	Nam Theun 2, Izmit
Private project with majority public holding	Theun Hinboun
Private project with direct public subsidy	Guerdane, Pamir
Split project (private and public)	San Roque
Public project using private finance (parastatal)	Lesotho Highlands

The Case Studies reveal that a wide spectrum of financing instruments have been used, ranging from publicly-sourced grants and soft loans through to financing on strictly commercial terms. With some generalisation it is possible to group these disparate sources of finance into six broad categories of financing instruments, which are shown in Table 6.2 below:

Table 6.2: The Financing Instruments

Instrument	Source
Concessionary finance	Grants or soft loans (low interest or long tenor), usually from bilateral or multilateral aid agencies; carbon credits
Public equity	Public investment with the support of the government, often indirectly funded from bilateral and MDB sources.
Public debt	Project-specific loans from the government or from bilateral and multilateral development banks.
ECA and Guarantees	Finance direct from the ECAs, or from private commercial banks using Guarantees from public MDBs.
Private “commercial” debt	Loans from private banks, and from the commercial arms of the public MDBs. Occasionally bond issues.
Private equity	Direct investments made by private Sponsors and other private investors, and the by the public MDBs.

Figure 6.1 is a Financing Matrix showing how the main instruments have been used for the different financing models. The intensity of the shading of each column indicates that some instruments are more important than others for a particular model.



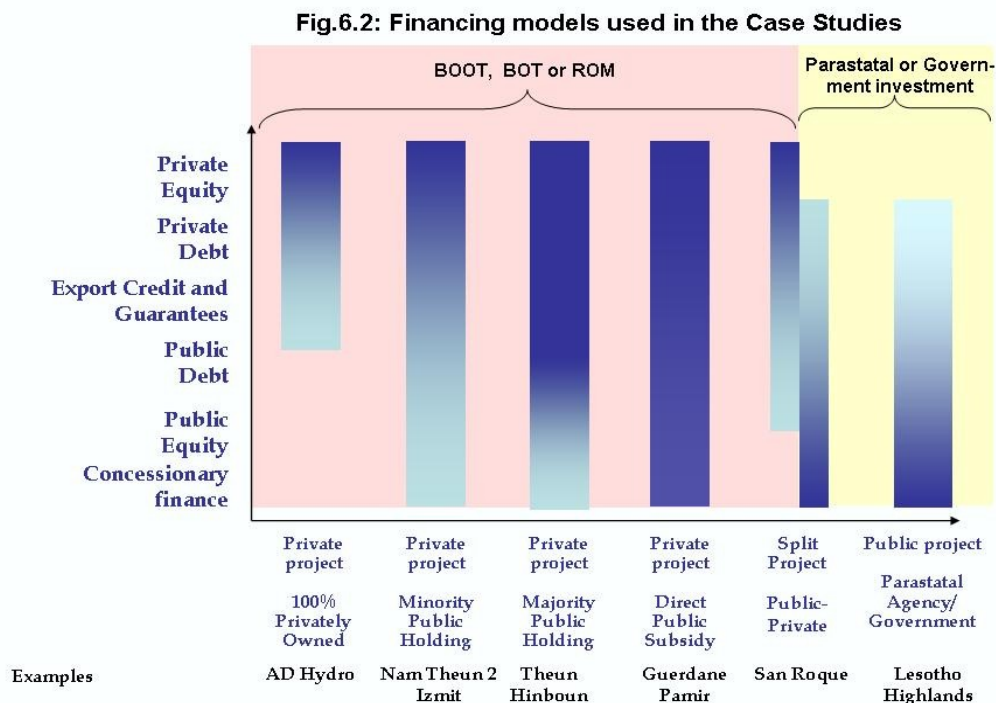
The Case Studies also reveal how the individual projects fit into the basic project structures identified in Chapter 3, as illustrated in Figure 3.2. The basic project structures are shown in Table 6.3 below.

It should be noted that Split Projects, like San Roque, combine two basic structures. Although they obviously bridge the gap between the public and private sectors, they are nevertheless clearly divided into public and private parts when it comes to ownership and financial accountability.

Table 6.3: The Project Structures in the Case Studies

Project Structure	Examples
BOOT	Allain-Duhangan, Izmit, Nam Theun 2, Theun Hinboun, San Roque (power complex)
BTO/ROM	Guerdane, Pamir
Parastatal	Lesotho Highlands
Government	San Roque (dam and ancillary works)

Figure 6.2 illustrates where these schemes are located within the Financing Matrix, and the clear delineation that ultimately exists between private and public projects.



1.2 Role of the International Financing Institutions

The Case Studies clearly demonstrate that the publicly owned international financing institutions (bilateral agencies, the MDBs and the ECAS) have all had an important role to play in financing the projects. The various institutions have supported the financing exercise at all levels, and in a variety of different roles including the provision of hard cash, guarantees and advisory services.

