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A Review of Private-Public Partnership Models in Hydropower Projects

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A Review of Private-Public Partnership Models in Hydropower Projects

Commissioned by
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Econ Pöyry AS
P.O.Box 5, 0051 Oslo, Norway. Phone: + 47 45 40 50 00, Fax: + 47 22 42 00 40, http://www.econ.no

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Abbreviations

ADB	Asian Development Bank
AfDB	African Development Bank
BOT/BOOT/BOO/BOSS	Build, Operate and Transfer/Build, Own, Operate and Transfer/Build, Operate, Own/Build, Operate, Sell and Start again
COD	Commissioning Operation Date
DBO/DBFO/DBFT	Design, Build, Operate/Design, Build, Finance and Operate/ Design, Build, Finance and Transfer
DFI	
ECA	Export Credit Agency
ENSAP	Eastern Nile Subsidiary Action Program
EPC	Engineering, Procurement and Construction
ESIA	Environmental Social Impact Assessment
ESMP	Environmental Social Management Plan
FC	Financial Closure
HPP	
IADB	Inter-American Development Bank
ICB	International Competitive Bidding
IPP	Independent Private Producers
NBI	Nile Basin Countries
NELSAP	Nile Equatorial Lakes Subsidiary Action Program
MoU	Memorandum of Understanding
MDB	Multilateral Development Bank
MDG	Millennium Development Goals
MIGA	Multilateral Investment Guarantee Agency

PIP	Project Implementation Plan
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPI	Public Private Infrastructure
PPIAF	Public-Private Infrastructure Advisory Facility
PPP	Private-Public Partnership
PTC	Power Technical Committee
RPTP	Regional Power Trade Project
SAP	Subsidiary Action Programmes
SSEA	Strategic/Sectoral Social Environmental Assessment
SVP	Shared Vision Programme
WB	World Bank

Executive Summary

Background

The investment needs in the power sectors of the NBI region are substantial, and hydropower will have to continue to make up a substantial part of the regions generation mix if least cost principles are to be adhered to. As described in this paper, private-public partnerships (PPP) will likely have to emerge as a primary model for power sector expansion if both public and private investment is to be mobilized and implemented efficiently and effectively. Thus, the Regional Power Trade Project (RPTP) of the NBI has commissioned a review of the associated PPP financing and implementation models, so as to draw out lessons learned that can inform a set of guiding principles for its member states. Given the significant challenges and implications of this work, as exemplified with both short- and long-term power crises throughout the region and the continent, the review and associated training workshops represent an important component of the RPTP overall aim of establishing the institutional means to coordinate the development of regional power markets among the Nile Basin countries.

Objectives and Methodology

The overall objective of the PPP Review is to;

"arrive at a set of guiding principles, grounded in international lessons-learned, for NBI member countries looking to implement PPPs in the development and utilization of their hydropower resources."

In achieving this objective, two data collection and analysis streams have been carried out. First, data and information from international databases, publicly available documents and the institutional expertise housed at the consultant have been put to use in reviewing international trends and experience. The analysis of the three case studies have been based on a detailed review of relevant documentation obtained from official websites, the World Bank, donors and journals. Additionally, in providing a recommended PPP model framework, the consultant has carried out a review of available literature on country-specific contextual issues for the NBI countries, as well as reviewed the outcome of a questionnaire which was filled out by representatives of member states.

International Trends

A review of international trends related to private-public participation in infrastructure reveals that shifting policy focus between public and private investment and ownership, respectively, had until recently left little space for innovative and pragmatic private-public partnerships. As a result, it appears that many countries, especially in Africa, will have to play catch-up with respect to rapidly growing demand for infrastructure services, particularly electricity. It is now well understood that in order to fill the growing infrastructure gap, public and private investors will be needed to carry out their respective comparative advantages. While the Asian financial crisis in 1997 and the current global credit market turmoil present challenges, there remains strong interest and available funding in search of attractive power projects. This is particularly true for renewable energy projects, given the rapid emergence of climate change concerns as a so-called mega-trend, having an impact on investment and policy trends.

Internationally, PPPs have been implemented in a wide range of industries and have proven particularly useful in large-scale infrastructure projects in higher-risk countries. As indicated in later sections, PPPs can be viewed as an alternative to pure private and pure public implementation models, which provide a tool for mobilizing investment while ensuring that the well-being of the public are looked after.

The concept of private-public partnerships (PPPs) is a broad one, generally used to describe financing, ownership and implementation models in which the government, the consumer and the private developer share the risk of the project as well as the rewards. Specific PPP models are generally differentiated along a number of lines; model employed to select private partner; public and private ownership and financing shares; designation and distribution of specific endogenous (controllable) and exogenous risks; role of multi- or bi-lateral donor financiers; cross-border relations, and; time-frame. The specific PPP model which is most appropriate for a given project will be dependent on a number of factors, including; the anticipated external benefits (e.g. beyond financial benefits and costs of a project); the comparative operational advantage and relative financial strength of the public and private actors; and the planning horizons of the public and private actors. Broadly speaking, policy makers should choose a model which best balances the need to mobilize private finance to a prioritized project with the objective of maximizing the positive impact of the projects on the citizens and consumers they represent.

Case Studies and Lessons Learned

The three case studies analyzed were Cana Brava, Brazil; Birecik, Turkey and Nam Theun 2 in Lao PDR.

Brazil prepared an Expansion Plan for 1997 to 2006 in which it was concluded that massive investments in generation capacity was needed to meet the growing demand. Therefore Electrobras[1] (Contrails Elétricas Brasileiras SA) proposed the construction of the Cana Brava run-of-river hydropower plant (450MW). The project was one of the first projects with private participation after the new institutional and regulatory frameworks were established in 1995 and 1996 and it is one of the first IPPs to be financed under a project finance mechanism in Brazil.

In **Turkey,** Birecik is part of a $32 billion South Eastern Anatolia Project (known as GAP after its Turkish name, Guneydogu Anadolu Projesi). GAP has been largely financed by the Government of Turkey, with $3.79 billion coming from foreign sources. Turkey's macro-economic troubles during the 1990s, however, led to an increasing reliance on external financing, including export credits from Germany, Switzerland, Italy, Austria and the USA. GAP consists of a planned network of 22 dams, 19 power plants and ancillary irrigation and industrial projects, and GAP is intended to use the waters of the Tigris and Euphrates Rivers to transform the Southeast of Turkey into a regional "breadbasket". The Birecik Hydropower Project includes a reservoir and 672MW in installed capacity, and is expected to generate 2.5 billion kWh per year. The project was the first project, in any sector, using the build-operate-transfer (BOT) model. As the project was completed on time and under budget, it has be argued that the project can be used as a role model in terms of the efficiency of having private

[1] The major Utility in Brazil, the Government owns 52% of the stocks.

companies being in charge of the planning, financing, construction and operation of hydro power plants.

In **Laos**, the Government of Lao (GOL) signed a MoU in 1993 with the Thai Government (GOT) in which GOL agreed to supply GOT with 1500MW of hydro based power by 2000, an agreement that was later extended to 3000MW by 2006. GOL also signed a MoU with Vietnam in 1995 to supply 1500 MW by the end of 2010 and in 1996 a MoU was signed with Cambodia but no specific agreements in terms of MW supplied were detailed. The Nan Theun 2 (NT2) is a large project (1075 MW) and the overall purpose with the project is to "generate revenue through environmentally and socially sustainable development of NT2's hydropower potential to finance poverty reduction and environmental management programs in Lao PDR."(World Bank, 2007)

Table A provides a summary of the success criteria, as applied to the case studies.

The analysis of lessons learned in the review focuses on the tools and approaches available to policy makers in pursuing the above stated objective; ie balancing the need to mobilize private finance while maximizing the developmental impact of the resulting project(s). This analysis, together with the contextual assessment, is the building blocks of the proposed guiding principles, summarized below.

Table A. Summary of lessons learned versus success factors

Success factor	Brazil	Turkey	Lao PDR
Terms of the PPA for public entities, particularly the tariff level achieved by the single buyer.	Not applicable – as PPA signed with private entity	The public utility took on the majority of the risks which might have been necessary to get the necessary private funding for the project.	Lao only kept 5% of the power of this project, but gained export revenue due to the agreement with Thailand, who is a steadily growing economy with increasing demand for electricity
The timeliness of implementation.	Short and smooth, four years from Concession award to COD.	Long and complex until FC but short construction time.	Long due to environmental and social impacts and external factors such as the Asian crisis which disturbed the MoU with EGAT.
The overall effect on country/region's power sector.	Cana Brava was part of a generation expansion plan for 1997-2006 and as such it was a prioritized project.	Part of a large scale project, the GAP, which is a highly prioritized project by the Turkish government.	Power mainly for export hence the project will mainly contribute to the country through export revenues. NT2 is part of a larger program of economic development for Lao citizen and hence the export revenues is geared towards this programme
The effectiveness and efficiency of operation and maintenance	No negative references found, it seems that the plant is delivering the expected amount of power to the Brazilian net.	No negative references found, it seems the plant is delivering the expected amount of power; only problems relate to environmental and social impacts.	N/A since its not yet in operation
Efficiency and prudence of the procurement process.	Smooth ICB process	Complex due to interpretation of concession terminology by Danistay	Direct negotiations
Both positive and negative environmental and social impacts	Some negative environmental impacts and some complaints regarding inadequate resettlement compensation	Large social impacts, both in terms of resettlement and in cultural values. Inadequate resettlement processes	Initial delays due to inadequate ESIA but the concession agreement now regulates all social issues in detail and several external independent audit teams are reviewing the work, approx two teams per month.
Impacts on cross-border relations.	N/A	World Bank did not support the project since it argued that riparian countries did not approve it, could be a potential conflict in the area.	The Mekong River Commission was established already in 1995 to assure the management of the water resources in the Mekong river system, of which river Theun is a part. Unlike the Birecik project, the World Bank did support this project which means the project fulfilled their policy regarding international waters.
The overall sustainability of the PPP and PPA.	Sustainable	The transparency and good governance could be questioned due to the lack of international observers, such as Multilaterals.	Good transparency and governance which can be partly attributed to the heavy involvement of multilateral agencies such as ADB and WB as well as strong NGOs.

Contextual Review

The contextual review sets out to identify key similarities and differences between the NBI member states (as a group) and the case study countries – as applicable in identifying guiding principles based on lessons learned. A range of issues are considered, including; investment attractiveness; sector institutional set-ups; power sector planning; water rights and multiple use issues; and regional cooperation. The contextual assessment reveals that while there is a relatively wide range of institutional

preparedness for PPP throughout the region, overall there appears to be *no* reason to believe that the (relative) successes of the case study countries *cannot* be repeated, in some form, in the Nile Basin region.

Guiding Principles for PPP Financing and Implementation Models

Based on the international trends, lessons learned and contextual assessment, as well as discussions during the training workshop, a set of guiding principles has been developed. These guiding principles are meant to serve as guide posts for the member countries and NBI-RPTP in developing and implementing PPP models which will have a high probability of success. The key recommendations associated with these principles are summarized below and laid out in detail in Section 7.2:

1. Independent regulator should be in place before implementation of PPPs, as it is critical for ensuring;
    a) transparent and fair processes – especially in case of (part) public ownership,
    b) that benefits of PPP reach the general public
    c) the long-term sustainability of the project
2. Progress is needed in much of the region in ensuring financial viability of the off-taker – ***before*** private capital can be raised on reasonable terms
3. PPPs in hydropower are not a 'quick fix' and must be carefully planned and diligently prepared, and should follow least-cost expansion principles. For many countries in the region this will require a return to systematic investment planning. There is a risk that this will be neglected in favor of emergency power needs.
4. Regulatory frameworks should allow for private financing (not necessarily ownership) of transmission lines which allow for evacuation of power – thus reducing the associated risk
5. Public ownership of the 'reservoir component' of HPPs could be particularly beneficial in the region, given the likely multiple use benefit and the regional importance of the Nile River.
6. Progress should be made towards improving power trade capabilities, and a Regional Hydropower Investment Help Desk should be considered for private participation within the Nile Basin– as opposed to country-specific help desks. This could also serve as a platform for sharing of regional experiences and best practices in implementation of PPPs.

Résumé

Contexte

Les besoins d'investissement dans les secteurs de l'énergie de l'Initiative du Bassin du Nil (NBI: *Nile Bassin Initiative*) sont substantiels, et l'énergie hydroélectrique devra continuer de représenter une part significative de la production afin d'en minimiser le coût total. Tel que présenté dans ce document, les partenariats public-privé (PPP) deviendront très certainement le modèle principal de développement du secteur de l'énergie afin de pouvoir mobiliser des financements tant publics que privés et d'assurer une gestion efficace et effective des investissements. Dans le cadre de son *Regional Power Trade Project* (RPTP), le NBI a lancé une étude des modèles de PPP liés au financement et au développement de tels projets, afin de tirer les enseignements des expériences en cours et d'établir un ensemble de principes directeurs pour ses Etats Membres. Ainsi que l'ont démontré les crises énergétiques de court- et de long-terme dans la région et sur le continent, ce travail revêt une importance majeure. L'étude et les ateliers de formation qui y sont associés sont un élément important de la stratégie d'ensemble du RPTP visant à créer les moyens institutionnels pour coordonner le développement des marchés énergétiques régionaux parmi les pays du Bassin du Nil.

Objectifs et méthodologie

L'étude PPP a pour objectif principal :

"d'élaborer, sur la base des enseignements d'expériences internationales, un ensemble de principes directeurs à l'attention des pays membres du NBI afin de faciliter la mise en oeuvre de PPP en vue du développement et de l'utilisation des ressources hydroélectriques."

Afin d'atteindre cet objectif, deux types de collecte de données et d'analyse ont été menées. Premièrement, les expériences et tendances internationales ont été examinées à partir d'informations disponibles dans les bases de données internationales, ainsi que sur la base de l'expertise institutionnelle du consultant. Trois études de cas ont été analysées à partir de la documentation de sites internet officiels, de celui de la Banque Mondiale, des pays "donneurs" et des journaux de référence. Deuxièmement, le modèle de PPP recommandé par le consultant a été élaboré au moyen d'une revue de la littérature disponible sur chaque pays du NBI, ainsi que sur la base des réponses à un questionnaire adressé aux représentants des Etats Membres.

Tendances internationales

L'analyse des tendances internationales relatives aux collaborations public-privé en matière d'infrastructure montre que les changements d'approche entre investissement et propriété public/privé au cours du temps ont jusqu'à présent laissé peu de place à la mise en oeuvre de PPP innovants et pragmatiques. En conséquence, beaucoup de pays, notamment en Afrique, devront faire face à une croissance rapide de leurs besoins en infrastructure, notamment électrique. Il est désormais bien établi qu'afin de répondre à cette demande, il conviendra de mobiliser des investisseurs publics et privés et d'utiliser au mieux leurs avantages comparatifs. Même si l'expérience de la crise financière asiatique de 1997 et les perturbations actuelles du marché du crédit mondial présentent des défis, il y a toujours un intérêt fort et de nombreuses possibilités de financement disponibles pour développer de nouveaux projets énergétiques attrayants. Cela vaut particulièrement pour les projets ayant trait aux énergies renouvelables, étant donné

l'importance des préoccupations liées au changement climatique et leurs impacts sur les politiques énergétiques et sur les décisions d'investissement.

Au niveau mondial, les PPP ont été mis en oeuvre dans un grand nombre d'industries et se sont révélés particulièrement utiles dans les projets d'infrastructure à grande échelle menés dans les pays « à haut risque ». Les dernières parties de l'étude soulignent que les PPPs peuvent être une alternative crédible à des modèles de mise en oeuvre uniquement publique ou privée. La valeur des PPP réside dans leur capacité à mobiliser des sources d'investissement tout en tenant compte des préoccupations d'intérêt général.

Le concept de PPP est vaste et souvent utilisé pour décrire des modèles de financement, de propriété et de mise en oeuvre dans lesquels les autorités publiques, le consommateur et l'entrepreneur privé partagent le risque du projet, ainsi que ses bénéfices. Différents modèles de PPP existent selon la configuration du projet: modèle pour sélectionner le partenaire privé; propriété publique et privée et montage financier; identification et partage des risques endogènes (contrôlables) et exogènes; rôle des donneurs financiers multi- et bilatéraux; relations transfrontalières; et calendrier d'exécution. Le modèle de PPP le plus pertinent pour un projet particulier dépendra de plusieurs facteurs, notamment: les gains externes anticipés (e.g. au-delà des gains et coûts financiers du projet); l'avantage comparatif d'un point de vue opérationnel; le poids financier relatif des acteurs publics et privés; l'horizon temporelle de ces mêmes acteurs en termes de planification. En principe, l'objectif des décideurs publics devrait être de choisir un modèle qui puisse combiner au mieux le besoin de mobiliser des financements privés pour un projet prioritaire avec l'objectif de maximiser l'impact positif de ce projet sur les citoyens et les consommateurs qu'ils représentent.

Etudes de cas et principaux enseignements

Les trois études de cas retenues sont Cana Brava au Brésil, Birecik en Turquie et Nam Theun au Laos.

Le Brésil a développé un Plan d'Expansion de 1997 à 2006. Ce plan souligne le besoin massif d'investissement dans les capacités de production afin de faire face à la croissance de la demande. Electrobras[2] (Contrails Elétricas Brasileiras SA) a proposé la construction d'une usine hydroélectrique "au fil de l'eau" (sans barrage) de 450MW sur le Cana Brava. Le projet a été un des premiers projets à participation privée depuis que les nouvelles dispositions institutionnelles et réglementaires ont été adoptées en 1995 et 1996. Il s'agit également d'un des premiers projets de PPP institutionnels à bénéficier d'un mécanisme de financement de projets au Brésil.

En Turquie, l'usine Birecik fait partie du projet "Anatolie du Sud-Est" d'une valeur de 32 milliards $ (connu sous l'appellation GAP, Guneydogu Anadolu Projesi). GAP était initialement largement financé par le gouvernement turc, avec seulement 3,79 milliards $ en provenance de sources étrangères. Les difficultés macroéconomiques de la Turquie au cours des années 1990 l'ont cependant progressivement conduite à s'appuyer de plus en plus sur le financement extérieur, y compris sous la forme de crédits d'exportation en provenance de l'Allemagne, la Suisse, l'Italie, l'Autriche et les Etats-Unis. GAP consiste en la création d'un réseau de 22 barrages, 19 usines électriques et des projets annexes d'irrigation et de développement industriel. GAP a pour but d'utiliser les eaux

[2] La principale enterprise de travaux publics dans le secteur de l'énergie au Brésil, dont 52% du capital appartient au gouvernement.

du Tigre et de l'Euphrate afin de transformer le sud-est de la Turquie en une "corne d'abondance" régionale. Le projet hydroélectrique de Birecik prévoit la création d'un réservoir et d'une capacité d'installation de 672 MW, en vue de produire 2,5 milliards kWh par an. Le projet a été le premier du genre, dans tous les secteurs, à être bâti selon le modèle « construction - gestion - transfert » (*build-operate-transfer*). Le projet a été réalisé dans les délais et à un coût moindre que prévu : il est donc souvent cité comme un modèle d'efficacité en termes d'implication de sociétés privées dans la planification, le financement, la construction et la gestion d'usines hydroélectriques.

Au **Laos**, le Gouvernment (GOL) a signé un accord de principe avec le Gouvernment thaïlandais (GOT) en 1993 qui prévoit que GOL fournira à GOT 1500 MW d'hydroélectricité d'ici 2000. L'accord a été ensuite étendu à 3000 MW d'ici 2006. GDL a également signé un accord de principe avec le Vietnam en 1995 afin de fournir 1500 MW d'ici la fin de 2010, ainsi qu'un accord avec le Cambodge en 1996, sans toutefois spécifier un montant de livraison. Le Nan Theun 2 (NT2) est un grand projet (1075 MW) dont le but est de "créer un bénéfice durable du point de vue environnemental et social grâce à l'exploitation du potentiel hydroélectrique du NT2 en vue de financer les programmes de réduction de la pauvreté et de gestion de l'environnement au Laos" (Banque Mondiale, 2007).

Le Table A ci-dessous fournit une synthèse des conditions de succès identifiés dans les études de cas ci-dessus.

L'analyse des enseignements se concentre sur l'approche et sur les instruments à la disposition des décideurs publics pour atteindre l'objectif pré-cité: combiner le besoin de mobiliser des financements privés avec l'objectif de maximiser l'impact positif du projet en termes de développement économique, social et environnemental. Les résultats de l'étude ainsi que l'analyse de contexte ont permis de construire les principes directeurs proposés ci-dessous.

Tableau A Synthèse des enseignements et conditions de succès

Conditions de succès	Brésil	Turquie	Laos
Termes du PPA (PPP: *Purchase Power Agreement*) pour les entités publiques, notamment niveau du tarif payé par l'acheteur individuel.	Non applicable car le PPA est signé par avec une entité privée.	L'entreprise publique a pris la majorité des risques pour obtenir le financement privé nécessaire au projet.	Le gouvernement a conservé seulement 5% de l'électricité de ce projet, mais a obtenu les revenus de l'exportation résultant de l'accord avec la Thaïlande, dont l'expansion économique crée une demande accrue d'électricité.
Le respect du calendrier de mise en oeuvre	Mise en oeuvre courte et sans heurts: quatre années entre l'obtention de la concession et le COD.	Mise en oeuvre longue and complexe jusqu'au 'financial closure' mais court délai de construction.	Mise en oeuvre longue en raison des impacts environnementaux et sociaux et de facteurs externes tels que la crise asiatique, qui a perturbé l'accord de principe avec EGAT.
L'effet global sur le secteur électrique du pays/de la région.	Cana Brava était un projet prioritaire dans le cadre du Plan d'Expansion des capacités de production pour 1997-2006.	Fait partie d'un projet à grande échelle, le GAP, au centre des priorités du gouvernement turc.	Production d'électricité essentiellement pour l'exportation, dont les revenus profitent au pays. NT2 fait partie d'un programme plus large de développement économique pour les citoyens du Laos et les revenus associés sont orientés vers ce programme
L'efficacité et l'efficience de l'opération et de la maintenance	L'étude n'a pas montré de problèmes : il semble que l'usine fournisse l'électricité attendue au réseau.	L'étude n'a pas montré de problèmes : il semble que l'usine fournisse l'électricité attendue au réseau. Quelques problèmes liés à l'impact sur l'environnement et sur les sols.	Non applicable car pas encore en opération.
Efficacité et prudence du processus de marché.	Processus ICB sans heurts	Complexe en raison de l'interprétation de la terminologie liée aux concessions par Danistay.	Négociations directes.
Impacts environnementaux et sociaux (positifs et négatifs)	Quelques impacts environnementaux négatifs et plaintes concernant le montant inadéquat des compensations liées à la réinstallation des populations.	Impacts sociaux de large ampleur, aussi bien en termes de relocalisation que de valeurs culturelles. Processus de réinstallation des populations inadéquat.	Des retards initiaux en raison d'un ESIA inadéquat mais l'accord de concession réglemente maintenant toutes les questions sociales en détail et des équipes indépendantes d'experts auditeurs passent en revue le travail environ deux fois par mois.
Impacts sur les relations transfrontlaières	Non applicable	La Banque Mondiale n'a pas soutenu le projet au motif que les pays voisins ne l'ont pas approuvé et qu'il pourrait s'avérer source de conflit dans la région.	La Commission de la rivière Mékong a été créée en 1995 pour assurer la gestion des ressources hydrauliques des régions limitrophes, où se trouve la rivière Theun. Contrairement au projet Birecik, la Banque Mondiale a soutenu ce projet, le considérant conforme à sa politique mondiale de gestion des eaux.
Viabilité du PPP et du PPA.	Viable	La transparence et la gouvernance pourraient être mises en cause en raison de l'absence d'observateurs internationaux.	Bonnes transparence et gouvernance en raison notamment de l'implication directe d'agences multilatérales telles que la Banque Africaine de Développement et la Banque Mondiale, ainsi que des ONGs.

Analyse de contexte

L'analyse de contexte a pour but d'identifier les similarités et les différences entre les pays membres du NBI d'une part, et les pays ayant servi d'études de cas de l'autre. Sur base de ces enseignements, l'analyse devait permettre de sélectionner les principes directeurs applicables au sein de la région NBI. Plusieurs questions ont été étudiées notamment l'attractivité des investissements; les dispositifs institutionnels au niveau

sectoriel; la planification du secteur électrique; la législation relative aux droits d'accès à l'eau et la question des usages multiples; et la coopération régionale. L'analyse de contexte montre qu'en dépit d'un degré de préparation institutionnelle variable à travers la région, il n'y a pas de raison de penser que le succès (relatif) des études de cas ne puisse pas être répété dans la région NBI, sous une forme ou sous une autre.

Principes directeurs pour des PPP liés au financement et à la mise en oeuvre de projets

L'étude des tendances internationales, les enseignements des études de cas et l'analyse de contexte, ainsi que les discussions lors des ateliers de formation, ont permis d'élaborer un ensemble de principes directeurs. Ces principes directeurs ont pour but de servir de cadre de référence pour les pays membres et pour NBI-RPTP afin de concevoir et de mettre en oeuvre des modèles de PPP offrant les meilleures chances de succès. Ces principes sont résumés ci-dessous et présentés en détails à la Section 7.2.

Parmi les recommandations essentielles:

1. Une autorité de régulation indépendante doit être établie avant la mise en œuvre des PPP, afin d'assurer :

    a) des processus justes et transparents, notamment dans les cas où la propriété est (partiellement) publique

    b) une vaste diffusion des bénéfices du PPP au public au sens large

    c) la viabilité du projet sur le long terme

2. Des progrès sont nécessaires dans la région afin de garantir la viabilité financière de l'acheteur d'électricité - ***avant*** de pouvoir mobiliser le capital privé à des conditions raisonnables:

3. Les PPP hydroélectriques ne sont pas des « solutions de court terme » : ils doivent être planifiés et préparés avec soin, et suivre les principes du moindre coût de développement. Pour beaucoup de pays de la région, cela signifie revenir à une planification systématique des investissements. Le risque existe qu'un tel effort soit négligé face aux besoins énergétiques urgents.

4. Le cadre institutionnel doit permettre le financement privé (pas nécessairement la propriété) des lignes de transmission afin d'évacuer le courant électrique, et de réduire les risques associés.

5. La propriété publique de la composante « réservoir » des usines hydroélectriques pourrait être particulièrement bénéfique dans la région, étant donné les usages multiples et l'importance régionale du Nil.

6. Des progrès sont nécessaires afin d'améliorer les capacités de commerce de l'électricité. La mise en place d'un service d'appui (« help desk ») régional à l'investissement hydroélectrique devrait être considérée afin de faciliter l'implication des acteurs privés dans la région, de préférence à des services d'appui nationaux. Cette initiative pourrait également servir de plateforme pour le partage d'expériences et de bonnes pratiques dans la mise en œuvre des PPP au niveau régional.

1 Introduction

Under the Regional Power Trade Project of the Shared Vision Program, the Nile Basin Initiative has contracted Econ Pöyry to;

i) Carry out a blue chip study to review private-public partnership financing and project implementation models for hydropower and transmission projects, and present recommended model framework for the Nile Basin countries.

ii) Provide a compendium of relevant capital investment sources which could be accessed to facilitate the establishment of PPPs in the power sector, together with guidance on accessing these funds.

iii) Carry out and facilitate a 5-day training workshop aimed at providing representatives from member countries with the tools necessary for implementing the recommended models in a manner which will help bring prioritized projects forward and ensure sustainability.

iv) Provide a workshop to members of the PTC, presenting the findings of the report, the recommended regional PPP model framework, and suggesting follow-up activities.

As indicated in the ToR for this assignment, the general objective of the consultancy is;

"*to assist the Project Management Unit (PMU) and the Power Technical Committee (PTC) of the NBI in conducting a "blue chip" study on the review of Private-Public Partnership models for financing and implementing Hydropower and Transmission Line projects in the Nile basin countries. The consultant should propose innovative practical models that will result in overall reduction in project life-cycle costs and ensure project benefits are shared equitably with all stakeholders. The complete assignment shall include a five-seven days training workshop for members of the PTC."*

The more operational objectives are as follows;

i) Based on international lessons learned, develop a recommended PPP model framework for NBI member countries based on a set of guiding principles.

ii) Provide training to member country representatives so as to facilitate a better understanding of the steps required in implementing effective and sustainable PPPs in the power sector.

iii) Provide guidance to the NBI-RPTP and member country representatives on the sources and approaches for accessing available international funding for the implementation of PPPs in the power sector.

1.1 Objective and Methodology

The overall objective of the PPP Review is to;

"arrive at a set of guiding principles, grounded in international lessons-learned, for NBI member countries looking to implement PPPs in the development and utilization of their hydropower resources."

In achieving this objective, two data collection and analysis streams have been carried out;

- First, the methodology of the review reflects an aim to provide a general description of international trends while providing a detailed analysis of three case studies. Data and information from international databases, publicly available documents and the institutional expertise housed at the consultant have been put to use in reviewing international trends and experience. The analysis of the three case studies have been based on a detailed review of relevant documentation obtained from official websites, the World Bank, donors and journals.
- Additionally, in providing a recommended PPP model framework, the consultant has carried out a brief review available literature on country-specific contextual issues, as well as reviewed the outcome of a questionnaire which has been filled out by representatives of all but two member countries (Burundi and Egypt). The literature review included documents as made available by the PMU, including the Preliminary Basin Wide Study (SNC Lavalin International, 2008), Institutional, Regulatory and Cooperative Framework Model for the Nile Basin Power Trade (Mercados EMI, et al, 2007), Review of Environmental Impact Assessment Frameworks and Procedures in Regional Power Investment Projects (Tecsult International, 2008), Review of Hydropower Multipurpose Project Coordination Regimes: Best Practice Compendium (Sweco Grøner, 2008).

