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15 March 2005

Proposed Loan Greater Mekong Subregion Nam Theun 2 Hydroelectric Project (Lao People's Democratic Republic)

1. The Report and Recommendation of the President (RRP: LAO 37734) on a proposed loan to the Lao People's Democratic Republic is circulated herewith, together with the following attachments:

(a) (Draft) Loan Agreement

(b) (Draft) Project Agreement

2. This Report and Recommendation should be read with (i) *Greater Mekong Subregion: Regional Cooperation Strategy and Program (2004-2008)*, which was circulated to the Board on 5 March 2004 (DOC.IN.35-04); and (ii) *Lao People's Democratic Republic: Country Strategy and Program Update (2005-2006)*, which was circulated to the Board on 30 July 2004 (DOC.Sec.M59-04).

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**REPORT AND RECOMMENDATION
OF THE
PRESIDENT
TO THE
BOARD OF DIRECTORS
ON A
PROPOSED LOAN
TO THE
LAO PEOPLE'S DEMOCRATIC REPUBLIC
FOR THE
GREATER MEKONG SUBREGION:
NAM THEUN 2 HYDROELECTRIC PROJECT**

March 2005

CURRENCY EQUIVALENTS

(as of 28 February 2005)

Currency Units	=	kip (KN) Baht (B) Euro (€)
KN1.00	=	\$0. 000097
\$1.00	=	KN10,300
\$1.00	=	B40.00
\$1.00	=	€0.767

ABBREVIATIONS

ADB	–	Asian Development Bank
AFD	–	Agence Française de Développement
CIA	–	cumulative impact assessment
CCGT	–	combined cycle gas turbine
DSRP	–	dam safety review panel
EAMP	–	environmental assessment and management plan
EdFI	–	Electricité de France International
EdL	–	Electricité du Laos
EGAT	–	Electricity Generating Authority of Thailand
EGCO	–	Electricity Generating Public Company Limited
EIB	–	European Investment Bank
EIRR	–	economic internal rate of return
EMDP	–	ethnic minority development plan
EMO	–	environmental management office
EMU	–	environmental management unit
GDP	–	gross domestic product
GLIP	–	government letter of implementation policy
GMS	–	Greater Mekong Subregion
HCC	–	head construction contractor
HIV/AIDS	–	human immunodeficiency virus/acute immunodeficiency syndrome
IAG	–	International Advisory Group
IDA	–	International Development Association
IFI	–	international financial institution
IMF	–	International Monetary Fund
ITD	–	Italian Thai Development Public Company Limited
IWRM	–	integrated water resources management
Lao PDR	–	Lao People's Democratic Republic
LHSE	–	Lao Holding State Enterprise
LA	–	lender's adviser
MIH	–	Ministry of Industry and Handicraft
NGO	–	nongovernment organization
NGPES	–	National Growth and Poverty Eradication Strategy
NNT–NPA	–	Nakai Nam Theun National Protected Area
NTPC	–	Nam Theun 2 Power Company Limited
NT2	–	Nam Theun 2 Hydroelectric
OCR	–	ordinary capital resources

PEMSP	–	public expenditure management strengthening program
PHAP	–	public health action plan
POE	–	panel of experts
PPA	–	power purchase agreement
RAP	–	resettlement action plan
RMU	–	resettlement management unit
SDP	–	social development plan
SEMFOP	–	social and environment management framework and operational plan
STEA	–	Science Technology and Environment Agency
WACC	–	weighted average cost of capital
WMPA	–	Watershed Management and Protection Authority

WEIGHTS AND MEASURES

cm	–	centimeter
GWh/y	–	gigawatt hours per year
ha	–	hectare
kg	–	kilogram
km	–	kilometer
km ²	–	square kilometer
kV	–	kilovolt
m	–	meter
m ³	–	cubic meter
m ³ /s	–	cubic meter per second
MW	–	megawatt

NOTES

- (i) The fiscal year (FY) of the Government and its agencies ends on 30 September.
- (ii) The fiscal year of Nam Theun 2 Power Company Limited ends on 31 December.
- (iii) In this report, “\$” refers to US dollars.

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LOAN AND PROJECT SUMMARY

Borrower	Lao People's Democratic Republic (Lao PDR)
Classification	<p>Targeting Classification: General Intervention</p> <p>Sector: Energy</p> <p>Subsector: Hydropower Generation</p> <p>Themes: Sustainable economic growth, private sector development</p> <p>Subtheme: Public-private partnership</p>
Environment Assessment	<p>Category A</p> <p>An environmental impact assessment was undertaken and the summary environmental and social impact assessment was circulated to the Board on 29 November 2004.</p>
Project Description	<p>The Project includes the development, construction, and operation of a 1,070-megawatt (MW) trans-basin diversion power plant on the Nam Theun River, a tributary of the Mekong, in the central region of the Lao People's Democratic Republic (Lao PDR). A 450 square kilometer reservoir will be formed on the Nakai Plateau by constructing a dam 39 meters (m) high northwest of the plateau. Water from the reservoir will drop about 350 m to a powerhouse. The Project will divert about 260 cubic meters of water per second through a power station to the Xe Bang Fai River Basin, also a tributary of the Mekong. The water discharged from the powerhouse will be released to the Xe Bang Fai through a 27 kilometer (km) channel and a regulating pond.</p> <p>The Project will export 5,354 gigawatt-hours (GWh) of electricity to Thailand and will provide revenue to the Lao PDR through taxes, royalties, and dividend. About 200–300 GWh will be supplied to electricity consumers in the Lao PDR. The Project will be developed by a private company, the Nam Theun 2 Power Company Limited (NTPC). NTPC is owned by a consortium comprising Electricité de France International (EdFI) of France (35%), the Electricity Generating Public Company (EGCO) of Thailand (25%), the Italian Thai Development Public Company Limited (ITD) of Thailand (15%), and the Government of the Lao PDR (25%). The Project is structured as a build-own-operate-transfer, with a concession period of 31 years, of which the operating period is 25 years. At the end of the concession period, the project facilities will be transferred to the Government free of charge.</p> <p>The major project impact areas include the Nam Theun River upstream and downstream of the dam, the Nakai Plateau, a section of the Nam Phit River downstream of the regulating pond, and the lower Xe Bang Fai. A comprehensive assessment and evaluation of potential social and environmental impacts of the Project have been undertaken by NTPC and the Government.</p>

Through extensive consultation with the project-affected people and international stakeholders, the project formulation has been geared to avoid or minimize negative impacts and focused on providing mitigation measures for negative impacts and compensatory provisions where impacts cannot be mitigated. Public health issues have been addressed and are incorporated into the social development plan. The international financial institutions (IFIs) led by the World Bank and Asian Development Bank (ADB) have undertaken an extensive due-diligence process to ensure that the Project meets the institutions' requirements. The involvement of IFIs brought standards of transparency, accountability, and predictability to project preparation in the framework of the broader reform agenda in the Lao PDR.

Three independent panels comprising internationally recognized experts scrutinized the Project during the preparatory and design work and will continue to be involved during construction and implementation. The panels comprise the World Bank's three-member International Advisory Group, the Government's five-member environmental and social panel of experts, and a three-member dam safety review panel of experts for design and safety aspects.

Rationale

The Lao PDR is entering a period of economic growth that will depend on effective management of one of its main natural resources—river water. To ensure long-term sustainable development, the Lao PDR needs to harness its vast hydroelectric power potential in a socially and environmentally sustainable way. The Lao PDR is well positioned in terms of the natural resource and physical location to develop hydroelectric energy as a major source of growth and to generate revenues to implement the Government's poverty reduction and environment conservation initiatives.

The Project aims to support two of the Lao PDR's key national development objectives through the power sector: (i) promote economic and social advancement by providing reliable and affordable electricity supply, and (ii) earn foreign exchange from electricity exports. The Project is an integral part of the Government's development framework, which aims to achieve the country's medium- and long-term economic growth and poverty reduction objectives. The Government anticipates successful project implementation to serve as the catalyst for the Lao PDR to reduce its dependence on official development assistance and to graduate from the group of least developed countries.

Objectives

The Project will promote economic growth in the region by developing hydroelectric power resources. Project revenues will support the Government's priority poverty reduction and environmental conservation programs as outlined in the National Growth and Poverty Eradication Strategy.

Cost Estimates	The base project cost is estimated at \$1,250.0 million, including \$795.7 million in foreign currency cost and \$454.3 million equivalent in local currency cost. Contingent financing of \$200.0 million of debt and equity has been committed to cover any delay that may occur.
Financing Plan	The Project is proposed to be financed using a combination of loan facilities amounting to about \$900 million, and shareholders' equity of about \$350 million—a debt–equity ratio of 72:28. ADB financing is expected to include a \$20 million public sector loan to the Government, a direct loan to NTPC without Government guarantee of up to \$50 million, and a political risk guarantee for up to \$50 million to mobilize commercial debt.
Loan Amount and Terms	A public sector loan of \$20 million from ADB's ordinary capital resources (OCR) is proposed to be provided to the Government under ADB's London interbank offered rate (LIBOR)-based lending facility to help the Government pay for a portion of its equity shares in NTPC. This is the first time ADB is lending to the Lao PDR from OCR. Although the Lao PDR is a group-A country, the OCR resources are proposed because the Project is a commercial one and will yield high returns for the country. The loan will have a 30-year term, including a grace period of 6 years, an interest rate determined in accordance with ADB's LIBOR-based lending facility, a commitment charge of 0.75% per annum, and such other terms and conditions set forth in the draft Loan Agreement.
Allocation and Relending Terms	The Government will relend the proceeds of the ADB loan to the Lao Holding State Enterprise, which is the Government shareholder of NTPC, on the same terms and conditions as ADB's loan to the Government.
Period of Utilization	Until May 2010
Estimated Project Completion Date	November 2009
Implementation Arrangements	The Government and NTPC will implement the Project and take on the responsibilities outlined in the concession agreement. NTPC will implement the Project through a construction contract entered into between NTPC and the head contractor. The contract covers the engineering, procurement, construction, and management of the Project, and most of the contractual risk of the subcontracts. The head contractor will subcontract the physical works, goods, and services to five principal subcontractors to undertake the civil works and to provide the electromechanical goods and services. The technical services and personnel management contracts will provide the operation and maintenance services to NTPC.