When it comes to assembling the financial packages, the international financing institutions have provided:

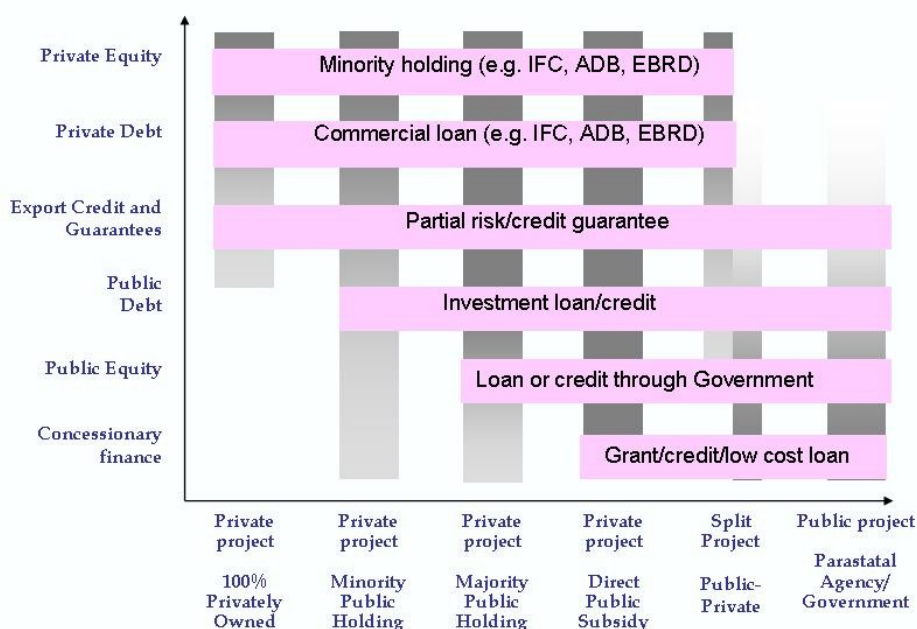
- Concessionary funding in the form of grants and credits
- Long-term loans to government, at less-than-commercial rates
- Partial risk and partial credit guarantees
- Loans to private project companies on commercial terms
- Finance in the form of equity for minority holding in the private project companies.

Without such support most, if not all, of the Case Study projects would have failed through lack of financing.

In the absence of sufficient public funding, it is evident that there will need to be more dependence on the private sector in the future. But the Case Studies demonstrate that, when it comes to financing water infrastructure, the role of the international financing institutions will continue to be of central importance. Irrespective of the financing model actually used, the support mechanisms offered by the MDBs and the bilateral agencies will found in most financing plans.

Although the actual instruments offered by the various international financing institutions may vary between the different organisations, most of them provide a broadly similar array of products that can be used to support projects across a wide range of economic situations. Figure 6.3 shows how these support mechanisms relate to the different parts of the Financing Matrix.

Fig.6.3: Main financing instruments from MDBs and Bilateral agencies



2 CONCLUSIONS

Finally, it is possible to draw a number of general conclusions from the Case Studies that might serve as guidance for those involved in the financing of future water projects: These are listed below.

2.1 General

Lack of replicability. Financing of water infrastructure is highly project-specific. Therefore the financing models to be found in the Case Studies may not in themselves be directly replicable, although the individual components of the financing plan and the institutional arrangements will be replicable in the right circumstances on a project-by-project basis.

Many different models are possible. The financing model will always have to be tailored to suit a specific situation. It will be determined by the nature of the project itself, and by the surrounding economic and political environment. There is no single prescriptive solution – but there are many instruments in the toolbox.

Financial viability and risk are overriding factors. Where the intention is to attract private sector participation, the most important criteria are financial viability and the project’s risk profile. Projects that do not meet the necessary thresholds can still be developed in the private sector through the use of credit enhancements such as subsidies and guarantees.

Need for strong sponsors. The success of many of the projects studied rested heavily on the financial strength and experience of the main sponsor, which was usually a foreign company. Without the strength of organisations like EdF (Nam Theun2), Statkraft (Theun Hinboun), Marubeni (San Roque) and Thames Water (Izmit) it is probable that the projects would have failed when they hit problems, as most of them did.

2.2 Public or Private?

Some projects must remain in the public sector. Certain types of project are not suitable for private sector development, and must remain in the public sector. This particularly applies to very large schemes with high risks and weak financial returns. However it may still be possible to finance such projects from private sources (Lesotho Highlands).

The private sector can succeed where the public fails. The Case Studies show that private entities can be more innovative in financing than the public sector. Both the San Roque and Izmit projects were originally started in the public sector but they failed through the lack of funding,, and were then successfully developed in the private sector.

There may be a private option, even in a weak economic environment. The Pamir project demonstrates that it is possible to structure a project as a private entity even in the most unpromising economic environment. But it depends upon having a Sponsor who is primarily development-orientated (as opposed to being primarily profit driven) and an international financing institution that is prepared to blend aid with commercial money.

The alternative may be a public sector shareholding in a private project. A public sector holding in the project company aligns the interests of the public and private partners, and widens the range of financing instruments that might be accessed. It is particularly appropriate for export projects (Theun Hinboun, Nam Theun 2).

Public projects can be privately financed. The Lesotho Highlands Water Project demonstrates that it is possible to finance a public project substantially from private sources, but it requires the appropriate institutional arrangements and usually needs a lot of public sector capacity building, which can make it unsuitable for small projects.

2.3 Financing Overview

Financing depends upon a guaranteed revenue stream. Private financing has to be based upon a guaranteed revenue stream which must be sufficient to service the debt with an adequate margin of safety, and provide an acceptable Return on Equity. This normally means a long-term sales agreement for water/electricity. If the offtaker is not creditworthy his obligations will have to be backed by a creditworthy Guarantor.

It is important to avoid currency exposure. To avoid exposure to local currency devaluation, a private project company will need to match the currency of its debt servicing obligations with that of the revenue stream. If financing is mainly in hard currency and the revenue stream in local currency, the offtaker will usually be required to assume the exchange rate risk (Izmit).

Project company still at risk from devaluation. The Asian financial crisis was accompanied by local currency devaluation that caused payment defaults on a number of private projects. It also dislocated the currency mix during the financing of Theun Hinboun, so that the project company lost money on the exchange rate until it correct the balance through refinancing.

Increasing use of local currency financing. A substantial amount of local currency financing was secured from regional banks and capital markets - particularly in Thailand and South Africa, where over \$1 billion was raised for projects that are located in an economically weak neighbouring state. In the case of export projects the issue becomes one of regional financing in the currency of the buying State.