It is worth emphasizing that PPP arrangements are generally highly complex, catering to unique project specific conditions and public development goals. As a result, in arriving at a set of guiding principles, particular emphasis is placed on the results of the consolidated analysis of the case studies in this report, as well as reflection of other related studies. Particularly relevant studies here include "Financing of Private Hydropower Projects" by Chris Head (2000) and "An Analysis of Independent Power Projects in Africa: understanding development and investment outcomes" by Katharine Nawaal Gratwick and Anton Eberhard (2007).

Finally, preliminary guiding principles have been presented and discussed with members of the PTC at a 5-day conference in Dar es Salaam in May 2008. The guiding principles have been edited and updated based on the discussion at the conference and the consultants' own professional interpretations and conclusions from this discussion.

2 Framework

This chapter aims to provide a background to the Nile Basin Initiative in order to set the stage for the review of PPP models. It further aims at provide a brief introduction to the different concepts of PPPs and to provide an introduction to the motivation and approach of the current project.

2.1 NBI context

According to the Basin Wide Study draft (SNC Lavalin International, 2008), the Nile Basin Initiative (NBI) provides for an agreed basin-wide framework to fight poverty and promote socio-economic development in the ten Nile basin countries (Burundi, Rwanda, Uganda, Tanzania, Kenya, Sudan, Eritrea, the Democratic Republic of Congo (DRC), Ethiopia and Egypt). It directly and indirectly contributes to the achievement of the Millennium Development Goals (MDGs). The NBI is led by a Council of Ministers in charge of Water Affairs from the member states (Nile-COM) with the support of a Technical Advisory Committee (Nile-TAC), and a Secretariat (Nile-SEC). A Strategic Action Program has been established that includes both basin-wide projects (Shared Vision Program) designed to lay the foundation for cooperative action, and two subsidiary action programs (SAPs) whose objectives are to promote poverty alleviation, growth and improved environmental management

Under the NBI framework, two subsidiary action programs have been established: The Nile Equatorial Lakes Subsidiary Action Program (NELSAP) and the Eastern Nile Subsidiary Action Program (ENSAP). ENSAP includes Egypt, Ethiopia, and Sudan and focuses on integrated water resources management, flood management, power generation and interconnection, irrigation and drainage and watershed management. NELSAP includes Burundi, D.R. Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania, and Uganda and targets investments in power development, transmission interconnection and trade, water resources management, management of lakes and fisheries, agricultural development, and water hyacinth control.

The Shared Vision Program (SVP) is a broad-based series of projects designed to establish a foundation for transboundary regional cooperation, promote exchange of experiences, enhance capacity, and create an enabling environment for investments on the ground, within an agreed upon framework. The SVP projects were identified and prepared by the Nile riparians based on a complex participatory, multi-country process involving the NBI institutions and national experts from the Nile countries. The SVP comprises seven thematic projects focusing on water resources, environment, power trade, agriculture, applied training, communication and stakeholder involvement, and benefit sharing. These projects address the priority water-related sectors and cross-cutting themes identified by the Nile riparians to ensure an integrated and comprehensive approach to water resources development and management. Cooperative water resources management can also serve as a catalyst for broader socioeconomic development and regional cooperation, with benefits far exceeding those derived from the river itself. The SVP portfolio also includes an eighth “project,” which will strengthen the capacity of NBI institutions to execute and coordinate cooperative basin wide projects.

The Regional Power Trade Project. The Regional Power Trade (RPT) Project, one of the seven thematic projects of the Shared Vision Programme (SVP), aims to establish the institutional means to coordinate the development of regional power markets among the Nile Basin countries through the creation of an institution referred to as the Nile Basin Power Forum. The Nile Basin Power Forum will support dialogue and special studies to explore a range of policy-related issues such as potential institutional and regulatory frameworks to support regional power trade.

The objective of the power trade project is to develop a regional power trading structure to improve power supply and reduce costs. It has two main components[3]:

- To facilitate power trade among the Nile basin countries.
- To provide a comprehensive basin-wide analysis of long-term power supply, demand, and power trade opportunities, as a basis for planning multi-purpose river basin management in the subsidiary action plans of the NBI.

The comprehensive basin wide analysis is to be carried out in two phases - Phase 1 (which is the object of this work) to collect, organize and harmonize relevant data for the study, and to prepare the terms of reference for Phase 2, which will be the comprehensive study.

Detailed implementation planning for the SVP, including the development of generic guidelines for the program as a whole[4] and the preparation of project specific Project Implementation Plans (PIPs), began in late 2001.[5] This document presents the SVP Regional Power Trade Project Implementation Plan. Based on the project document and additional inputs from the beneficiary countries, the PIP provides a detailed description of the project components and activities, the implementation schedule and arrangements, the project costs and financing, procurement, disbursement, financial management, and monitoring and evaluation.

As noted in the draft Review of Environmental Impact Assessment Frameworks and Procedures in Regional Power Investment Projects (NBI document), cheap and reliable supply of electricity is a critical input for economic growth, employment generation and poverty alleviation. As such, the long term objective of the RPTP is to contribute to poverty reduction in the Region by assisting the NBI countries in developing the tools for improving access to reliable and low cost power in the Nile basin in an environmentally sustainable manner. An important element in achieving this goal is to create an effective institutional mechanism to promote and develop power trade opportunities among the countries participating in the Nile Basin Initiative. Facilitating the development of a regional electricity market can play a key role in furthering co-operation among the Nile basin states and in ensuring that the resources of the Nile Basin are developed and managed in an integrated and environmentally sustainable manner.

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[3] NBI Shared Vision Program - Nile Basin Regional Power Trade - Project Document, March 2001, Council of Ministers of Water Affairs of the Nile Basin States

[4] The SVP Master Pad Appraisal Document (Feb. 2003) sets forth the generic implementation guidelines for the SVP.

[5] SVP Implementation Review Meeting, Entebbe, October 2001.

2.2 Introduction to project finance

As indicated in the next section, PPPs can take on a range of financing and ownership structures. In the case of IPPs, it is increasingly popular to establish a dedicated project company to develop, construct and operate the generation plant. In particular, this will generally be the case when there are to be both private and public owners of the project – as this approach readily allows for the establishment of a joint venture. One of the key advantages of this approach, from a public planning point of view, is that it emphasizes the importance of assessing such projects as an isolated investment opportunity. Given that the majority of PPPs in hydropower are surely to come about through this financing and ownership model, it is important to gain a basic understanding of this approach.

Yescombe (2002) introduces project finance as;

> ”Project finance is a method of raising long-term debt financing for major projects through ‘financial engineering,’ based on lending against the cash flow generated by the project alone; it depends on a detailed evaluation of a project’s construction, operating and revenue risks, and their allocation between investors, lenders, and other parties through contractual and other arrangements. [] ’Project finance’ is not the same thing as ‘financing projects,’ because projects may be financed in many different ways. Traditionally, large scale public-sector projects in developed countries were finance by public-sector debt; private-sector projects were financed by large companies raising corporate loans. In developing countries, projects were financed by the government borrowing from the international banking market, multilateral institutions such as the World Bank, or through export credits. These approaches have begun to change, however, as privatization and deregulation have changed the approach to financing investment in major projects, transferring a significant share of the financing burden to the private sector.”

Further, although all major projects finance deals are unique in structure and implementation, Yescombe (2002) identifies a number of typical characteristics of project finance;

- It is provided for a “ring-fenced” project (i.e., one which is legally and economically self-contained) through a special purpose legal entity (usually a company) whose only business is the project (the “Project Company”).
- It is usually raised for a new project rather than an established business (although project finance loans may be refinanced).
- There is a high ratio of debt to equity (“leverage” or “gearing”) – roughly speaking, project fiancé debt may cover 70-90% of the cost of a project.
- There are no guarantees from the investors in the Project Company (“non-recourse” finance), or only limited guarantees (“limited recourse” finance), for the project finance debt.
- Lenders rely on the future cash flow projected to be generated by the project for interest and debt repayment (debt service), rather than the value of its assets or analysis of historical financial results.
- The main security for lenders is the project company’s contracts, licenses, or ownership of rights to natural resources; the project company’s physical assets are

likely to be worth much less than the debt if they are sold off after a default on the financing.

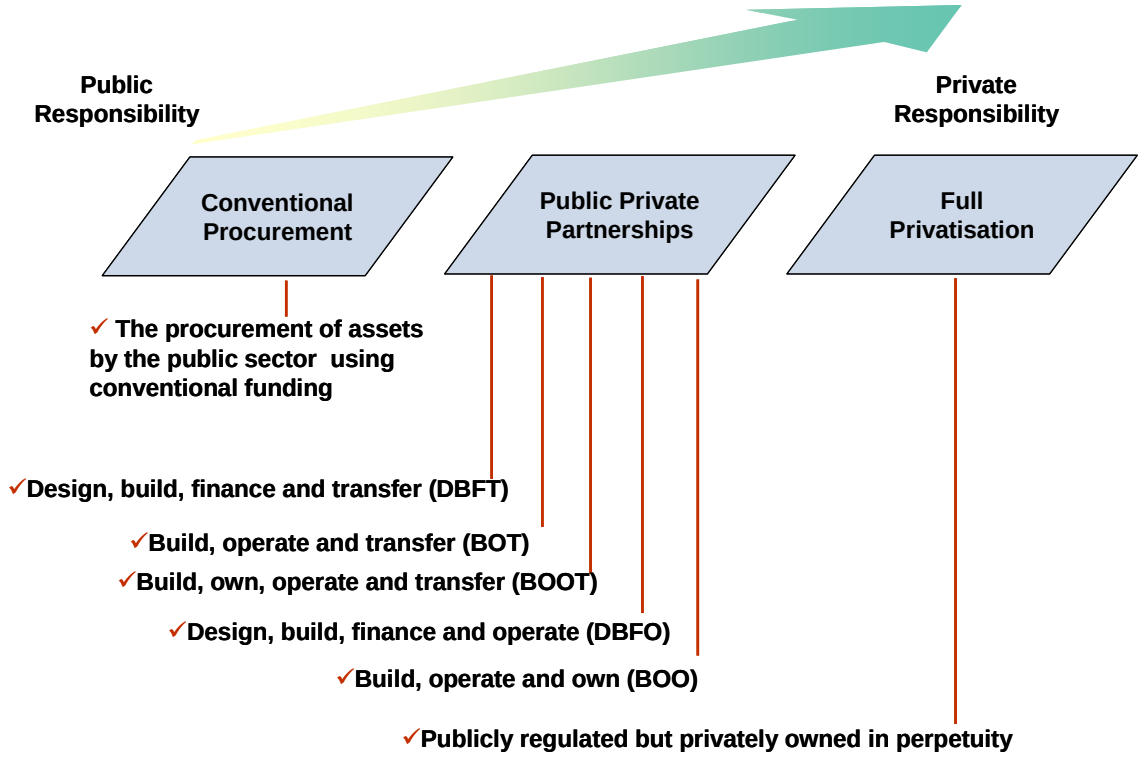
- The project has a finite life, based on such factors as the length of the contracts or licenses or the reserves of natural resources, and therefore the project finance debt must be fully repaid by the end of this life.

2.3 Private-public partnerships models

Internationally, PPPs have been implemented in a wide range of industries and have proven particularly useful in large-scale infrastructure projects in higher-risk countries. As indicated in later sections, PPPs can be viewed as an alternative to pure private and pure public implementation models, which provide a tool for mobilizing investment while ensuring the well-being of the public are looked after.

The concept of private-public partnerships (PPPs) is a broad one, generally used to describe financing, ownership and implementation models in which the government, the consumer and the private developer share the risk of the project as well as the rewards. Specific PPP models are generally differentiated along a number of lines; model employed to select private partner; public and private ownership and financing shares; designation and distribution of specific endogenous (controllable) and exogenous risks; role of multi- or bi-lateral donor financiers; cross-border relations, and; time-frame. The concept of PPP ranges from a ‘service contract’ in which the public sector employs a private contractor to undertake certain functions while all the risk rests with the public sector to ‘divestiture’ which implies private ownership and private commercial risk backed up by guarantees from the government, debt financing and a secured revenue stream through energy sales contracts. An Independent Power Producer (IPP) is another form of a PPP where the investor is protected through long terms PPAs and government guarantees among other things. After the concession period, (commonly 20-30 years) IPPs are transferred back to the host government.

Figure 2.1 A range of PPP options



Source: KPMG (2003) and authors own additions

The specific PPP model which is most appropriate for a given project will be dependent on a number of factors, including; the anticipated external benefits (e.g. beyond financial benefits and costs of a project); the comparative operational advantage and relative financial strength of the public and private actors; and the planning horizons of the public and private actors. Broadly speaking, policy makers should choose a model which best balances the need to mobilize private finance to a prioritized project with the objective of maximizing the positive impact of the projects on the citizens and consumers they represent.

Commonly cited and implemented PPP models include;

- **Service contracts** awarded to a private company by the public utility by which the private company is obligated to undertake certain tasks such as billing, maintenance etc. The aim of the contract is to for example minimize repair costs or improve collection performance.
- With a **Management contract**, the ownership of the facility rests with the public utility while the private company is responsible for operations and maintenance. The owner typically controls the tariff revenue while the contractor is responsible for collection and billing. A certain degree of performance incentives is included in the contract but the larger part of the commercial risk rests with the public utility.
- An **Affermage contract** is typically used to operate the network and the ownership and the capital investments responsibility rest with the public utility. The private contractor is only the operator of the system as well as responsible for maintenance. Revenues form the operations are shared between the utility and the contractor, based on an agreed upon formula.

- A **Lease contract** is similar to an Affermage contract in that the ownership rest with the public utility while the private contractor operates and maintain the network. The private contractor pays a fee for the right to operate the network (monthly/quarterly etc). A larger share of the revenue risk is hence placed on the private contractor, this is the major difference from an Affermage contract.
- **Design-Build-Operate (DBO):** In the absence of private financing, a DBO contract can provide assurance that lifecycle costs are minimized and that private sector skills are employed during the operation of the facility. The owner, ex the host government, mobilizes the financing and pays annual fee to the contractor.
- In a **Concession,** the state is still the owner of the facility but transfer the complete responsibility for construction, operation and maintenance to the private actor. This is regulated through a Concession agreement. A typical concession period is 20-30 year and it is the responsibility of the operator to collect the revenues in order to cover for capital and operations costs. At the end of the period, the concessionaire is obligated to return the facility to the state unless the concession is renewed. This is a commonly used format for a semi-privatization of distribution networks. This format can also be used for rehabilitation project if the utility wishes to attract private capital; this is referred to as a Rehabilitate-Operate-Transfer (ROT) contract.
- **Build-Own-Operate-Transfer (BOOT)/ Build-Operate-Own (BOO)/ Build-Lease-Transfer (BLT):** A BOOT contract is awarded by the government who enters into a long term off-take agreement with the private company who builds and operates the plant for a specified number of years. At the end of the contract period, the assets are transferred back to the host government. BOOT projects are typically financed through non- or limited recourse technique under which the lenders, in case of default, only have recourse to the assets and revenue streams of the project and do not have recourse back to the balance sheet of the original sponsor. The rights and obligations of each party is carefully designed and detailed though several agreements. In addition to the BOOT format, the Build-Own-Operate (BOO) which means no transfer back to the host government and the Build-Lease-Transfer (BLT) are other used formats. The private party typically takes most of the commercial risk in the BOOT/BOT/BLT arrangements while the off taker assumes part of the market risk.
- **Divestitures**: Using this format, full ownership of the assets is transferred to the private company that takes full responsibility, from capital investments, operations and maintenance. The investor takes on full market, commercial and operational risks. The host government's role is to provide different forms of guarantees and energy sales contracts.[6]
- **Build-Operate-Sell-Start again (BOSS):** This is a new format of the classical BOOT arrangement and the key feature is the separation of the development and the operational stages for financing purposes. The host government guarantees to buy the project 'at cost' within a specified number years after commissioning should no other buyers be interested. By removing the concept of 'transfer free of charge' as is done in classical BOOT arrangements, BOSS releases the wealth in the project to the equity holders at an earlier stage while also removes an number of barriers currently facing private investments in hydropower projects.

[6] P. Ljung, 2007

The key features of the different PPP models can be summarized as in Table 2.1 below.

Table 2.1 Key features of PPP models

Type	Asset ownership	O&M responsibility	Capital investment	Commercial Risk	Typical duration (years)	Primary application	Main type of facility
Service contract	Public	Public and private	Public	Public	1-2	Operations	Any
Management contract	Public	Private	Public	Public	3-5	Operations	Any
Affermage	Public	Private	Public	Shared	5-15	Operations	Network
Lease	Public	Private	Public	Shared	5-15	Operations	Network
Design-Build-Operate	Public	Private	Public	Shared	1-10	New construction	Generation and transmission
Concession	Public	Private	Private	Private	20-30	Operations and new construction	Network, (ROT for generation)
Build-Operate-Transfer (BOT)	Private	Private	Private	Private	20-30	New construction	Generation and transmission
Divestiture	Private	Private	Private	Private	Indefinite	All	Any

Source: Ljung, 2007

It is important to recognize that private-public partnerships do not necessarily involve public ownership. Indeed, at the extreme, a PPP is established when a long-term PPA with an independent and privately owned power producer is established. Given a general shortage of public funds in most developing countries, including NBI member countries, it would be preferred if power projects could be wholly financed by the private sector and designed so as to maximize the benefits to society. However, this is rarely possible, particularly when the country is viewed as a risky destination for private investment and/or the project has a wide-range of external impacts – such as a typical hydropower plant.

Generally speaking, in implementing the most appropriate and effective PPP model will be guided by balancing the comparative advantages and limitations of the private and public sectors, respectively;

1) **Private participation** should be sought so as to; i) raise finance; ii) reduce construction and operational costs; iii) realize a transfer of world class technological solutions;

2) **Public sector participation** should be guided by the sole objective of improving the developmental impact of the project, particularly through; i) the mitigation of investment risks confronting investors; ii) the incorporation of external impacts into investment and operational decision making; iii) the incorporation of the fact that hydropower plants will have a life-span which is much longer than the private sector's planning horizon.

2.4 PPP Assessment Framework

Thus, policy makers will generally face a number of trade-offs in finding an effective and efficient PPP financing and implementation model. However, the above discussion

provides for a number of success criteria against which the effectiveness of specific models can be evaluated, including;

- The favorableness of the **terms of the PPA** for public entities, particularly the tariff level achieved by the single buyer.
- The **timeliness of implementation** – recognizing a general desire to achieve implementation with as few delays as possible.
- The **overall effect on country/region's power sector**, with particular considerations to; the relief or avoidance of power deficits; the impact on the regulator's (and customers) ability to benchmark the incumbent power utility, and; impacts on local power sector construction and manufacturing industries.
- The **effectiveness and efficiency of operation and maintenance** of the generation plant and accompanying transmission line.
- **Efficiency and prudence of the procurement process**.
- Both positive and negative **environmental and social impacts** with particular consideration of resettlement processes and multiple use benefits.
- In the case of projects with regional orientation, any **impacts on cross-border relations** will be considered.
- The **overall sustainability of the PPP and PPA**, with a particular focus on the suitability and performance of the agreement in promoting transparency and good governance.

As indicated here, PPPs can be quite complex, involving many different participants including government, private sector experts, financiers, development banks, bi- and multi-lateral donors and customers, each having a different perspective, which is not always fully understood by the other participants. In; i) identifying PPP opportunities; ii) preparing the necessary due-diligence, and; iii) implementing and operating PPPs in the power sector, public servants must look to balance the often competing interests of various participants so as to achieve the greatest benefits to the citizens they represent.

Accordingly, in both evaluating the effectiveness of internationally implemented PPP models and determining relevant guiding principles for NBI member countries, the following broad criteria are considered;

- **Enabling environment, regulation and energy sales contracts**. What do the case-studies tell us about the pre-requisites for sustainable PPPs? In particular, what sort of systems/institutions/incentives has proven effective in courting international investors and reducing perceived risks and/or cumbersome bureaucratic procedures? Also, how have the countries honored PPAs and other contractual terms? And, are 'standardized' PPAs available?
- **Bidding processes and concession award**. Can the case-studies provide any lessons regarding whether or not is always preferable to implement an international bidding process? Or, can selective bidding or bilateral negotiations be preferred in certain cases, e.g. in the case of small scale hydropower projects?
- **Mobilization of investment**. By employing PPPs, one is able to draw on many sources of financing. Thus, early successes on individual project can ensure return on investments in the country from a wide range of sources. Of particular concern is how to attract private investors while ensuring consumer benefits and sustainable projects. This, in particular, involves a thorough understanding as to

what sort of returns are required in the specific market so as to attract private involvement. What do the case-studies tell us about the impact of the involvement of development finance institutions, multi- and bilateral donor agencies, and/or export agencies? What do the case-studies tell us about the impact of various private participation models? The impacts of foreign v. local financing, ownership and operation? Impacts of post-construction sale of operations? Experience of the investor(s) in the country/region and in hydropower?

- **The most appropriate ownership models and implementation arrangements**. This involves an understanding of the interests of each project participant and which are best suited for the range of responsibilities required for efficient project implementation. Of particular interest is what responsibilities can be fulfilled more effectively by profit-seekers than by public entities. This is, however, often partly a function of the regulatory and incentive tools available to the public sector. What can be achieved by the public sector going beyond a policy and regulatory role and acquiring an ownership stake in the project company?
- **The most effective/efficient distribution of risks**. While one of the motivations of PPPs is to off-load some risk onto private investors, it is critical that the entities which; i) are in the best position to manage, and thus mitigate, a given risk, and; ii) are the best position to bear the downside risk are assigned the risk. This approach will generally provide public servants with the negotiation space necessary to ensure the greatest benefits to its citizens.
- **Social and environmental due-diligence processes**. What sort of regulatory and institutional due-diligence has contributed to positive/negative environmental impacts and the overall sustainability of projects covered by the case studies?
- **Ensuring the most appropriate planning horizon**. Public servants must be aware of, and plan for, the involvement of private investors with planning horizons which are generally much shorter than the expected life-time of the assets. If not appropriately managed, this characteristic can (and has) lead to unsustainable projects. Two categories of lessons learned will be relevant here. First, what sort of planning horizon can and should the respective private and public actors take when entering into a PPP and what implication does this have on the structure of the partnership? Second, given the typical goals of timely and effective implementation, as well as adherence to an existing master plan, what lessons can be drawn from international experience which could inform policy makers in the Nile Basin Region?
- **Expectations**. Government expectations (development objectives) vs. investors expectations (investment objectives) with the PPP – if they differ widely, challenges arise that must be addressed.
- **Enabling cross-border institutional arrangements**. Did certain regulatory or institutional set-ups promote or hinder the sustainable implementation of any of the projects covered in the case-studies?

Thus, the review will be geared towards drawing out lessons to guide public servants on these, and other, issues.

3 International Trends

NBI member countries are expected to experience significant growth in electricity demand in coming years. Given limited public budgets and competing demands for funds, governments will have to partly rely on private investors – likely international – in meeting this growing demand. However, the strategy of member countries in attracting private participation in PPPs in hydropower will be partly dependent on international investor attitudes towards power sector investments. Accordingly, this section provides an overview of the recent trends in private sector participation in energy sector projects. The section aims to show the trends across different regions, by type of private sector participation and by type of technology.

Private investment in Greenfield power generation projects in developing countries hit its peak in the 1990s. The total value of IPP deals closed in 1997 alone was nearly US$43 billion, comprising almost 50% of all investments in power generation that year. While facilitated by the institutional reforms and contractual innovations, the supply of capital and demand for investment in this market was primarily fuelled by three interacting trends, namely:

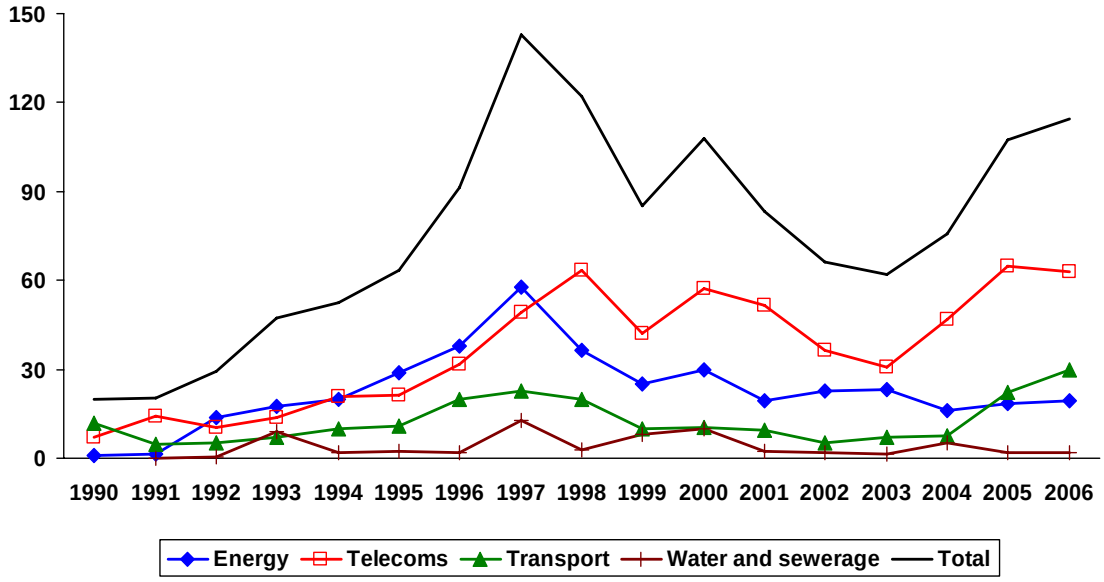
1. The increasing demand from developing countries as they reformed their electric power sectors in response to electricity or financial crises.
2. Key changes in lending policies from major multilateral banks shaped government's emphasis on private investment by restricting access to concessionary loans unless coupled with complementary moves to "no-lend" policy for the power sector unless accompanied by substantial reforms intended to commercialize and corporatize the electricity sector, and to introduce independent regulation.
3. Massive liquidity and tight domestic returns in US and European utilities markets drove investors to seek higher returns in new markets abroad.

Independent power producers in developing countries were a hot commodity in the 1990s; fuelled by rumors of returns of up to 35%, investors competed for market share in the new and lucrative market. However, troubles began to appear in 1997 with the Asian financial crisis. By the end of the decade, the market for greenfield IPP's had collapsed in both quantitative and qualitative terms. The Asian financial crisis propagated throughout the developing world—Russia in 1998, Brazil in 1999, Argentina in 2001— and projects began to unravel and new development stalled. Private investment in IPP's sank to $6 billion dollars in 2001. China, India and Argentina—countries, among many others, that had been prized attractions—saw investors flee. Spectacular failures, such as the Dabhol project in India, the Hub project in Pakistan, and the entire IPP sector in Indonesia, dominated the industry headlines.

In addition to successive economic shocks in emerging markets, the decline in IPP investment coincided with corporate scandals in the United States (including the downfall of Enron, a major IPP investor), the bursting of the dot-com bubble and domestic recession in the United States, and somewhat later, the attacks of September 11th and an increasingly uncertain global security environment. The same period was one of unprecedented turmoil in United States utilities markets, particularly in merchant electricity trading. Across the Atlantic, European utilities weathered equally grave losses in their home market and grew cautious in their developing country adventures.

Figure 3.1 includes all sectors and shows the overall trends in investment commitment in developing countries by sector. As can be seen, Telecom is the sector receiving the largest share of private sector participation. The energy sector did receive more investments than the Telecom sector in the pre-1997 period but as of 2006, it has taken up a third position, only receiving more than the Water and sewage sector.

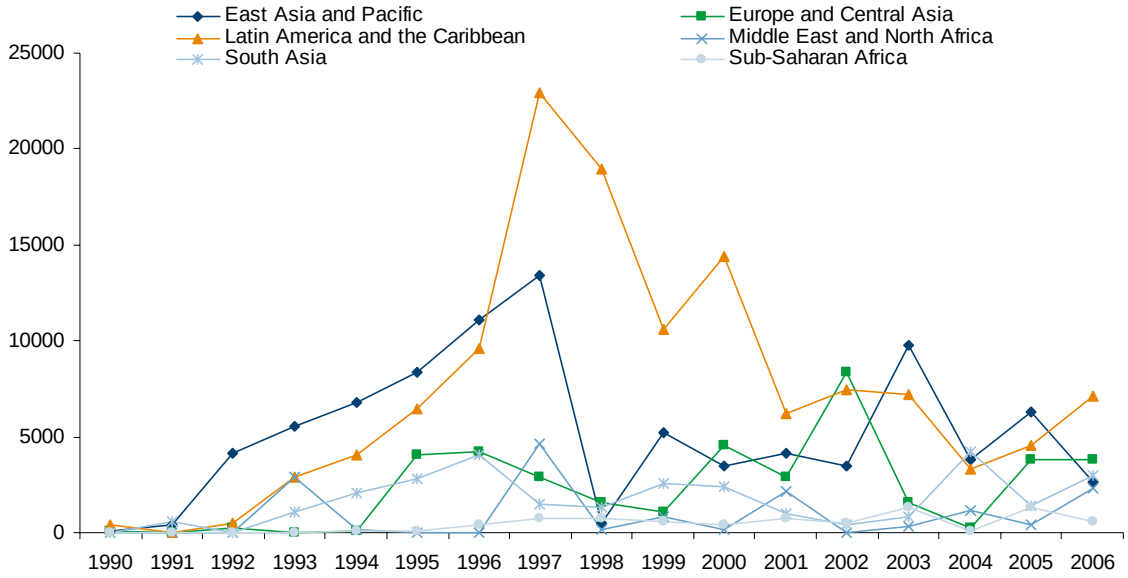
Figure 3.1 *Investment commitment to PPI projects in developing countries by sector*



Source: World Bank and PPIAF, PPI Project Database

Looking in more details on the energy sector, the trend of investments is shown in Figure 3.2, where a clear drop in investments occurred in 1997. Throughout this period, Sub-Saharan Africa has been the region experiencing the most modest share of investments; it has only on a few occasions received higher investments than the Middle East and North Africa region.