Watershed management will be undertaken by the Government's Watershed Management and Protection Authority (WMPA), with technical advice from NTPC.

Executing Agency

The Ministry of Industry and Handicrafts (MIH) will be the Executing Agency on behalf of the Government. The Secretariat of the Lao National Committee on Energy under MIH, and WMPA will be the implementing agencies on behalf of the Government..

Procurement and Disbursement

The Project is being carried out by a private sector company, with the Government participating as a 25% shareholder. Therefore, provisions for procurement under private sector loans in ADB's guidelines for procurement will be followed. As the Project will be implemented by NTPC, disbursement of this loan to the Government for its equity contribution will be made to NTPC through the direct payment method.

Project Benefits and Beneficiaries

The Project will generate about \$1.9 billion of revenue for the Government over the 25-year operating period. The Government revenue from the Project will help implement measures for poverty reduction and programs to uplift the quality of life. About 70% of the people in the Lao PDR live on less than \$2 per day, and about 80% live in rural areas with little access to basic social services. The Government aims to improve their livelihoods, transportation infrastructure, irrigation, electricity supply, water supply, education, and health facilities. The Project will help preserve one of the region's few remaining intact tropical rainforests and wildlife habitats. The Project will also benefit electricity consumers by providing 200–300 GWh to the domestic market.

The Project will promote public-private partnerships to meet the Lao PDR's economic growth objectives. The Project will also help Thailand meet its power demand and diversify its power supply to lessen its heavy dependence on natural gas and thus stabilize fluctuations in the cost of supply to consumers.

The Project will generate about 4,000 unskilled jobs in the Lao PDR during construction.

Risks and Assumptions

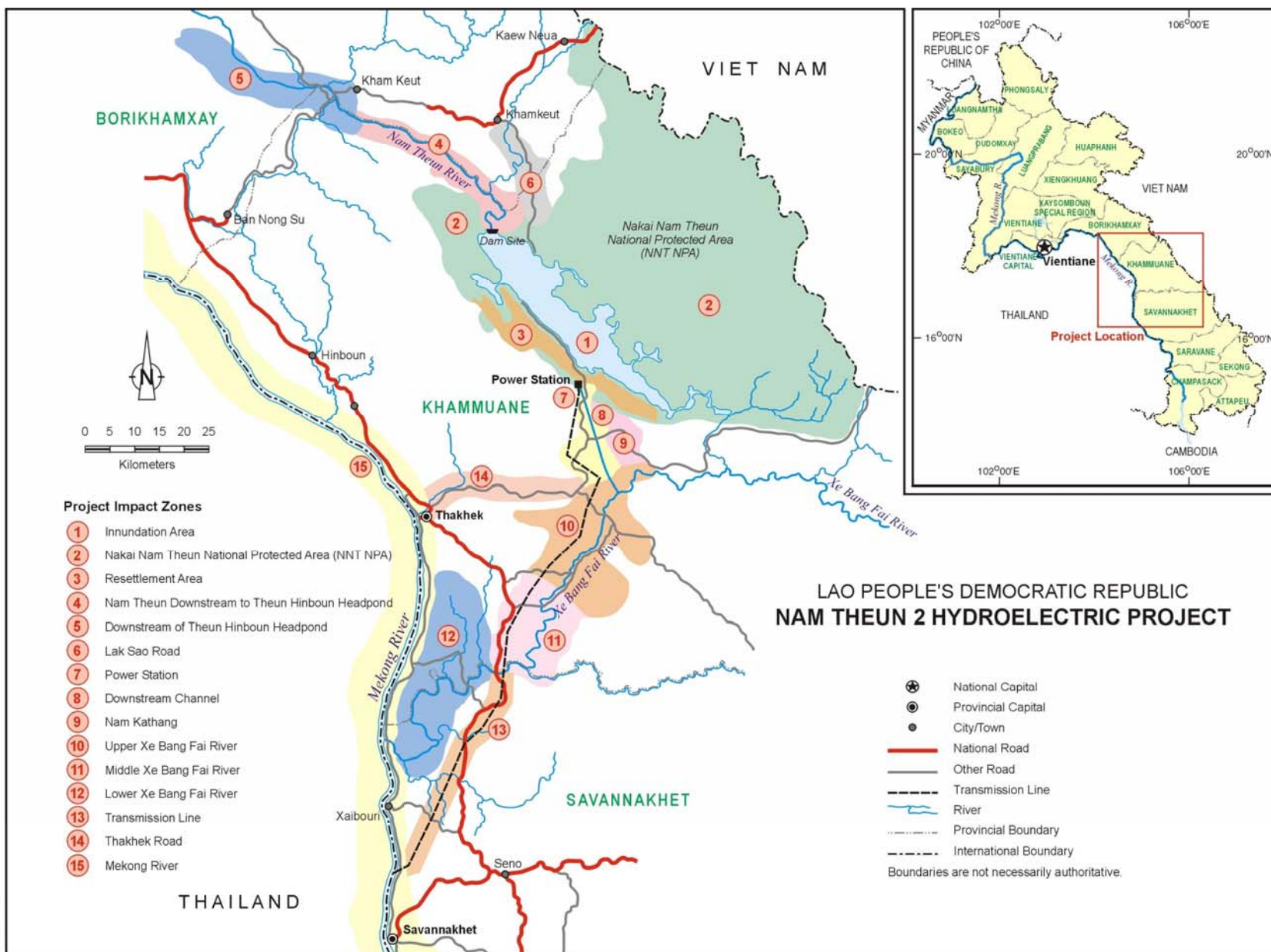
A Project of this magnitude and complexity will have risks. A major one is that the social and environmental mitigation measures might not be implemented effectively by the project proponents. To ensure compliance with the project commitments, NTPC has entered into a legal contract with the Government through the concession agreement for the mitigation, compensation, and rehabilitation of project-affected people. In the event of breaches of environmental and social obligations, or of unanticipated or unintended project impacts, the concession agreement obligates NTPC to provide financial and technical support to take mitigation measures. The panel of experts will assess the breach(es) and recommend that NTPC and the Government undertake mitigation measures within a specified time. The panel's recommendations will be final and binding on the Government and NTPC.

Ineffective use of the Government's revenues from the Project for priority poverty reduction projects and programs is another risk. The Government has, however, agreed to implement a public expenditure management strengthening program. It will ensure that all capacity-building and reform initiatives such as the World Bank's Poverty Reduction Support Credit and ADB's technical assistance support to strengthen the State Audit Organization and public accounting system are integrated into a comprehensive reform strategy. The Government has also agreed to implement specific revenue management arrangements to enhance transparency and accountability in the use of revenue generated from the Project.

The supply of electricity from the Project to Thailand is small in the context of the large Thai electricity market. The risk that projected power demand forecasts in Thailand may not materialize will not affect the least-cost viability of the Project in the Thai power sector expansion plan. The power purchase agreement takes into account the power demand based on projected economic growth and the gap in supply and demand in Thailand.

The risk of inadequate water flows and/or flooding from the Xe Bang Fai may result in the loss of electricity output and revenues. The extensive hydrological studies and investigations covering the last 50 years, and the hydrological modeling of the Project, including future hydroelectric power projects in the region, indicate that this risk is minimal. However, revenues from the Electricity Generating Authority of Thailand power purchase agreement include provision for the intertemporal adjustments of the possible effects of the dry years and the flooding in the Xe Bang Fai.





I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the Lao People's Democratic Republic (Lao PDR) for the Greater Mekong Subregion (GMS): Nam Theun 2 (NT2) Hydroelectric Project (the Project).¹ The project proposal² is included in the country strategy and program update (2004–2006) and regional cooperation strategy and program (2004–2008). The design and monitoring framework is in Appendix 1.

II. RATIONALE: SECTOR PERFORMANCE, PROBLEMS, AND OPPORTUNITIES

2. Over the last decade, the Lao PDR has achieved stable economic growth and significantly reduced poverty. The share of the poor is decreasing rapidly, from about 45% in 1992 to around 32% in 2003. The rapid decline occurred mainly as a result of high economic growth of about 6.5% per annum during the same period. The Government has thus set the ambitious target of having the Lao PDR graduate from being a least developed country by 2020 and aims to rapidly reduce the incidence, depth, and severity of poverty. To do so, the Government needs to accelerate sustainable economic growth by broadening development opportunities.

3. Electricity exports began in 1971 and have provided an important source of foreign exchange earnings. In 2003, electricity exports accounted for about 30% of total export earnings. While domestic consumption has been small in relation to total production and exports, the situation has changed over the past decade. Imports have increased as a share of total domestic production, and the share of exports has declined. Closer regional cooperation is opening up opportunities to promote electricity exports and satisfy increasing domestic consumption. The abundance of hydroelectric power resources and the location of the Lao PDR between rapidly developing neighboring countries give it a comparative advantage in developing hydroelectric power potential.