Refinancing after completion has many advantages. Theun Hinboun demonstrated the value of refinancing after several years of successful commercial operation. It allowed the project company to negotiate more favourable terms, and to realign the currency of the debt to match the revenue split, thereby removing devaluation risk. It also permits the release of capital for further investment in new projects. The Lesotho Highlands project demonstrated broadly the same, namely that it was much easier to finance the second phase once the first was up and running.

2.4 Financing Instruments

Concessionary funds can assist financing. Concessionary funds in the form of grants or credits can assist by softening the financing package (Guerdane, Lesotho Highlands) or funding geographically discrete elements of the project (San Roque). They can also be used to fund project-related costs that are not part of the project itself (Nam Theun 2). But concessionary finance alone is unlikely to provide the full amount needed..

Output Based Aid (OBA) can indirectly assist financing. By providing direct and overt subsidies to the revenue stream, OBA can improve affordability for the consumer and the project's overall financial viability. By enhancing the debt servicing capability it allows more money to be borrowed by providing lenders with an assurance that there will be a guaranteed revenue stream. This was an essential element in the financing of the Pamir project.

Financing on a "merchant plant" basis is unusual. Project financing without a long-term sales agreement is not unheard of, but is very unusual other than in situations where there is a mature market trading the commodity (water or electricity) at stable prices, or under special circumstances where there is short supply and the production price is known to be competitive. It helps if there also are a number of alternative creditworthy buyers (AD Hydro).

Sovereign guarantees are often needed. The payment obligations of public sector entities that are not in themselves creditworthy will need to be guaranteed by the Host Government. But such guarantees are not easy to obtain as they count as public debt, and they are normally only available for strategic projects of national importance (Lesotho Highlands, Izmit). In many of the poorer countries the Government's Guarantee is not sufficient, and it is necessary to support its obligation by international Guarantees of the type provided by the MDBs.

MDB Guarantees can leverage private finance. Guarantees provided by the MDBs can improve the terms for private financing by eliminating political risk for the Lenders. But despite having been in existence for a decade, they are still not widely used in the water sector, as they can prove expensive for projects which are already of questionable financial viability. Amongst the projects studied, only Nam Theun 2 utilised such Guarantees.

Export credits are important, but limited in application Export credit financing played a significant role in some of the projects studied, particularly Izmit. But being tied to imports it will generally only be of limited value for most water infrastructure projects, which usually have a high local civil work content. The Izmit project demonstrates how financing can be structured around export credits in certain circumstances, albeit probably at a higher overall cost to the project

Concessionary and commercial funds can be mixed. The blending of commercial and concessionary financing in a single private project, or in separate parts of the same split (public-private) project, is achievable. However the “public benefit” element must be clearly identified and accountable. Blending of aid with commercial money can convert a weak project into a bankable project suitable for the private sector (Pamir, San Roque).

2.5 Organisational Aspects

Inadequately preparation causes delay. A common feature on most of the private projects is the long and costly negotiating period between signing the MOU and the eventual financial closure. In some cases the delays lasted for many years, and can be attributed to environmental and social objections (Nam Theun 2) and the lack of a clear enabling framework of legislation (Izmit).

Partnership with the local community. This is a key element in ensuring support for the project and avoiding negative campaigning from external bodies. A number of the projects suffered initially from having overlooked the views of the local community, and they then corrected the position by a programme focussing on local consultation, information and responding to community concerns – and this gave positive results (Allain-Dunangan, San Roque, Nam Theun 2).

Need for substantial resources for project preparation. Under any financing scenario the public sector must bear primarily responsibility for project preparation, which is much more onerous than it has been in the past. This work must be adequately resourced in both financial and manpower terms, as the private sector has made it clear that it is no longer prepared to spend the sort of money that it has in the past on such at-risk activities (On Nam Theun 2 the Sponsors spent \$70m before reaching financial closure).

MDBs can play an important advisory role. The MDBs are playing an increasingly important advisory role when it comes to the financial structuring of projects, particularly difficult ones where there is a need for an innovative approach. IFC advised on Guerdane, Pamir and AD Hydro, and IBRD advised on Lesotho Highlands.

Most concessions have been directly negotiated. Although transparency remains a basic requirement of the MDBs, competitive bidding for concessions is proving to be very difficult. In all of the projects studied - with the exception of Guerdane and San Roque, where there was only one bidder - the private sector participation was directly negotiated without a formal procurement process.

Construction contracts generally procured by open competition. Construction contracts were subjected to international competitive bidding for most of the work on the private projects, and for all of the works on Lesotho Highlands Project. Where contract were not competitively bid they were usually undertaken by the Sponsors companies under free-standing contracts. (Nam Theun 2, Izmit).

Need for contractual checks and balances. Where Sponsors also act in a contracting role, either for the construction of the works or for their operation, this creates potential conflicts of interest. Lenders are very wary of this situation, and it has to be care-fully controlled to avoid disadvantaging other investors and the public sector. This situation arose on both Nam Theun 2 and Izmit, where the contract arrangements were carefully structured with independent advisors to maintain the necessary checks and balances.