Figure 3.2 Investments in energy sector projects, per region, 1990-2006



Note: The figure includes projects from both low- and middle-income countries and includes management or lease contracts, concessions, Greenfield projects and divestitures. The data base contains more than 3,800 projects.

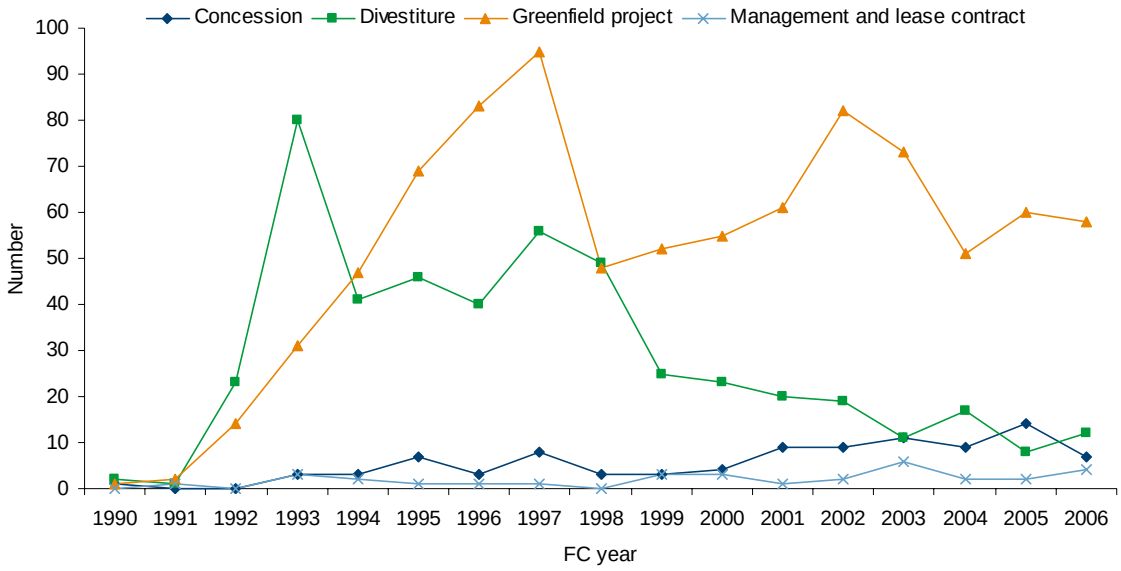
Source: World Bank PPI Database

The fall in private sector investment in electricity generation capacity since 1997, which was not matched by increased public investment, combined with rapid economic growth in many developing countries has resulted in power shortages and blackouts. This combined with a significant focus on climate change issues in recent years which has resulted in a renewed interest in renewable energy generation, has resulted in a gradual increase in investments in power generation. However, the effect has been less significant in the Sub-Saharan Africa region, where investments actually peaked in 2005 at $1359 million and the dropped to $616 million in 2006. The committed investments in 1997 were $754 million.

Within the energy sector, Greenfield projects were by far the most prevalent type across all regions, as can be seen from Figure 3.3. This has been the trend throughout this period and as can be seen, the increase in divestitures in late 1990 is mainly part to the privatization of 26 distribution companies in Brazil. Traditionally, investors prefer Greenfield projects as they can be structured in a way that protects the investor from many of the sector risks. Private investments going into the distribution sector has generally been smaller than for generation as the distribution sector is considered more risky. During the period of 1990-2005 twice the share as for generation projects were cancelled or no longer operational within the distribution sector. According the PPIAF, distribution projects in Sub-Saharan Africa is most likely to be troubled. In 2005, 47 percent of the 30 contracts involving distribution were no longer in operation, compared with 9 percent in other developing regions. (Tenenbaum and Izaguirre, 2007) It is believed that the high rate of cancellation and distress is due to a mismatch in expectation, an issue that will be discussed in more detail in later sections. The Management and Lease type has increased in later years, mostly in countries where tariffs are below cost-reflective levels and enterprise operations are largely inefficient. Through this type of participation, the private investors' commitment is limited to contribute with managerial expertise to improve the operations; hence no risk is involved in terms of investments. The challenge with Management and Lease contracts is that the performance of the private participator is largely dependent on investments in

the sector by the public utility. However, if the public sector fails to commit to the promised investments and hence the performance of the contracts if falling, the private actor will be largely blamed even if it was the lack of public investments that caused the declining performance. (Tenenbaum and Izaguirre, 2007)

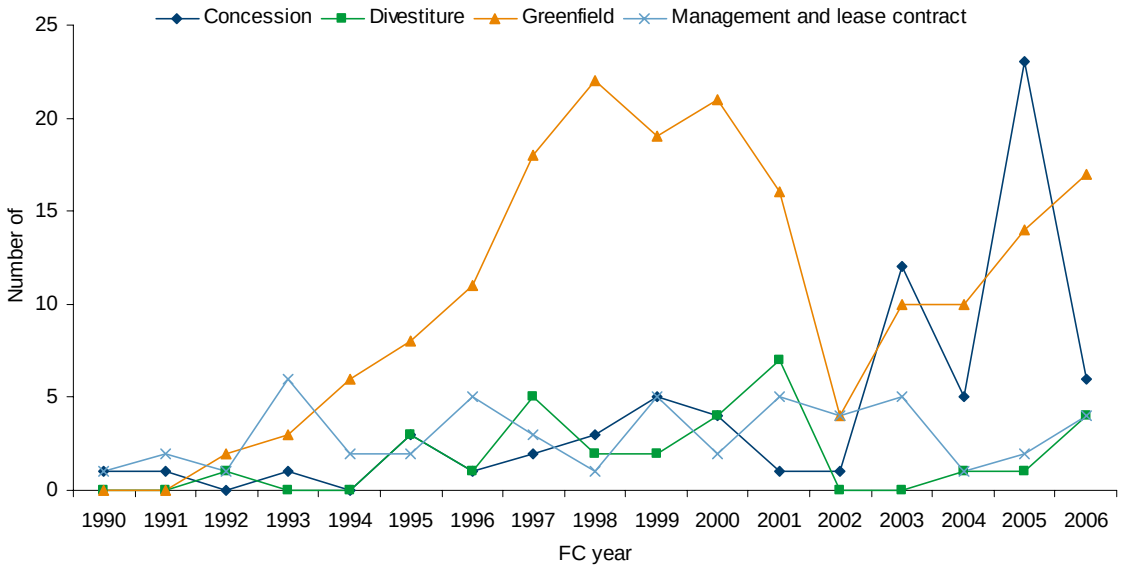
Figure 3.3 *Number of projects by type of private participation, for all regions, 1990-2006*



Source: World Bank and PPIAF, PPI Project Database

Looking at the energy sector in the Sub-Saharan Africa region only in Figure 3.4, Greenfield projects were the most common type until 2002 when Concession type project started to increase.

Figure 3.4 *Number of projects by type of private participation, Sub-Saharan Africa, 1990-2006*



Source: World Bank and PPIAF, PPI Project Database

Focusing on hydropower projects in Sub-Saharan Africa 2006. As can be seen, out the total of 19 projects, one was cancelled, one was distressed while five are concluded and nine in operation. Annex 1 outlines an overview of all energy sector projects in Sub-Saharan Africa, by type of participation and by type of technology, per country.

Table 3.1 Hydropower project with private participation, Sub-Saharan Africa, 1990-2006

Country	FC	Project name	Project status	Type of PPI	Sub type of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Angola	2003	Chicapa Hydroelectric Plant	Construction	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Hydro	MW	16.00
Burkina Faso	1998	Hydro-Afrique Hydroelectric Plant	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Hydro	MW	12.00
Lesotho	2002	Lesotho Electricity Corporation (LEC)	Operational	Management and lease contract	Management contract	Electricity	Electricity distribution, generation, and transmission	Hydro	MW	0.00
Nigeria	2005	Dadin Kowa Hydropower Plant	Construction	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Hydro	MW	39.00
Sao Tome and Principe	2004	Sinergie concession contract	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity generation	Hydro	MW	0.00
South Africa	2005	Bethlehem Hydro	Construction	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Hydro	MW	4.00
Uganda	2003	Uganda Electricity Generation Company Limited	Operational	Concession	Rehabilitate, lease or rent, and transfer	Electricity	Electricity generation	Hydro	MW	300.00
Zambia	2001	Lunsemfwa Hydro Power	Operational	Divestiture	Full	Electricity	Electricity generation	Hydro	MW	38.00
Cameron	2001	AES Sonel	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	Number of connections (thousands)	528.00
Cote d'Ivoire	1990	Compagnie Ivoirienne d' Electricite	Operational	Concession	Rehabilitate, operate, and transfer	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	..	0.00
Guinea	1995	Societe Guineenne d'Electricite	Concluded	Concession	Rehabilitate, lease or rent, and transfer	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	MW	180.00
Tanzania	2002	Tanzania Electricity Supply Company (TANESCO)	Concluded	Management and lease contract	Management contract	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	..	0.00

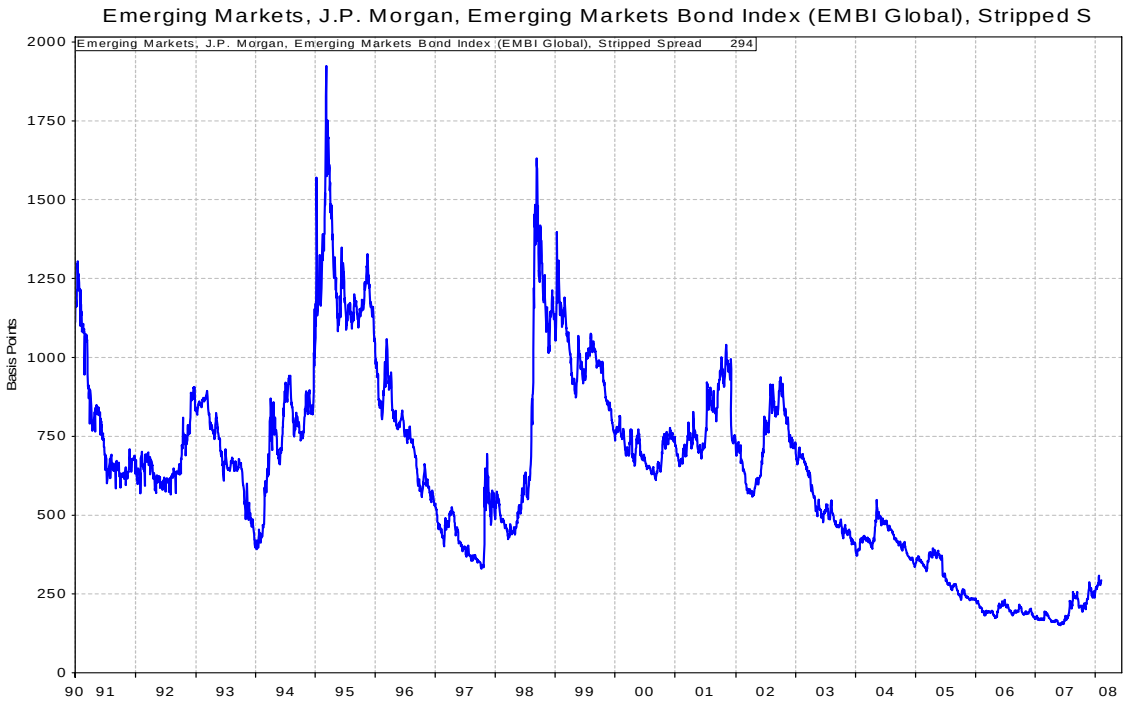
Source: World Bank and PPIAF, PPI Project Database

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Madagascar	2005	Jiro sy Rano Malagasy (Jirama)	Operational	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission,	Hydro, Diesel, N/A	Number of connections (thousands)	340.00
Gabon	1993	Societe Africaine de Gestion et d'Investissement (SAGI)	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility with sewerage	Hydro, Geothermal, N/A	..	0.00
Gabon	1997	Societe d'Energie et d'Eau du Gabon (SEEG)	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	Hydro, Geothermal, N/A	Number of connections (thousands)	125.00
Rwanda	2003	Electrogaz	Cancelled	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility with sewerage	Hydro, N/A	Number of connections (thousands)	67.00
Sao Tome and Principe	1993	Empresa de Agua e Electricidade	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Hydro	MW	4.75
Mali	1994	Electricite et Eau du Mali (Management)	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Hydro, Diesel	..	0.00
Mali	2000	Energie du Mali (EDM)	Distressed	Concession	Build, rehabilitate, operate, and transfer	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Hydro, Diesel	..	0.00

Source: World Bank PPI Database

However, the market stabilized around 2002. The perception of risk in the market has gradually improved, as can be seen in the graph below picturing the credit spread above LIBOR (risk free rate). Investors are now pricing the credit worthiness of governments in emerging markets relatively high, in fact the spreads were at all time lows before the market started to re-price risk after the credit crunch which started in August 2007.

Figure 3.5 Credit spread



Source: Reuters EcoWin

Summary

The World Bank's PPI database provides an overview of general trends regarding private participation in electricity, which can be summarized as follows: (Tenenbaum and Izaguirre, 2007);

- **More balanced among regions**. While the shares of PPI in electricity have declined for East Asia and Latin America, this has been primarily off-set by investments in Eastern Europe and South Asia. Private participation in the power sectors of Sub-Saharan Africa, on the other hand, remains low at…
- **Country distribution shifting**. Around 100 countries have had private participation in the electricity sector between 1990 and 2005. Of these, 20 have opened the sector to private investment since 2000, including Rwanda and Uganda. However, investment remained concentrated in a few countries with the top ten countries accounting for 72% of investment between 2001-2005.
- **New investors emerging**. While many global sponsors were withdrawing from developing countries, regional and local investors became more active in 2001-05. However, in Africa, recent commitments in hydropower by international investors in Angola, Mozambique, Uganda and Zambia indicate a continued interest.
- **Generation plants still predominant**. Annual investment in stand-alone power plants have recovered somewhat to over $10b annually from 2003-05, following its peak in 1996 of $28b and fall to $7b in 2002. As already described, IPPs accounted for the larges share of private activity in electricity – 77% of total investment between 2001-2005. In IDA countries, this percentage was 90%.

The most critical message here is that the shifting policy focus between public and private investment and ownership, respectively, has left little space for innovative and

pragmatic private-public partnerships. As a result, it appears that many countries, especially in Africa, will have to play catch-up with respect to rapidly growing demand for infrastructure services, particularly electricity. It is now well understood that in order to fill the growing infrastructure gap, public and private investors will be needed to carry out their respective comparative advantages. While the Asian financial crisis in 1997 and the current global credit market turmoil present challenges, there remains strong interest and available funding in search of attractive power projects. This is particularly true for renewable energy projects, given the rapid emergence of climate change concerns as a so-called mega-trend, having an impact on investment and policy trends.

4 Hydropower PPP Models: Three Case Studies

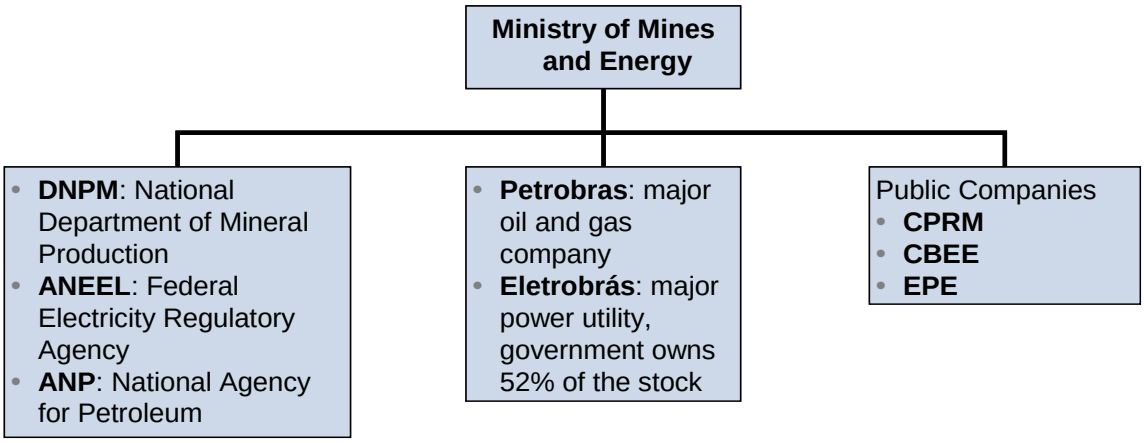
The following section presents a summary review of three cases studies; Cana Brava, Brazil; Birecik, Turkey; and Nam Theun 2, Laos PDR, focusing on the regulatory background, concession-, off take-, financing- and project implementation arrangements as well as the role of the host government, the utility and multilateral institutions, together with environmental and social impacts. Section 6, on the other hand, provides a summary analysis of the lessons learned which are relevant to member countries of the NBI, having made an assessment of the contextual relevance of the NBI countries with those included as case studies.

4.1 Cana Brava, Brazil

Brazil Power sector background

The power sector in Brazil is overseen by the Ministry of Mines and Energy with key departments and other major players organized as outlined in Figure 4.1.

Figure 4.1 Organizational structure of the power sector in Brazil



Source: Oliveriea et al, 2005

About 80% of the distribution is operated by private companies and generation is largely state owned, by either federal or provincial governments. Three federal hydropower companies, Furnas, CHESF and Electronorte control 27.8 GW of installed hydro generating capacity, or 33 % of total capacity. The major private players in the hydropower sector are Tractabel (7 GW), Duke (2.3 GW), AES (3.3 GW) and Endesa (658 MW). In addition private companies own and operate 6 GW of thermal power.

Transmission is mainly controlled by Electrobas' regional subsidiaries since no transmission assets have yet been privatized. However, there are several cases in which private companies have won bids for new transmission lines.

Hydropower is the dominant source of electricity in Brazil. During normal years, more than 80% of the countries electricity originates from a network of hydroelectric dams. Most of the dams were built by the state decades ago and are largely fully amortized. The electricity system in Brazil accounts for nearly 40% of consumption in all of Latin America. As indicated in Table 4.1, hydropower is the dominant source of generation.

Table 4.1 Generation Mix (2005), GWh

Source	GWh	%
Thermal	43 680	8
Hydro	453 180	83
Nuclear	24 024	4.4
Other	25 11	4.6
Total GWh	**546 000**	**100**

Source: IEA, 2007

Close to 95% of Brazilian households have access to electricity and lack of access is mainly a problem in remote areas in the North and Northeast. As many hydropower plants are largely amortized, power costs in Brazil are rather low. However, the actual tariff is comparatively high, in line with OECD countries for households, due to the system of different charges and taxes. Before the power sector reform, tariffs were well below cost reflective levels.

Table 4.2 Review of electricity production and consumption

Production	369 400
Consumption	368 500
Export	160
Import	39 200

Source: IEA, 2007

Regulatory background[7]

The initial development of the Brazil power industry was conducted by private companies. However, after WWII the sector was gradually taken over by the state companies' and the private sector was gradually squeezed out of the sector. CESP, Cemig, Furnas, CHESF and Electrobrás were the main players.

In the 1980's the state dominated power companies deteriorated due to increasing capital costs, low tariffs and over-capacity since the demand was not growing at the anticipated pace. During the years 1971 to 1993, tariffs were set by the Federal Government in such a way that the publicly owned state utilities had little or no incentives to reduce their costs and/or increase efficiency. As a result, they failed to meet the investment required for the sector. Hence, Brazil embarked on a power sector reform in 1990s after the new constitution in 1988 was ratified, that laid the foundations for democracy. Law 8631 were passed in 1993 and aimed at restructuring the power sector to encourage private investments and the previously tariff methodology was abandoned meaning that each utility was mandated to set a tariff based on full cost recovery and a "reasonable return on investment". In addition, Decree 1009 established the national transmission system, SINTREL, which involved free access to the network

[7] Oliveriea et al (2005), Tractebel (2005) and Head (2000)

by any supplier or off-taker, using a wheeling charge. But the pace of new investments was slow and hence in 1995, two new laws were passed, the Concession law, that allows private parties to supply public services, and the IPP law, that set the terms under which IPP concessions are awarded, namely through public bidding on a maximum of 35 years. In 1997, a previous restriction on the participation of foreign companies was abandoned. In addition, a number of Decrees have been passed to create a more enabling environment for private participation including increasing transparency in the regulatory and tariff-setting processes for IPPs. The introduction of these two laws boosted private investment during the period if 1995 and 2002.

Following the period of dominance by state owned companies, president Cardoso's goal was to give the private companies a more leading role in the power sector in Brazil, under the 'supervision' of the regulator, Agencia Nacional de Energie Elétrica (ANEEL). Hence, the major privatization efforts were undertaken during the Cardoso administration aiming for a model similar to England and Wales with wholly private and competitive electricity market.

However, the privatization journey was interrupted by the currency devaluation in 1999, the electricity crisis that followed a drought and the power rationing in 2001/02. Hence, new measures were needed for the power sector. Now, the da Silva administration, is abandoning the privatization plans, has reintroduced government control by channeling sales in the regulated market through a power pool that aggregates power purchase costs in a series of auctions conducted by ANEEL.

The definition of IPPs is used very broadly in Brazil. However, in the context of Greenfield projects that are developed by the private sector and sell electricity to the national grid, the IPPs in Brazil confront two different policy environments. The first round of IPPs was developed during the first reform which aimed at full privatization and competition. All current IPPs in Brazil were developed under this old framework while future IPPs will be developed under the new framework, guided by the second reform. Under the new framework, projects will be auctioned and receive a PPA for up to 35 years. However, as a large chunk of the hydro potential in Brazil has already been exploited and the potential sites are far from the grid in environmentally sensitive areas, few new projects have yet secured the environmental permits necessary to continue the development. Overall, the current IPPs in hydro have been functioning smoothly but have faced problems related to environmental permits.

Under the old framework, ANEEL regulated the procedure of awarding hydro concessions and is focused on the license needed to develop a site. The license to develop a site is project size specific and for project larger than 30 MW a competitive bidding process was required. The process was as follows:

- Private company undertakes feasibility and submits non-price application to ANEEL
- ANEEL publicly invites offers from other developers
- After prequalification, the feasibility study is made available to all qualified bidders
- A period of four months is given to prepare full bids
- The winner is the bid that provides the highest premium, if it is not the original developers that wins the bid, the original developer is reimbursed for the cost of the feasibility study by the winning bidder

For smaller projects, the concession can be awarded without competitive bidding, given that a satisfactory feasibility study can be presented and approved by ANEEL. Generally, site licenses were granted for a period of 30-35 years during the previous framework and there was no provision for the transfer back to the state.

Cana Brava Introduction

Brazil prepared an Expansion Plan for 1997 to 2006 in which it was concluded that massive investments in generation capacity was needed to meet the growing demand. Therefore Electrobras[8] (Contrails Elétricas Brasileiras SA) proposed the construction of the Cana Brava run-of-river hydropower plant. The project was one of the first projects with private participation after the new institutional and regulatory frameworks were established in 1995 and 1996 and it is one of the first IPPs to be financed under a project finance mechanism in Brazil. The Tractebel Cana Brava Hydro power plant was developed under the old framework referred to above.

Construction

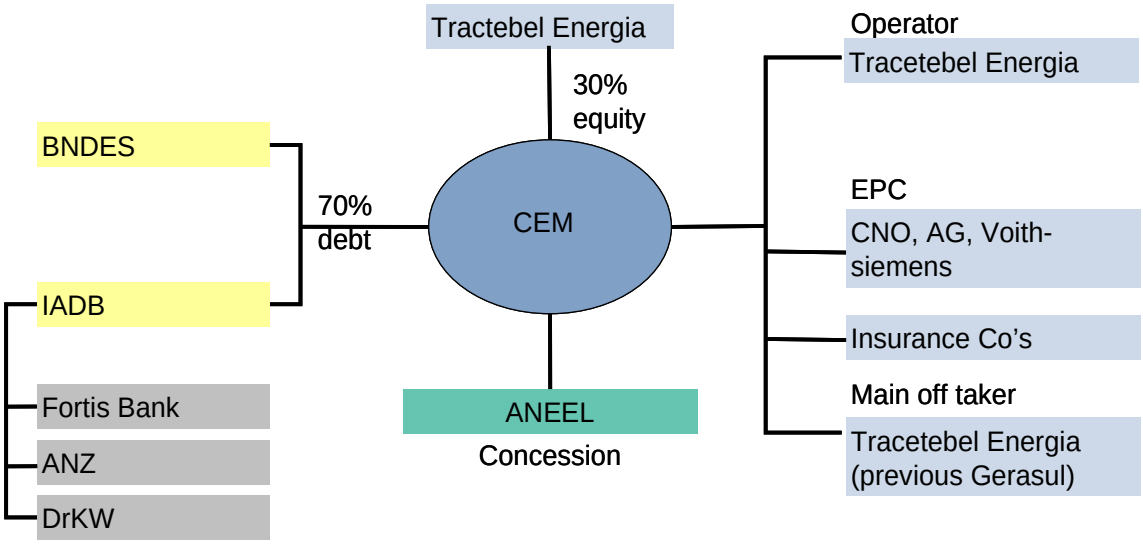
The first study of the site was carried out in 1997 at which point the concept included two sites of a total of 1350 MW. This was later changed into two separate projects, Serra da Mesa of 1275 MW and Cana Brava of 450 MW capacity. The construction of the 450MW Cana Brava hydro power plant was concluded in 2001 and the reservoir filling began in January 2002. The project also included the construction of a 50km 230 kV transmission line. The project is located in the State of Goias, approximately 250 km north of Brasilia. It was a turn-key fixed price Engineering, Procurement and Construction (EPC) contract. The EPC contract was awarded to Construtora Norberto Odebrecht (CNO), the largest Brazilian engineering and construction company together with two foreign firms, AG and Voight-Siemens.

Concession Award and Project Structure

An international competitive bid was held in March 1998 after which ANEEL awarded a 35-year concession contract to the project company Companhia Enérgetica Meridional (CEM), with Tractebel Energia SA as the main project sponsor. CEM is a wholly owned subsidiary of the project sponsor Centrais Geradoras do Sul do Brasil S. A. (Gerasul), a subsidiary of Tractebel Belgium. Prior to 1998 Gerasul was a state owned company which Tractebel purchased in 1998 following privatization. The concession agreement runs for 35 years after which it can be extended or transferred back to the Brazil Government.

[8] The major Utility in Brazil, the Government owns 52% of the stocks.

Figure 4.2 Financing structure for development of Cana Brava



Source: Tractebel (2005)

Financing

The budget for the plant's construction was set at US$ 361 million, of which the project sponsor (Gerasul) contributed with 30% equity and the remaining, funded with debt from Brazilian National Development Bank (BNDES) and Inter-American Development Bank (IDB). CEM received a US$ 160 million loan from IADB including a US$ 67, 2 million loan of ordinary capital and a US$ 80, 6 million of syndicated loans from different funds from financial institutions. BNDES contributed with US$ 105,9 million.(Tractebel, 2005) BNDES is a federal public company under the Ministry of Development, Industry and Foreign Trade with a mission to provide "long-term financing for endeavors that contribute to the country's development" and as such, the public sector played a key role in the financing and development of the Cana Brava project. In addition, the budget for environmental and social mitigation activities during construction and operation was estimated at US$ 25, 5 million and covers the total cost of Environmental Social Management Plan (ESMP), including measures for the campsite (about 2000 workers were employed for construction) and rehabilitation of degraded areas as well as expropriation and resettlement costs.

Figure 4.3 Cana Brava Financing Structure

Main Characteristics	Equity	BNDES	IDB A-Loan	IDB B-Loan
Amount (US$ million)	107,8	105,9	67,2	80,6
Interest rate	-	TJLP+4%	Libor+4,375%	Libor+4%
Amortization period (yrs)	-	10	12	9
First amortization	-	15/Aug/2003	15/Nov/2003	15/Nov/2003
Last amortization	-	15/April/2013	15/May/2015	15/Nov/2012
Amortization	-	Semi-annually	Quarterly	Quarterly

Source: Tractebel (2005)

Off-take arrangements

The base PPA was agreed upon between Gerasul and CEM, developed at IADB's request, and it runs for 18 years. In addition, the project documents allow CEM to enter

into PPAs with third-parties (e.g. distribution companies) under the following conditions: (a) the power price agreed to with such clients should be equal to or greater than the price in the base PPA; and (b) the terms and conditions agreed to with such third parties should not be less favourable to CEM than those agreed to with Gerasul in the base PPA. If CEM enters into agreements with third parties, Gerasul would be released from purchasing those volumes under the base PPA. This arrangement provided CEM with a steady revenue stream from power sales under the base PPA, while also allowing CEM an upside potential in terms of price/revenues and a diversification of its client base. Such structure clearly mitigated market risk, particularly during the system's transition period. While both the producer and the off-taker are private entities, the public sector was instrumental in both raising debt capital and ensuring effective implementation.