4. The Project intends to deliver 5,354 gigawatt-hours (GWh) per year of electricity to Thailand, where demand has historically exceeded economic growth. During 1993–2002, Thailand's gross domestic product (GDP) grew at 2.8% annually while electricity demand grew by 6.4%. During 2000–2002, GDP grew by 11.7%, while electricity demand grew by 20.0%. Growth in electricity demand is expected to rapidly absorb the excess capacity that resulted from the economic downturn in 1997. During 2005–2010, capacity should be increased by about 1,500 megawatts (MW) and 9,500 GWh per year. Electricity capacity consists of combined cycle gas turbine (71%); thermal (lignite and oil, 19%); hydroelectric power (9%); and other smaller sources (1%). While Thailand will likely continue to rely mainly on natural gas, fuel sources should be diversified as heavy reliance on just one may result in undesirable price fluctuations

¹ As part of the same Project, Asian Development Bank (ADB), through its Private Sector Operations Department (PSOD), is also processing (i) a loan, without Government guarantee, to Nam Theun 2 Power Company Limited (NTPC); and (ii) a political risk guarantee, with Government counter-guarantee, in favor of commercial lenders lending to NTPC. NTPC's commercial lenders, as part of their security package, are requiring NTPC's shareholders to pledge their shares, and NTPC itself to mortgage its assets. Such security requirements are normal for a project financing of this type. To accommodate these requirements, the Government has requested a partial waiver of the traditional negative pledge clause incorporated into ADB public sector loan agreements by way of section 7.07 of the Ordinary Operations Loan Regulations.

² ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Political Risk Guarantee to Nam Theun 2 Power Company Limited for the Greater Mekong Subregion: Nam Theun 2 Hydroelectric Project in the Lao People's Democratic Republic*. Manila (RRP 37910, March 2005). The MKRD project team worked closely with the PSOD project team, led by C. Locsin, principal structured finance specialist. This report and recommendation to the President (RRP) will be circulated back-to-back with the above-referenced RRP. To avoid repetition, the documents are cross-referenced to each other as appropriate.

in the power sector. Continued reliance on natural gas will require further investment in the gas pipeline network and imports.

5. In the Lao PDR, the power sector (i) promotes economic and social development by providing reliable and affordable domestic power supply, and (ii) earns foreign exchange from electricity exports by developing its hydroelectric power potential. The domestic power system is in its early stages of development. Per capita consumption is among the lowest in Asia. The system consists of four national transmission grids, none of which are interconnected. Electricité du Laos (EdL) has made a prudent commitment to purchase at least 200 GWh from the Project but can purchase up to 300 GWh to meet domestic demand. This commitment is consistent with the country's absorptive capacity, given constraints in system expansion and grid interconnection, and with the least-cost strategy to add capacity only when it can be absorbed by the system. The domestic off-take from the Project would increase domestic supply by about 7%.

6. The Government has requested Asian Development Bank's (ADB's) assistance in preparing the Project³ as a public-private partnership. The Nam Theun 2 Power Company Limited (NTPC), a private sector consortium led by Electricité de France International (EdFI) as the lead sponsor, will develop and operate the Project. The advantages of the private sector undertaking the Project include (i) efficient, effective, and on-target implementation; (ii) access to global capital; and (iii) access to state-of-the-art technology. Recognizing that most large dam projects, including the proposed Project, are controversial because of their environmental and social risks, the Government considered involvement of the World Bank and ADB important to the Project's success.

7. The rationale of the Project is to help the Government develop hydroelectric power as a foreign exchange earner and provide least-cost electricity supply to consumers in the Lao PDR. The Project will support medium- and long-term economic growth, poverty reduction, and environmental conservation as outlined in the National Growth and Poverty Eradication Strategy (NGPES). The strategy articulates a medium-term program of reforms and public spending programs to sustain high growth and rapidly reduce poverty. Developed through an unprecedented participatory process and endorsed by the National Assembly in October 2003, it describes the country's overall development framework. The strategy has strong support from the donor community, including the International Monetary Fund (IMF), the World Bank, and ADB. It identifies the power sector, specifically hydroelectric power resources, as strategically important for earning revenue to finance poverty reduction and environmental and social programs. The Project is expected to generate about \$1.9 billion in cumulative revenue for the Government over the 25-year operating period. While the revenue stream from the Project has significant potential to improve the fiscal revenue base, the impact on economic growth and poverty reduction will depend on effective revenue and public expenditure management. Continued structural reforms, sustained fiscal discipline in public expenditure and revenue management, and an environment of accountability and transparency at all government levels are key to economic growth and poverty reduction. The involvement of international financial institutions (IFIs) in the Project will facilitate improvement in transparency and accountability in public expenditure management. It will promote effective regional cooperation, enable the Government to tap significant private capital in a country without a track record of large projects, and provide technical expertise in comprehensive due diligence and monitoring supervision.

³ ADB. 2003. *Technical Assistance to the Lao People's Democratic Republic for Preparing the GMS: Nam Theun 2 Hydropower Development Project*. Manila. (TA 4213-LAO, for \$700,00, approved on 9 November 2003); ADB. 2004. *Technical Assistance to the Lao People's Democratic Republic for Preparing the GMS: Nam Theun 2 Hydropower Development Project Phase II*. Manila. (TA 4323-LAO, for \$1,000,000, approved on 29 March 2004).

8. The challenge for the Government and NTPC is to maximize benefits while ensuring that potential adverse social and environmental impacts of the Project are fully addressed through a detailed program of mitigation, compensation, rehabilitation, and offset measures. The Government and NTPC, with the assistance of ADB, the World Bank, and other IFIs agencies, comprehensively assessed and evaluated these potential impacts in accordance with the safeguard policies of the Government and the institutions. The Government's commitment to implement the Project effectively is articulated in the Government letter of implementation policy (Appendix 2).

A. Performance Indicators and Analysis

9. Based on technical evaluations, the Lao PDR has hydroelectric power potential of about 18,000 MW, but only 663 MW of generation capacity has been harnessed so far. Thirty-three potential sites have been evaluated for hydroelectric power development, and 11 projects with a total capacity of 4,000 MW are in various planning stages for implementation during the next 15 years. Despite the country's advantage in producing power at low cost, low population density makes initial capital investments in rural electrification expensive. Only about 41% of households have electricity. The Government's target is to raise the household electrification ratio to 90% by 2020 while striving to implement the hydroelectric power development program in a socially and environmentally sustainable manner.

10. The power market in the GMS is changing toward effective regional cooperation. Bilateral power trade under the Inter-Governmental Agreement on Regional Power Trade is well established and the Lao PDR has been a key participant. The governments of the Lao PDR and Thailand have a framework agreement for power trade between them. First signed in June 1993, it has been modified to reflect market changes. The latest understanding reached between the two governments, in 1998, specifies the power sale arrangements of up to about 3,300 MW by 2008. A memorandum of understanding for the sale of 1,500–2,000 MW of electricity to Viet Nam by 2010 was signed in 1995. The Project is a key element of these commitments.

B. Analysis of Key Problems and Opportunities

11. A major challenge in realizing the country's hydroelectric power potential is domestic resource constraints on financing development expenditure. Recognizing that it will need to attract financing, the Government is promoting private sector involvement. The new financing modalities are fundamentally changing the way projects are planned and implemented. Private sector involvement has been limited to export projects, and the preferred purchaser has been the Electricity Generating Authority of Thailand (EGAT).

12. The trend toward closer regional cooperation and regional grid interconnections opens up opportunities for the Lao PDR to develop hydroelectric power projects—otherwise not viable for the domestic market—to serve the rapidly growing region and the regional power market. The Project's power exports to Thailand will create an opportunity to serve Lao consumers with least-cost electricity.

13. Several challenges, however, require serious attention in the short to medium term. Above all, improving governance is essential for the success of reforms and a socially and environmentally sustainable development program.

1. Governance and Effective Public Expenditure and Revenue Management

14. Governance has emerged as a key ingredient in power sector development. Inadequate governance has had a major impact on macroeconomic performance and hindered the effectiveness and sustainability of the power sector. Dividends from Government investments in the power sector have remained with EdL to subsidize electricity tariffs instead of supporting poverty reduction programs. The Government has agreed to establish a company to hold the Government's shares in NTPC and to receive dividends to ensure a transparent and efficient flow of Government revenue from the Project to finance poverty reduction initiatives. In current terms, the Government's revenue from the Project is expected to be about 5% of the Government's total revenue. While modest, its impact could be significant if targeted at priority sectors.⁴

15. Improvements in the Government's capacity to manage public expenditures transparently and efficiently are critical to ensure that the Government's revenues from the Project will be used to support priority poverty reduction and environmental conservation programs. The Government, with support from the World Bank and ADB, has formulated a public expenditure management strengthening program (PEMSP), which will focus on strengthening fiscal planning and budget preparation and improving budget execution, accounting, and financial reporting. Other multilateral and bilateral donors have shown interest in supporting the program and related capacity initiatives.

16. An ADB evaluation study⁵ determined that a lack of comprehensive and systematic diagnostics has affected the design, implementation, and results of ADB's capacity development assistance. The absence of clearly stated capacity development goals and objectives, including organizational performance criteria, baseline information, and time-bound targets has resulted in inefficient use of resources, unsustainable results, and limitations on efforts to monitor progress and assess outcomes. To strengthen capacity development efforts, a capacity-building strategy to support the PEMSP will be designed and implemented through action plans to increase national managerial, technical, and administrative skills and capacities within the public sector, in support of improved budget preparation and execution, and monitoring. The strategy will incorporate the findings of the initial assessment of public expenditure management functions and institutional arrangements, capacity gaps, and possible mitigation measures.