Annex 1: CASE STUDY PROJECTS

This Annex gives further details of the projects used for the Case Studies. The projects are presented in the following order:

1. Allain-Duhangan Hydropower, India
2. Izmit Bulk Water Supply, Turkey
3. Theun Hinboun Hydropower, Lao PDR
4. Guerdane Irrigation Supply, Morocco
5. San Roque Multipurpose, Philippines
6. Nam Theun 2 Hydropower, Lao PDR
7. Pamir Rural Hydropower, Tajikistan
8. Lesotho Highlands Water, Southern Africa

Case Study 1	Allain-Duhangan Hydropower Project, India (page 1 of 2)
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	<p>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.</p> <p>The Sponsor MPCL is a joint venture between a local industrial group with diversified interests in a number of industries (turnover US\$400 m/year) and international hydropower investor Statkraft Norfund Power (SNP). The local company has already successfully developed two other privately owned hydro-power projects of 13.5 MW and 86 MW respectively, the second in conjunction with SNP.</p>
Chronology	<p>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.</p> <p>In 2001 the original MOU was converted into an Implementation Agreement. The project received clearance from the Central Electricity Authority in August 2002.</p>
Scope of Works	<p>The scope of the works consist of:</p> <ul style="list-style-type: none"> • 2 diversion weirs, on the Alain and Duhangan streams; • 9 km of headrace and tailrace tunnel; • Underground powerhouse (192 MW) • 185 km of 220kV transmission line
Structure	<p>Financing model: BOOT (40 year concession with an option to extend for another 20 years).</p> <p>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 standardised arrangement, the State Government will receive free energy in lieu of royalties - 12% of the deliverable energy for the first 12 years, and 18% for the next 28 years.</p> <p>The project company will be majority owned by MPLC, with the only other shareholder being the International Finance Corporation, which will take an equity stake of up to 10% as well as providing commercial debt.</p>

Case Study 1	Allain-Duhangan Hydropower Project, India (page 2 of 2)
Power Sales	<p>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 privatised distribution companies, and to State Electricity Boards (SEBs) through the Power Trading Corporation^{16/} (“PTC”) under short-term Power Purchase Agreements.</p> <p>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.</p> <p>In the event of unfavourable market conditions the project would be able to sell part of its available power (about 40%) 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.</p>
Financing	<p>The total investment cost is US\$ 191m. This figure includes a contingency of US\$19m, equivalent to about 15% of the “hard” construction cost.</p> <p>The project is to be funded through a combination of 60% senior debt, 5% subordinated debt and 35% 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.</p> <p>Senior debt financing is being provided by IFC (\$40m equiv) and by local commercial banks (\$75m equiv.). The IFC loan is denominated in local currency and has a tenor of 10 years from the start of commercial operation.</p> <p>At least 90% of the equity financing is to be provided by MPCL and the remainder by IFC (up to US\$7m equiv). The return on equity is estimated to be 15%.</p>
Security	<p>Financing is not dependent on external guarantees, because the project is considered to be robust enough to survive on its own merits and the GOI commitment to the power sector.</p> <p>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% (US\$ 10m) of subordinated debt. The present value of the royalty and tax payments to be made over the lifetime of the project to GOHP and GOI are US\$31m and US\$10m respectively</p>

^{16/} 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. .

Case Study 2	Izmit Bulk Water Supply Project, Turkey (page 1 of 2)
Nature	<p>The BOOT company has an arrangement with the Greater Izmit Municipality to deliver 142Mm³/year of treated water to the municipality's service reservoirs.</p> <p>The project will augment supplies to a large industrial area and a population of 1.2 million</p>
Background	<p>The project was originally intended to supply water to Istanbul, and to the Izmit region which lay en-route, but it was later reduced in scope to focus on the Izmit area which was coming under serious water stress.</p> <p>At the time the domestic supplies in Izmit were coming from ground-water resources, and the paper and petrochemical industries in the region were taking water from a freshwater lake that was being heavily overdrawn. Serious water shortages were occurring, with supplies being heavily rationed in the summer months.</p> <p>DSI (State Hydraulic Works Dept.) initiated the scheme as a public sector project, and in 1986 they awarded the Turkish contractor Gama a contract to start the work on one of the main project components, the Yucavit Dam. However the work was seriously delayed due to the lack of public funding, and eventually, in 1989 Gama was asked to consider ways of progressing the project using private finance.</p> <p>Gama approached Thames Water, a major UK utility company already working in Turkey, with a view to them assisting the funding of the project by implementing it on a BOOT basis.</p>
Chronology	<p>In its privatised version the project was scaled down to serve the Izmit area alone. Negotiations took place over a number of years between DSI, Thames Water and the Greater Izmit Municipality, and in 1994 the two main project agreements – the Implementation Agreement and the Water Sales Agreement – were initialled.</p> <p>But the project was further delayed while certain aspects of the BOOT concept were reviewed by the Government. In particular there was a concern that the requirement for international arbitration was contrary to the constitution.</p> <p>The Government eventually authorised the project by Decree in late 1995, and construction started in April 1996. The scheme was put into commercial operation three months ahead of schedule in January 1999</p>
Scope of Works	<p>The project comprises:</p> <ul style="list-style-type: none"> • a major 100m high earthfill dam (storage of 60Mcm); • 100 km of steel trunk main ranging from 2.2m to 1.2 m in diameter; • 40 km of ductile iron distribution main; • water treatment plant (480 Mld); • two major pumping stations <p>The cost of construction was US\$580m.</p>