Environmental and Social Impact

Large protests were undertaken during the constructions due to the need for resettlement of approx 260 families and a flooded area of 124.47 km^2. An independent audit was carried out and they concluded that resettlement and compensation was carried out according to plans and in line with IADB standards[9] and the construction could continue on schedule. Tractebel had developed a Social Agreement between relevant levels of government, municipalities, entrepreneurs, NGOs etc and Tractebel to define and clarify the expectation of the social and environmental impacts of the project.

Challenges

Even after construction, the project encountered a number of serious financial and commercial challenges – mostly related to exogenous macro-economic shocks. In particular, around the time the plant started production, the electricity crisis became real, due to major droughts which depleted the reservoirs while there was no thermal power to back it up and the Real (the Brazil currency) faced a devaluation of about 40% in one year – and the IADB loan was denominated in foreign currencies. In addition, not all power produced had been contracted to distribution companies. CEM came up well short of its return expectations. (Oliviera et al, 2005)

Furthermore, at a corporate level, Tractebel identified specific challenges related to investing in emerging markets. It lists access to financing, the high cost of financing, lack of electricity market 'sophistication', end-user tariffs structures, heavy bureaucracy relating to obtain relevant permits, strong lobbying by NGOs, lack of infrastructure which complicates overall construction, regulatory risks and the option of international arbitration if often denied or opposed. (Tractebel, 2005) From the public sector point of view, these challenges as pointed out by a private investor as key hurdles, are important considerations in designing a framework that will attract private investors to participate in PPPs in NBI.

Conclusion

The Cana Brava hydropower plant is an example of a PPP of a BOOT nature, with the public sector playing a key financing role, but maintaining no direct ownership. In particular, the public sector participated in raising funds through the BNDES and by

[9] IADB environmental and social standards are higher than the once applicable in Brazil and the application of these was a loan requirement from IADB.

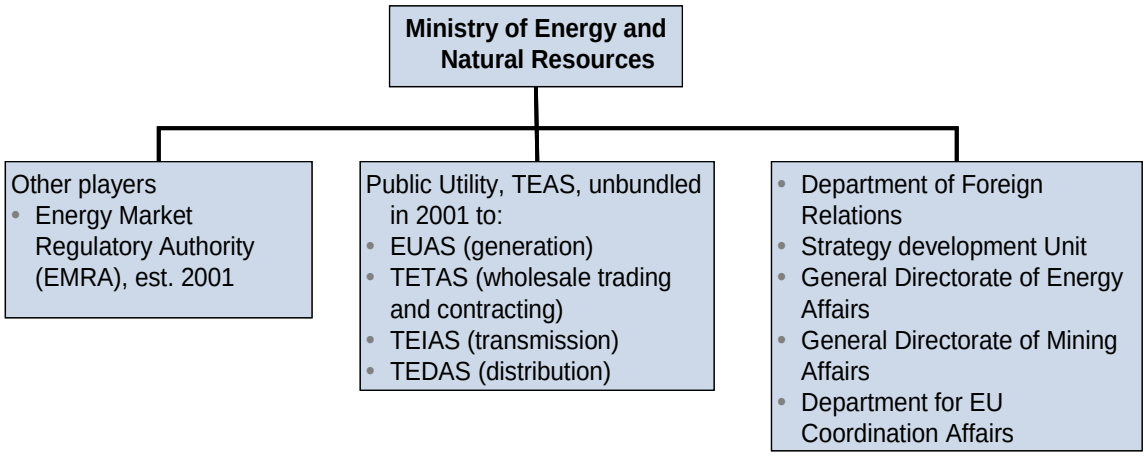
facilitating the implementation of the project. The participation of IADB ensured that high environmental and social standards were followed and several independent audits have been carried out. Cana Brava came into operation in 2002, fours years after the concession was awarded. The plant is fully running today, producing some 533.49 GWh annually. It is still run by Tractebel Energia.

4.2 Birecik Hydropower Project, Turkey

Turkey Power sector background

The Ministry of Energy and Natural Resources is the entity responsible for energy and natural resource issues in Turkey, the rest of the sector is structured as outlined in Figure 4.4.

Figure 4.4 Turkey power sector structure



Source: Head, 2000 and Cakarel and House, 2004

Table 4.3 Generation mix, 2005, GWh

Source	GWh	%
Thermal	151	76,6
Hydro	46	23,4
Total GWh	**197**	**100**

Source: IEA, 2007

Table 4.4 Overview, production and consumption

Production	154 200
Consumption	129 000
Export	1 798 000
Import	636

Source: IEA, 2007

Regulatory background[10]

Turkey liberalized the electricity sector in 1986 through Law 3096 which recognized that organisations other than the public utility, Turkey's Electricity Generating and Transmission Company (TEAS), could establish and operate generation facilities. The law further provided for power sales to TEAS at a tariff agreed to with the Ministry of Energy and Natural Resources (MNER). At the end of the contract term, most commonly 20 years, the privately developed project was to be transferred to the government at the end of the term at no cost.

However, progress towards privatization was slow, due to uncertainty regarding the interpretation of the contracts between the private developer and MNER as a concession or as a contract with the government governed by private law. If it is a concession, it is regulated by the jurisdiction of the Danistay, Turkey's highest administrative court. A concession agreement has to be approved by Danistay which is a cumbersome process. In addition, the court demanded conditions which were in conflict with the requirements of normal limited-recourse financing. Specifically, the court could not accept the right to assign contracts in the event of a default by the project company and it could not accept international arbitration as this was in conflict with the jurisdiction of the Danistay. Hence, an additional BOT law (Law 3996) was passed to clarify the situation. This law clarified the definition of the contract as not being a concession but rather a contract and hence regulated by private law. Based on this, a number of projects proceeded, but in 1996 the Constitutional Court annulled certain paragraphs of the law and decided that it was the courts that should decide whether a contract were a concession or not. In order to overcome the concession issue, the BOO law was passed in 1997 but hydro projects were excluded from this law. This means that all hydro projects must still pass through the Danistay for approval.

Terms and conditions that apply to such agreements include the following:

- The off-take contracts with TEAS are denominated in foreign currency but is payable in local currency with full convertibility
- No limitation of foreign ownership of the project company
- There is a take-or-pay obligation with full pass through to TEAS of hydro risk and unforeseen construction risk related to geology
- Certain fiscal incentives such as tax concession and access to government loans
- Specific supervision of the construction by an Independent Consultant reporting to the Ministry.

In tendering BOT contracts, the government advertises the projects and invites for a pre-qualification process. Thereafter, all pre-qualified bidders that wish to take part in the bid must purchase the full technical studies by MNER and prepare full technical and financial proposals during a period of 4-6 months. Each bidder is allowed to undertake any additional study as he/she find relevant to prepare a responsive bid, at own costs. Bids are then evaluated on lowest average tariff, subject to technical compliance.

[10] Head (2000) and Cakarel and House (2005)

In sum, the legal and regulatory framework of Turkey's energy sector has passed through a number of stages, outlined in Table 4.5. The Birecik project was developed under the second stage, i.e. using the BOT law.

Table 4.5 Overview of development of the legal and regulatory framework in Turkey

Framework	Year	Characteristics	MW	Operational Greenfield IPP (>100 MW)	Assessment
I	1984	BOT for Greenfield IPP	2 349	None	Unsuccessful due to interpretation of law, concession subject to approval by government agencies
II	1994	BOT with state guarantees		**Birecik;** Doge Enerji, Trakya Eletrik	Constitutional Court struck down framework as 'unconstitutional'
III	1997	BOO, treasury backed, take-or-pay contracts with TEAS	5 900	Gebze Plant; Adapazari Plant; Izmir Plant	Successful to attract foreign investment, more than 6 000MW foreign sponsored power
IV	2001	Electricity Market Law, establishment of EMRA, framework generally follows 'textbook' model of electricyt reform	490	None	Privatization programme slowly progressing, no foreign IPPs to date (2005) under latest framework

Note: Due to incomplete data, it is pointless to divide the 2349 MW on the two first frameworks.

Source: Cakarel and House (2005)

Introduction to Birecik

Birecik is part of Turkey's $32 billion South Eastern Anatolia Project (known as GAP after its Turkish name, Guneydogu Anadolu Projesi). GAP had been largely financed by the Government of Turkey, with $3.79 billion coming from foreign sources. Turkey's macro-economic troubles during the 1990s, however, led to an increasing reliance on external financing, including export credits from Germany, Switzerland, Italy, Austria and the USA. GAP consists of a planned network of 22 dams, 19 power plants and ancillary irrigation and industrial projects, and GAP is intended to use the waters of the Tigris and Euphrates Rivers to transform the Southeast of Turkey into a regional "breadbasket".

It is noteworthy that The World Bank has declined to support GAP projects, following their policy on projects constructed on international rivers. According to this policy, the World Bank would only support such project if the riparian countries have reached an agreement that the project have no negative impact on their interest. More precisely, Paragraph 8(b) in the policy outlines the conditions for support: "The other riparians have given a positive response to the beneficiary state or Bank, in the form of consent, no objection, support to the project, or confirmation that the project will not harm their interest." These conditions were not realized in the case of the Birecik dam, neither was it for the Ilisu dam which is another dam under the GAP. Therefore the World Bank did not support the project. (World Bank, 2001 and Sahan, 2001)

Construction

The Birecik Hydropower Project includes a reservoir and 672MW in installed capacity, and is expected to generate 2.5 billion kWh per year. The dam is located downstream of the Ataturk dam, and is a 2.5km long, 62.5m high and 489m wide concrete gravity dam. The retaining volume of the dam is over 620m^3 and the watershed of the reservoir covers an area of over 100,000km^2. The power house contains 6x112 MW Francis turbines and water is directed through penstocks each with a diameter of 8.4m and a gross head of 44.65m. In Turkey, the civil works, through an EPC contract, were executed by a joint venture between GAMA, Strabag and Philipp Holzmann. Philipp Holzmann led the consortium and represented the European countries which participated in the project. Interestingly, in the case of Birecik, the private sponsor belonged to the same group as the construction consortium. However, all the contracts were designed in an attempt to assure full accountability and transparency in order not to risk cross-subsidy from the project company to the construction company.

Concession Award and Project Structure

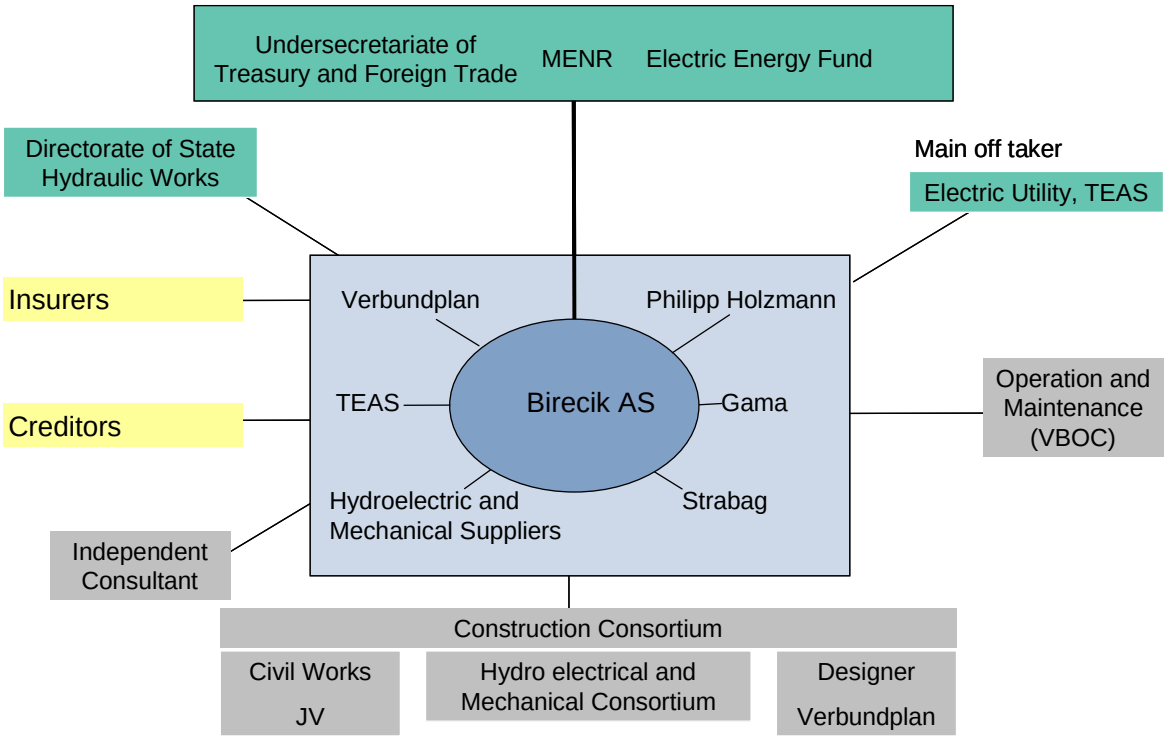
The project operates on a BOT model, or a build-operate-transfer model. The concession was directly negotiated and it was the first BOT in Turkey in any sector. The progress was slow mainly due to the already mentioned Danistay issues. Birecik was eventually defined as a non-concession project and could hence be treated as a contract under private law, a less cumbersome process. Provisions were also made for international arbitration in Vienna. After repayment of the loans by the Project Company, the plant will then be transferred to the Turkish Government in 2016 free of cost.

Ten companies formed the Birecik Group that designed and constructed the dam, turbines, generators and the electrical and hydraulic equipment. They formed a Project Company, Birecik AS, responsible for completing the project and also for operation and maintenance of the facilities. The original companies included Gama Industry, Philipp Holzmann (Germany), GEC-Alshtom-Cegelec (GB- France) and Stabag Osterreich (Austria). (OME, 2003) Out of the original companies, all but two—Philipp Holzmann and Alstom France—have sold their shares to Sumitomo Corp,[11] a Japanese company engaged in infrastructure projects around the world.[12] TEAS, the publicly owned utility company, took a 30% stake in the project company.

[11] http://www.thecornerhouse.org.uk/item.shtml?x=369029#index-05-00-00-00

[12] http://www.sumitomocorp.co.jp/english/

Figure 4.5 Initial Project Structure



Source: Verbundplan

Figure 4.6 Time horizon

Stage	Year
First feasibility study	1986
Implementation contract with GoT	1993
Final Design	1994
Foundation of Birecik AS	Feb 1995
Loan syndication	Sept 1995
Financial Closure (FC)	1995
Commencement of construction	Apr 1996
Completion	Oct 2001
Operation Period	Oct 2001 until 2016
Transfer to GoT	2016

Source: Verbundplan

Financial Structure

The US$1.25 billion project has a complicated financial structure. The project company operates on the basis of an 86%:14% debt: equity split, with much of the debt being provided by Export Credit Agencies (ECA) - equivalent to 64 % of the total project cost (ECA's from Germany, France, Belgium and Austria). The remaining debt is provided by commercial loans, from 44 commercial banks arranged by Chase Investment Bank. As mentioned above, the World Bank is not involved due to their policy neither was any other multilateral agency.

Table 4.6 Financial Structure, Birecik

	Project cost			Equity portion			Project Debt			
					Public through		Private debt		Public-supported debt	
	Total	Equity	Debt	Spons	MDB/ bilateral	Utility/ Gov't	Commercial	Bonds	ECA	MDB/ bilateral
US$ m	1236	179	1057	125		54	299		758	
%	1236	14%	86%	70%		30%	28%		72%	

Source: Head, 2000

The financial structure of the project turned out to be very effective. The hydropower plant was constructed in just four years and eight months, and additionally, through efficient construction work, the plant was in commercial operation more than twelve weeks ahead of schedule. In addition, the total project costs were reduced. The Birecik Hydropower plant can therefore serve as a model for the efficiency of private companies in the planning, financing, construction and operation efforts. However, the project took seven years to reach FC in 1995 due to its complex financial structure.

Off-take arrangements

The government guarantees the performance of TEAS under the Energy Sales Agreement and also the performance obligations of the Electrical Energy Fund (EEF), which will provide additional funding in the event of cost overruns in a number of identified areas including reservoir works (clearance, leakage) and final design modifications. The Electrical Energy Fund is a government entity that was established to help BOT projects. It reports directly to the Ministry who is also in charge of EEFs financial resources. The main responsibilities of the EEFs is to ensure that electricity rates are stable nationwide, to pay buyout price to private companies if such situation should arise as well as it has the mandate to approve cash or non-cash credit, pending approval of the Ministry. (Centre for Energy Economics, 2006) In the event of default by the project company there is a step-in provision under which the government assumes the debt and takes over the project, through the EEF.

The PPA for Birecik is between the Birecik AS and TEAS. It is effectively a leasing arrangement under which payment is made on a cost-plus basis irrespective of river flow, subject to plant availability and sponsor performance. The essential features are as follows:

- The PPA is for 15 years, the duration of the operational part of the site license.
- TEAS is obligated to buy all production on a take-or-pay basis, and has full freedom to order dispatch of the power and operate the reservoir as it wishes.
- The Base Tariff is updated every six months to reflect actual costs, and "adjusted" every month to reflect actual energy production (for example, due to variations in river flow).
- An Excess Energy tariff is payable if certain minimum plant efficiency criteria are exceeded. It is not related to hydrology.
- Certain construction risk (unforeseen ground conditions) is passed through to TEAS in the form of adjustments to the tariff.

- Payments were originally denominated and payable in Deutsche Marks[13]. Foreign exchange risk rests with TEAS, and ultimately with the Turkish Treasury.
- The Turkish government is to be responsible for land purchase, rights of access, easements and the like.(Head, 2000)

Environmental and Social Impact

There were some complications in the due diligence process. The Birecik project affects 1,200 square kilometers, its reservoir flooded or partially flooded 44 settlements, including the town of Halfeti. According to some NGO's, 30,000 people were affected, but only 6,500 people were officially resettled. No resettlement plan or environmental impact assessment was made available for public comment, and those evicted were not consulted, in violation of international standards. Critics also claim that those without title to land were not compensated. Additionally, during construction, the remains of the Roman city of Zeugma were discovered and the flooding of the reservoir destructed the site. The place has been called a "second Pompeij" since the remains were so well conserved. Last minute actions managed to save some highly valued mosaics but a majority was lost due to the flooding. (Neyer and Hildyard, 2005) The fast construction of the project is likely a result of a lack of thorough due-diligence processes and the lack of adhered to resettlement plans. As indicated below in the description of the Nam Theun 2 project in Lao, insufficient environmental and social impact assessments delayed the project several years. The insufficient due-diligence process in Birecik was likely partly a result of the lack of multilaterals involvement as these generally require international standards to be followed, as they have obligations towards their member countries to support projects that are carried out in line with international agreements and standards.

Conclusions and Challenges

As the project was completed on time and under budget, the developer argues that the project can be used as a role model in terms of the efficiency of having private companies being in charge of the planning, financing, construction and operation of hydro power plants. Two particularly interesting elements of the project stand out. First, nearly all risks not in direct control of the project company were assumed by the state. Given that very limited financial risk was shifted to the private sector, it is clear that the overriding objective of implementing the PPP was the mobilizing of the $1.2 billion to construct a prioritized project. Second, the Birecik project stands out in that no MDBs participated in the project. It is likely that short-cuts were taken in the environmental and social impact due-diligence, compared with international standards. This was partly a result of the MDBs glaring absence from the project. These issues, and others, are addressed in greater detail in chapter 6.

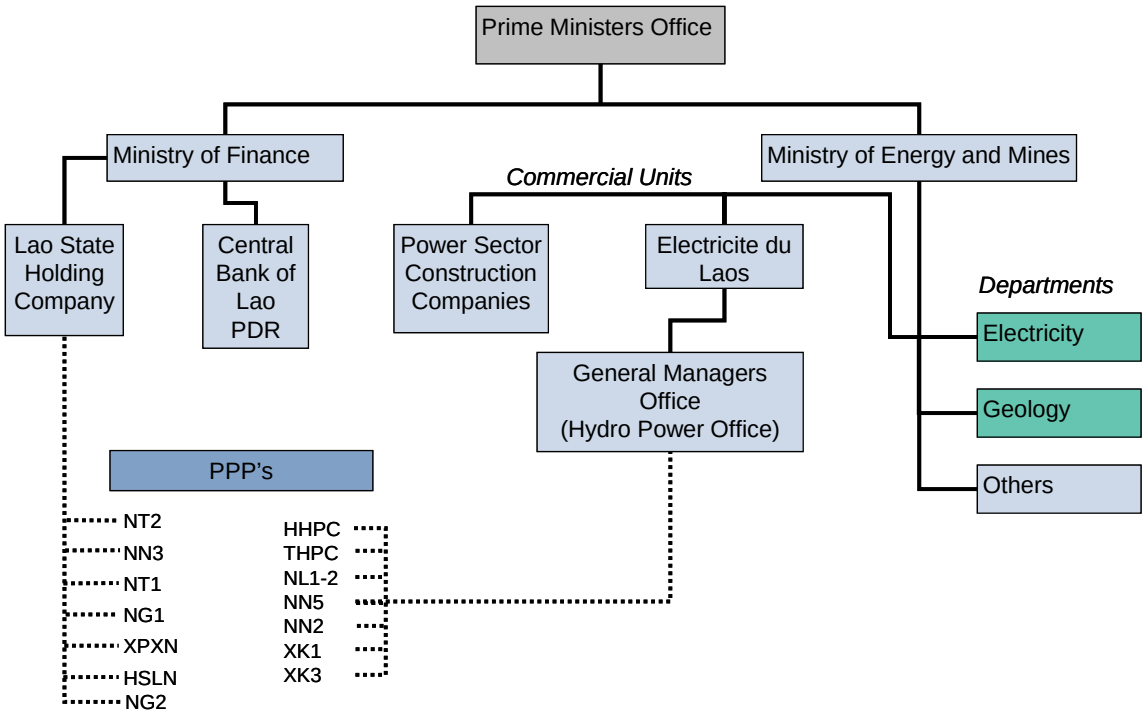
4.3 The Nam Theun 2 (NT2) Hydroelectric Project, Lao PDR

Power Sector Background

The organizational structure of the Lao power sector is illustrated in Figure 4.7

[13] Assumed changed to Euro payments

Figure 4.7 Organizational Structure, including IPPs



Source: www.poweringprogress.org

The generation mix in Lao PDR is outlined in Table 4.7.

Table 4.7 Generation mix

Source	GWh	%
Hydro	1660	97,1
Diesel	50	2,9
Total	**1710**	**100**

Source: IEA, 2007

In 2005, the electricity production, consumption, export and import division were as outlined in Table 4.8.

Table 4.8 Overview

Production	1 715
Consumption	1 193
Export	728
Import	326

Source: IEA, 2007

Regulatory Background[14]

The state-owned Eléctricité du Lao (EdL) has in the past been the sole responsible actor within generation, transmission and distribution in Laos. However, the Government introduced the New Economic Mechanism in 1986 to encourage private participation in the power sector in order to increase electricity exports and hence increase export earnings to the country. Hence, the deregulation of the power sector was mainly aimed at increasing private investments in order to increase exports and not so much focus was put on the domestic market. In order to boost private participation in hydro power the Hydropower Office was established. This operated as a separate unit from EdL with the mandate to plan and implement IPP hydropower projects for power exports to Thailand. Both EdL and the Hydropower Office report to the Department of Electricity.

As domestic sources of private investments are limited in Laos, large private investment projects are bound to have a significant foreign component. Accordingly, these projects are generally managed through the Foreign Investment Management Committee. Their mandate is to negotiate terms of concessions and obtain the required approvals from the relevant governmental bodies. In order to contribute to an enabling environment for investors in terms of the banking and legal system, the Foreign Investment Law was passed in 1994 which regulates the following:

- The investments are protected under the laws of Lao PDR and cannot be requisitioned, confiscated or nationalized except for a public purpose and with proper compensation
- The investment can take the form of either a joint venture with local partners of wholly foreign partners
- Foreign investors may lease land from the Government of Laos for a period not exceeding 30 years as regulated in Article 65 of the Land Law, a period that can then be extended and transfer lease held interests(Government of Lao PDR, 2003)
- Priority should be given to employ Lao citizens but the investor has the right to employ other nationals if the skills require it. It is likely that this clause contributed to the fact that 75% of the laborers were Lao. The obligation also includes training and upgrading of professional skills of Lao citizens as well as technology transfer to Lao workers. (Government of Lao PDR, 2004)
- Earnings can be repatriated through Lao or foreign banks in Lao PDR
- Arbitration should follow international procedures

Lao PDR has not established any specific BOT legislation and there are no formalized procedures for the award of BOT concessions. Rather, every hydro concession has been negotiated on a case by case basis with the government.

Introduction to NT2

The Government of Laos (GOL) signed a MoU in 1993 with the Thai Government (GOT) in which GOL agreed to supply GOT with 1500MW of hydro based power by 2000, an agreement that was later extended to 3000MW by 2006. GOL also signed an MoU with Vietnam in 1995 to supply 1500 MW by the end of 2010 and in 1996 an

[14] Based on Head, 2000

MoU was signed with Cambodia but no specific agreements in terms of MW supplied were detailed.

A number of interested developers approached the GOL which were invited on a case by case basis through the Foreign Investment Management Committee; hence no invitation for bids or no competitive bidding was conducted. MoUs were signed with several developers which gave them the exclusive rights to the site for an unspecified time period. Only a fraction turned out to real projects. At this point in time, Laos had a nearly non-existent legal or regulatory framework which was conducive with private investment in place and maintained a low credit standing. In spite of this, the GOL was very keen to attract private investors and hence requested support from multilateral development banks.

The NT2 is a large project (1075 MW) and the overall purpose with the project is to "generate revenue through environmentally and socially sustainable development of NT2's hydropower potential to finance poverty reduction and environmental management programs in Lao PDR."(World Bank, 2007)

In addition to Nam Theun 2, two other projects - Nam Theun Hinboun (210 MW) and Nam Theun I (523 MW) - are located on the same river. Nam Theun Hinboun was the first IPP to be negotiated and a MoU was signed in 1993 between GOL and Nordic Hydropower AB[15]. The Joint Venture Company developed and now operates the plant with EdL as a major shareholder. In addition, Asian Development Bank (ADB) was involved as an advisor and EdL provided equity financing. Nam Theun 1 is still in a planning phase with key issues such as feasibility studies, environmental and social impacts assessments conducted and a tariff MoU was signed with EGAT in 2006. However, it has not started to operate yet.[16] As such, issues related to water management and livelihoods from the water resource along the river are key components of the design of the project.

Assisting the transition to a market economy by supporting such private sector participation, the ADB acted as the lead international coordination agency for Government's negotiations on NT2 with the foreign investors and provided legal and financial advice in the form of a technical assistance grant. The Hydropower Office and the Foreign Investment Management Committee acted as the national coordination agencies, facilitating the applications for permits and licensees which were required. The Foreign Investment Management Committee also negotiated the terms of the concession.

Construction

The capacity of the plant is 1075 MW and consists of a 48 meter high gravity dam, a 450km^2 reservoir and a power house. Associated with the plant, were a 130 km 500 kV transmission line to deliver the generated power to a power station operated by the Electricity Generating Authority of Thailand (EGAT) at the EGAT Delivery Point located at the border of Lao PDR, and a 70 km 115 kV transmission line to deliver electricity for domestic usage. In total the project spread over an area of 10 000km^2 and includes 14 construction sites and 300km of linear construction zones. The project

[15] A joint venture between Norwegian and Swedish utilities and MDX Ltd of Thailand

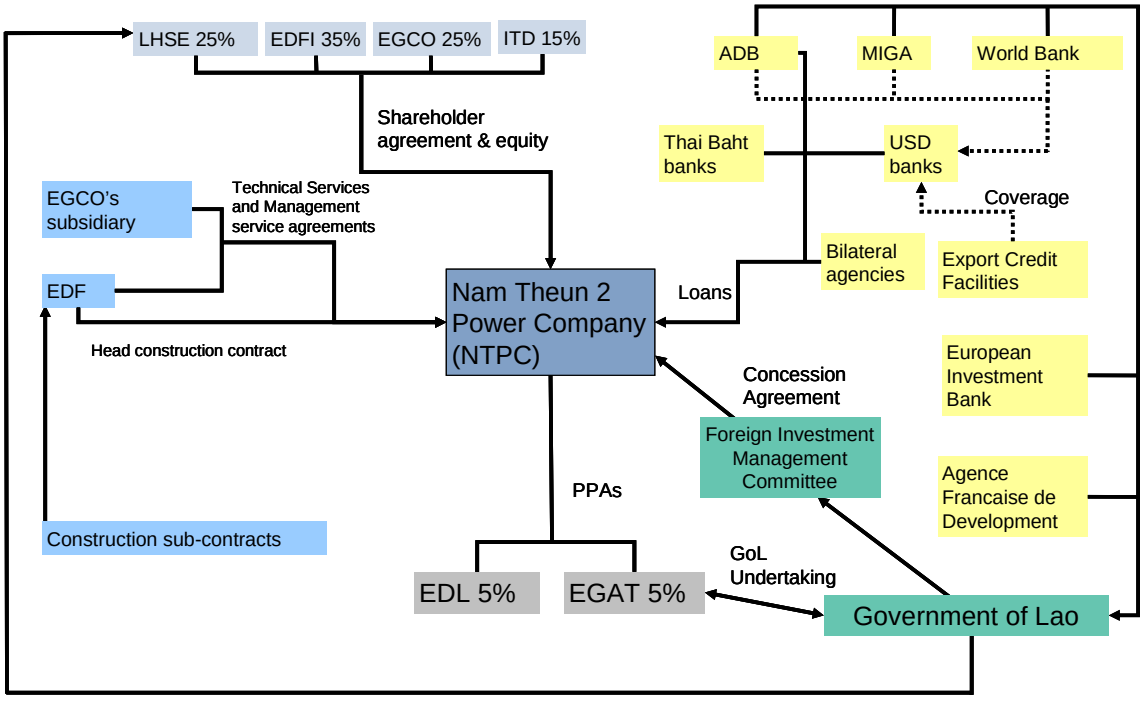
[16] http://www.poweringprogress.org/updates/news/press/2006/Nam_Theun_1.htm

covers three provinces, one where the dam is located, one where the actual power plant, channels and roads are located, and one through which the main transmission lines to Thailand pass. EDF of France, was the head EPC contractor, with civil works being carried out by a JV of Italian-Thai Development Public Company (ITD and the Japanese Niskimatsu Construction Company (NCC) and the transmission line work was carried out by a JV with Mitsubishi.(NTPC, 2008) Planned Commission Operation Date (COD) is December 2009.