17. The Government has defined performance indicators that will allow the PEMSP to monitor the progress in achieving the objectives of the public expenditure management program. The monitoring framework and process will enable the Government to verify proper use of funds and, if necessary, take actions to ensure that they are used for eligible poverty reduction and environmental conservation programs. Budget execution reports and financial statements will identify programs supported by Government revenues, and will verify additionality⁶ of expenditures on eligible programs, as measured by comparison with base-year budgets and actual expenditures. The financial statements of the eligible programs will be subject to an annual audit by the State Audit Organization. Regular public expenditure reviews and expenditure tracking surveys will be carried out. The revenue management arrangements

⁴ As an illustration, Government revenues from the Project could be up to about 50% of domestically financed expenditure on education and health in FY2004.

⁵ ADB. 2004. *Special Evaluation Study on Capacity Development Assistance of the Asian Development Bank to Lao People's Democratic Republic*. Manila.

⁶ Additionality means in addition to the base year budget allocation.

and PEMSP are in Technical Annex 1 of Appendix 2, with detailed discussions provided in the Supplementary Appendix A.

2. Lessons Learned and Reflected in Project Design

18. The major lessons learned from ADB-funded hydroelectric power projects in the Lao PDR⁷ are (i) an early comprehensive assessment of social and environmental impacts is needed, (ii) baseline data needs to be established, (iii) downstream impacts of trans-basin projects are often underestimated, (iv) livelihood restoration should be emphasized more, (v) a comprehensive monitoring mechanism is needed to evaluate achievement of all objectives during implementation and operations, (vi) sufficient funds for environmental and social mitigation are needed, and (vii) strengthened capacity is needed to implement and monitor the project effectively. The project design considers the experiences of other hydroelectric power and major infrastructure projects in other parts of the world, the experiences reflected in the report of the World Commission on Dams, the report of *Extractive Industries Review*.⁸ Appendix 3 describes how these experiences and key lessons learned have been taken into account in the project design.

19. Based on these lessons, the project proponents have increasingly focused their efforts on designing the environmental and social mitigation, offset, and compensation measures. They have collected baseline information on all project-affected sites and people, which will be updated regularly, and continue to do so during project implementation and operations. The Government and NTPC have focused their efforts in recent years on identifying the potential social and environmental impacts of the Project in the downstream areas, and have provided adequate funds for environmental mitigation and social development programs. The Project includes performance guarantees and contingency-financing allocations for unanticipated impacts and for modifications, if required, during project implementation and operations. To augment the large number of studies and analytical work conducted to formulate and design the Project, the proponents commissioned a study to assess the Project's cumulative and regional impacts. The Project includes mechanisms for monitoring and evaluation, using agreed-on indicators, of all aspects of project implementation.

3. Institutional Issues and Capacity Building

20. The power sector has been subject to institutional and organizational weaknesses that have affected decisions on investments, electricity tariff determination, and appointment of senior management and staff. While the technical capacity of EdL is adequate, the scope of its activities has become overextended, covering power generation, transmission and distribution, and planning and operating the power system. Therefore, ADB will provide assistance to strengthen and streamline the independent power producer development framework that will facilitate and promote transparent private participation in the power sector.⁹

⁷ Three evaluation reports are related to ADB-financed hydroelectric power projects in the Lao PDR: ADB. 2004. *Project Performance Audit Report on the Nam Leuk Hydroelectric Power Project in the Lao People's Democratic Republic*. Manila; ADB 2002. *Project Performance Audit Report on the Theun-Hinboun Hydroelectric Power Project in the Lao People's Democratic Republic*. Manila; and ADB 1999. *Special Evaluation Study on the Social and Environmental Impacts of selected Hydroelectric Power Projects*. Manila

⁸ Prepared by the World Bank to discuss its future role in the extractive industries with stakeholders.

⁹ ADB. 2003. *Report and Recommendations of the President to the Board of Directors on a Proposed Loan to the Lao People's Democratic for the Northern Area Rural Power Distribution Project*. Manila (Loan 2005 LAO[SF] approved on 18 September 2003 for \$30 million).

21. ADB-funded hydroelectric power projects indicate that the planning, management, implementation, and monitoring of social safeguard and environmental mitigation measures in the Lao PDR are weak. While the Government is committed to implementing these projects in a socially and environmentally sustainable manner, many measures were less than effective due to inadequate capacity, particularly in financing and human resources.

22. To help the country solve these problems, the donor agencies¹⁰ have been assisting the Government in its longer-term capacity building efforts. ADB provided assistance¹¹ to the Government to (i) strengthen the policy and regulatory framework for environmental management and social safeguards; (ii) enhance institutional capacity at sectoral and provincial levels to identify, analyze, and address social and environmental issues; (iii) bolster compliance with and enforcement of laws and regulations; (iv) foster improved sector planning within an integrated natural resource management framework; and (v) promote sustained financing for priority environmental management activities. The concession agreement between the Government and NTPC includes many capacity-building activities for Government staff. The agreement requires NTPC to provide on-the-job training to Government officials. The main focus of this arrangement is to encourage knowledge transfer from NTPC to the Government as they work together on the Project. The ADB capacity-building program under the project preparatory technical assistance (TAs)¹² for the Project carried out the needs assessment and then designed a short-term capacity-building program that would provide technical advisers at key Government agencies involved in implementing social and environmental programs.

23. Recognizing institutional capacity constraints, the proponents are developing the Project through private-public partnership. The Project is in line with ADB's private sector operational strategy, which aims to promote private sector participation in the infrastructure sector. Together with the closer integration of the Association of Southeast Asian Nations–GMS power system, this could open the way to financing and development options not available to national governments or the private sector.

III. THE PROPOSED PROJECT

A. Objectives

24. The objective of the Project is to promote economic growth in the region by helping the Lao PDR develop its hydroelectric power resources in an environmentally and socially sustainable manner and to promote power trade in the GMS. The Project also targets poverty reduction under the aegis of the NGPES and conservation of the Nakai Nam Theun–National Protected Areas (NNT–NPA).

B. Components and Outputs

25. The project site is in the central provinces of Khammuane and Bolikhamxay, about 250 kilometers southeast of Vientiane, and stretches from the top of the annamite mountain chain

¹⁰ The World Bank has included an extensive program of capacity building under its proposed Nam Theun 2 Social and Environmental Project (NTSEP) and proposed Lao Environmental and Social Project (LENS).

¹¹ ADB. 2001. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Lao People's Democratic Republic for the Environment and Social Program Loan*. Manila (Loan 1867 LAO[SF], approved on 6 December 2001 for \$20 million).

¹² ADB. 2003. *Technical Assistance to the Lao People's Democratic Republic for Preparing the GMS: Nam Theun 2 Hydropower Development Project*. Manila. (TA 4213-LAO, for \$700,000, approved on 9 November 2003). ADB. 2004. *Technical Assistance to the Lao People's Democratic Republic for the GMS Nam Theun 2 Hydropower Development Project Phase II*. Manila. (TA 4323-LAO, for \$1,000,000, approved on 29 March 2004).

along the Lao PDR–Viet Nam border, to the Nakai Plateau, and ultimately to the confluence of the lower Xe Bang Fai with the Mekong (Map 1). The Project has the following major components.

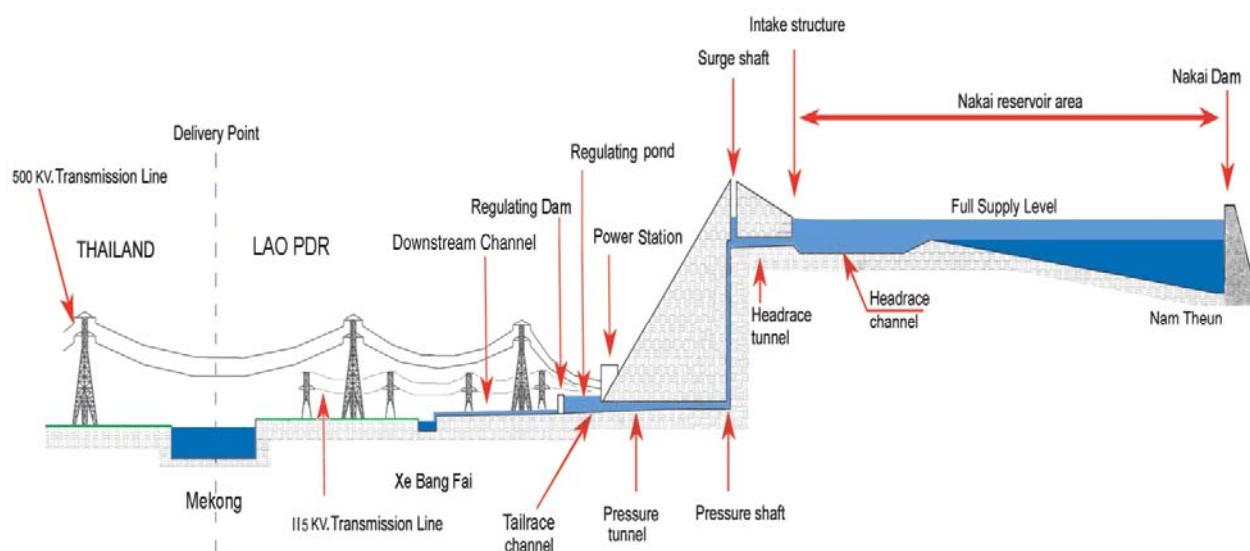
1. Construction of Hydroelectric Power Plant and Related Infrastructure

26. The Project includes the development, construction, and operation of a 1,070 MW trans-basin diversion power plant on the Nam Theun, a tributary of the Mekong. It will capture the flow of water from the watershed of the Nam Theun and the Nakai Plateau by building a dam 39 meters (m) high at the northwestern end of the plateau.