Case Study 2	Izmit Bulk Water Supply Project, Turkey (page 2 of 2)
Structure	<p>Financing model: BOOT (3 years construction + 15 years operation)</p> <p>A special purpose company Izmit Su AS (ISAS) was established to finance build, own and operate the project for a concession period of 15 years. The shareholders were the contracting consortium and the Municipality (the offtaker) in the following proportions:</p> <ul style="list-style-type: none"> • 56% Thames Water • 15% Gama Construction • 14% Greater Izmit Municipality • 7.5% Mitsui • 7.5% Sumitomo <p>Under the terms of the Implementation agreement the physical assets are owned by the Project Company and will revert back to the Municipality at the end of the concession period.</p> <p>Under the terms of the Water Sales Agreement IASA undertakes to supply the municipality with 142Mm³/year, with IASA assuming the hydrological risk. In return the Municipality has entered into a take-or-pay contract under which it buys all of the contracted supply irrespective of demand.</p>
Implementation	<p>A fixed-price turnkey contract was awarded by ISAS to the construction consortium, which included Gama, Mitsui and Sumitomo. In order to ensure an “arms length” relationship between the owner and the contractor, independent consultants were appointed to advise ISAS and the Municipality.</p> <p>Under a separate O&M Contract, the project is operated and maintained by Thames Water for the duration of the concession. The water is sold in bulk to GIM, so that the project company is not involved in distribution or revenue collection from retail customers.</p>
Financing	<p>Total investment cost: US\$ 900m.</p> <p>The Project was funded on an 85/15 debt-equity ratio.</p> <p>Debt financing was dominated by export credits, which accounted for about 70% of the total project cost. The credits were mainly for steel and iron pipes, and equipment. The ECA financing came from ECGD, COFACE, and JEXIM on the basis of 10 year loans plus a grace period for construction (interest rate 7.25% or Libor +1.125%).</p> <p>Commercial bank loans made up less than 20% of the total cost, and were repayable over 3.5 years at a higher interest rate.</p> <p>The estimated return on equity is reported to be 14% p.a.</p>
Security	<p>The Turkish Treasury guaranteed the payment obligations of the Municipality under the Water Sales Agreement.</p> <p>Thames Water provided a Parent Company Guarantee in respect of its obligations under the O&M contract.</p>

Case Study 3	Theun Hinboun Hydropower Project, Laos (page 1 of 2)
Nature	<p>Independent 210 MW run-of-river power project developed under BOOT arrangements for the bulk export of electrical energy to Thailand.</p> <p>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).</p>
Background	<p>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.</p> <p>The neighbouring 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 has a system that is heavily dependent on thermal power.</p> <p>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.</p>
Chronology	<p>The original proponents of the project were Nordic Power Company (“NPC”) a JV company owned by public power utilities in Norway (Statkraft) and Sweden (Vatenfall), together with local company MDX of Thailand.</p> <p>In 1994 the principal projects agreements were signed between the Sponsors and the Government. At about the same time the Sponsors initialled power purchase agreements with EGAT, and with EDL the Lao power utility which was to take a small proportion of the output.</p> <p>Construction started in late 1995, although financing was not finalised until October 1996. Commercial operation commenced in March 1998.</p> <p>In 2002, after five years of profitable operation, the Owners refinanced the project.</p>
Scope of Works	<p>The project comprises:</p> <ul style="list-style-type: none"> • a low diversion dam on the Theun River, downstream of the Nam Theun 2 project currently under construction. • 10 km. of waterway, of which about half is tunnel, leading from the Theun to the Hinboun Rivers. • Surface powerhouse (2 x 105 MW) operating under a notional head of 228m. • Switchyard and 100 km. of 230 kV transmission line leading to a metering station on the Thai border. <p>The cost of construction was about US\$240m.</p>

Case Study 3	Theun Hinboun Hydropower Project, Laos (page 2 of 2)
Structure	<p>Financing model: BOOT (30 years from COD, with an option to extend for another 10 years thereafter).</p> <p>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.</p> <ul style="list-style-type: none"> • 20% Nordic Hydropower (Lead Sponsor)^{17/} • 20% MDX Lao^{18/} • 60% Electricité de Lao (EDL)
Implementation	<p>Construction was arranged along traditional lines, using six separate civil and E&M contracts that were competitively bid and coordinated by THPC. External consultants were engaged for design and construction supervision under a separate contract.</p> <p>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.</p>
Original Financing	<p>Total investment cost: US\$ 300m. 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.</p> <p>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% US\$ and 50% Baht.</p> <p>The equity portion held by EDL was financed through soft loan from ADB (\$58m) and Nordic aid agencies (\$14m) to the Government, which was then on-lent to EDL at commercial rates.</p>
Refinancing	<p>The floatation of the Baht in July 1997 had a major impact on the project. A liquidity crisis impaired the Thai banks' ability to meet drawdown requests, and as a result over 40% 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% of the debt.</p> <p>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 \$152m, mainly in Baht funds provide by Thai commercial banks.</p> <p>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 (\$55m). The capital reduction has resulted in the shareholders recovering their original investment within 4 years of commercial operation.</p>

^{17/} Nordic Hydropower was a joint venture company owned by Statkraft and Vatenfall. Subsequently Vatenfall sold out their interests in the project to Statkraft

^{18/} MDX Lao is a wholly owned subsidiary of GMX Power, one of Thailand's leading IPP developers.