Project Structure

A private-public partnership, the Nam Theun 2 Power Company (NTPC) Limited, which is a limited liability company, was established in 2002, as a special purpose company. The shareholders of NTPC include Electricité France International (EDFI) (35%), Italian-Thai Development Public Company (ITD) (15%), Electricity Generating Public Company of Thailand (EGCO) (25%) and the Nam Theun 2 Power Investment Company (NTPI) (25%). NTPI is special purpose and public company that will invest in the company on behalf of Electricité du Lao (EdL). Reference is also made to Lao Holding State Enterprise (LHSE), as the name of the company investing on behalf of GoL. It will be used hereinafter.

Figure 4.8 Project Structure



Note: The structure is further described in the Financing section below. The bilateral agencies involve Agencie Francasie De Development (AFD), PROPARCO (Promotion et Participation pour la Cooperation Economique, which is a French development finance institution specializing in capital investment, loans and guarantees. AFD and PROPARCO are also extending their support to the Bujagali Energy Limited in Uganda, with an amount of USD 72.8 million under a credit agreement.

Source: World Bank, MIGA, 2006

Concession Award and Off-take arrangements

The NT2 is a large project (1075 MW) and required support from multilateral guarantees in order to be developed. The IFC and the World Bank were approached by developers and in 1993, a concession was directly negotiated and a MoU was signed

with Australian Transfield. Later, EdF of France joined the consortium together with a number of Thai companies and a more detailed MoU was signed setting out the terms and granting full exclusivity in 1994. However, in 1996, already at a relatively advanced stage of financing and preparation, concerns were raised regarding the environmental and social impacts of the project, mainly due to the large reservoir. Together, the government, the developer and the World Bank developed a program in order to map the environmental and social impacts as well as to conduct a number of consultative meetings with the affected communities. By the time this process was finalized, the Asian crisis had hit the Thai economy and EGAT was no longer in need of the power produced. Hence, the project construction start was postponed until 2002. (Head, 2000)

The project is a typical BOOT (Build-Own- Operate- Transfer) project and a number of contractual issues are important to note. Firstly, a concession agreement was signed in 2002 between NTPC and the Lao PDR government, the period was set for 25 years from the COD as set out in the Power Pursuance Agreement (PPA) which was agreed upon between NTPC and EGAT. (NTPC, 2005a) A PPA was also signed with EDL. Secondly, a shareholder agreement was signed in 2001 between the project sponsors, and was later taken over by NTPC after its establishment in September 2002. Thirdly, the PPA signed between NTPC and EGAT is valid for 25 years. Lastly, the contract between NTPC and the head EPC contractor (EDF) was a turnkey, price-capped EPC contract. (World Bank/MIGA, 2006)

Table 4.9 Overview concession arrangements

Project	Basis of Concession	Concession period	Sovereign Guarantees	Royalties	Tax waiver	Public Holding
NT2	Negotiation	25 yrs	Yes	No	15 yrs	25% equity

Source: Head, 2000

The Concession agreement divides the Project into four phases

1. Condition Precedent Phase[17]
2. Preliminary Construction Work Phase
3. Construction Work Phase
4. Operating Phase – Company is *"obligated to operate and maintain the Project in accordance with certain standards"*

In terms of land and water rights, the concession agreement outlines that the GOL will give the company "right of access to, use and possession of Project Land sufficient to enable the Company to exercise its rights and perform its obligations" and that the GOL will grant "free of charge to the Company exclusive Water Rights". The transmission system required for the project is to be owned by the company during the concession period and under the companies' full responsibility. The Concession Agreement further regulates several reasons for early termination of the agreement and also states that "By

[17] From the date of concession agreement, the Project Company and GOL are required to satisfy certain conditions in order to bring the Agreement into effect. Some of the conditions include signing the the PPAs with EGAT and Edl, signing Sponsors Agreement and the government to approve the PPAs and other relevant project document, among others.

the time the concession period is over, the company is required, free of compensation from the GoL, to transfer the Project and Project Assets." Other issues that are highlighted in the summary of the Concession Agreement is that the agreement regulates actions to be taken in relation to environmental and social issues; the Company is exempted from several taxes, as are contractors and it regulates that the Company must pay profit tax and resource usage charges.(NTPC, 2005b)

Royalties, taxes and dividends are budgeted to increase from $25m to $140m per year, totaling $2000m over the life of the 25-year concession period. After the period ending, the project will be transferred free of charge to the GoL.

The PPA signed between NTPC and EGAT, valid for 25 years, obligates NTPC to make available capacity to EGAT of up to 995MW and 5636 GWh of electrical energy per year on a take-or-pay basis for the pre-agreed upon tariff. EGAT will take 95% of electricity production while EdL will take the remaining 5%. (NTPC, 2008) The company is prohibited to enter into agreement with any third party.

Table 4.10 Summary of PPAs, NT2

PPA with	Basis of tariff	Duration	Offtake obligation	Hydrological risk	Energy price (USDc/kWh equiv)	Defining currency	Transmission Liability
EGAT	Energy (2 part)	25	Take-or-pay	NTPC	4.50	USD and Thai Baht	Shared
EDL	Energy (2 part)				3.91[18]		

Source: Head, 2000 and Lahmeyer International and Maunsell, 2004

Financing

Total estimated project cost was $1.25 billion and as such it is the largest investment ever made in Lao PDR. In addition, it is the world's largest private sector hydropower plant utilizing project financing. The project financing includes 28 percent equity and 72 percent debt. The equity is shared among the project shareholders namely, Electricité du France International (EDFI), Italian-Thai Development Public Company Ltd (ITD), Electricity Generating Public Company of Thailand (EGCO) and the LHSE, as described above.[19] The additional $200 million in contingent costs is financed 50-50 by equity and debt on a 'pari passu basis'.

The World Bank Group participated through building capacity for revenue and expenditure management, and establishing a monitoring and evaluation system. In addition, they also provided financial resources; a $50 million Partial Risk Guarantee (IBRD), $20 million IDA Grant and a $91 million MIGA guarantee. The MIGA contribution consisted of $86 million to cover a non-shareholder loan by the Fortis Bank NV of Belgium, against risks of expropriation, breach of contract, war, civil disturbance

[18] Lahmeyer International and Maunsell, 2004

[19] Reference has also been made to Lao Holding State Enterprise (LHSE) as the state owned company replacing EdL. It is interpreted that NTPI and LHSE is fulfilling the same purpose, ie passing NT2 revenue to GoL, hence the name is not relevant.

and transfer restriction and inconvertibility in both Lao and Thailand. The rest is to cover EDFI who is one of the project sponsors, against the risk of transfer restriction in Lao. (World Bank/MIGA, 2006)

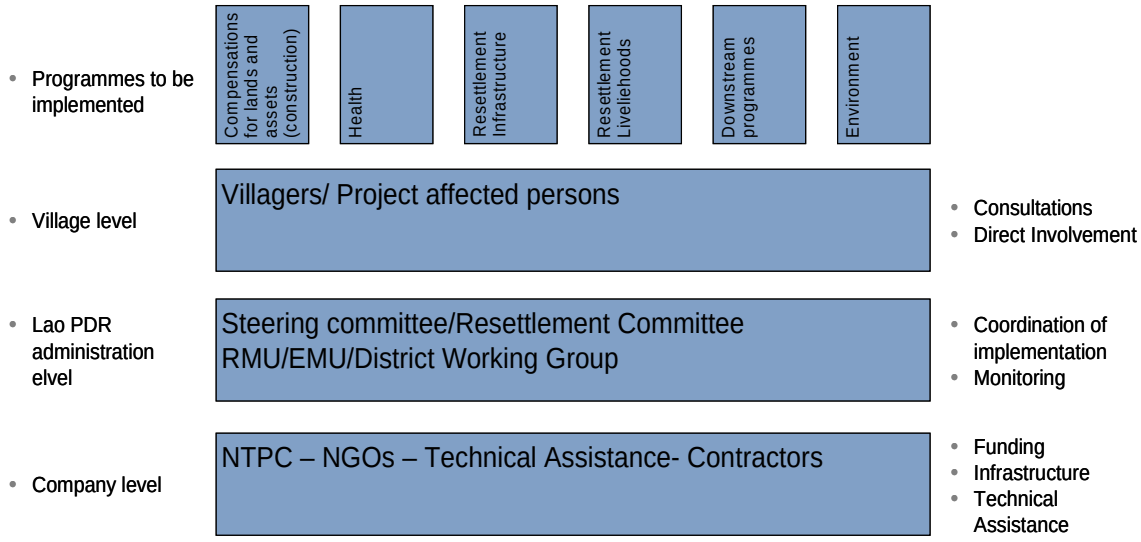
The project is being supported by three export credit agencies – COFACE (France), EKN (Sweden), GIEK (Norway). In addition, the project received direct loans from a number of bilateral and multilateral development agencies including the ADB, Nordic Investment Bank, Agence Francasie De Development (AFD), PROPARCO and Export-Import Bank of Thailand. Nine international commercial banks (ANZ, BNP Paribas, BOTM, Calyon, Fortis Bank, ING, KBC, SG and Standard Chartered) and seven Thai commercial banks (Bangkok Bank, Bank of Ayudhya, KASIKORNBANK, Krung Thai, Siam City Bank, Siam Commercial Bank and Thai Military Bank) are providing long terms loans to NTPC. The project reached financial closure (FC) in 2005 and full construction began in May 2005.

Environmental and Social Impact

As of early 2008, the project was halfway into its 5-year construction timeline. Civil and electromechanical works are over 70% completed, and over 75% of more than 6000 people employed are Lao nationals, which could be a result of the regulation in the Foreign Investment Law that requires the foreign investor to hire local Lao people. If this paragraph would not have been in the law, it is possible that more Thai people would have been used in the workforce as two of the shareholders have links to Thailand. However, there was a two year delay in construction resulting from problems related to due diligence issues, such as inadequate environmental and social impacts assessments as well as lack of resettlement plans put in place.

The project has a $16 million Development Programme covering 200 villages downstream of the plant. All Environmental and Social measures are to be implemented jointly as illustrated in

Figure 4.9 Development Program for Nam Theun 2



Source: NTPC, 2008

For construction activities, the concession agreement includes an obligation on the company to carry out a Health Impacts Assessment (HIA) and implement the Environmental Management Plan (EMP). In addition, the IAGs 7th review of the project

recommends that village based information, education and communication schemes be implemented working closely with local actors and NGOs in order to increase safety around the construction site. In terms of resettlement, clear resettlement plans and plans for temporary housing must be addressed as it forms part of the concession agreement. The Concession Agreement outlines that during the resettlement period, estimated to be nine years, a target for the income earning capacity for the settlers is set. The household income target is either US$ 820 per households or the national rural poverty line, whichever is higher after five years; after nine years the target is US$ 1200 per household or the national average rural income, again whichever is higher. An independent international advisory group recommended that greater attention should be paid to monitoring the adjustment of lifestyle changes and livelihood that occurs due to resettlements, support is needed if people have to change their livelihood activities due to the project. Awareness raising campaigns and training in new cultivation techniques and other income generating activities should be included in the agreements. (IAG, 2007 and NTPC, 2005c)

The environmental and social due diligence of NT2 was extensive and resource demanding. NTPC has a team of 150 staff for the Environmental and Social activities while GOL has a team of 300 technical staff. During a 33 month period from Financial Closure to March 2008, the project had 59 external review/monitoring missions, an average of nearly 2 per month.(NTPC, 2008)

In spite of the ambitious mitigation plans and development programmes, the project lags behind on meeting their set out targets, according to reviews carried out by International Rivers Network (IRN).(IRN, 2006 and IRN, 2008) A number of delays and problems have confronted the project since its construction start in 2005. The resettlement plan is, according to IRN, behind schedule but even so villagers have experienced health improvements, as well as benefits due to new houses and new roads. However, according to IRN, there is a significant risk that these benefits will be outweighed by the failure to fully implement and improve the livelihood programmes. In particular, the downstream programme is inadequate to deal with the impacts on downstream communities. In addition, the start up of the dam, planned for June 2008, will mean that villagers will likely experience a severe drop in incomes before the livelihood programmes starts to yield results, this is likely to be true both for downstream and people resettled from the reservoir area. Even if all villagers living in the reservoir area, that will be flooded in June, has been resettled not all of them have been compensated with a permanent house as of February 2008, only five months before dam filling.

In 2005, IRN conducted a review of the NT2s compliance with the World Commission of Dams (WCD) seven strategic priorities in relation to hydropower developments. Their conclusion was that the project failed to comply with six out of the seven, according to the table below. (IRN, 2005)

Table 4.11 WCD and NT2 compliance

Priority[20]	Description	NT2 situation	Complied?
Gaining public acceptance	There need to be a fair, informed and transparent decision making process Right of indigenous people to free, prior and informed consent Access to information and legal support for affected communities	Lack of civil society movements The decision to build the dam and the logging on the site took place well in advance of informing the affected communities Affected communities have not been able to access independent legal support 6 200 people will be resettled and 100 000 people will be affected and many had not been consulted by construction start.	- No
Comprehensive options assessment	Obligation to undertake a participatory assessment of alternatives to hydropower as a means to generate foreign exchange	No comprehensive study was undertaken and WB has pushed for NT2 as a source of revenue since 1986 In addition, there is no study showing that NT2 is the best option for electricity supply to Thailand	- No
Addressing existing dams	Obligation to deal with outstanding issues of existing dams before entering in to new developments.	The Nam Theun Hinboun dam, 40km downstream of NT2, has suffered from severe problems and should have been dealt with before NT2 developments. The ADB funded Nam Leuk in central Laos nas affected 9 000 villages and fish catches dropped by 50 to 95 %. Another 23 000 were affected by Nam Song, Nam Mang 3 and Houay Ho hydropower projects	- No
Sustaining rivers and livelihoods	Obligation to gather good baseline information over a number of years before decision is taken.	Sufficient data on hydrology, fishery and water quality was not collected	- No
Recognizing entitlements and sharing benefits	Obligation to assess all risk by affected people prior to project approval	Not part of the projects risk assessment	- No
Ensuring compliance	Obligation to identify a set of consistent, transparent criteria to ensure compliance is adopted by sponsoring, contracting and financing institutions and that a Compliance Plan is prepared for the projects	WB has been unable to ensure compliance related to logging, this happened even before project implementation	- No
Sharing rivers for peace, development and security	Obligation to ensure transparent management of transboundary rivers	IRN did not comment on this and hence it is assumed NT2 complied with this priority	- Yes

Conclusions

Some of the characteristics that stand out from this case study are briefly described here, while they are analyzed in more detail in chapter 6.

- Bilateral negotiations and Export agreements – the MoU signed between the Lao Government and the Thai Government provided for an excellent export market for generation projects in Laos. As the Thai economy is rapidly growing and the NT2

[20] http://www.unep.org/dams/documents/Default.asp?DocumentID=664

is assured that 95% of its power to be sold to EGAT, this provided a secure load for the project

- Lack of proper regulatory framework – Lao PDR is still without a clear and transparent framework. Despite this, the country has rather successfully pursued private sector participation in the power generation sector, partly due to the expected exports revenues stemming from agreements with the Thai government but also due to its ambitions to involve the hydropower sector in the countries overall development goals. The lack of regulatory framework can of course be seen as a benefit by some private actors as short cuts can more easily be taken but this is a major shortcoming from the perspective of the communities affected. However, due to the heavy involvement of international development agencies, the concession agreement does include several obligations on the Project Company in terms of environmental and social impacts and mitigation measures.
- Significant delays – due to initial insufficient environmental and social impacts assessment studies, the project was delayed. However, the major cause of delay was the Asian crisis that occurred just when the necessary studies were completed and the project was ready to be taken forward again.
- Ownership of Transmission – the Project Company is the owner of the transmission lines up to the delivery point with EGAT and EDL until the concession agreement period runs out. As such, the Project Company is also obligated to maintain the transmission system.

5 Contextual Assessment

In drawing relevant lessons learned from the PPP review and applying them appropriately to the region and individual member countries, an understanding of country-specific contextual issues is critical. The aim is to provide an assessment of the key similarities and differences between context within which NBI member countries will look to implement PPPs and the context within which the case study countries implemented PPPs. It is important to emphasize that the intention here is not to provide a detailed analysis, but simply to allow for appropriate application of lessons learned. Accordingly, only readily available sources are utilized.

5.1 Investment Attractiveness

The role to be played by public entities in a PPP will partly be a function of the terms on which private investors can be attracted. If the given country and power sector is viewed as a low risk – potentially high return investment destination, it is likely that the public authorities should be able to transfer a great deal of risk over to private investors while achieving a relatively low tariff (or high concession payment). That is, the most appropriate PPP ownership, financing and implementation structure will be at least partly dependent on the overall investment framework in the country and sector.

Country-risk and investment climate

For potential investor in the power sector of a country, both the sovereign credit ranking and overall business climate and outlook are of importance. In particular, because the PPA will generally be backed up by a publicly owned utility, the sovereign rating provides a proxy for the terms on which debt will be provided. Table 5.1 provides a summary indication of how investors would, all else equal, likely weigh investment destinations against one another. Tellingly, no NBI member country had achieved an investment grade rating as of 2007. Egypt has a rating one notch below investment grade at BB+. Otherwise, it is only Kenya and Uganda with ratings by one of the major rating agencies, albeit a “speculative” rating. This compares with the case study countries; Brazil (BB+), Turkey (BB-) and Lao (none).

All in all, the table indicates that there is no obvious reason why NBI member states (as a group) should be any less successful than the case-study countries in attracting investments. However, as in the case-studies, authorities should not expect that significant private investments will be accompanied by a significant transfer of project and/or macro-economic risks to private investors. In fact, it is worth noting that perhaps the most attractive destination for private investment in the sample (Turkey) went to great lengths to reduce risks, so as to raise the necessary financing.

Table 5.1 Indications of country risk and investment climate

	Sovereign Credit Rating	Ease of Doing Business (of 178)	Global Competitiveness Index (of 130)
Burundi	None	174	130
DRC	None	178	N/A
Egypt	BB+	126	77
Ethiopia	None	102	123
Kenya	Spec	72	99
Rwanda	None	150	N/A
Sudan	None	143	N/A
Tanzania	None	130	104
Uganda	Spec	118	120
Brazil	BB+	122	72
Turkey	BB-	57	53
Lao	None	164	N/A

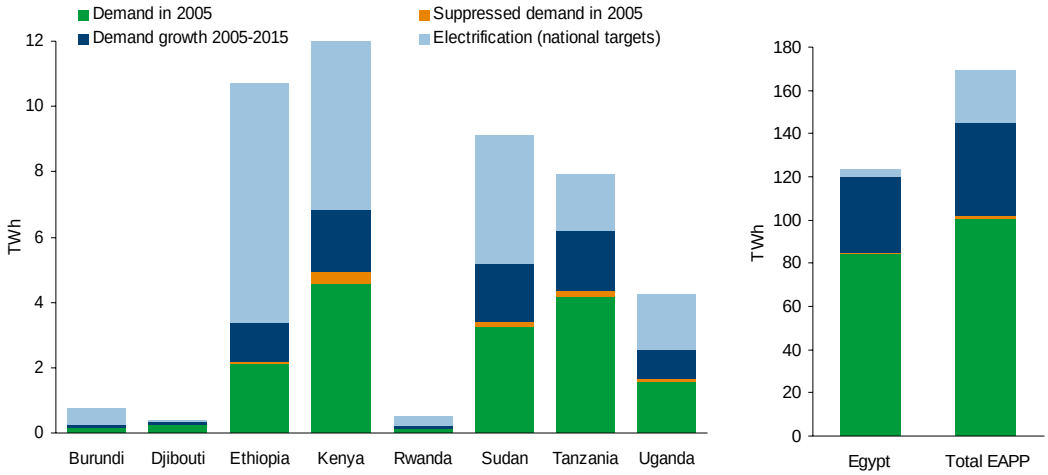
Source: Gatwick and Eberhard (2007); World Bank Doing Business (online); UNIDO (online).

Investment opportunities

As described in the case studies, at the time of implementation of the individual projects, all three countries had significant hydro potential, together with growing markets to serve (an export market in the case of Lao). Likewise, the hydro-power potential in the NBI is significant. As indicated in Figure 5.1, demand in the region is expected to grow substantially. A regional least cost expansion plan would imply that hydropower should account for 30-50% of the required production increases until 2015, depending on development in trade arrangements and infrastructure.

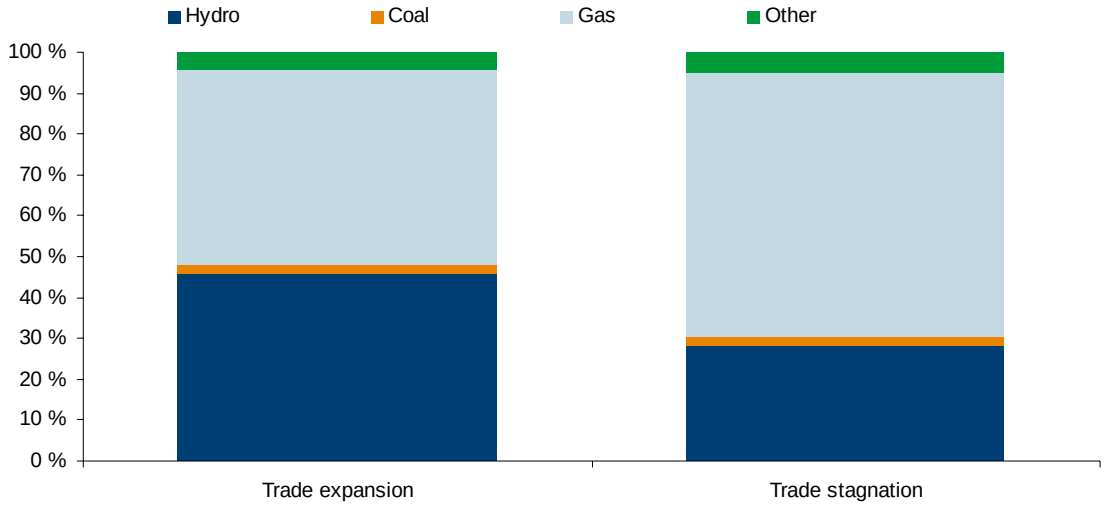
Assuming that country-specific master plans reflect a similar finding, project developers should have confidence in both achieving an agreement on the terms of the PPA, as well as ensuring the long-term financial sustainability of the project.

Figure 5.1 Projected demand in the NBI region in 2015[21]



Source: Econ Pöyry (2007)

Figure 5.2 Distribution of production required to meet increases in demand until 2015, by source



Source: Econ Pöyry (2007)

Credit-worthiness of off-taker

Most PPPs in the power sector are implemented as non-recourse project companies. Accordingly, the security of the project is in the assets and the security of the PPA – i.e. the single buyer. Accordingly, the terms on which countries can attract private investors are highly dependent on the financial well-being of the single-buyer. Table 5.2 provides a summary of the results of a questionnaire sent out to country representatives, with

[21] Note that this figure is based on an ongoing project by the consultant and are among the most comprehensive and most recent estimates available. It should be noted that in project the DRC was grouped in another power pool (PPA) in the analysis. In that power pool the DRC hydro resources have significant impacts on the least cost expansion path in the region – as the associated power is among the cheapest in the region. Likewise, if interconnectivity and regulatory frameworks made it possible for large scale power trade, one could expect significant gains from trade in the region due to significant low cost production in the DRC.

evaluations of the consultant filling in the gaps. As indicated here, the single-buyer in each case analyzed above were in relatively strong financial positions. This table thus indicates a significant obstacle for some NBI countries in securing private financing on terms which are favorable from a public perspective.

Table 5.2 Summary of self-assessed financial positions of single-buyers

	Sufficient – operating costs, maintenance and expansion	Sufficient for operating costs and maintenance only	Sufficient for operating costs only	Heavily reliant on Gov't Subsidies	Even subsidies are not sufficient
Burundi*					
DRC		**X**			
Egypt*					
Ethiopia	**X**				
Kenya	**X**				
Rwanda		**X**			
Sudan		**X**			
Tanzania					**X**
Uganda	**X**				
Brazil*	**X**				
Turkey*	**X**				
Lao*	**X**				

*As assessed by the consultant, based on answers provided by country representatives.

Precedents

According to Gratwick and Eberhard (2007), approximately 40 IPPs have been developed in Africa. This has included 12 in NBI Member countries, as summarized in Table 5.3.

Table 5.3 IPPs in NBI member countries

Egypt	2 – El Biban, Rades II
Ethiopia	1 – Gojeb
Kenya	4 – Westmont, Iberafrica, OrPower4, Tsavo
Tanzania	4 – Tanwat, IPTL, Songas, Mtwara
Uganda	1 - Bujagali

Source: Gratwick and Eberhard, 2007

In their detailed and rather comprehensive review of experience of IPPs in Africa, Gratwick and Eberhard (2007:72) make the following conclusions;

> "On the one hand, where there was a perceived balance between sponsors and host country governments, contracts generally remained intact, as seen in most of the North African cases, with the contributing elements of success being: the more favorable country level factors (such as favorable investment climates, clear policy frameworks, and ICBs, among others). On the other hand, perceived imbalances (often exaggerated by exogenous stresses) between sponsors and host country governments frequently did lead to an unraveling of the original contract. Neither the PPA, nor the security arrangements were sufficient in locking in long-term sustainability.

Although the evidence is not conclusive, strategic management on behalf of sponsors and government as well as strong technical performance have been used to cope with contract instability. Furthermore, the fact those projects with participation of development-minded firms and DFIs were less likely to unravel signals two points: such projects may have been more balanced from the get-go, and when an exogenous stress struck, they may have also been better equipped to resist any form of host country pressure.

Thus, the findings are four-fold. First, evidence for contract unraveling is widespread across the pool of African IPPs where an imbalance is perceived, which largely corresponds to the more risky SSA projects. Secondly, the incidence of such unraveling does not necessarily signal the end of a project's operation. New agreements may be reached, albeit at a cost, those prove sustainable. Third, efforts must continue to close the initial gap between investors and host country governments (or else examples of the further contract unraveling will continue). Finally, the means to closing the gap may not be only, or mainly, be via increasing the sort of new protections, including political risk insurance, which have been reported to often confound political and economic issues and may instead lie in systematic treatment of the numerous contributing elements to success defined by this paper."

In addition to the IPPs studied above, some PPPs in hydropower in SSA are at various stages of planning and/or operation. While not a complete list, the consultant is aware of the following projects;

- **Angola**. Capanda HPP (260MW) was constructed and is operated by a project company (GAMEK) in partnership with Russian and Brazilian contractors. Another smaller plant (Hidro Chicapa – 18MW) was Angola's first IPP and was developed by the Russian company La Rosa and ENE, the Angolan utility.
- **Mozambique**. SN Power (Norway) has signed a Heads of Agreement with EDM. The companies intend to form a joint venture to upgrade and operate two hydropower plants in the Manica province of Mozambique, subject to final agreements, board approval and financing. The plants, Mavuzi and Chicamba, have a total capacity of 90 MW and are important suppliers in the Mozambique energy market. Mavuzi is a run-of-river plant, while Chicamba lies at the foot of a multipurpose reservoir. The initial investment in rehabilitation will likely provide SN Power with an initial source of revenues, as well as experience and contacts in the sector, thus reducing the risks associated with future investment in Greenfield projects.
- **Uganda**. Bujagali (250MW) – see box 5-1. Meant to be a flag-ship project for Uganda and the region, the project has been confronted with a number of challenges and delays. This has resulted in significant economic and financial losses for both Uganda and investors.
- **Zambia**. Three projects are currently being developed; Kafue Lower is still at an early stage, with a tender for the feasibility study currently being carried out; Itezhi Tezi (60MW) being developed by Tata Africa Holdings and ZESCO; Kalungwishi (210MW) is reportedly to be developed by Olympic Hydro Ltd.