27. The Project will create a reservoir of 450 square kilometers (km²) on the Nakai Plateau. Water from the reservoir will drop about 350 meters to a powerhouse at the base of the Nakai escarpment near the town of Gnommalat. The water discharged from the powerhouse will then flow through a 27 km channel to the Xe Bang Fai, which drains into the Mekong approximately 150 km south of the Nam Theun confluence. A regulating pond will be constructed downstream of the powerhouse to ensure smooth release of water into the downstream water courses. About 260 cubic meters per second of water will be diverted to the Xe Bang Fai.

28. The Project will construct a 138 km double circuit 500 kV transmission line to the Thai grid, and a 70 km single circuit 115 kV transmission line and 22 kV connections to the regional Lao grid. Approximately 5,354 GWh of power will be provided to Thailand annually and about 200–300 GWh of power will be transmitted for domestic consumption. The other infrastructure components included are spillways, riparian flow outlets, reservoir and saddle dams, headrace channel and intake structures, headrace tunnel, surge shaft, pressure shaft and pressure tunnel, power station and switchyard, tailrace channel and aeration weir, roads, bridges, and workers' camp. A schematic view of the major physical component is in Figure 1.

Figure 1: Schematic Diagram of the Nam Theun 2 Hydroelectric Project



kV = kilovolt, LAO PDR = Lao People's Democratic Republic.

2. Management of Environmental and Social Impacts

(i) Social Impacts

29. The resettlement and social mitigation program comprises (i) compensation, resettlement, and restoration of livelihood of about 6,200 people displaced by the reservoir, about 6,700 people displaced for construction of project infrastructure, about 50,000 people who could be affected by changes in the flows of the Xe Bang Fai, about 18,500 people in Nam Phit, and about 10,000 people in Nam Katang; (ii) ethnic minority development on the Nakai Plateau, downstream, and in the watershed; and (iii) mitigation of health impacts and improved health conditions for resettlers and spontaneous and local population in the project areas. The key outputs are (i) establishment of infrastructure and provision of services in the resettlement areas; (ii) improvement in living standards of people resettled on the Nakai Plateau, of people in the watershed, and of the poorest and vulnerable groups affected by acquisition of lands and by changes in river flows of the Xe Bang Fai and downstream Nam Theun; and (iii) maintenance of living standards through compensation and restoration for loss of assets and the livelihoods of people affected by project land acquisition and changes in river flows in the downstream areas. In particular, the Project's objective for the resettlers affected by reservoir inundation is to meet verifiable impact targets by means of livelihood packages; improved land tenure; improved institutional capacity; improved access to health, education, agricultural extension services, and markets; and exclusive rights to the sustainable use and management of natural resources. The social development plan (SDP) recognizes that implementation of the livelihood program may be delayed during the transition and, therefore, provides for transitional assistance and then its gradual phasing out.

30. Particular attention will be paid to the ethnic minorities. The mitigation, compensation, and livelihood restoration measures under the Project take into account specific needs of the Brou communities along the downstream channel and small Vietic groups along transportation corridors. During implementation, data collection and detailed planning specific to ethnic minorities in the river valleys of the NNT–NPA and in other project areas will take place.

(ii) Environment

31. The environment management program comprises mitigation of impacts due to (i) creation of the reservoir, (ii) diversion of large quantities of water into the Xe Bang Fai, and (iii) major reduction of Nam Theun River flow downstream of the dam. Environmental impacts include (i) loss or modification of natural habitats and associated effects on wildlife modifications to water quality and the associated impacts on public health, fisheries, and aquatic habitat; (ii) riverbank erosion along the Xe Bang Fai and associated loss of household assets and livelihoods; (iii) fish reproduction impacts, particularly on migration and loss of breeding habitats in the two basins; (iv) construction-related impact of spoil disposal, erosion, and air quality; and (v) increased pressure on resources due to the increased population. The key outputs of the Project are mitigation measures such as the construction of a regulating pond for more constant water release into the Xe Bang Fai, construction of a degasification and aeration weir, lining of the exposed section of the channel, and soil protection measures to stabilize riverbanks. The Project outputs also include construction of retention tanks to confine and store liquid and solid fuels and chemicals, repair and improve management of dikes at entrances to tributaries of the Xe Bang Fai for flood control, and solid waste and wastewater management programs for construction camps and resettlement areas.

(iii) Biodiversity Offset and Conservation

32. Conservation of the NNT–NPA, an area of significant bio- and cultural diversity covering some 4,200 km², will serve as the major offset for the anticipated habitat loss caused by the Project on the Nakai Plateau and downstream from the project dam. The principal conservation targets are the habitats and cultural heritage of the ethnic minority population of the NNT–NPA. The key project outputs are the protection of flora and fauna in the watershed; preservation of culture and improvement in living standards of the ethnic minority community consistent with conservation of the NNT–NPA; and protection against soil erosion in the reservoir watershed catchment, which is vital for Project sustainability. Management plans for mammals and bird species, including a conservation program for the Asian elephant and the white-winged duck, are part of such outputs. In addition, 28,700 hectares of forest area will be rehabilitated and/or reforested to further enhance compensation and offset measures to the habitats lost due to inundation of the reservoir area.

33. The project proponents have allocated about \$90.5 million for environmental and social costs, including \$31.5 million for the project watershed management and \$16.0 million for downstream mitigation measures up to the end of the concession period. A summary of environmental and social impacts assessment, resettlement plans, ethnic minority development plans, and the framework for addressing resource access restrictions is in Appendix 4. A summary of the environment and social project cost estimates is in Table 1.

Table 1: Environment and Social Cost Estimates
(\$ million)

Item	Up to end of Concession Period
Social	47.7
Environment	3.8
Watershed Management	31.5
Social and Environment Remediation Fund	7.5
Total	90.5^a

^a Includes \$48.8 million for environmental and social costs up to commercial operation date.

Source: Nam Theun 2 Power Company Limited estimates.

C. Environment and Social Safeguard and Other Policy Issues

34. The Project involves three ADB safeguard policies on involuntary resettlement, indigenous peoples, and environment. It also involves operational provisions in sector and thematic policies such as forestry, water, energy, and gender and development. The key safeguard documents are (i) the environmental assessment and management plan (EAMP),¹³ which assesses project impacts and details plans to minimize, mitigate, or compensate for these impacts; (ii) the SDP, to manage social impacts, including those related to resettlement, health, gender, and downstream impacts and to address special issues related to ethnic minorities; and (iii) the social and environment management framework and operational plan (SEMFOP), to manage the NNT–NPA, including its corridors. The Government, NTPC, and IFIs also prepared the summary environmental and social impact assessment, cumulative impact assessment (CIA), and NT2 contributions, safeguard due diligence on the Thai transmission lines, social and environment cost–benefit analysis, and capacity assessment. All NTPC obligations, including those related to social and environmental mitigation, are detailed in the safeguard documents and summarized in schedule 4 of the concession agreement. Supplementary Appendix B provides the safeguard documents.

1. Social Mitigation, Compensation, and Livelihood Restoration

35. ADB's social safeguard requirements are addressed under the SDP for the project area, and the SEMFOP for the NNT–NPA. The SDP addresses the social safeguards and other cross-cutting social issues. It includes (i) a public health action plan (PHAP), (ii) the Nakai Plateau resettlement plan, and ethnic minority development plan (EMDP), (iii) downstream areas resettlement and livelihood restoration and EMDP, (iv) project land resettlement plan and EMDP, and (v) a construction-phase social management plan for managing and mitigating impacts related to contractors and spontaneous camp followers. The SEMFOP includes a resource access restriction process framework for livelihood development through participatory planning and EMDP for inhabitants in the NNT–NPA and the peripheral impact zone.

36. The Government has established a comprehensive resettlement organizational structure for implementing the SDP together with NTPC, which will provide experts to work side by side, and provide on-the-job training to, their Government counterparts. Specialized activities will be

¹³ The first draft of the environmental assessment and management plan (EAMP) was completed in May 1997, with revisions in 2000, 2001, 2003, and 2004.

outsourced to nongovernment organizations and other experts. The Government and NTPC are jointly responsible for the outcomes.

37. The PHAP contains a comprehensive health impact assessment following a World Health Organization model. The PHAP, which includes a resettlers' health plan and a regional health plan, is designed not only to mitigate all identified significant health risks to acceptable levels but also to improve local conditions during construction and operation. The PHAP includes an HIV/AIDS¹⁴ awareness program. The head construction contractor (HCC), who is responsible for overall project implementation, has prepared a staff health plan for all construction workers. A gender action plan and strategy (Supplementary Appendix C) has been prepared and mainstreamed into the SDP and SEMFOP. A social management plan for the construction phase has been prepared and includes a trafficking awareness and prevention program.

2. Environmental Mitigation

38. The environmental management plan includes (i) detailed environmental management and monitoring requirements for the HCC to mitigate construction-related impacts; (ii) specific programs during operation to reduce impacts on water quality, flooding, and channel degradation, and to protect wildlife; (iii) specific activities designed primarily for controlling synthetic chemical use to safeguard water quality management and monitoring as well as riparian release to the Nam Theun river to lessen impacts on the ecosystem and livelihoods; and (iv) measures for various implementation agencies on public education, plantation forestry, and shifting cultivation reduction. The main project-affected areas include (i) the Nakai Plateau, (ii) the NNT–NPA, (iii) downstream Xe Bang Fai; (iv) downstream Nam Theun and Nam Kading, and (v) the Mekong. (Map 2)

3. Cumulative and Regional Impacts

39. A CIA and NT2 Project contribution¹⁵ study was undertaken to gain understanding of the cumulative impacts of various development activities in the region and the contribution of the Project to such impacts. The study analyzed the potential combined induced impacts of a series of projects in the region, either implemented together or in sequence, in relation to the Project. The primary geographic areas covered are the Mekong, Nam Theun and/or Nam Kading, Xe Bang Fai, and Theun Hinboun basins and the linear development zone of the transmission lines and roads. Broader areas are covered in relation to social development, transport, and biodiversity. Two development scenarios are presented in the CIA based on a 5- and 20-year planning horizon. These scenarios cover a number of sectors by examining the present situation, existing plans, and development trends. The sectors are hydroelectric power, transport, irrigation, water supply and sanitation, urban development, fisheries, forestry, industry, social development, and conservation.