Case Study 4	Guerdane Irrigation Project, Morocco (Page 1 of 2)
Nature	<p>The project involves the granting of a concession to a private operator for the construction and operation of water conveyance and distribution system to serve 10,000ha.of citrus irrigation</p> <p>The object of the project is to delegate public services to a private operator. The Government motivation is to decrease public spending, improve water management and remove risk from the public sector, while at the same time ensuring that tariffs remain affordable.</p>
Background	<p>In the past private wells had been the only source of water, but due to overexploitation groundwater levels were falling at an average rate of 2.5m/year which was unsustainable. The continuous depletion of the aquifer was causing farms to be abandoned as wells dried up or pumping costs become unaffordable.</p> <p>To overcome this problem 45 Mm³/year of water originating from dams 90 km away was allocated to support the project. Under this arrangement approximately half of the water needed by the citrus groves will be supplied by the concessionaire, leaving the remainder to be taken from groundwater.</p>
Chronology	<p>The proposal to supplement the groundwater resources from the dams was made in a 1995 Watershed Management Plan. The project was originally solicited as private concession in 2001/02 but failed to attract any response. The primary reason for this was that the enquiry document was targeted at international firms with significant technical expertise, but it came out shortly after the Argentinean currency crisis when international companies were shifting their investment strategy away from foreign currency investment in public infrastructure in the developing world.</p> <p>The Government then engaged IFC as an Advisor and, having restructured the proposals to be more suited to local companies, re-invited private sector to bid for the concession. Two proposals were received, both locally led, and in 2004 the project was awarded to a consortium led by ONA, a Moroccan industrial conglomerate.</p> <p>At the time of writing it is understood that the subscription campaign with the farmers has been on-going successfully, and that company has finalised feasibility and planning studies with a view to commencing construction in mid-2006.</p>
Scope of Works	<p>The project comprises the construction and operation of a 90km long pipeline, and ancillary distribution works, capable of delivering 45 Mm³/year (1.4 m³/sec) to about 670 farms.</p> <p>The cost of construction is estimated to be US\$85m.</p>

Case Study 4	Guerdane Irrigation Project, Morocco (Page 2 of 2)
Structure	<p>Financing model: BTO</p> <p>The consortium has entered into a contract for the construction, co-financing, and management of the irrigation supply system for a concession period of 30 years.</p> <p>Under the terms of the Agreement, the concessionaire recovers his costs through the tariff. He is responsible for collecting the revenue from the farmers.</p>
Financing	<p>The \$85m. capital cost is heavily subsidized by the Government, who are providing around \$50m. Half of this sum is as a grant and the remainder a very soft loan (30 year maturity, 1% p.a.).</p> <p>This leaves the private partner to raise only \$35m. Details are not available, but one obvious option would be export credits if there is a long pipeline involved, as for Izmit.</p>
Tariff	<p>The objective of providing such a large subsidy was to maintain the tariffs at affordable levels. It was necessary to make it attractive for farmers to take surface supplies rather than to continue pumping groundwater.</p> <p>The tariff is expected to combine fixed and variable proportions, with the fixed fee being about 20% of the farmer's anticipated average costs. The variable proportion is tied to consumption, and is intended to encourage efficiency in water use.</p> <p>The concessionaire has the right to suspend farmers who fail to make payment, but he has no obligation to force a farmer to take the supply.</p>
Security	<p>All commercial and operational risks rest with the concessionaire. He has no guaranteed offtake, as the decision to use the supply rests with the individual farmers, and he therefore assumes the full market risk.</p> <p>However the concessionaire is not obliged to start construction until 80% of the farmers have signed up, and in the event of farmers discontinuing their subscription he has the right to divert flow to other potential water users.</p> <p>The concessionaire's hydrological risk is capped at 15% of the average revenue. Beyond this the risk is borne by the Government and the farmers.</p>

Case Study 5	San Roque Multipurpose Project, Philippines (Page 1 of 2)
Nature	<p>This large storage project adds 345 MW (1,030 GWh/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.</p> <p>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.</p>
Background	<p>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.</p> <p>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.</p> <p>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</p> <p>The project started in 1998 and, after some delays caused by local protestors, was eventually commissioned in 2003.</p>
Scope of Works	<p>The scope of works comprise:</p> <ul style="list-style-type: none"> • 200m high embankment dam and ancillary structures • Irrigation headworks • Power intake, tunnels and underground powerhouse • 3 x 115 MW power station, transformers, switchyard • 10 km of 230 kV transmission line <p>The total cost of construction was \$792m.</p>
Structure	<p>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.</p> <p>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.</p> <p>The downstream irrigation component not directly included in the scope of the project was financed and implemented by National Irrigation Administration, who were responsible for the re-regulating pond, the supply canal and lateral canals.</p>

Case Study 5	San Roque Multipurpose Project, Philippines (Page 2 of 2)
Financing	<p>The total cost of the project was \$1.2 billion, of which the private BOOT element accounted for approximately half (\$580m).</p> <p>The private sector element as financed a 75/25 debt-equity ratio, with the debt being a mixture of Japanese export credits and Japanese 10-year commercial loans backed by JEXIM guarantees (for the NAPOCOR payment obligations) which extended the loans to 15 years.</p> <p>The public sector element was partially financed by a \$400m 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.</p> <p>Financing of the downstream irrigation developments was provided by Japanese concessionary OECF financing, under a soft loan arrangement.</p>
Tariff	<p>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.</p> <p>There is no payment for water as this is derived from the public part of the scheme.</p>
Security	<p>NAPOCOR'S payment obligation is backed by a Sovereign Guarantee.</p> <p>The utility shares part of the hydrological risk through a minimum payment provision.</p> <p>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.</p> <p>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.</p>