Box 5.1 Bujagali HPP, Uganda

The project consists of the development, construction and maintenance of a run-of-the-river power plant with a capacity of up to 250 MW on a Build-Own-Operate-Transfer (BOOT) basis on the River Nile, at Dumbbell Island, 8 kilometers north of the existing Nalubaale and Kiira power plants, in Uganda. The project company will also manage the construction of approximately 100 kilometers of 132 kV transmission line on behalf of the Uganda Electricity Transmission Company Ltd. (UETCL), Uganda's national transmission company, to strengthen the evacuation of electricity from the facility. The project will be an Independent Power Project (IPP) and will sell electricity to UETCL under a 30-year Power Purchase Agreement (PPA), which was signed on December 13, 2005. UETCL's payment obligations under the PPA will be guaranteed by the Government of Uganda (GOU) through a government guarantee.

The total project cost is expected to be approximately $750 million, including approximately $126 million in interest during construction, other financing costs and reserve accounts. The IFC has earmarked an investment of $100 million. The sponsors of the project are;

- **Industrial Promotion Services (Kenya) Ltd**. (IPS(K)), the industrial development arm of the Aga Khan Fund for Economic Development (AKFED) which, in turn, is a member of the Aga Khan Development Network; and

- **SG Bujagali Holdings, Ltd**., an affiliate of Sithe Global Power LLC (US) (Sithe Global), an international development company formed in 2004 to develop, construct, acquire and operate strategic assets around the world, which is currently owned 78.8% by funds affiliated with Blackstone Capital Partners, an affiliate of the Blackstone Group, 19.7% by funds affiliated with Reservoir Capital Group, LLC, a privately held investment firm, and 1.5% by Sithe Global's management.

The project is expected to have a major economic and developmental impact on Uganda. The current energy crisis faced by Uganda has led to significant load shedding. As a result, the GoU is forced to rely on an additional 100 MW of expensive thermal power to mitigate the problem and has had to almost double tariffs in 2006. Some business users have resorted to importing backup diesel generators, but many other users cannot afford them. This is constraining economic growth, particularly in the industrial sector.

Source: IFC homepage

Generally, private investors will evaluate investment opportunities on a country-by-country and project-by-project basis. Although there is significant variation between the individual NBI member countries, a few generalized conclusions may be drawn. First, the broad macro-economic and political stability outlook in the NBI region will likely not be a significant hindrance to the attraction of private investors, when compared with the case-study countries. However, the general lack of financial depth in the region prevents a range of potentially interested strategic investors from foreseeing an exit strategy. Finally, the lack of credit worthiness among many of the regions single-buyers, combined with a relatively poor track record with IPPs, represents a significant obstacle in attracting private investment on reasonable terms, when compared with the case studies.

5.2 Power sector institutional set-up

As noted by the Power Trade Study (Mercados EMI, et al (2007); "The region is characterized by big disparity in terms of power sector structures and regulatory

environments. The existence of vertically integrated state owned companies and private sector participation restricted only to Independent Power Producers is however quite generalized. There is disparity in terms of policies and objectives for the power sector. In terms of what is possible and feasible when implementing PPPs, it is critical to have a general understanding of the power sector set-up in each country."

Table 5.4 summarizes the institutional set up of the power sectors in the member countries, as well as the three countries of the case studies. The sectors are summarized along three lines;

- **Power Market Structure** refers to the degree of vertical and horizontal unbundling of the sector from (integrated) Monopoly on the one end to retail competition on the other. This methodology follows from Ljung, P. (2007).
- **The private involvement in the sector** category is self-evident.
- **The Legal and Regulatory frameworks** refer to the sufficiency to which the framework is established so as to pave the way for power sector reform.[22]

In addition to these factors, the questionnaire filled out by NBI representatives revealed differences in terms of ownership rights for hydropower plants and transmission lines, as well as where the responsibility for evacuating power lies.

Despite these differences, IPPs are generally allowed and many countries have the required legal and regulatory frameworks in place. Many also provide a number of incentive mechanisms.

[22] Note that this is the interpretation of the author, as Ljung provides no explanation for the 'adequacy of legislation'.

Table 5.4 Institutional set-up of power sector in Nile Basin countries and case study candidates considered

		Power Market Structure	Private Ownership/ Involvement			Legal/ Regulatory	
			Gen	Trans	Dist	Adequacy of Legislation	Independent Regulator
Nile Basin Countries	**Burundi**	Monopoly	Public	Public	Public		No
	DRC	Monopoly	Public	Public	Public	No	No
	Egypt	Unbundled Single Buyer	Private Partic	Public	Public	No	No
	Ethiopia	Monolithic Single Buyer	Private Partic	Public	Public	Yes	Yes
	Eritrea*	Monopoly	Public	Public	Public		No
	Kenya	Unbundled Single Buyer	Private Partic	Public-Private	Public-Private	Yes	Yes
	Rwanda	Monopoly	Private Partic	Public	Public	Yes	Yes
	Sudan	Monopoly	Public	Public	Public	No	No
	Tanzania	Monolithic Single Buyer	Private Partic	Public	Private Part	Yes	Yes
	Uganda	Unbundled Single Buyer	Private Partic	Public	Private	Yes	Yes
Potential Case Studies	**Brazil**	Wholesale Competition	Private	Private	Private	No	Yes
	Turkey	Unbundled Single Buyer	Private	Public	Private	Yes	Yes
	Lao PDR	Monolithic Single Buyer	Private	Public	Public	Yes	No

Source: Assessment is based on P. Ljung (2007) and updated according to responses provided by NBI country representatives.

5.3 Power Sector Planning

In order for policy makers to prioritize the most suitable projects and minimize the perceived risks of investors, it is generally important that the policy direction and investment plans are stated clearly and adhered to consistently. After years of experience in developing countries and Africa, in particular, investors are aware of the long-term sustainability risks associated with investment in projects that are not prioritized from a technical-economic perspective.

The results of the questionnaire revealed that while most countries had a general policy for liberalization, the member countries are at different stages of this process. Of particular interest and concern is the relative lack of reliance on Master Plans in guiding expansion plans. Compared with the context within which the PPPs were implemented

in the case study countries, the general lack of sufficient long-term planning in the region will represent a risk to both private and public stakeholders.

Table 5.5 How systematic is your country in identifying, prioritizing and selecting generation projects?

	Diligently follow master plan	Short-term concerns has prevented use of master plan	Lack of resources prevents use of master plan	Master Plan being developed	No plans for Master Plan
Burundi*					
DRC			**X**		
Egypt*					
Ethiopia	**X**				
Kenya		**X**			
Rwanda				**X (2008)**	
Sudan	**X**				
Tanzania			**X**		
Uganda			**X**		
Brazil*	**X**				
Turkey*	**X**				
Lao*	**X**				

Based on responses of country representatives.

In addition to national plans, it is important to recognize that many of the projects have a regional dimension. This implies that investors and policy planners should be concerned with, and interested in improving, regional planning. According to the EIA Review, the Strategic/Sectoral, Social and Environmental Assessment (SSEA) of Power Development Options in the Nile Equatorial Lakes Region (SNC Lavallin International, 2007) provides a foundation for planning the development of the power sectors of the region as it contains a proposed development strategy and a NELSAP indicative development plan to the year 2020. It is based on a review of the current environmental and social context, the existing legal and regulatory framework, an assessment of the power needs for the region, an identification of the power development options available in the region and a comparison of these options in terms of environmental, socio-economic and risk considerations. It also takes into account the conclusions and recommendations of the East African Power Master Plan Study (BKS Acres, 2005).

In fact, an ongoing study by Econ Pöyry reveals significant gains from increased regional power sector integration. However, despite a number of regional studies, most investors will not expect members to fully commit to a regional coordinated investment plan (and implementation) until the individual members are able to maintain progress on domestic master plans.

5.4 Water Resources and Multiple-Use Issues

While each country has its own policy and guidelines for managing water resources and, for the most part, have sufficient regulations to allow for IPPs and hence PPPs, the international perspective attached with the Nile catchment will undoubtedly require special consideration, for two primary reasons. First, private investors will surely not accept any risk tied with international water rights disputes, especially in the case of

multiple use reservoirs, with irrigation being a potentially hot topic. Second, the case studies and the review of IPPs in Africa both reveal that involvement by multilateral institutions in PPPs have a positive impact on the long-term sustainability of the project. Yet, these institutions are also highly unlikely to be involved if the above mentioned risk is present. Indeed, as a principal, the guidelines of the World Bank (Box 5.2).

Box 5.2 Summary of World Banks Policy regarding international waterways

The Operational policy 7.50 – Projects on International Waterways of the World Bank applies to (i) any water body that forms a boundary between or that flows through two or more states; (ii) any other water body part of the watershed of a waterway described in (i); and (iii) any bay, gulf, strait, or channel bounded by two or more states or, if within one state, recognized as a necessary channel of communication between the open sea and other states. This policy applies to the following types of projects:

- Hydroelectric, irrigation, flood control, navigation, drainage, water and sewerage, industrial, and similar projects that involve the use or potential pollution of international waterways;
- Detailed design and engineering studies of above-mentioned projects. Projects on international waterways may affect the relations between the World Bank and its borrowers, and between riparian states.

Therefore, the Bank attaches great importance to the riparians making appropriate agreements or arrangements for the entire waterway, or parts thereof, and stands ready to assist in this regard. In the absence of such agreements or arrangements, the Bank requires, as a general rule, that the prospective borrower notifies the other riparians of the project. The Policy lays down detailed procedures for the notification requirement.

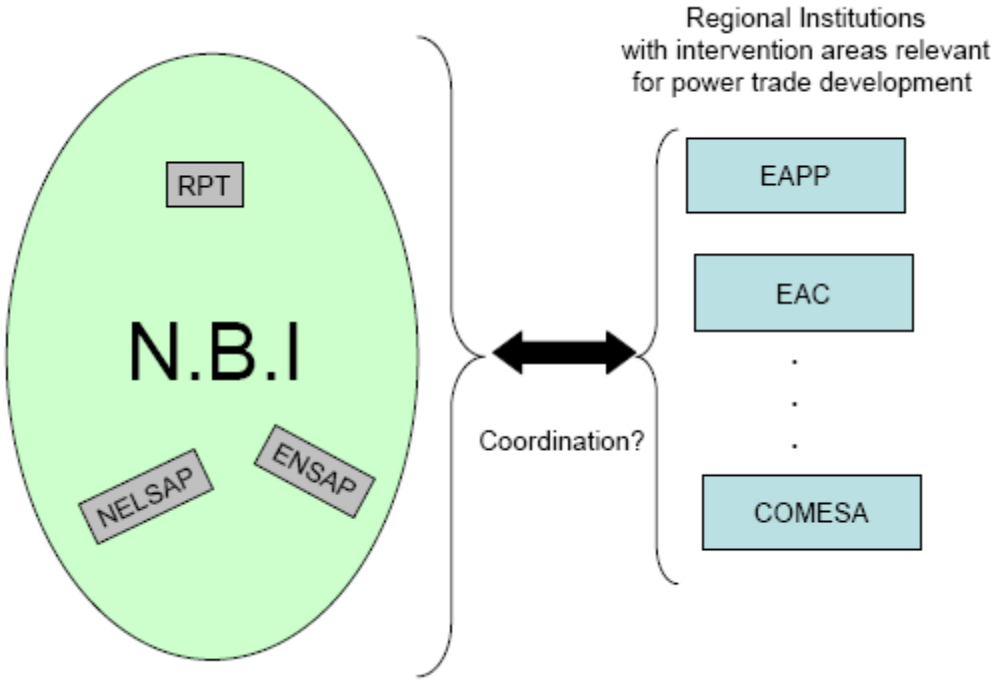
Source: EIA Review.

Source: Draft Environmental Impact Assessment Framework (NBI document)

5.5 Regional Cooperation and Trade

While the Regional Power Trade Project has proposed an institutional framework meant to provide a systematic and coherent approach to allowing power trade and coordinated planning efforts, actual power trade continues to be governed by bilateral agreements on an ad-hoc basis. Thus, in implementing a PPP with a regional dimension will have to overcome the administrative and bureaucratic barriers associated with these projects. Additionally, as referred to in the Power Trade Study (see Figure 5.3), a perception of confusing and uncoordinated regional power sector planning could present unnecessary risks for investors.

Figure 5.3 Regional power planning and trade organizations



Source: Mercados EMI, et al (2007)

As summarized by Mercados EMI;

> "Particularly important are already mature initiatives taken and developed under the Shared Vision Program and its two sub-basin Subsidiary Action Plans, NELSAP and ENSAP, which through their Power components have accumulated many achievements, experience and concrete proposals, especially with regards to coordinated regional expansion planning.
>
> However, it is important to remark that while some arrangements may be transitory different, sub-regions should anyway coordinate their activities through centralized coordination infrastructure. Particularly aspects related to expansion planning coordination/exchange of information, technical standards harmonization, capacity building, and even development and adjustment of trading rules should always be treated as a unity even if occasionally some differences are conceivable for some aspects.
>
> The NBI countries are characterized by very different levels of economic, industrial and technological advances. Their power sector policies and objectives differ significantly between downstream and upstream countries. In proposing the path to development of NBI Power Trade, it was analyzed in Deliverable 4 [of Power Trade Study] how these differences affect the development of cross border power trade, and a number of recommendations were made on how to mitigate those impediments, especially during the initial stages."

Perhaps, the most critical bottleneck restricting the development and expansion of regional power trade, and thus regional power projects is the expansion of cross-border transmission lines. In this regard, the following interconnection lines have been proposed by the NELSAP SSEA:

- 110 kV line from Kigoma, Rwanda to Rwegura, Burundi;
- 132 kV line from Kabarondo, Rwanda passing near Ngara to Biharamuro in the Kagera Province of Tanzania;
- 132 kV line from near Ngara, Rwanda to Gitega, Burundi; and
- 110 kV line from Gitega, Burundi through Bururi to Kigoma, Tanzania.

The DRC has also proposed substantial investments in transmission lines, primarily to interconnect with neighboring countries and to evacuate power from new or rehabilitation options being considered.

6 Application and Analysis of Consolidated Lessons Learned

This section presents the consolidated lessons learned from the three case studies. The aim is to draw lessons which are useful from a public authorities' perspective while at the same time shedding light on other more general lessons learned. The section also aims to reflect on the contextual issues in drawing conclusions and recommendations for the Nile Basin Region and its member countries. This section first presents a summary matrix of the lessons related to the success criteria outlined in Section 2.4. This is followed by a more detailed description of the lessons learned following the framework as set out in Section 2.4, i.e. according to the following issues;

- Enabling environment, regulation and energy sales contracts.
- Bidding processes and concession award
- Financing and investment
- Ownership models/project structure and implementation arrangements.
- Distribution of risks.
- Social and environmental due-diligence processes
- Planning horizon.
- Expectations.
- Cross-border institutional arrangements.

Before addressing these elements, it is important to point out that in all cases described above; PPPs were implemented as special purpose project companies. These companies demonstrated a range in the degree of public sector involvement. In Brazil, it was determined that the provision of financing was sufficient to ensure the interest of the public sector, since the off-taker was also private. In Lao and Turkey on the other hand, public ownership was likely meant to, among other things; protect the public interest associated with the project and ensure an efficient distribution of project risks.

No matter the nature of public involvement, the international tendency is towards IPP implementation models which utilize special purpose companies and project finance structures. This implies that PPPs will in most cases be a special case of IPPs. Thus, just like IPPs, PPPs should be financially viable. Accordingly, any best practices which are relevant for IPPs will, in general, also be relevant for PPPs. However, PPPs in hydropower are motivated so as to address particular challenges and thus deserve special attention. The lessons below are thus meant to address PPPs as a special case of IPPs.

6.1 Matrix of success factors

Success factor	Brazil	Turkey	Lao PDR
Terms of the PPA for public entities, particularly the tariff level achieved by the single buyer.	Not applicable – as PPA signed with private entity	The public utility took on a majority of the risks which might have been necessary to get the required private funding for the project.	Lao only kept 5% of the power of this project, but gained export revenue due to the agreement with Thailand, who is a steadily growing economy with increasing demand for electricity
The timeliness of implementation.	Short and smooth, four years from Concession award to COD.	Long and complex until FC but short construction time.	Long due to environmental and social impacts and external factors such as the Asian crisis which disturbed the MoU with EGAT.
The overall effect on country/region's power sector.	Cana Brava was part of a generation expansion plan for 1997-2006 and as such it was a prioritized project.	Part of a large scale project, the GAP which is a highly prioritized project by the Turkish government.	Power mainly for export hence the project will mainly contribute to the country through export revenues. NT2 is part of a larger program of economic development for Lao citizen and hence the export revenues is geared towards this programme
The effectiveness and efficiency of operation and maintenance	No negative references found, it seems that the plant is delivering the expected amount of power to the Brazilian net.	No negative references found, it seems the plant is delivering the expected amount of power; only problems relate to environmental and social impacts.	N/A since its not yet in operation
Efficiency and prudence of the procurement process.	Smooth ICB process	Complex due to interpretation of concession terminology by Danistay	Direct negotiations
Both positive and negative environmental and social impacts	Some negative environmental impacts and some complaints regarding inadequate resettlement compensation	Large social impacts, both in terms of resettlement and in cultural values. Inadequate resettlement processes	Initial delays due to inadequate ESIA but the concession agreement now regulates all social issues in detail and several external independent audit teams are reviewing the work, approx two teams per month.
Impacts on cross-border relations.	N/A	World Bank did not support the project since it argued that riparian countries did not approve it, could be a potential conflict in the area.	The Mekong River Commission was established already in 1995 to assure the management of the water resources in the Mekong river system, of which river Theun is a part. Unlike the Birecik project, the World Bank did support this project which means the project fulfilled their policy regarding international waters.
The overall sustainability of the PPP and PPA.	Sustainable	The transparency and good governance could be questioned due to the lack of international observers, such as Multilaterals.	Good transparency and governance which can be partly attributed to the heavy involvement of multilateral agencies such as ADB and WB as well as strong NGOs.

6.2 Regulatory and legal setup

As expected, all of the case study countries have, to varying degrees, implemented laws or acts aimed at encouraging private sector participation during the 1980's. The case studies have illustrated the critical role that a well established regulatory framework, which enables private investment, plays in awarding public authorities the policy space necessary to stimulate the development/creation of PPPs in a manner which is also favorable for the power sector, particularly consumers. For example, while Cana Brava only took four years from concession award to dam filling, the other two projects took much longer time to reach financial closure, delaying the delivery of badly needed power. In Turkey, the regulatory framework was unclear as to how to treat a concession agreement which created delays in the process while the NT2 was largely delayed firstly due to inadequate environmental and social studies, and secondly due to the loss of an export market following the Asian crisis, which resulted in that EGAT did not longer need the power it had originally signed on to take.

Another critical element is the particular importance of a credible and competent independent regulator when PPPs are to play an important role in developing the power sector. Specifically, once public entities are part owners with private investors and competitors with other pure private IPPs, the potential for perverse incentives, political interference and out-right corruption increases substantially. Independent regulators are considered of critical importance in establishing a credible process of PPP implementation, especially in light of a general power sector liberalization process. In Lao, nearly all power was meant for export, and the private and public interests were thus to a much greater extent aligned with one-another and the lack of an independent regulator was arguably of less importance. As Table 5.4 indicates, a critical step for many NBI countries in establishing effective PPP programs is the establishment of an independent regulator.

The civil society, represented by large international NGOs, seems to have a strong position in the Lao and Mekong region while this presence was somewhat weaker in the other two countries. Hence, the quick implementation of Cana Brava, which did result in some environmental and social impacts, could be partly a result of a lack of 'watch dog' organizations.

All three case studies have reinforced the crucial role played by forward-looking governments looking for long-term solutions to increasing hydropower production. Indeed, the case studies emphasize that in promoting PPP arrangements, the host government must work towards establishing the enabling environment necessary to attract private funding at an early stage – preferably well in advance of implementation. On this front, NBI member countries are at various stages in the development of a regulatory framework conducive with attracting responsible investors.

To the extent possible, NBI member countries should strive to establish a framework which provides them with the possibility to attract private investors on favorable terms, while providing the strength and capacity for the public sector to emerge as a credible actor (financially and technically) in PPPs. The review has indicated that this should include efforts aimed at;

- The designing and honoring of a power sector regulatory and legal framework which makes IPPs/PPPs possible – including land ownership, water use rights, grid access, PPA and/or concession arrangements consistent with national legal frameworks.

- Ensuring sufficient financial strength of both the single-buyer as well as potential public partners in a PPP. This is critical in ensuring that the development goals of the country are properly accounted for in the design, construction and operation of the plant.
- Ensuring that bureaucracy is minimized in terms of obtaining relevant permits and licenses, for example by establishing a 'PPP office'/'hydropower development office' or similar that will act as a 'one-stop shop' for private sector actors.
- Preparing prioritized sites to the greatest extent possible – potentially utilizing ODA resources. At the least, assisting in providing the necessary hydrological and relevant technical data necessary to determine an optimal design.
- Providing clear and consistent framework related to resettlement and environmental management. It is likely in the interest of all parties that the public sector takes an active/lead role in ensuring that the long-term impacts and sustainability of the project is accounted for. Serious investors will generally prefer stringent yet consistent requirements to relaxed but unpredictable ones.
- Recognize that international investor will usually require a track record of honoring public contracts, as well as a fair and efficient arbitration. For most NBI member countries, this will usually mean allowing for international arbitration.
- Ensuring sufficient international cooperation so as to allow for power trade and site approvals. The example of the Birecik projects highlights the importance of the latter, particularly in the NBI where multilateral banks will likely play a critical role.

6.3 Energy Sales Contracts

As already noted, like IPPs, the implementation of PPPs should be based largely on financial/economic considerations. This implies that the terms of the energy sales contracts will be of critical importance to the project company, power sector stakeholders and consumers.

As 95% of the NT2 electricity is to be exported to EGAT of Thailand, NT2 is more vulnerable to one single, foreign, off-taker. However, since it is a take-or-pay agreement, NT2 is assured a certain revenue stream, as long as the Thai off-taker honors the agreement. As has been seen, the NT2 project was delayed in the wake of the Asia financial crisis and the reduced demand in Thailand. However, had a PPA been in place before the crisis, EGAT would have been forced to pay for the power to the NT2 no matter if it needed it or not. Thus, a PPA with sufficient penalty clauses and signed at an early stage can contribute to mitigating risks for the project developer, while likely increasing the country's exposure to the effects of macro-economic risks.

The base PPA for Cana Brava was agreed upon between CEM and Gerasul, but third party agreements could also be entered into. Such arrangement provided CEM with a steady revenue from power sales under the base PPA, while also allowing CEM an upside in terms of price/revenues and a diversification of its client base. This PPA structure appears to have mitigated market risk for the project company, particularly during the power system's transition period. In particular, this structure provided a potential upside for developers but introduced a new supply risk to the off-taker. However, given that the primary sponsor was also involved as an off-taker, this was acceptable.

In Turkey, on the other hand, the publicly owned utility was the single off-taker on a take-or-pay basis. In the NBI region, a long term take-or-pay tariff is likely the most efficient model, providing both revenue security to investors and electricity to power-hungry economies. However, it is important to note that the sustainability and even credibility of these PPAs is highly dependent on effectively planned investments which maintain a balance between supply and demand.

However, in reviewing the case studies[23] and other PPAs for similar projects, it is apparent that there is no 'one size fits all' solutions to the design of a PPA, especially not for larger projects. For small, renewable energy projects (<10 MW), a number of developing countries have designed standardized PPAs[24] to ease the process but for the larger projects, they are still largely negotiated on a case by case basis.

Some key points that should be highlighted regarding PPAs include:

- The PPA is the key instrument available to public policy planners looking to mobilize private investment while ensuring benefits accrue to the public. The individual components (e.g. payment type, risk sharing, time horizon) and agreements in the PPA should be geared towards finding an optimal balance between these two objectives.
- The design of a transparent tariff regime and method is the responsibility of the public sector parties, often the regulator. Providing standardized tariff methodologies per technology and project type will greatly enhance and improve the likelihood of attracting private participants in the hydropower development. Tariff structures tend to be energy charge only for run-of-river projects, given a minimum guaranteed off-taker, while the tariff structure for storage projects tend to be energy and capacity charge. If there is no capacity charge applied, the energy charge will be structured as such as to cover the fixed elements, hence guaranteeing the minimum necessary revenue for servicing the debt.
- The PPA should set clear construction and operation performance criteria for the developer to adhere to
- The PPA will only be credible if the financial system behind it is credible – i.e. the credit worthiness of the single-buyer and/or government backing the single-buyer. A key argument in favor of PPPs is that public ownership, by itself, can contribute to improving the credibility of a long-term PPA.
- In markets which are perceived as risky (e.g. NBI countries), investors will look to ensure a payback period of less than 20 years (including required returns). In this case, PPAs which have longer duration will be sub-optimal from a policy planner perspective. Thus, while a PPA arrangement covering approximately 20 years will be crucial to securing financial closure, public authorities should consider building in a transfer or a new tariff negotiation in the PPA to reflect this reality.
- Despite plans of continued power sector deregulation and liberalization, the perceived risks in most NBI member country power markets means that long-term

[23] Information regarding PPAs is often limited on a case by case basis. We have not been able to retrieve the specific PPA documents for the three case studies but rather relied on other sources.

[24] At least Tanzania and Uganda have drafted such standardized PPA as well as tariff methodologies for small power producers using renewable energy.

PPA are likely the only means of attracting serious hydropower investors and securing the necessary debt financing to PPPs.

- The hydrological risk is a particularly important component of the PPA. While there is a recent tendency towards the off-taker assuming this risk (Birecik), it may be advisable for some hydro-based NBI countries to place the risk on the project company. This stems from the financial vulnerability of such single-buyers to country-wide variations in rainfall. Thus, placing all financial risk associated with rainfall variations on these single-buyers could put the financial sustainability of the PPA at risk. In countries with less hydro-intensive power sectors are perhaps in a better position to achieve better PPA terms by assuming this risk. Projects built downstream of other hydropower plants should motivate some risk sharing mechanisms. This is particularly true in the case of international rivers.
- Dispatch obligations of purchaser should be clear and transparent. It should also be clear if the plant is for base load or peak load purposes.
- Roles and responsibilities associated with environmental, social and resettlement costs should be shared between the developer and the public.
- The treatment of transmission losses in the PPA will also be an important issue. In general, the associated risk should rest with the owner and operator of the transmission line.
- The PPA should regulate termination rights from both the developer and the public point of view. In case of termination, the PPA should regulate the buyout rights and the PPA should provide for a buyout price methodology.
- It is of utmost importance that public authorities maintain a long-term perspective and recognize the often long-lasting and diverse impacts of renegotiating long-term PPAs. However, experience has demonstrated the vulnerability of such PPAs to changing economic and financial situations. It is thus critical to build in a transparent, credible and preferably internationally mediated renegotiation option, as was done in Turkey. In particular, it is important that a set of guiding principles for such a renegotiation be agreed upon ex-ante.

6.4 Bidding process and award of concession

Selection processes are relevant in two respects when it comes to PPPs. First, in selecting the appropriate private partner, public authorities have a responsibility to think about the long-term impact of the PPP – including financial capacity, environmental management track record, approach to technological transfer and capacity development programs. Second, PPPs should be subject to competition for the market on similar terms as purely private investors – i.e. competitive tenders should still be relevant.

While the case-studies provide little insight into partner selection processes, they do provide insight into different approaches in concession awards. However, it is important to note that whether selecting a private partner for a PPP or selecting a project owner for development, quite similar principles will be applicable.

ICBs are generally associated with high costs of preparing bids and often lack incentives for innovative developers to initiate costly feasibility studies since they are not guaranteed to win the project. This should be a serious concern, as feasibility studies are critical in progressing through the initial stages of the project cycle. However, this

obstacle is generally overcome rather easily, as exemplified in the Cana Brava case. In this case, if the initial developer was not the winning bidder, he/she was to be reimbursed for the cost of the initial feasibility study by the winning bidder.

The concession for Cana Brava was awarded through an ICB covering a period of 35-year while direct concession negotiations took place in Lao PDR, resulting in a 25-year agreement as was done in Turkey, resulting in a 15-year concession agreement. While a comparison of what could have been achieved through an ICB is not possible, it can be observed that both projects are of significant size and both processes experienced important challenges. In Lao PDR, private investment was sought by means of direct negotiations which lead to the signing of a number of MoUs that included exclusivity clauses, but lead to almost no projects being developed. This likely could have been avoided if the government took an active role in preparing the necessary studies and dictating the process by means of an ICB. In Turkey, very few of the project-specific or macro-economic risks were transferred to the project company. Here, a more structured process which allowed public authorities to present a viable project to a wider audience would have both allowed for greater competition for the market, while also potentially awarding the public stakeholders with the knowledge and understanding that would have provided them with improved negotiation power.

Thus, when considering PPPs, it is important to note that just like in the case of the selection of IPP developers, public authorities have a responsibility of selecting private partners based on a set of criteria which goes beyond the short-sighted financial wins. Based on the review, the following can be stated;

- As a general principle, ICBs are preferred, as they should lead to the most efficient developer and technological transfer by leading international companies. The potential for savings from lower construction and operational costs, together with more advanced technology can lead to significant savings over the life-time of a larger project. However, it is critical that a mechanism which compensates developers for crucial up-stream studies and investments be in place at an early stage so as to stimulate entrepreneurial activity. This should be considered as best practice from an enabling environment perspective.
- However, the prospects of achieving more favorable terms on a small-scale project (e.g. <30MW) by means of an ICB will generally not be sufficient to motivate the transaction costs associated with ICBs. Thus, it is critical to have standard processes for small-scale bilateral negotiation procedures, including a thorough monitoring, accounting and benchmarking procedures so as to ensure efficient construction and operation.
- Whether an ICB or a direct negotiation, experience has demonstrated a critical need of looking beyond strict consideration of tariffs and/or costs. The financial capacity together with the technical, management and administrative capacity of the winning project owner or private partner will be decisive in determining the long-term sustainability of the project, the degree of technology transfer, the potential for creation of jobs and industries associated with the development of the project (see NT2 case study) and the potential for additional investment in the sector and/or overall economy.
- Again, irrespective of the choice between ICB or direct negotiations, it is critical that public authorities remain in control and follow as structured a process as possible. Ad-hoc procedures will generally benefit the private counterpart vis a vis the public interest. Rights to a (pre-) feasibility study are generally a good, and

often necessary, starting point for public authorities to dictate the direction and pace of PPP implementation.