40. The study covered the magnitude of the Project's induced impact in the downstream Mekong River Basin, including the Tonle Sap Lake in Cambodia and the Mekong Delta. It concluded that the potential impact of the Project alone on downstream Mekong would be changes in flow pattern and sedimentation load, which could have a positive impact on flood management and saltwater intrusion in the Mekong Delta but could have a negative impact on the fisheries in the Tonle Sap. In line with the Agreement on the Cooperation for the Sustainable

¹⁴ Human immunodeficiency virus/acquired immunodeficiency syndrome.

¹⁵ ADB. 2003. *Technical Assistance to the Lao People's Democratic Republic for Preparing the GMS: Nam Theun 2 Hydropower Development Project*. Manila. (TA 4213-LAO, for \$700,00, approved on 9 November 2003).

Development of the Mekong River Basin, the Government issued the riparian notification letter, and exchanged dialogue with the Cambodian Government to provide clarifications in the specific technical aspects of the Project.

41. The study reported that Mekong fish have adapted to the annual flood pulse. It indicates a strong positive correlation between floods and fish production. However, baseline data on fish catch are uncertain and a number of other significant ecological factors in addition to the flood levels are in play. Given this, a definite fish production figure for flooded areas cannot be determined. The most productive fish-breeding areas on the floodplains and around the Tonle Sap are reported to be shrub- and forest-covered wetlands. These vegetation types are being converted into agricultural land, which is less suitable as breeding grounds and may increase pollution. The study assessed the following factors that could impact fisheries: water level, sedimentation and/or nutrient level, and fish migration.

42. **Water Level.** The study shows that the Project will cause water to flow to Cambodia in a more regulated way than without the Project. There will be slightly less water during the wet season and slightly more during the dry season. The project-induced impact on the water level in the Tonle Sap is estimated to be about 1% of the normal yearly wet season fluctuations (3-centimeter reduction as opposed to 2.5–3.0 m normal fluctuation in the wet season).

43. **Sedimentation.** The sedimentation, which is affected by two parallel developments working in opposite directions—intensive agriculture and deforestation—increases the erosion and sediment load in the Mekong, whereas the building of reservoirs might trap sediments. Without the Project, the first process seems to be the strongest and the sediment transport in Mekong is increasing. When the Project comes on stream it will result in the dilution of sedimentation load in the Xe Bang Fai because of the water with less sediment load coming from the plateau. However, the study predicts that the sediment load will be sufficiently increased by the time the Xe Bang Fai reaches the Mekong. Sedimentation and nutrient level issues will become negligible by the time the water reaches Cambodia.

44. **Fish Migration.** Most of the fish species in the Cambodian and Vietnamese parts of the catchment migrate within the Mekong and its tributaries downstream of the Khone falls. Some species are able to climb the falls but will not be affected by the higher water level in the Xe Bang Fai. Migration of fish to the NNT–NPA through the Nam Theun is not an issue at this stage since the Theun Hinboun Dam already blocks the passage. Changes in water flow and water quality in the Nam Kading and Xe Bang Fai are therefore not likely to have any significant impact on fisheries in downstream countries. Supplementary Appendix D provides the CIA and NT2 contributions.

4. Thai Transmission Lines

45. **Thai Transmission Lines.** To supply electricity into the EGAT system, a 166 km double circuit 500kV transmission line, will be constructed from the Lao–Thai border to a new substation at Roi Et, Thailand. Planning and construction of this additional transmission line is the responsibility of EGAT. Since EGAT is not receiving any financial support from ADB or the World Bank to construct this transmission line, ADB and the World Bank undertook due-diligence work rather than the full safeguard compliance review to seek as assurance that the social and environmental impact assessment and mitigation work would be undertaken by the Thai authorities. The work is expected to be completed before the transmission lines are installed by 2008.

5. Integrated Water Resources Management

46. Integrated water resources management (IWRM) is an approach to improve planning, conservation, development, input of water, forest, land, and aquatic resources for maximizing social and economic welfare. The Government recognizes the benefits of a basin-wide strategic approach to IWRM, which would involve the key stakeholders in planning and decision-making process. National agencies such as the Ministry of Industry and Handicraft (MIH), Ministry of Agriculture and Forestry, Science Technology and Environment Agency (STEA), and provincial and district administrations pursue their respective programs independently of the other in the Nam Theun and Xe Bang Fai basins and in an ad hoc manner. The Government is planning to establish a permanent river basin organization to coordinate the planning, monitoring, and regulatory framework in the Nam Theun Basin. It intends to tap resources from existing and future hydroelectric power projects in the basin to provide funding for the mitigation measures for the cumulative impact. The mitigation measures will be implemented by national or provincial agencies or by hydroelectric power companies. The project design includes various measures, which are in line with IWRM, including the CIA and NT2 Project Contribution Study, and an adaptive management approach covering activities such as riparian release from downstream Nam Theun, water release to the Nam Kathang, regulation of dam release management into the Xe Bang Fai, and wildlife programs to respond to the basin-wide changes and potential impacts with flexibility. The extensive consultation on the proposed livelihood restoration program along the affected river basins reflects the good practice to IWRM.

6. Consultation and Disclosure

47. ADB has promoted the informed participation of the Government, civil society, and other stakeholders in an open and inclusive manner. During the project preparation, stakeholders had the opportunity to comment on the details of the Project, as per ADB's guidelines. The Government and NTPC initiated consultation with the project-affected people in 1997. However, the consultations could have been made more effective had they been undertaken in a more balanced, transparent, and meaningful way. Since early 2004, ADB and the World Bank have engaged independent consultation experts to help the Government and NTPC undertake a new round of local consultation. NTPC and the Government began posting the safeguards documents on the Internet for public review and comment in March 2004. The risks and mitigation plans outlined in the draft documents have since been discussed with a wide group of stakeholders through a series of local consultations with project-affected communities in the major impact zones: Nakai Plateau, project land areas, downstream Xe Bang Fai, downstream of the dam, and the NNT–NPA. Information on the compensation and resettlement plans, and livelihood options have been presented to the project-affected people by trained community and district facilitators through media they can understand, including radio broadcasts in minority languages, visual materials together with verbal explanations, site visits to proposed and pilot resettlement areas, and open discussions. The project design was adjusted to accommodate concerns of the project-affected people, such as location of the plateau resettlement area, village layout, housing design, and types of crops under the livelihood program as well as livelihood options for project lands and downstream areas. Summaries of the resettlement action plans have been distributed to project-affected people and integrated into adult education and Lao-language training sessions.

48. Due to the sensitivity of, and the global interest in, the Project, it was decided that a series of national and international workshops in Bangkok, Paris, Tokyo, Vientiane and Washington D.C. would provide a forum for open and well-informed dialogue, explain project details, clarify issues and debate stakeholders' concerns, inform the due-diligence process of

the IFIs, and provide feedback to the Government and NTPC before finalization of project documents. The international workshops were facilitated by well-known resource persons, and a summary of the proceedings of the workshops have been made public. Consultation and disclosure efforts under the Project are in Appendix 5.

D. Cost Estimates

49. The total base cost of the Project is estimated at \$1,250.0 million equivalent, comprising \$795.7 million (63.6%) in foreign exchange cost and \$454.3 million (36.4%) in local currency costs.¹⁶ The cost estimates have been prepared using 2005 price levels and a summary is in Table 2, with details in Appendix 6.

Table 2: Summary of Project Base Cost Estimates
(\$ million)

Item	Foreign Exchange	Local Currency	Total
A. Construction Cost	396.2	315.3	711.5
B. Environmental/Social Mitigation	48.8	0.0	48.8
C. Development Cost ^a	150.6	14.0	164.6
D. Financing Cost ^b	173.0	106.3	279.3
E. Base Contingencies	27.1	18.7	45.8
Total Base Cost	795.7	454.3	1,250.0

^a Pre-operating, compensation to the Government of the Lao People's Democratic Republic, Nam Theun 2 Power Company Limited (NTPC) administration, works and project preparation.