Case Study 6	Nam Theun 2 Hydropower Project, Laos (page 1 of 2)
Nature	<p>A 1,070 MW project developed on the BOOT model to supply 995 MW of power for export to the Electricity Generating Authority of Thailand (EGAT) and 75 MW for domestic consumption.</p> <p>It is one of the largest privately financed hydropower projects in the world, and it will create average revenue of about \$80/year for the State.</p>
Background	<p>In 1993 the governments of Laos and Thailand signed an MOU under which Lao hydropower would be developed for export to Thailand. Nam Theun 2 was one of the first projects to be promoted under this protocol.</p> <p>The project was first assigned to an Australian-led consortium in 1993, but before reaching financial closure it was seriously delayed by a combination of opposition from NGOs and the Asian financial crisis. When it restarted in 2000, the original Lead Sponsor had withdrawn, and was replaced by the French power utility EDF.</p> <p>Under the changed circumstances EGAT negotiated a lower energy price, but at the same time required more capacity which increased the cost of the project.</p> <p>Financial closure was eventually achieved in 2005, twelve years after the signing of the first MOU granting the private concession. The project is currently under construction and scheduled for commercial operation in 2009.</p>
Scope of Works	<p>The project comprises:</p> <ul style="list-style-type: none"> • A 39m high RCC dam • Power intake and tunnels • Surface powerhouse (1,070 MW) • 500 kV transmission line • Re-regulating weir and downstream channels • Resettlement infrastructure <p>The cost of construction is \$722m excluding financing costs.</p>
Structure	<p>Financing model: BOOT (25 years concession from COD)</p> <p>The Nam Theun Power Company (NTPC) was established to finance, build, own and operate the project for the concession period.</p> <p>The Lao Government has a minority holding in NTPC, for which the shareholding structure is:</p> <ul style="list-style-type: none"> • 35% EDF • 25% EGCO¹⁹ • 15% Italian-Thai Contactor • 25% Government (Lao State Holding Enterprises)

^{19/} EGCO is a Thai power company, originally a subsidiary of the national power utility EGAT, and now still partially owned by EGAT.

Case Study 6	Nam Theun 2 Hydropower Project, Laos (page 2 of 2)
Implementation	<p>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.</p> <p>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.</p>
Financing	<p>The total investment cost including contingencies of \$200m is \$1.45 billion. The project is financed on a debt-equity ratio of 72/28.</p> <p>International debt totalling some \$350m 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 (\$500m) which is uncovered for both Thai and Lao political risks.</p> <p>Government equity to the sum of \$87m 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.</p> <p>About 85% 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 mobilise over \$1,000m of private financing.</p>
Security	<p>EGAT is obliged to purchase power from the project up to the contracted amount (5,636 GWh/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.</p> <p>Under a similar agreement the Lao power utility, EdL, undertakes to buy 200 GWh/year at an agreed tariff on a take-or-pay basis.</p> <p>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.</p> <p>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.</p> <p>Government obligations under the Concession Agreement are being backed by the World Bank and ADB.</p> <p>An IDA Partial Risk Guarantee covers a \$42m tranche of debt provided by international dollar lenders, extends 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 its own.</p>

Case Study 7	Pamir Hydropower Project, Tajikistan (page 1 of 2)
Nature	<p>The purpose of this project is to improve the electricity supply in the Gorno-Badakshan Autonomous Oblast (GBO) of Eastern Tajikistan, one of the most isolated and impoverished areas of the world.</p> <p>A private company has been contracted to upgrade and operate the power system for 25 years.</p>
Background	<p>Prior to the break-up of the Soviet Union the power supply in GBO was mainly provided by diesel generation, but after independence fuel deliveries virtually ceased. As winters are severe and there is a heavy dependence on electricity, the situation became very serious, with temperatures dropping to -30C and frequent and lengthy power cuts being common. In many areas schools and hospitals were forced to close in the winter months, and 70% of the region's tree cover was cut down for firewood within a decade.</p> <p>It became imperative to develop local hydro resources quickly and, in particular, to finish the Pamir hydro project which had been abandoned in a partially completed state at the end of the Soviet era. In the mid-1990s two out of the planned four machines were installed under US Aid, but it became evident that this was not enough. There was a need to upgrade the project and to build an upstream regulating structure to ensure adequate winter flows.</p>
Chronology	<p>In 1994 the Aga Khan foundation had managed a programme to put into operation two of the planned four machines. When it became evident that further upgrading was needed the Government was in the course of reforming the Energy Sector and decided to introduce the disciplines of the private sector.</p> <p>In 1999 IFC were called in to advise on how the supply to GBO might be privatised. The object was to inject an element of commercial rigour into an operation where standards were low and there was a poor record of revenue collection, while at the same time keeping tariffs affordable.</p> <p>A financial structure that would allow the project to proceed under the auspices of a private company was eventually agreed in 2002.</p>
Scope of Works	<p>The works involve:</p> <ul style="list-style-type: none"> • The installation of 2 x 7 MW new units • Rehabilitation of the existing 2 x 7 MW units • Rehabilitation of other small hydro schemes • Rehabilitation of transmission and distribution <p>The total cost of the works is \$26.4 m.</p>
Structure	<p>Financing model: BTO (25 year private concession). The project is being developed and operated under a concession granted to the Pamir Energy Company (PEC) which is 70% owned by the Aga Khan Fund for Economic Development (AKFED) and 30% owned by IFC.</p> <p>AKFED is the "for profit" economic development arm of the Aga Khan Development Network, a NGO development agency.</p> <p>PEC will recover its costs direct from the consumers at an agreed tariff.</p>

Case Study 7	Pamir Hydropower Project, Tajikistan (page 2 of 2)
Financing	<p>The project is being financed on a 55/45 debt-equity ratio.</p> <p>The \$14.5m of debt is being provided in the form of \$10m soft loan by IDA, and a \$4.5m commercial loan from IFC.</p> <p>Equity to the sum of \$11.7m is being provided by AKFED (\$8.2m) and IFC (\$3.5m)²⁰. The return on equity is reported to be 10%.</p> <p>All of the financing is in foreign currency.</p> <p>A \$5m grant from the Swiss Government is being used as Output Based Aid to cushion the tariff increases for the first ten years.</p>
Security	<p>PEC is responsible for the operation and management of the project and the concession.</p> <p>The Government will underwrite the payment obligations of public entities, which represent a significant proportion of the load and have a poor payment record. It has also undertaken to use the interest rate spread between the IDA loan and the on-lending rate to PES to meet part of the costs of social protection (subsidised tariffs).</p> <p>The sponsors undertake to bear cost overruns up to an agreed level. All contracting will be on the basis of fixed price contracts.</p> <p>Foreign exchange risk rests on the consumer, and ultimately on the Government through the social protection measures. The tariffs are defined in US\$.</p> <p>There are significant risks arising from the relative immaturity of the legal system, and the fact that foreign judgements and foreign arbitral awards would be difficult to enforce.</p> <p>The project is regarded as having a high risk rating, but to be socially and environmentally very important.</p>
Implementation	<p>The project is being implemented using local companies under a restricted invitation to tender. The works will be managed by an international consulting engineering firm, which is on contract that incentives the firm to bring in the work on time and within budget.</p>

^{20/} The balance of \$0.2m is internally generated cash from the project company.