6.5 Mobilizing investments

The mere fact that the projects have been developed indicates that the processes have been successful in mobilizing the necessary investment. However, of critical importance are the terms on which the investments have been mobilized. Of additional importance is the understanding the motivations and objectives to be achieved through public financing and public ownership, respectively. This section summarizes the lessons learned along these lines.

Equity Financing

All three of the projects have been financed through locally established special purpose companies, NTPC in Laos, CEM in Brazil and Birecik AS in Turkey. The general trend is towards highly geared projects which are characterized by equity contributions of about 25-30% of the total project costs. For the case studies in this review, this range has held true for Cana Brava and NT2, while the equity contribution for Birecik was low at 14%. The amount of equity the developer is willing to put into a project is largely related to the perceived risk, where a lower equity proportion can be achieved for projects where the risk has been transferred away from the project company or where construction risk is perceived to be low. This is because providers of debt will tend to be more risk averse than equity providers and they have little or no possibility for affecting the project outcome – unlike owners of equity. Thus, in high risk environments, debt providers view higher equity contributions as a stronger commitment to ensuring a successful project.

For the Birecik project, the public sector accounted for 30 % of the equity while all of the equity in the Cana Brava case is private through Tractebel. For NT2, the equity is shared among the project shareholders namely, EDFI, ITD, EGCO and the LHSE, where LHSE is under the GOL, i.e. the host government has a 25% share in the company. The public sector share in equity is often through multilateral banks, in the form of loans to the host utility or as a direct equity holding by the multilateral bank.

Private equity sponsors can be broadly divided into four groups, namely:

- State-owned foreign utilities (such as EDF in NT2)
- Foreign engineering firms (Such as in Birecik)
- IPPs (such as Tractebel) and foreign trading houses
- Local industrial groups

While low equity shares are preferred by sponsors, policy planners should be aware that debt financing in excess of 70-80% can create an unfavorable financial/tariff situation. In particular, if the debt has a relatively short payback period (e.g. <10-15years), then the tariff will have to be set high during the payback period in order to ensure liquidity in the project company. This type of project situation will likely lead to a high tariff during payback, thus also having financial implications for the single-buyer and/or consumers. An additional potential consequence is popular and/or political dissatisfaction with a larger project that requires such a high tariff in early years. Importantly, while highly geared projects with a high initial tariff can appear highly attractive, private investors have experienced this type of scenario, in most cases

resulting in renegotiations, and are likely to take this into consideration in future developments. In summary, given current difficulties in raising long-term debt finance in a number of NBI countries could thus imply that countries should consider a lower limit of around 30% on equity contribution. In this case, the public sector will likely have to contribute with some equity finance.

Debt Financing

As 30% of total project costs is generally covered by equity, the rest is naturally covered by debt. This can be sourced through different channels, for example direct lending and guarantees. **Export Credit Agencies (ECAs)** can provide both direct loans and guarantees in support of bank lending. Terms are regulated by OECD and the administration is handled by an appointed body in the exporting country. Overall, this credit form is widely used for power projects but has been used in a limited form for hydro project due to the limited export component. The favorable terms associated with ECA loans means that they are generally used to the extent possible, but normally not exceeding 30 percent of project cost. Birecik had an unusually high ECA contribution (72% of total debt) and NT2 was supported by three ECAs, due to the large export share in the project. However, in countries like Brazil, with a larger domestic power market as well as a stronger domestic financial market, the role of ECAs is likely smaller.

Multilateral Development Banks (MDBs) such as the Inter-American Development Bank (IADB), African Development Bank (AfDB), Asian Development Bank (ADB) and the World Bank (WB) are generally playing important roles in large hydro power projects. There are a number of channels for multilateral participation such as through guarantees and insurance facilities. The MDBs offers a wide range of support, such as debt financing, guarantee programmes and political risk insurance programmes (Such as the World Bank Multilateral Investment Guarantee Agency (MIGA facility). MDBs have generally played a vital role in many hydro power projects and in some cases, without their support, the project would not have reached financial closure. In particular, their contribution for debt financing can be crucial in cases where commercial banks assess the project to risky to support. While MDBs will also face the risk, they have a stronger position to take on the risk as well as development objectives to fulfill. The guarantee programs that are offered through the MDBs have not been widely used which could partly be explained by the fact that these require a counter guarantees by the host government, who have often been reluctant to provide such a guarantee to private developers. Support by MDBs will function as a third party insurer in the sense that the private developer will likely have trust in that the MDBs follows transparent procedure, as MDBs have tight obligations against their member countries to fulfil certain standards and procedures. Ie the perceived risk of default is less if MDBs are involved. The host government, will also likely be more interested to get involved in a PPP if a MDB is supporting it, as the MDB can back up the host government is terms of providing insurance and guarantees through different instruments, making it more attractive for private developers. The MIGA facility mitigates noncommercial risk by insuring the investment against the risk of currency inconvertibility, expropriation, was and civil unrest and, finally, breach of contract.

Concessional financing can be provided by bilateral donors and/or IDA (of the World Bank). This can include grants or soft loans with favorable terms to the special purpose project company or to the government. Individual donors will have different rules on this type of project support when a private company is involved. Generally, donors will look to either support one of the following; the governments stake in the PPP; enabling

(publicly owned) infrastructure (e.g. road, transmission line); feasibility studies, or; development of regulatory, legal or planning capacity at associated public authorities. This source of financing will often represent a small share of the debt but nevertheless can play an important role, providing favorable terms on finance provided to critical components of the project that lie within the public domain, but for which the public sector does not have the available finance.

Commercial banks, as a group, have played a critical role in ensuring sufficient financing especially for larger projects. This includes funds provided by ECAs, which is generally the preferred source, as well as pure commercial funds. Commercial debt is in many countries limited and costly which often makes this channel rather unattractive. As indicated in the case studies, the commercial debt components were generally raised by a consortium of banks 44 banks in the case of Birecik and some 14 banks in the case of NT2. These bank consortia indicates that the PPP project company must maintain highly competent financial analysts so as to represent a credible partner in achieving the most appropriate debt package for a given project.

A final source of debt is through **bond issues**, these are however still rare in relation to financing hydro power projects. None of the case studies used Bonds as a source of finance. However, the Casecnan hydro project in the Philippines is likely the first project to have raised funds through this channel on the US Bond Market. For most NBI member countries, this is not likely a viable option, given the relative shallowness of financial markets in the region.

In the NT2, the World Bank, through MIGA, played an important role through the support of US$ 91 million. For Cana Brava, IADB together with BNDES provided the debt financing which was equal to a total of US$ 253 million. For Birecik, much of the debt was provided by Export Credit Agencies (ECA) - equivalent to 64 % of the total project cost (ECA's from Germany, France, Belgium and Austria). The remaining debt is provided by commercial loans, from 44 commercial banks arranged by Chase Investment Bank. No multilateral agencies were involved in the Birecik project, mainly due the above mentioned policy by the World Bank regarding support to project on international waters. Quite opposite to the situation with the GAP project in Turkey, the Nile countries are taking steps towards cooperation and the World Bank is taking a supportive approach in the development of the international rivers of the Nile. However, financing support will depend on prior cooperative agreements between the Nile Basin countries.[25]

Local debt sources are generally scarce in developing countries, although the Cana Brava project employed local debt financing through BDNES. Brazil, however, has a rather developed financial market. When the financing is largely in foreign currency, a certain degree of exposure to foreign exchange fluctuations is inevitable – whether the associated risk is born by the project developers or the single buyer. For example, a devaluation of the local currency can place the project company in a situation in which they can no longer meet the foreign exchange payments. This happened in Brazil as the Real (Brazilian currency) faced a devaluation of 40% in one year just as the Cana Brava plant was launched and since the IDB loans were in foreign currency, this affected the project severely. In the NBI region, most PPA will likely require an indexing likely with

[25] Shahan et al, 2001, " Sustainable Management of International Rivers – Case study: South eastern Anatolia Project in Turkey, GAP, http://www.eawag.ch/research_e/apec/Scripts/GAP07feb01.pdf

a basket of currencies. However, while this can contribute to mobilizing the required financing, it does not completely diminish the risk for the project company or the country. In Egypt, for example, a weakening currency put the IPPs under stress as the increasing energy bills became unacceptably high compared with price development in the rest of the economy. The only true way of mitigating this risk is to stimulate and utilize local finance sources. While this should remain an overarching goal of policy makers, government backed single buyers will likely have to continue to shoulder this risk. In any case, recent swings in the US dollar emphasizes the point that a basket of currencies will, in most cases, be less volatile and should be preferred as an index.

Summary

The governments in the three case studies used various strategies so as to mobilize investment in new hydropower on favorable terms. For NT2 and Birecik, the host government took a strategic decision to become an actual shareholder in the projects through contribution to the equity portion of the financing. Turkey was particularly successful in raising significant additional financing, but was forced to maintain the lion's share of the associated risks in the public sphere. The Brazilian Government, on the other hand, provided significant (42%) debt financing to the Cana Brava project, thus giving up any control of the management of the company. This however was likely motivated by the fact that the off-taker was also private. It is thus important to be clear and consistent regarding its justification of taking on financing and ownership roles, respectively.

Regarding the mobilization of private finance, investors are evermore sophisticated and experienced. They are increasingly looking beyond favorable PPAs with limited risk to the underlying fundamentals of the power sector – recognizing the long-term risks of the project. This again highlights the importance of maintaining or moving towards a fundamentally financially viable power sector, where investors can be confident about the robustness of the PPA to external shocks. In this situation, the Government, preferably in cooperation with multilateral banks, can offer guarantees and/or favorable terms so as to achieve a highly competitive tariff.

6.6 Project Structure

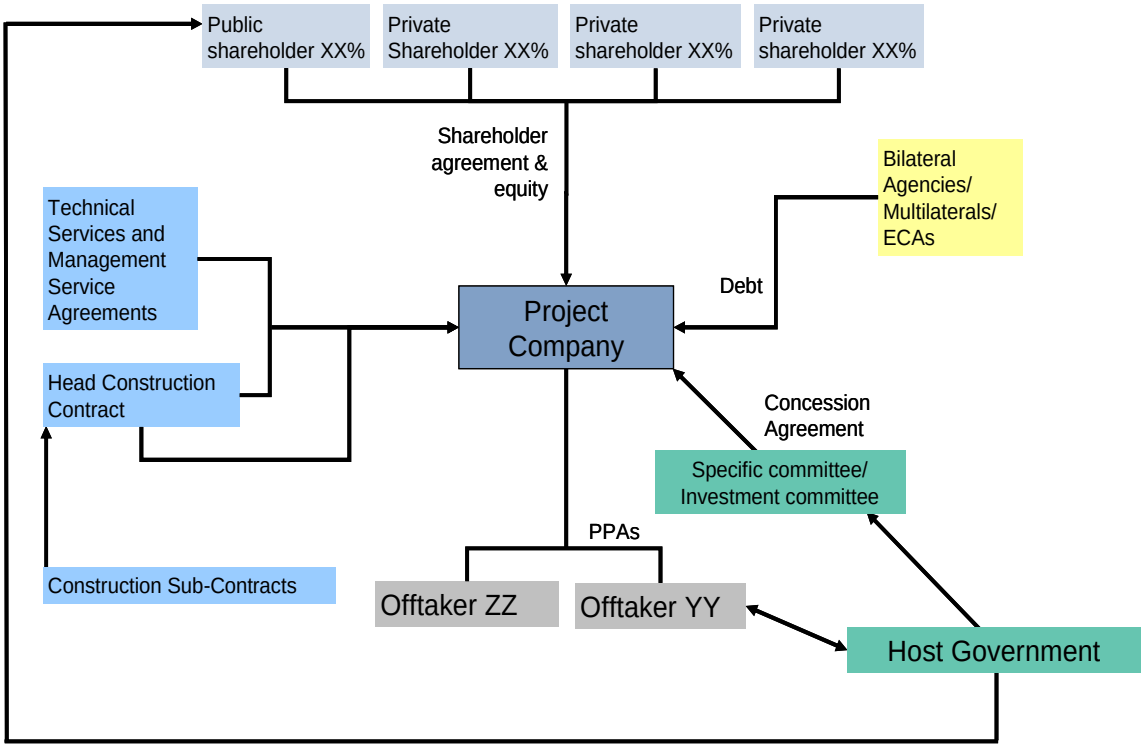
The ownership structure of the three case study projects all follow roughly the same organization. The main difference is that the project company in Brazil only had one single private shareholder, Tractebel, while NT2 and Birecik had a number of shareholders involved, including public bodies. A general illustration is detailed in Figure 6.1. As illustrated here, these financing and ownership structures are increasingly complicated, with diverse actors all aiming to maximize financial benefits and minimizing risks. This increasing sophistication means that a strategic interest by public authorities in taking on an ownership role should not lead to an undervaluation of the associated risks. The guiding principles presented in Table 6.1 reflect both international experiences, as well as the reality that ownership structure will tend to go hand-in-hand with financing arrangements and risk allocation. The NT2 project formed part of an overall development programme in Lao PDR and as the development programme will largely be financed by the export revenues from the project, the public sector support to the financing of the project as well as a shareholder in the project company can be seen as crucial to assure that the development objective is adhered to. The Turkey Government also participated in the equity funding and as shareholders in the project company. However, since the equity for this project was only 14 percent, large amounts

of debt financing were needed and hence the Government, through the Utility assumed a larger share of the risks. In Cana Brava, part of the debt financing was facilitated through the publicly owned development bank, BNDES, which has an aim to support the development of infrastructure projects to improve the economic development of the country. However, as the project company had not insured against currency risks, the performance of the Cana Brava project company was severely affected following the devaluation of the Brazil currency Real. Both PPAs for Birecik and NT2 are on a take-or-pay basis which puts the hydrological risk with the offtaker (the Turkish utility and the Thai utility). If the hydrology risk would have rested with the project company, it is not likely that private investors would participate, especially since many regions, particularly the NBI, have experienced recurrent droughts which have drastically affected the hydropower generation capacity in the region and increased the investment risk.

Table 6.1 Some general guiding principles in assigning appropriate project structure

	General Guiding Principle
Financing	Cost of capital should be minimized, while ensuring liquidity in early years (e.g. >30% equity). Public financing should be motivated by projects that have a good potential for a positive macro-economic impact or a strategic interest in managing the project (e.g. export revenue). Private financing of transmission lines should be made possible with a credible system in place for purchase by single-buyer.
Ownership	Generally, ownership in the project company will be consequence of equity contributions. However, direct public ownership of large reservoirs with multiple-use purposes should be considered, especially when cross-border risks are present. Most investors will prefer ownership of the transmission lines to rest in the public domain.
Risk Distribution	As a first step, risks under (partial) control of public authorities should generally be born by the public sector. Regarding the critical risks associated with foreign currency and hydrological flows, public authorities must take into consideration the robustness of the financial viability of the entire sector under perverse conditions – i.e. consider the sector wide ripple effects of the downside risk.

Figure 6.1 General project structure



6.7 Project Implementation Arrangements

This section aims at outlining the general approach to hydro project implementation arrangements. Issues that are specific to hydro power projects and that require careful attention include; (i) the rather expensive and time consuming front-end studies to establish the project design and feasibility; (ii) the unreliability in determining costs and completion dates in advance; and (iii) the need to carefully mitigate construction risks as to not inflate the contract price.

Overall, lessons from PPP have shown that private sponsors are well positioned to carry out certain task more efficiently than public bodies. For example, private sponsors manage to carry out efficient development and construction management by keeping budgets and timetables by aiming at technical and economical optimization; they are able to secure funding; carry out efficient operation and maintenance and often sit on the commercial expertise. Private investors can play a key role in developing hydropower project as they bring with them cutting-edge management expertise, the latest technical expertise, commercial expertise and commitments to minimal environmental and social impacts.

In assessing implementation arrangements and risk allocation, it is useful to briefly outline the stage of development of hydro power projects. Overall, is can be concluded that the development of most hydro power projects will follow the same stages, in one form or another. These broad stages are summarized in Table 6.2.

Table 6.2 Stages of development

Stage	Description
Scoping	Initial identification of sites, based on available maps, hydrological data etc, but without actual site visit
Pre-feasibility	Brief outline of scheme concept, based on mapping and geology as well as preliminary estimations of costs and benefits. Might involve a site visit but normally no detailed site investigations are carried out.
Full feasibility	Detailed mapping of the site and detailed geological investigations resulting in final optimal concept with well defined project parameters. Cost estimates should be finalized based on reliable and reasonable quantities. A full Environmental and Social Impact Assessments (ESIA) should be conducted.
Design (Tender Design)	Structure-specific site investigation and development of design and individual structure specifications. This will be the basis for engineer's estimations and is traditionally used for tendering.
Detailed design	Detailed design of each component, incl. fabrics drawings etc. This should be carried out in parallel with construction and should be modified to meet any changing conditions. Carried out by EPC contractor

Source: Head, 2000

Traditionally, contract were awarded in the 'Design' stage while contracts using the EPC approach is awarded at a much earlier stage so as to minimize the costs for the developer. But this is also based on the notation of giving the contractor the freedom to develop the optimal design from his/her perspective and budget. However, the earlier a contact is awarded, the more difficult it is to predict the final costs. Both approaches have pros and cons, as outlined in Table 6.3.

Table 6.3 Overview of EPC contract award

	Pros	Cons
Early award	Lower front-end costs for the developer Reduced liability related to information sharing of project details	Difficulty to estimate final costs and hence difficulty to match costs with the PPA agreement
Late award	Easier determination of final costs and likely to better match with the PPA agreement	Increased liability High front-end costs

Source: Head, 2000

6.8 Roles and responsibilities

Based on the case study reviews, recommendations regarding the preferred the roles and responsibilities of key actors in hydro power projects can be summarized as outlined in Table 6.4.

Table 6.4 Overview of roles and responsibilities

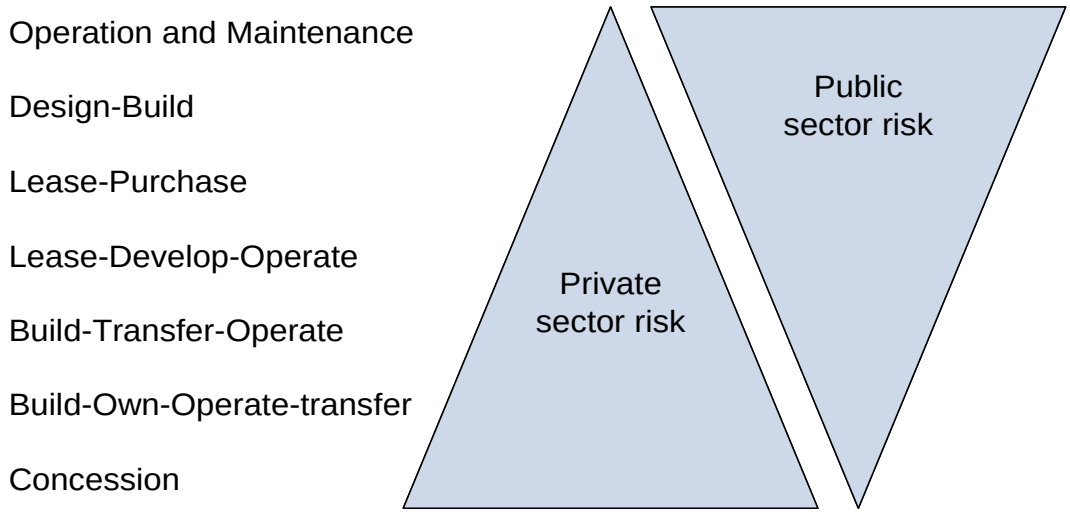
Host government	Utility	Private Sponsor	MDBs
Site development in relation to river basin and water resource management plans including coordination with possible bordering countries	As offtaker or power on a take-or-pay basis and honouring the PPA	Bring best management practices	Reduce risk by: - Support rule of law - support fair and balanced regulatory framework
Minimized bureaucracy, transparency and accountability, set fair power sector regulatory framework and honour it	Resettlement, compensation, wayleaves, land and water rights issues	Bring latest technical expertise	- assist in securing government compliance with commitments - educate public opinion/NGOs of the benefits of hydropower
Equity/debt contributor (ex of LHSE and BDNES)	Initial preparation studies	Bring commercial and free market expertise	- offer insurance and guarantee programmes
Cost-benefit balance, considering the benefits to local communities specifically and the overall development impact of the project	Share project risk, in terms of hydrological risks and other construction related risks	Share project risks with utility	Help secure balanced social and environmental standards by: - support assessment of previous environment
Assure that the benefits of the projects are linked back to the country and the community surrounding the project in particular. Possibly by including the hydropower project in larger development planes, such as was done in Lao PDR.	Assist in obtaining environmental clearances	Secure funding	- support agreement on social and environmental impact mitigation plan - be a guarantor of implementation - act as a facilitator between opposition actions, the government and the private sponsor
Ensure that safety, health, environmental and resettlement standards are adhered to and manage/facilitate, together with the project company, environmental mitigation plans and facilitate resettlement	Assist in the mobilization of support from Multilaterals	Commit to minimal and acceptable environmental impacts, following country specific and international policies	
Assume responsibility for initial project design and site visits through Power Sector Master Plans and honouring such		Commit to fair treatment of resettled populations	

Host government	Utility	Private Sponsor	MDBs
Make available historical data necessary for the private developer to develop the site		Commit to a social and environmental mitigation activities and possibly develop a (local) Social Development Programme together with the host government.	Be a partner, by - Participate to funding, act as an umbrella for commercial lenders - Assist in developing domestic funding facilities - Develop innovative instruments to reduce long pay-back time - Develop innovative instruments to mitigate currency gap - Contribute to transparency and ensure good governance
Assist in obtaining, in a timely manner, environmental permits and site acquisition, licenses etc			
Mobilize support from Multilaterals and favour development of domestic investment funds			
Coordinate actions initiated by NGOs so that they contribute to the success of the project and not unfairly damage corporate images			
No unnecessary interference with the market			

6.9 Risk allocation

The details of the allocation of risk are regulated in the concession agreement and the PPA. As these types of agreement documents have not been readily available for the three case studies, this section attempts to draw some general conclusions regarding risk allocations in hydro power projects between the public and private sector. Figure 6.2 illustrates how the risk is shifting between using different forms of PPP.

Figure 6.2 Degree of risk



Source: Ribeiro and Dantas,

Major risks related to hydro power initiation, development and implementation can be broadly summarized to include the following:

- Development and construction cost over-run due to unexpected 'discovered' geological features during development and construction;
- Environmental and social impacts, their related mitigation costs and the cost followed by actions by NGOs;
- Unreliable climate changes and unpredictable rainfall scenarios;
- Financial risk such as interest rates and exchange rates;
- Lack of regulatory framework and /or instable/non-transparent regulation;
- The market structure in terms of hedging instruments for contractual supply obligations; and
- Possible damage to the corporate image due to NGO and other opponent's actions.

Typical characteristics for hydropower assets is that relative to Combined Cycle Gas Turbine (CCGT) and Thermal power, hydro has long development and construction times and higher variability of development and construction costs due to lower certainty in return forecasts. Typically, the production costs in hydro is mainly based on capital and fixed costs while for CCGT projects it is mainly based on the fuel costs. Furthermore, there is no one-size-fits-all solution since the cost of construction of each hydropower plant will depend on site specific characteristics and geology and hence the development time is longer than for CCGT project for example.[26] All these features creates a higher risk profile for hydropower projects relative to CCGT and thermal power, issues that has to be taken into consideration if a country wishes to develop its hydropower potential. Table 6.5 set out the normal risk sharing arrangements for hydro power projects.

Table 6.5 Normal risk sharing for hydro power projects

Risk	Primary Responsibility
Hydrology	
* temporary	Usually Project Company, but sometimes access to Government funds - insurable
* permanent	Government/Utility increasingly assuming this risk - not insurable
Construction Risk	
* changes in quantities and cost	Project Company - insurable
* unforeseen ground conditions	Government shared with Project Company
* delayed completion	Contractor or Project Company
Performance Risk	
* equipment	Plant supplier or turnkey contractor
* project performance	Contractor or Project Company
* transmission	Usually the responsibility of the Utility/Transmission Company
Environmental Aspects	
* permitting	Government/Utility
* land acquisition/resettlement	Government/Utility
* EMP	Government/Utility

[26] Tractebel presentation 2005

Risk	Primary Responsibility
Market	
* market risk	Usually Utility through take-or-pay
* dispatch	Obligation and right of the Utility
Force Majeure	
* continued debt servicing	Generally obligation on the Utility to maintain payments
* rehabilitation costs	Project company/insurance company
Political	
* obligations of utility	Government obligation often backed by political risk insurance
* changes in law	Government obligation often backed by political risk insurance
* changes in tax	Government obligation often backed by political risk insurance
* buyout obligations	Government obligation often backed by political risk insurance
Financial	
* increase financing costs	Passed on to the end user through tariffs
* exchange rate	Generally passed to Utility, backed by Government
* cost escalation	Reflected in tariff during construction and by limited tariff escalation thereafter

Source: Head, 2000 and modified by consultant

6.10 Environmental and Social Impacts

All the three case studies have shown the importance of ensuring and putting in place, at an early stage, solid plans for mitigation of environmental and social impacts. The NT2 project was severely delayed due to insufficient assessment of the social and environmental impacts while the Birecik project realized halfway into to construction that a an ancient Roman city of Zeugma was located at the site and the flooding of the reservoir destructed the majority of this historical site. The Cana Brava projects also experiences social and environmental impacts but not of the same dimensions as the other two projects. As an additional example, the Bujagali hydropower project in Uganda was partially delayed due to the environmental and social impacts and the inadequate measures put in place to deal with these.

In the Cana Brava case, the project company has explicitly communicated their concern regarding the lobbying of NGOs and the impact of such lobbying on the corporate image. In addition to incorporate and facilitating a dialogue with the civil society at an early stage to minimize the impacts and possible later conflicts is also to minimize the negative impacts on the project developer's image. If such negative images are based on false and unclear information, this can seriously hurt the future potentials for investments as no investor is likely to get engaged in project through which the corporate image will be damaged.

6.11 Additional issues

The following three sections highlights additional issues that are worth noting for the future planning and development of the hydropower potential in NBI using a PPP framework.

6.11.1 Planning horizon

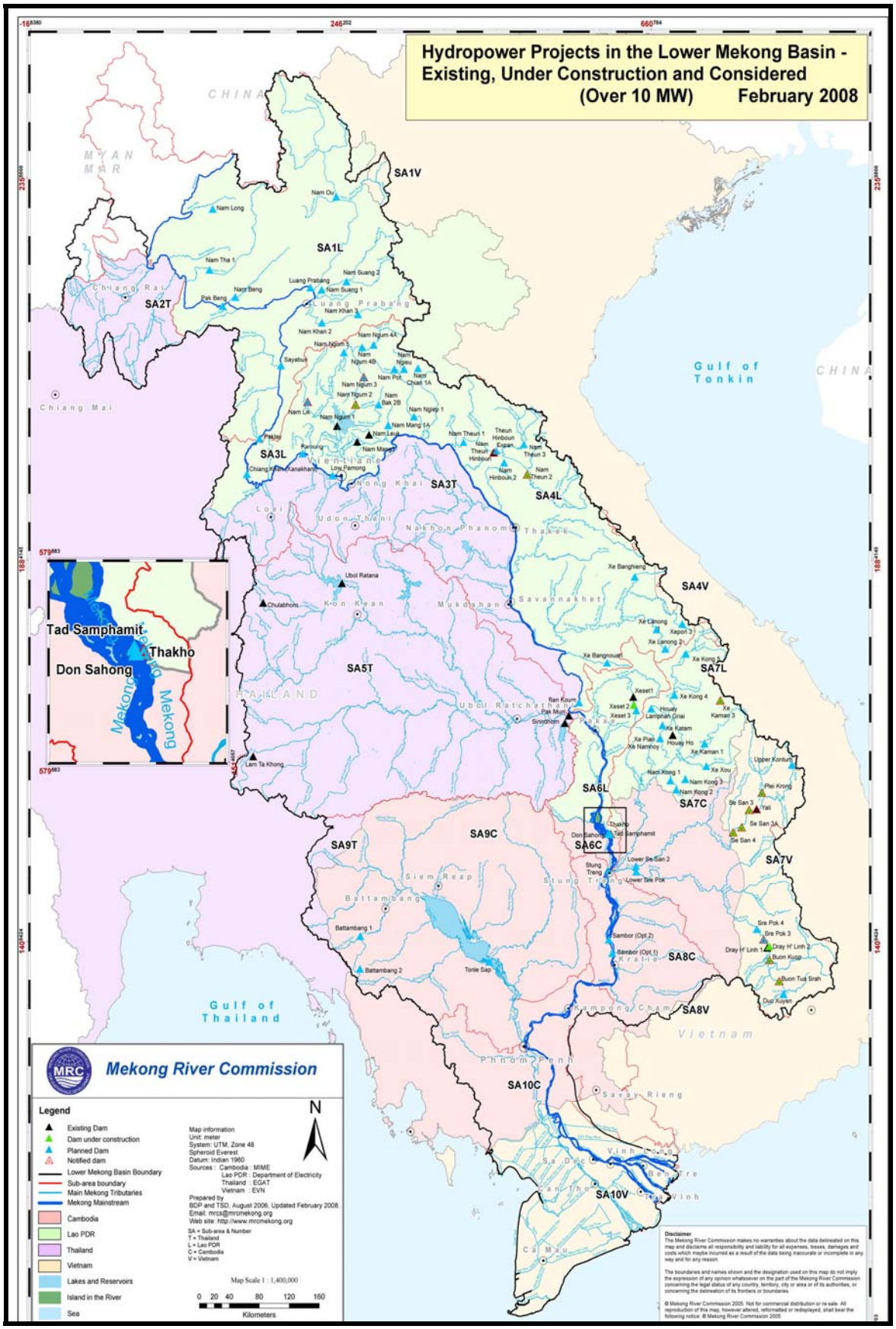
All the case studies were part of a long terms development plans of the host government and as such they received full support from the host government and the investors could clearly see the objective and time horizon for the project.