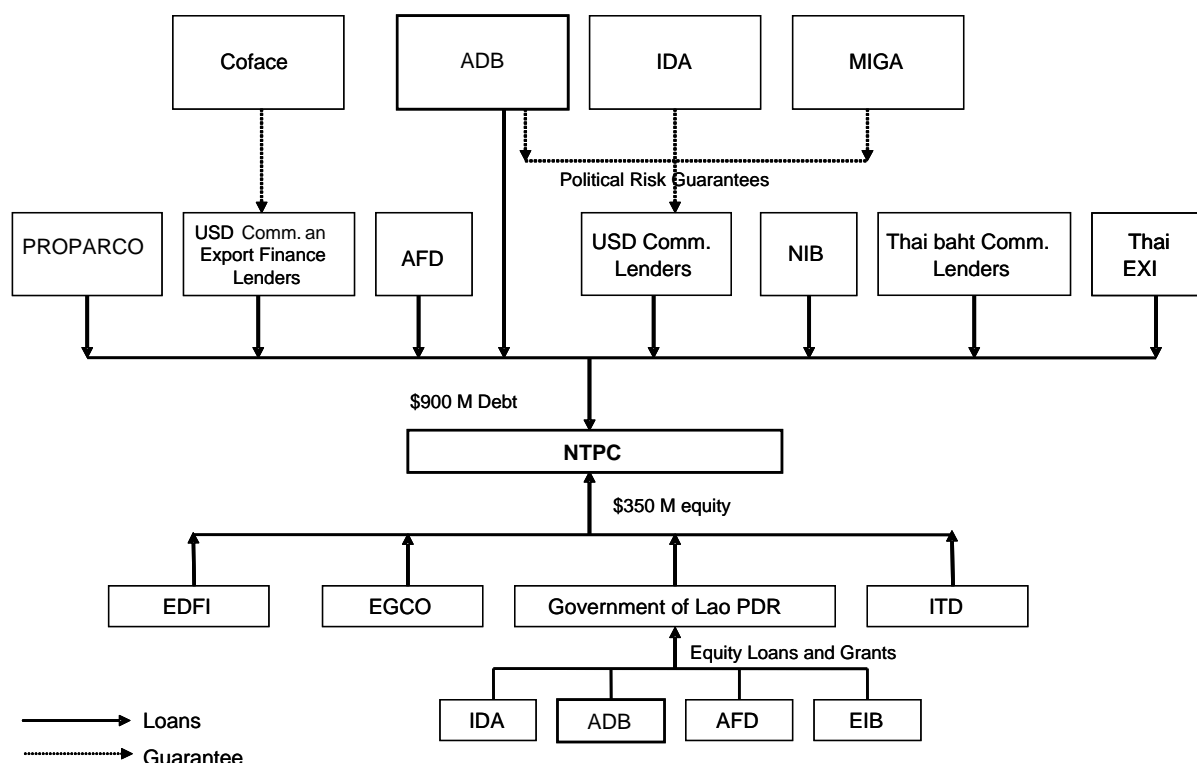
^b Financing costs also include upfront and commitment fees, charges related to political risk guarantees extended by the Asian Development Bank, International Development Association, and Multilateral Investment Guarantee Agency, and risk premium on export credit agency facilities.

Source: NTPC estimates.

E. Financing Plan

50. The base project cost is expected to be funded using loan facilities of \$900 million and shareholder's equity of \$350 million, or a debt–equity ratio of 72:28. An additional \$200 million of contingent debt and equity financing has been arranged. Debt and equity are denominated in a mix of dollars and baht to match the composition of the two currencies in project base costs. Therefore, project costs in US dollars are funded by dollar equity and debt, while costs incurred in baht are funded by baht equity and debt. The overall capital structure is 59.8% dollars and 40.2% baht, exactly matching the mix of dollar and baht capital expenditures required for project construction. The 50/50 mix of US dollar and baht debt is designed to match the tariff paid by EGAT and EdL. This will reduce the currency mismatch between the revenues received by NTPC and the amounts paid to the lenders. The Government has requested ADB to help mobilize financing for payment of a part of its equity contribution in NTPC. A tentative debt and equity financing plan is provided in Figure 2.

¹⁶ For the purposes of presentation, local currency costs are those incurred in baht and kip. Foreign currency costs are those costs incurred in US dollars or euros.

Figure 2: Tentative Debt and Equity Financing Plan

ADB = Asian Development Bank, AFD = Agence Française de Développement, Comm = commercial, EDFI = Electricité de France International, EGCO = Electricity Generating Public Company Limited, EIB = European Investment Bank, EXIM = Export-Import Bank, IDA = International Development Association, ITD = Italian-Thai Development Public Company Limited, Lao PDR = Lao People's Democratic Republic, M = million, MIGA = Multilateral Investment Guarantee Agency, NIB = Nordic Investment Bank, NTPC = Nam Theun 2 Power Company Limited, PROPARCO = Société de Promotion et de Participation pour la Coopération Economique, USD = US dollar.

1. Proposed Government Equity Financing Structure

51. The US dollar and baht base project equity contributions amounting to \$350 million will be shared pro rata by NTPC's four shareholders. As the Government holds 25% equity share of NTPC, its base equity injections will amount to \$87.5 million (excluding contingent equity). The Government's equity injection will be financed by loans, credits, and grants from ADB's OCR (loan up to \$20.0 million including interest during construction and contingent fees), the International Development Association (IDA) (grant up to \$20.0 million), the European Investment Bank (loan up to €40.0 million or equivalent to \$52.0 million), the Agence Française de Développement (grant funds of €5.0 million or \$6.5 million). NTPC is required to compensate the Government \$30.0 million for its loss of biodiversity and/or ecotourism assets and in payment of its development costs, as set out in the concession agreement (the Government contribution). A portion of this amount will be used to fund base equity, and the remainder will be reserved for contingent equity calls on Government.

52. A public sector loan from ADB's OCR is proposed to help Government to finance a portion of its equity in the Project. The loan will have a 30-year term, including a grace period of

6 years, interest determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.75% and such other terms and conditions set forth in the draft Loan Agreement. Although the Lao PDR is a group-A country, the OCR resources are proposed due to the commercial nature of the Project, which will yield high returns for the country. The 6-year grace period is proposed to match the construction period of 4.5 years and first year of commercial operation. The Government has provided ADB with (i) the reasons for its decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions, and (ii) an undertaking that the choices were the Government's own independent decision and not based on any advice of ADB.

2. Proposed Debt Financing and Political Risk Guarantee Structure

53. ADB has been asked to provide a direct loan and a political risk guarantee to NTPC through its Private Sector Operations Department (PSOD), while IDA and the Multilateral Investment Guarantee Agency have been requested to provide political risk guarantees. All political risk guarantees and export credit agency facilities will be funded by commercial banks or export finance lenders. Detailed description of the loans and guarantees is included in the PSOD Report and Recommendation of the President (RRP).

54. The proposed participants and possible debt and equity structure are shown in Table 3.

Table 3: Proposed Financing Structure

Source	Amount (\$ million)
Equity	
Government	87.5
EdFI	122.5
EGCO	87.5
ITD	52.5
Total Base Equity	350.0
Debt	
ADB Direct Loan	45.0
USD Commercial Lenders (ADB-guaranteed loan)	45.0
USD Commercial Lenders (IDA-guaranteed loan)	45.0
USD Commercial Lenders (MIGA-guaranteed loan)	45.0
Export Finance Lenders (Coface-guaranteed loan)	166.5
AFD	27.0
PROPARCO	27.0
Thai Exim Bank	22.5
Thai commercial lenders (\$ equivalent in baht)	450.0
Total Base Debt	900.0
Total Base Financing	1,250.0
Contingent Equity	100.0
Contingent Debt, of which:	100.0
ADB Direct Loan	5.0
ADB Guaranteed Loan	5.0
Total Contingent Financing	200.0
Total Financing	1,450.0

ADB = Asian Development Bank, AFD = Agence Française de Développement, EdFI = Electricité de France International, EGCO = Electricity Generating Public Company Limited, IDA = International Development Association, ITD = Italian Thai Development Public Company Limited, MIGA = Multilateral Investment Guarantee Agency, PROPARCO = Société de Promotion et de Participation pour la Coopération Economique, USD = US dollar.

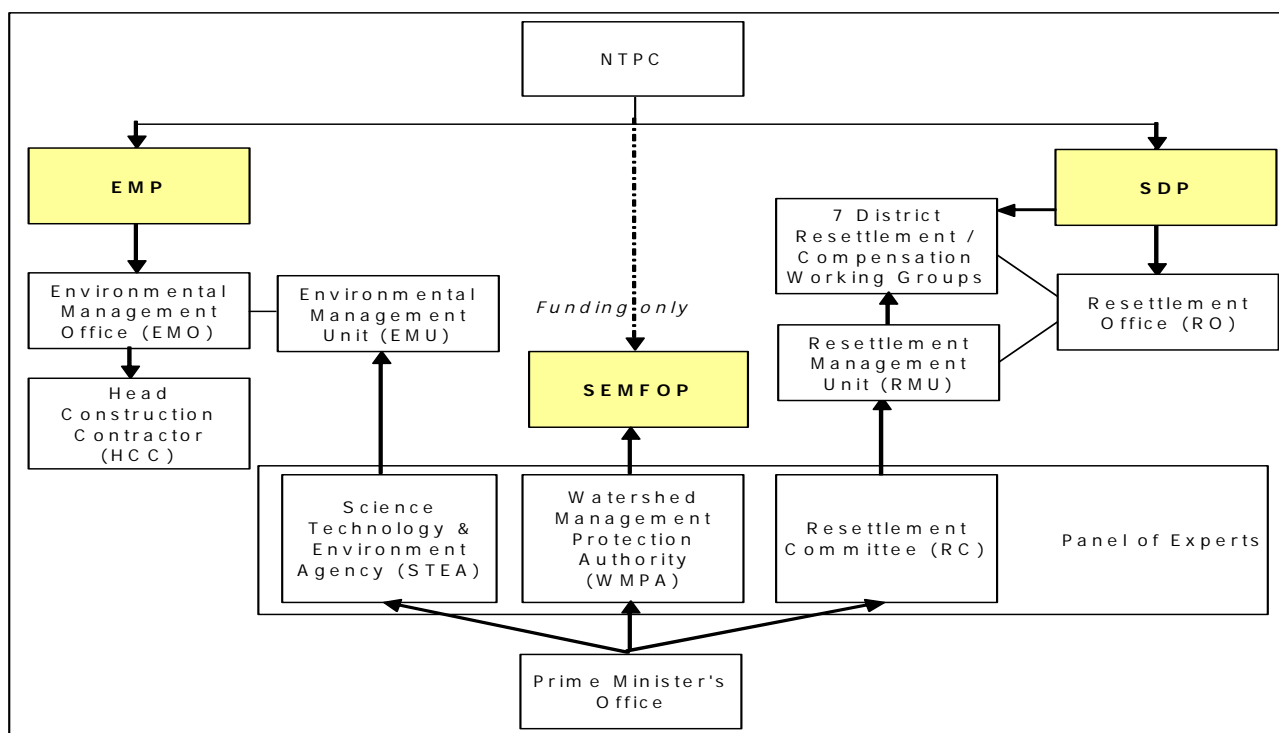
Source: Nam Theun 2 Power Company Limited estimates.