Case Study 8	Lesotho Highlands Water Project, Africa (page 1 of 2)
Nature	<p>A major cross-border water transfer project for conveying 900Mm³/year (29m³/sec) from the mountain rivers of Lesotho to the industrial heartlands of the Vaal River Supply Area (“VRSA”) of South Africa.</p> <p>The project also produces 72 MW of hydropower for domestic consumption in Lesotho.</p>
Background	<p>First mooted in the 1950s, the prospect of diverting waters from Lesotho to South Africa began to be taken seriously in the 1970s when it became evident that there was a prospect of serious water shortages in the VRSA which accounts for over half the country’s GDP. The water was needed to serve a growing and increasingly urbanised population, and to support a number of key industries such as mining, energy production, agriculture and petrochemicals.</p> <p>Lesotho, one of the poorest countries in Africa, badly needed the royalties from the sale of water, and the electrical energy to raise the living standard of its people. The project met both of these objectives.</p>
Chronology	<p>In October 1986, after many years of study, the Governments of South Africa and Lesotho signed a Treaty for the construction of LHWP.</p> <p>The Treaty was a remarkable document between two states of widely different economic strength and political philosophy²¹, linked only by a common interest in a single project. Amongst other things, the Treaty established the institutional arrangements for implementing the project, and set out the basis for sharing the benefits and responsibilities between the two governments.</p> <p>The project has been designed for phased development to avoid premature investment and ensure that works are only constructed when needed. The first two phases (1A and 1B) are intended to meet the present demand for both water and power, were constructed sequentially and completed in 2003.</p>
Scope of Works	<p>The project to date comprises:</p> <p><u>Phase 1A</u>: Katse and Muela Dams; 45 km main transfer tunnel ; 37 km delivery tunnels and the 72 MW Muela Hydropower scheme.</p> <p><u>Phase 1B</u>: Mohale Dam and 30 km water transfer tunnel to Katse reservoir; Matsoku Weir and 6 km transfer tunnel.</p> <p>The cost of constructing these two phases was about \$2.8billion.</p>
Structure	<p>The project was developed in the public sector by two national parastatal entities nominated under the Treaty. Within Lesotho, where the bulk of the works were located, responsibility for managing the project fell on the Lesotho Highlands Development Authority (“LHDA”). On the other side of the border the implementing agency is the Trans-Caledon Tunnel Authority (“TCTA”). A Joint Permanent Technical Commission (“JPTC”), on which both Governments are equally represented, has a monitoring, advisory and approval function.</p>

^{21/} At the time South Africa was under the apartheid regime and the subject of an international trade boycott.

Case Study 8	Lesotho Highlands Water Project, Africa (page 2 of 2)
Phase 1A Financing	<p>Under the terms of the Treaty, LHDA was charged with raising the finance on the most favourable terms possible. As the body had no equity base, this meant that most of the funding had to be raised through loans. The South Africa Government assumed responsibility for the guarantees needed to finance the water transfer element, whereas Lesotho guaranteed the loans for hydropower projects on the strength of its revenue from the waster transfer.</p> <p>The World Bank coordinated the mobilisation of funds. A Working Group was established to develop the financing strategy which in <u>Phase 1A</u> was based on:</p> <ul style="list-style-type: none"> • Maximisation of foreign funding to overcome foreign exchange shortages. • Maximise access to concessionary finance and the ECAs. • Use of contractor-led financing wherever possible. • Bond issues on the South African capital markets <p>About 36% was sourced from offshore, the majority of the offshore funding being in the form of export credits, with the remainder coming from bodies like the World Bank and CDC. About 85% of the onshore financing was raised on the local capital markets and from the publicly owned Development Bank of South Africa.</p>
Phase 1B Financing	<p>When the financing strategy was being developed for <u>Phase 1B</u> much experience had been gained, but most importantly the political situation had changed so that South Africa was now able to attract loans directly from the international community. The financing strategy was changed as follows:</p> <ul style="list-style-type: none"> • Direct Sovereign guarantees to be provided by South Africa to foreign banks. • Stand-alone financing introduced to reflect LHDA's stronger bargaining position and to increase competition amongst banks, • Contractors asked to provide only ECA financing, not commercial loans for non-export element. <p>Phase 1B cost approximately US\$1,400m. Three quarters of the cost was financed on a non-Concessionary basis, largely through the South African capital markets. The World Bank, EIB and the Development Bank of South Africa covered about 11% of the funding.</p>
Security	<p>The principal security on which the funding of the project rested was the Sovereign Guarantee issued by the South African Government in respect of the payment obligations of TCTA. Although the Lesotho government was notionally guaranteeing the borrowings in respect of the hydropower element, in practice these were directly linked to the payments for water.</p> <p>The arrangement of the guarantees in Phase 1A was a sensitive issue, as the international financing community was not in a position to deal direct with the South African apartheid regime. The problem was overcome by LHDA establishing a Trust Corporation in London, under which all lenders including the World Bank were treated on an equal basis.</p>

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