6.11.2 Expectations

Generally, private developers are likely to have other expectations and objectives (profit) of developing the project than the host government (revenues and economic growth). Hence it is important for the success of the project that an agreement is reached at an early stage that defines roles, responsibilities and expectations of the project, from the developer and government point of view. In addition, generally, the expectations by the local communities might differ widely from that of both the host central Government and the Developer.

6.11.3 Enabling cross-border institutional arrangements

If projects are of cross-border nature, which none of the case study projects where even if the Birecik was situated at a river downstream of other dams and the NT2 is part of a greater river delta which crosses borders, cross border river basin management issues must be taken into account. The river at which NT2 is located is part of the Mekong region, a river delta which has a total of dams built on different subsidiary rivers. Hence, the Mekong River Commission was establish already in 1957 to deal and coordinate with natural resource issues related to the river of Mekong and its subsidiary rivers. The Commission has for example drafted a Hydropower Development Strategy while they are also working with the regions environmental issues, water utilization, flood management, irrigation and fisheries. The map below shows all the planned and existing dams in the lower Mekong region which covers Lao PDR, Cambodia, Thailand and Vietnam. The upper Mekong is located in China, which is also exploiting the hydro potential of the river in the upstream sections.

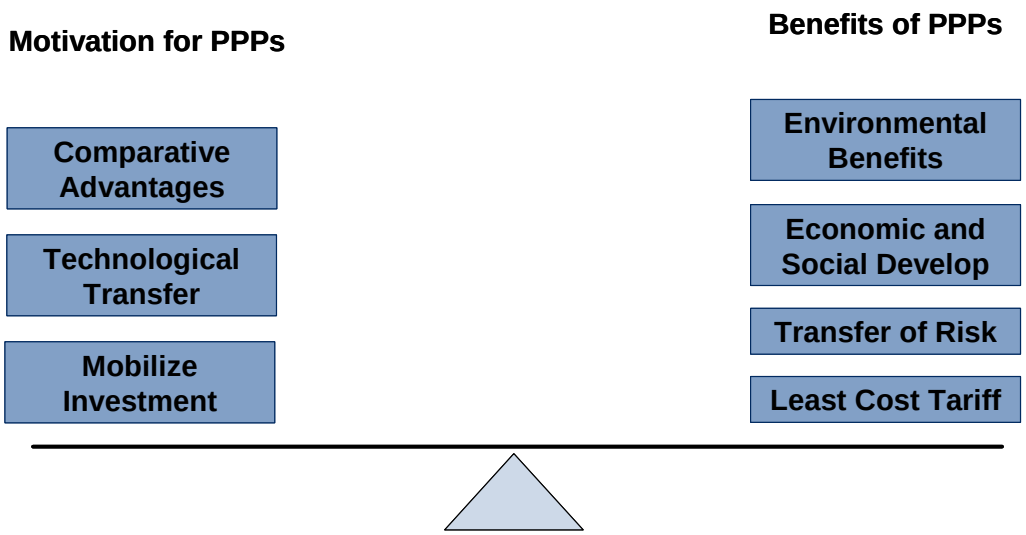


Source: Mekong River Commission, 2008

7 Recommended Guiding Principles towards a PPP Model Framework for NBI

Based on the lessons learned in the PPP review combined with an assessment of the contextual issues, a set of guiding principles for the financing and implementation of PPPs in hydropower in the NBI region have been developed. It should be recognized that each project will be unique, as will the final financing and implementation models. These guiding principles however should serve to guide policy planners in understanding lessons learned internationally and how they can be applied in the region. The guiding principles are meant to be somewhat broad in scope so as to be applicable in all countries. Nonetheless, some specific recommendations are made. Generally speaking, the guiding principles are meant to assist policy planners in balancing the two overriding objectives; i) mobilizing investment, and; ii) maximizing the benefits of this investment for the host country – as illustrated in Figure 7.1.

Figure 7.1 Guiding principles for balancing two objectives



7.1 Riparian shared vision

It is worth emphasizing here that the guiding principles are designed so as to contribute to the over-arching goals of the RPTP. And, the long-term goal of the RPT Project is to contribute to poverty reduction in the region by improving access to reliable and low-cost power in the Nile Basin in an environmentally sustainable manner. The creation of a regional electricity market can play a key role in furthering cooperation among the Nile Basin states and in ensuring that the hydropower resources of the Nile Basin are developed and managed in an integrated and sustainable manner.

The countries participating in the NBI understand the importance of interconnecting their electric power systems for the development of a regional power market. The establishment of the market is expected to have positive effects on system reliability and economies of scale in planning, and construction and operation of the generation and transmission facilities in the region. Furthermore, the market is expected to make significant contributions to the competitiveness of the Nile Basin economies by directly, and indirectly, creating new jobs and economic opportunities, providing a significant

impetus towards achieving the regional aims of economic growth, prosperity, and stability in the Nile Basin region.

7.2 Guiding Principles

Table 7.1 Guiding Principles for PPP Financing and Implementation Models for NBI member countries

Categories	Guiding Principles
1 Sector-wide Considerations	
1.1 Sector Policy	Governments, ministries and regulators should aim to communicate clear and consistent objectives regarding sector structure and prioritized reforms. An independent regulator should be in place before any large PPPs are implemented, recognizing that the particular importance if a PPP is to; i) compete on equal terms with other IPPs, ii) operate 'in good faith' with respect to overall power sector considerations, and iii) prove transparent.
1.2 Sector-wide Planning	Public authorities should develop a list of individual sites prioritized according to sector-wide technical and economic considerations before approaching private partners. This list and accompanying documentation will allow for the promotion of the least cost development of the sector and long-term sustainability of the PPP, while positioning authorities as a reliable partner.
1.3 Master Plan	Public authorities should be able to demonstrate that individual projects have been determined as consistent with least-cost development plans of the sector. This requires a thorough analysis and consistent application of long-term least-cost principles.
1.4 Risk Assessment	Public authorities should have an independent assessment of the key risks associated with individual project(s) carried out and presented to investors. The assessment will help create credibility with investors, as well as assist authorities understand the key obstacles to implementation.
2 Regional Coordination	
2.1 Power Planning and Trade	Member countries should organize and coordinate regional planning efforts under the NBI umbrella so as to add clarity to investors and ensure a coherent planning structure related to the hydro potential of the basin. The NBI should take immediate steps to begin implementation of a power trade framework similar to that proposed in the Power Trade Study.
2.2 Regional Power Investment Facility	Given the particular challenges, opportunities and risks associated with hydropower development along the Nile and its tributaries, a regional help desk should be considered. Particular functions should be limited to only those functions which a regional help desk would have a comparative advantage in, including (but not limited to); providing guidance on regional projects and plans, and; negotiations, mediation, technical assistance between investor-governments and government-government on regional projects. The RPTP-PMU could potentially serve as host for this function. This could also fill the role of a regional experience sharing platform.
2.3 International Waters	Proposed projects should receive approval (or no objection) from all effected Riparian States, preferably before private partners are selected. In cases where water right security is an issue, member countries should be willing to consider hydrological risk.
3 PPA Terms	
3.1 Off-take by Utility	Given significant perceived risks in NBI power markets, standard PPA arrangements with a Government backed utility should be developed, which allows for a secure revenue stream for at lest 20 years.
3.2 Direct Contracts	The possibility for direct contracts (including wheeling) should also be made available, but should be subject to assessment of a regulatory body which ensures that attractive sites supply users which add value to the country's economy.
3.3. Small Hydropower	Standardized and streamlined PPA procedures are particularly important if governments wish to stimulate investment in new small hydropower plants. Additionally, innovative PPPs in isolated grid settings should be considered, with local governments/organizations/cooperatives being empowered as the public partner and off-taker.

Categories	Guiding Principles
4 Site Development	
4.1 Pre-feasibility	So as to ensure that publicly-prioritized projects are brought forward, pre-feasibility studies should be produced by public authorities, perhaps financed by ODA. The eventual bidders/developer should then be required to share these costs.
4.2 Feasibility	Feasibility studies should be carried out by the eventual selected developer, but scrutinized by independent, experienced auditor and/or regulator before approval.
4.3 Exclusivity	While exclusive development rights can be beneficial and sometimes required for the development of an individual site, they should always be for a specified period of time and/or accompanied by progress requirements, such as completion of feasibility or financial closure. This should also apply to project companies that also have public ownership. At a local level, authorities should communicate possibility for exclusivity to local authorities – potentially providing longer exclusivity to developer initiated projects.
4.4 Marketing	Road shows should be carried out on the basis of independent analyses, including country and sector-wide analysis, market (including export) analysis, pre-feasibility studies and a least cost assessment which provides justification for the site(s). The analyses will help create credibility with investors, as well as assist authorities understand the key obstacles to implementation.
5 Implementation	
5.1 Competitive Tender	Competitive international tender should be the preferred model, even if one of the bidders is a PPP. This ensures that the most effective and efficient developer is selected and that public financing does not crowd out competitive private investment. Alternatively, the public entity could release a tender in order to select the best strategic investment partner on a project.
5.2 Award/Partnership Selection Criteria	Selection processes should be carried out in two stages. First, developers and/or investment partners (or sponsors of a Project Company) should be short-listed based on rather specific and strict transparent criteria, particularly a track record of timely, cost-effective and environmentally and socially responsible site development and operation. Second, the final award should be based on transparent criteria – usually tariff for tender award, or cost of capital for selection of private partner.
5.3 Bilateral Negotiations	The entrepreneurial actions of interested developers should always be rewarded either through bilateral negotiations for site development or through compensation. Preferably, useful and documented costs (including a reasonable return) should be covered by the eventual successful bidder. However, in the case of a lack of interest by other bidders (e.g. small-scale), negotiations should be made transparent, subject to thorough audit with built in PPA terms that provide incentives for timely and cost-effective construction.
5.4 Private Partners	The selection of private partners, in either PPPs or pure private projects, should take into consideration track-records in long-term sustainable plant operations, policy and approach to the transfer of technology and competencies, including employment of a local labor force. That is, public authorities should plan for the long-term and looks beyond entrepreneurs offering a ‘quick fix’.
6 Ownership	
6.1 Public Ownership	In general, the motivations and justifications for public ownership should be separated from public financing. In particular, public ownership should be motivated by the possibility of reducing risks and/or improving efficiency. In the case of hydropower, particularly with reservoirs, in high-risk investment environments, partial public ownership will generally be a tool in mitigating project company risks and thus reducing the full-cost tariff.
6.2 Reservoir and multiple-use	Particularly in the case when an associated reservoir is to be used for irrigation, or other consumptive uses, the public sector should retain complete ownership, but building in long-term agreement with the project company regarding dispatch and water rights, particularly during dry years.
6.3 Transmission	In order to reduce risks to the project company, even in those countries with monopolistic transmission set-ups, legislation should be passed so as to allow for grid connection with transmission lines financed and constructed by the project company. This should preferably provide for a standard agreement for purchase of the line by the transmission company at cost-plus.

6.5 Expectations	The private developer is likely to have other expectations and objectives (profit) of developing the project than the host government (revenues and economic growth). Hence it is important for the success of the project that an agreement is reached at an early stage that defines roles, responsibilities and expectations of the project, from the developer and government point of view. In addition, the expectations by the local communities might differ widely from that of both the host central Government and the Developer. Early, fair and transparent consultations are therefore needed to seek the local communities support, village chiefs, and regional and district levels of governments.
7 Risk Distribution	
7.1 Risk Allocation	The allocation of specific risks should be based on the principles of i) the party best able to control and mitigate the risk, and ii) the party in the best position to bear the downside of the risk.
7.2 The Public Interest	Member countries should not take lightly to accepting risks in order to attract investors or during negotiations. In particular, the small market size and reliance on hydropower of many power systems in the region, means that the financial viability of the sector could be put under stress if the utility accepts 100% of hydrological risks.
8 Financing	
8.1 Public Financing I	The degree of public financing should be guided by a detailed economic cost benefit assessment. Reasons for increased public fincancing include (among others); a high cost of private capital (due to sector risks); exceptional economy-wide, sectoral-wide, environmental and/or social impacts, or; a demonstration value for the project. Particularly in financially weak utilities, significant public financing (e.g. >20%) should be justified along these lines.
8.2 Public Financing II	Policy makers should determine the cost of public funds and apply this cost to the determination of public financing and make available to individual projects.
8.3 Multilateral Finance Institutions	Recognizing the expected contribution of MFIs to the achievement of a lower cost of capital and ensuring the long-term sustainability of projects, MFIs should play an integral part of the implementation of PPPs in the Nile Basin. Particularly in challenging investment environments, the longer development timeframes should be tolerated so as to achieve the above mentioned goals.
8.4 Equity Requirement	Equity requirements of 20%-30% should be considered so as to avoid substantially high tariffs in early years and ensure the commitment of sponsors to the success of the project.
8.5 Carbon Financing	For all hydro projects, the potential for carbon financing should be considered at an early stage, e.g. pre-feasibility stage.
9 Economic Development	
9.1 Technology Transfer and Industrial Development	In choosing strategic partners, public authorities should require a detailed plan for transferring technological and administrative competencies. Authorities should also place requirements regarding the use of local labor during construction.
9.2 Economic Growth and Poverty Alleviation	Projects which meet growing domestic demand and promote access expansion should be prioritized above supply to ‘mega projects’. Subsidies should be primarily limited to up-front contributions, followed by long-term financial sustainability.
9.3 Export Revenue Management	For larger projects that are expected to result in significant electricity exports, an export revenue management system should be put in place. The system should i) allow for the transparent management of export revenues; ii) contribute to mitigating negative environmental impacts from the project; iii) provide economic and social benefits to the local population, and; iv) contribute to sustainable economic benefits to the country – particularly within the power sector.

10 Environment and Social	
10.1 EIA	The host government should have in place a clear guideline for Environmental Impact Assessments as well as credible and fair systems for preparing for and mitigating impacts. The World Commission on Dams as well as the World Bank and other Multi- and Bilateral Banks/Development Agencies have guidelines available to provide frameworks built on international best practice. If followed, such guidelines will reduce conflicts, contribute to environmental conservation, social and economic development and facilitate clear communication channels between all effected parties. External environmental and social impact assessments should be carried out by independent teams and follow international guidelines. In addition, the host government should assure that the concession agreement regulates that all companies, down to the smallest sub-consultant should comply with applicable environmental and social requirements for loan agreements etc. It will also be the role of the awarder of the concession, often the regulator, to monitor that the obligations as set out in the concession are fulfilled.
10.2 Resettlement	Clear and firm guidelines for resettlement plans should be provided by the host government; again international actors have such guidelines based on best practice. As resettlement issues are a public concern but also require the full engagement of the private investor to be carried out effectively and satisfactory, the responsibilities of the resettlement issue, both in terms of coordination, consultation and financing should be shared between the public and the private actors. External auditing should be facilitated and the resettlement obligations should be regulated in the concession agreement.
10.3 Stakeholder Consultations	The host government should facilitate early communication between private investors and civil society actors together with the affected communities. This dialogue should be in place early, so that local populations can be included in strategic decisions as it will increase a sense of inclusion which will avoid potential conflicts. It should be continued through out the preparation, construction and implementation of the project as to avoid conflicts and unforeseen impacts. The civil society have a lot of knowledge and by working with them from the start, the risk of running in to problems and delays further down the road is minimized.

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Annex 1: Private participation in energy sector, Sub-Saharan Africa

By type of participation and by technology

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Angola	2003	Chicapa Hydroelectric Plant	Construction	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Hydro	MW	16.00
Angola	2006	Aggreko Cabinda Temporary Power Station	Operational	Greenfield project	Rental	Electricity	Electricity generation	Diesel	MW	30.00
Angola	2006	Aggreko Caminhos de Ferro de Angola	Operational	Greenfield project	Rental	Electricity	Electricity generation	Diesel	MW	30.00
Benin	2005	West African Gas Pipeline Company Ltd	Construction	Greenfield project	Build, operate, and transfer	Natural Gas	Natural gas transmission	N/A	KM	678.00
Burkina Faso	1998	Hydro-Afrique Hydroelectric Plant	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Hydro	MW	12.00
Cameroon	2001	AES Sonel	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	Number of connections (thousands)	528.00
Cape Verde	1999	Electra	Operational	Divestiture	Partial	Electricity, Utility	Electricity distribution, Water utility without sewerage	N/A, N/A	Number of connections (thousands)	71.00
Chad	2000	Societe Tchadienne d'Eau et d'Electricite (STEE)	Canceled	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, Water utility without sewerage	N/A, N/A	Number of connections (thousands)	16.00
Comors	1998	Comorienne de d'eau et de l'electricite (CEE)	Canceled	Concession	Rehabilitate, operate, and transfer	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Diesel	MW	16.00
Congo.Rep	1996	Sounda S.A.	Canceled	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Geothermal	MW	240.00
Cote d'Ivoire	1990	Compagnie Ivoirienne d' Electricite	Operational	Concession	Rehabilitate, operate, and transfer	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	..	0.00

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Cote d'Ivoire	1994	Compagnie Ivoirienne de Production d'Electricite (CIPREL)	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Diesel, Natural Gas	MW	99.00
Cote d'Ivoire	1995	CI-11 Gas Pipeline	Operational	Greenfield project	Build, own, and operate	Natural Gas	Natural gas transmission	N/A	KM	73.00
Cote d'Ivoire	1999	Azito Power Project	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Natural Gas	MW	420.00
Gabon	1993	Societe Africaine de Gestion et d'Investissement (SAGI)	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility with sewerage	Hydro, Geothermal, N/A	..	0.00
Gabon	1997	Societe d'Energie et d'Eau du Gabon (SEEG)	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	Hydro, Geothermal, N/A	Number of connections (thousands)	125.00
Gambia, the	1993	Management Service Gambia (MSG)	Canceled	Management and lease contract	Lease contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, N/A	..	0.00
Gambia, the	2006	National Water and Electricity Company Management Contract	Operational	Management and lease contract	Management contract	Electricity	Electricity generation	N/A	MW	40.00
Ghana	1994	Electricity Corporation of Ghana	Concluded	Management and lease contract	Management contract	Electricity	Electricity distribution	N/A	Number of connections (thousands)	500.00
Ghana	1999	SIIF Accra	Canceled	Greenfield project	Merchant	Electricity	Electricity generation	Steam	MW	39.00
Ghana	1999	Takoradi 2	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Natural Gas	MW	220.00
Ghana	2005	West African Gas Pipeline Company Ltd	Construction	Greenfield project	Build, operate, and transfer	Natural Gas	Natural gas transmission	N/A	KM	678.00
Guinea	1995	Societe Guineenne d'Electricite	Concluded	Concession	Rehabilitate, lease or rent, and transfer	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	MW	180.00
Guinea-Bissau	1991	Electricidade e Aguas de Guinea-Bissau	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Diesel	MW	10.40
Kenya	1996	Iberafrica Power Ltd.	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Diesel	MW	56.00
Kenya	1996	Mombasa Barge-Mounted Power Project	Concluded	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Diesel	MW	46.00

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Kenya	1999	Kipevu II	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Diesel	MW	75.00
Kenya	1999	Ormat Olkaria III Geothermal Power Plant (phase 1)	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Geothermal	MW	13.00
Kenya	2006	Aggreko Embakassi and Eldoret Power Stations	Operational	Greenfield project	Rental	Electricity	Electricity generation	N/A	MW	100.00
Kenya	2006	Kenya Electricity Generating Company Limited	Operational	Divestiture	Partial	Electricity	Electricity generation	N/A	MW	945.00
Kenya	2006	Kenya Power and Lighting Company Management Contract	Operational	Management and lease contract	Management contract	Electricity	Electricity distribution and transmission	N/A	Number of connections (thousands)	800.00
Lesotho	2002	Lesotho Electricity Corporation (LEC)	Operational	Management and lease contract	Management contract	Electricity	Electricity distribution, generation, and transmission	Hydro	MW	0.00
Madagascar	2005	Jiro sy Rano Malagasy (Jirama)	Operational	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility with sewerage	Hydro, Diesel, N/A	Number of connections (thousands)	340.00
Malawi	2001	Electricity Supply Corporation of Malawi Ltd (ESCOM)	Concluded	Management and lease contract	Management contract	Electricity	Electricity distribution, generation, and transmission	N/A	MW	300.00
Mali	1994	Electricite et Eau du Mali (Management)	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Hydro, Diesel	..	0.00
Mali	2000	Energie du Mali (EDM)	Distressed	Concession	Build, rehabilitate, operate, and transfer	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Hydro, Diesel	..	0.00
Mauritius	1997	Deep River Beau Champ	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Coal, Waste	MW	29.00
Mauritius	1998	Belle Vue Power Plant	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Coal	MW	100.00
Mauritius	1998	FUEL power plant	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Coal, Waste	MW	40.00
Mauritius	2004	St. Aubin Power Project	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Coal, Waste	MW	34.00
Mozambique	2003	Mozambique - South Africa Gas Pipeline	Operational	Greenfield project	Build, own, and operate	Natural Gas	Natural gas distribution and transmission	N/A	KM	865.00

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Mozambique	2004	Energia de Mocambique Lda (ENMo)	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity distribution and generation	N/A	Number of connections (thousands)	3,000.00
Namibia	1996	Northern Electricity	Concluded	Management and lease contract	Lease contract	Electricity	Electricity distribution	N/A	MW	0.00
Namibia	2000	Reho-Electricity	Operational	Management and lease contract	Lease contract	Electricity	Electricity distribution	N/A	Number of connections (thousands)	0.00
Nigeria	2001	AES Nigeria Barge Limited	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Natural Gas	MW	306.00
Nigeria	2001	Greater Lagos gas distribution pipeline	Operational	Greenfield project	Build, operate, and transfer	Natural Gas	Natural gas distribution	N/A	..	0.00
Nigeria	2002	Okpai Independent Power Project	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Natural Gas	MW	450.00
Nigeria	2003	Agbara/ Ota Natural Gas Pipeline	Construction	Greenfield project	Build, operate, and transfer	Natural Gas	Natural gas distribution and transmission	N/A	KM	75.00
Nigeria	2005	AEL Ilorin gas power plant	Construction	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Natural Gas	MW	105.00
Nigeria	2005	Afam Power Project	Operational	Concession	Rehabilitate, operate, and transfer	Electricity	Electricity generation	Natural Gas	MW	400.00
Nigeria	2005	Dadin Kowa Hydropower Plant	Construction	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Hydro	MW	39.00
Nigeria	2005	West African Gas Pipeline Company Ltd	Construction	Greenfield project	Build, operate, and transfer	Natural Gas	Natural gas transmission	N/A	KM	678.00
Rwanda	2003	Electrogaz	Canceled	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility with sewerage	Hydro, N/A	Number of connections (thousands)	67.00
Rwanda	2005	Aggreko 10 MW Power Station Rwanda	Operational	Greenfield project	Rental	Electricity	Electricity generation	N/A	MW	10.00
Sao Tome ad Principe	1993	Empresa de Agua e Electricidade	Concluded	Management and lease contract	Management contract	Electricity, Utility	Electricity distribution, generation, and transmission, Water utility without sewerage	N/A, Hydro	MW	4.75
Sao Tome ad Principe	2004	Sinergie concession contract	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity generation	Hydro	MW	0.00

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
Senegal	1997	GTi Dakar Ltd.	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Diesel, Natural Gas	MW	56.00
Senegal	1999	Societe Nationale d'Electricite du Senegal (SENELEC)	Canceled	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity distribution, generation, and transmission	Diesel	MW	300.00
Senegal	2005	Aggreko Dakar Temporary Power Station	Operational	Greenfield project	Rental	Electricity	Electricity generation	N/A	MW	40.00
Senegal	2005	Kounoune I IPP	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Diesel	MW	68.00
South Africa	1995	PN Energy Services (Pty) Ltd	Operational	Concession	Build, rehabilitate, operate, and transfer	Electricity	Electricity distribution	N/A	Number of connections (thousands)	0.00
South Africa	2000	Egoli Gas	Operational	Divestiture	Full	Natural Gas	Natural gas distribution	N/A	Number of connections (thousands)	14,000.00
South Africa	2001	AES Kelvin Power	Operational	Divestiture	Partial	Electricity	Electricity generation	Coal	MW	600.00
South Africa	2003	Mozambique - South Africa Gas Pipeline	Operational	Greenfield project	Build, own, and operate	Natural Gas	Natural gas distribution and transmission	N/A	KM	865.00
South Africa	2005	Bethlehem Hydro	Construction	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Hydro	MW	4.00
South Africa	2006	Darling Wind Farm	Construction	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Wind	MW	5.00
Tanzania	1994	Tanwat Wood-Fired Power Plant	Concluded	Greenfield project	Build, lease, and transfer	Electricity	Electricity generation	Waste	MW	2.50
Tanzania	1997	Independent Power Tanzania Ltd	Operational	Greenfield project	Build, operate, and transfer	Electricity	Electricity generation	Diesel	MW	100.00
Tanzania	2001	Songas - Songo Songo Gas to Power Project	Operational	Greenfield project	Build, operate, and transfer	Electricity, Natural Gas	Electricity generation, Natural gas transmission	Natural Gas, N/A	MW	190.00
Tanzania	2002	Tanzania Electricity Supply Company (TANESCO)	Concluded	Management and lease contract	Management contract	Electricity	Electricity distribution, generation, and transmission	Hydro, Diesel	..	0.00
Tanzania	2005	Mtwara Region Gas-to-Power Project	Operational	Greenfield project	Build, own, and operate	Electricity	Electricity generation	Natural Gas	MW	12.00
Tanzania	2006	Aggreko Ubungo Temporary Power Station	Operational	Greenfield project	Rental	Electricity	Electricity generation	Natural Gas	MW	40.00
Tanzania	2006	Alstom Power Rentals	Operational	Greenfield	Rental	Electricity	Electricity generation	Diesel	MW	40.00

Country	FC	Project name	Project status	Type of PPI	Subtype of PPI	Subsector	Segment	Technology	Capacity type	Capacity
		Mwanza		project						
Tanzania	2006	Dowans Lease Power Ubungo	Construction	Greenfield project	Rental	Electricity	Electricity generation	Natural Gas	MW	100.00
Togo	1997	Companie Energie Electrique du Togo	Concluded	Management and lease contract	Management contract	Electricity	Electricity distribution and generation	N/A	..	0.00
Togo	2000	Togo Electricite	Canceled	Concession	Rehabilitate, lease or rent, and transfer	Electricity	Electricity distribution and generation	N/A	..	0.00
Togo	2005	West African Gas Pipeline Company Ltd	Construction	Greenfield project	Build, operate, and transfer	Natural Gas	Natural gas transmission	N/A	KM	678.00
Uganda	2003	Kasese Electrification Project	Operational	Concession	Rehabilitate, operate, and transfer	Electricity	Electricity distribution and transmission	N/A	MW	5.50
Uganda	2003	Uganda Electricity Generation Company Limited	Operational	Concession	Rehabilitate, lease or rent, and transfer	Electricity	Electricity generation	Hydro	MW	300.00
Uganda	2003	Western Nile Rural Electrification Project	Operational	Concession	Rehabilitate, operate, and transfer	Electricity	Electricity distribution, generation, and transmission	Diesel	MW	3.50
Uganda	2005	Aggreko Kampala Temporary Power Station	Operational	Greenfield project	Rental	Electricity	Electricity generation	Diesel	MW	50.00
Uganda	2005	Umeme Limited	Operational	Concession	Rehabilitate, lease or rent, and transfer	Electricity	Electricity distribution	N/A	Number of connections (thousands)	250.00
Uganda	2006	Aggreko Jinja Temporary Power Station	Operational	Greenfield project	Rental	Electricity	Electricity generation	Diesel	MW	50.00
Zambia	1997	Zambia Consolidated Copper Mines Ltd. Power Division distribution	Operational	Divestiture	Partial	Electricity	Electricity distribution and transmission	N/A	KM	700.00
Zambia	2001	Lunsemfwa Hydro Power	Operational	Divestiture	Full	Electricity	Electricity generation	Hydro	MW	38.00
Zimbabwe	1998	African Power	Operational	Divestiture	Partial	Electricity	Electricity generation	Coal	MW	920.00

Source: World Bank PPI Database