F. Implementation Arrangements

1. Institutional and Implementation Arrangements

55. The Government and NTPC will work in close partnership to implement the Project. The concession agreement outlines the sharing of responsibilities between the Government and NTPC in implementing all activities, including the environmental and social mitigation measures. NTPC will assume full responsibility for implementing the infrastructure works and will be jointly responsible with the Government for implementing the environmental and social program. The Government will be responsible for policy and regulatory issues such as land transfer and issuance of titles. The organizational structure and the institutional responsibilities for the implementation of the social and environmental management plans is shown in Figure 3. The key organizations responsible for implementing the environmental management plan are the Environmental Management Office (EMO) of NTPC, the HCC, and the Environmental Management Unit (EMU) of Government, which comprises officials from the key central and provincial government agencies and is established under the direction of STEA. EMO is responsible for technical planning, implementation, and monitoring of all environmental mitigation and compensation measures. It is also responsible for ensuring that the HCC fully meets its contractual and environmental management obligations. It will report to the EMU monthly and work in closely with the agencies. The HCC will be responsible for implementing mitigation measures for environmental and social impacts during construction, such as making design changes to avoid or minimize populated or environmentally sensitive sites. This will be subject to monitoring by the panel of experts, International Advisory Group, and lenders' advisers.

Figure 3: Organizational Structure and Institutional Responsibilities



56. To ensure effective implementation of the resettlement program, a comprehensive resettlement organizational structure has been established. The Resettlement Committee comprising the governor of Khammuane Province and officials of other affected provinces is responsible for guiding and managing the resettlement process. The resettlement management unit (RMU), under the Resettlement Committee, is responsible for working with the Resettlement Office of NTPC in planning and implementing the resettlement process on the ground. The RMU will participate in the grievance procedure. The district resettlement working groups, established in the seven districts to be affected by the Project, are responsible for relocation, technical restoration, compensation, and development activities specific in their districts, together with NTPC.

57. The Prime Minister's Office has established the Watershed Management and Protection Authority (WMPA) to implement the SEMFOP. The WMPA will be responsible for coordinating and managing all activities in the watershed area, including (i) conservation, maintenance, and promotion of biological diversity, coupled with the development of a national park for scientific research and tourism; (ii) building and strengthening the capacity of WMPA; (iii) facilitating improved livelihoods for inhabitants of the NNT–NPA; and (iv) protecting and rehabilitating forest cover in the NNT–NPA. NTPC will be responsible for funding and for providing technical advice in this regard.

2. Period of Implementation

58. NTPC is aiming for financial closure by 8 May 2005. Subsequently, the construction activities under the HCC are expected to commence in June 2005. The power plant is expected to begin commercial operation by November 2009.

3. Government Special-Purpose Company—Lao Holding State Enterprise

59. The Government will receive three streams of revenue from the Project: dividends, taxes, and royalties. To improve the transparency of the Government's investments in the Project and prevent the cross-subsidization of EdL, the Government has decided to establish a special-purpose company, Lao Holding State Enterprise (LHSE), to be the nominated Government shareholder in NTPC. The Ministry of Finance will own 100% of LHSE's shares. LHSE will be entitled to a 25% share of the total dividends declared by NTPC. The total dividends, minus the expenses of the LHSE and debt service payments, will be transferred to a dedicated treasury account of the Ministry of Finance, which is being established under the agreed-on revenue management arrangements. The proceeds of ADB's public sector loan to the Government for its equity participation in NTPC will be on-lent to LHSE, on the same terms and conditions as those of the ADB's loan to Government.

4. Procurement

60. NTPC, a private sector company, is implementing the Project, with the Government participating as a shareholder. Consequently, the ADB loan to the Government, which will be used to purchase equity in NTPC, will finance goods and works in accordance with relevant provisions for procurement under private sector loans in ADB's *Guidelines for Procurement*. The Government's participation as an equity shareholder in the project company, using ADB's public sector loan, is desirable because it would strengthen Government commitment to its obligations. NTPC has entered into a single contract with the HCC to design, construct, commission, and test all the facilities required to implement the generating plant. The HCC has signed five construction subcontracts for the design and construction of civil works elements, and design,

manufacture, and erection of the electromechanical plant items. The HCC is taking the risk for the subcontracts, and will be responsible for managing construction interface. The HCC contract and two subcontracts have been directly negotiated with nominated subcontractors, which are partners in the development consortium—the HCC and civil works 1 (Nakai dam, saddle dams, and intake canal). These negotiated contracts will not be eligible for ADB financing. The other two civil works and two electromechanical subcontracts were awarded based on competitive tenders and will be eligible for ADB financing. ADB is satisfied that the procurement process for the aforementioned four contracts was transparent and arrived at a fair price reflecting economy and efficiency, and that the contractors are qualified, experienced, and from eligible ADB member countries. The RRP of the PSOD discusses the procurement arrangements in detail.

5. Disbursement Arrangements

61. As the Project will be implemented by NTPC, with MIH as the Executing Agency, the disbursements of this loan to Government for its equity contribution will be made to NTPC in accordance with the guidelines and procedures in ADB's *Loan Disbursement Handbook* (2001). Disbursement of the loan will be subject to (i) the loan agreement(s) having been declared effective by ADB; (ii) MIH, MOF, LHSE, and NTPC having submitted sufficient evidence of authority of the person(s) who will sign the withdrawal applications; (iii) all conditions precedent having been met, including other financing being made effective; (iv) confirmation that all parties involved in disbursement are from ADB member countries; and (v) NTPC presenting evidence to ADB that goods and services requested by NTPC for ADB financing shall or have been produced in and procured from ADB member countries.

6. Accounts, Audit, and Report

62. Regular progress reports will be prepared for the Project and submitted quarterly to ADB, the World Bank, and other IFIs. The reports will include a description of physical progress, environmental and social mitigation efforts, problems and difficulties encountered, and a summary of financial accounts for the Project that will consist of project expenditures during the period, year to date, and total to date. A project completion report will be submitted within 3 months following completion of the Project.

63. Within 6 months of the close of the financial year, NTPC will submit its annual financial statements to ADB. These will consist of an income statement, balance sheet, statement of cash flows, and related notes to the financial statement. NTPC will hire independent auditors to audit its financial statements in accordance with the International Standards on Auditing and will certify that statements were prepared using International Financial Reporting Standards. The audit opinion will be submitted along with a memorandum on issues identified during the audit process.

7. Project Performance, Monitoring, and Evaluation

a. Monitoring Arrangements

64. The proposed monitoring and evaluation arrangements consist of multilayered complementary components: a dam safety review panel (DSRP), a panel of experts, the International Advisory Group (IAG), an independent monitoring agency for environment and resettlement, lenders' advisers, a Government engineer, an owner's engineer, and supervision by staff from the IFIs and commercial lenders.

65. Drawing on international experts and permanent local personnel in the Lao PDR, the consultants will provide regular and systematic monitoring, including technical oversight by satellite, of the key aspects of the Project during the 5-year implementation period and during commercial operations for a period sufficient to cover the legal obligations contained in the concession agreement. To ensure the independence and objectivity of the lenders' technical advisers, they will report directly to the financial institutions, although the contract will be funded by NTPC.

66. These monitoring arrangements would form the basis for reports on project progress and problems encountered, as well as on the much broader development agenda and macroeconomic reform program in the Lao PDR, which the Project would support. These reports would be presented to an annual meeting of project stakeholders, including the Government, sponsors, financial institutions, and local and international civil society. Principles of multilateral and bilateral partnership are being developed among participating donors to maintain the cohesion and shared vision of those stakeholders in the Project and in its contribution to the broader objectives of the Lao PDR's development programs.

b. Monitoring Indicators

67. Monitoring indicators will cover the technical, safeguard, and revenue management components of the Project. Completion of the physical works, and goods and services against time and budget targets will measure physical progress of the Project. Indicators to measure social and environmental programs will measure the effectiveness of the conservation, resettlement, and livelihood restoration activities. Indicators to measure implementation of the public expenditure management and revenue management programs will evaluate the effectiveness of the use of Government revenue from the Project for the poverty reduction program as agreed on by the Government and the donor partners. Monitoring and evaluation arrangements are detailed in the Technical Annex 3 of Appendix 2.

IV. PROJECT BENEFITS, IMPACT, AND RISKS

A. Social and Poverty Impact Analysis

1. Direct Impact on the Poor

68. Food security and nutritional requirements are major concerns for most communities in the project watershed. Since only a few households are self-sufficient in rice production, they rely on the harvesting of natural resources and hunting. Annual household income is estimated at about \$450, which is significantly lower than the national household poverty line of \$800. Most villagers are illiterate, birth and infant mortality rates are high, and general health is poor. About 1,150 ethnic minority households in the 31 enclave villages in the NNT-NPA, as well as possibly 3,750 households within the peripheral impact zone, who use or extract resources from the project watershed, improve their livelihoods. They will benefit from improved transportation infrastructure, irrigation, micro-hydroelectric power and water supply, and education and health facilities and service delivery. The livelihood development strategy under the SEMFOP embodies a number of important attributes. First, development activities are linked to conservation in a transparent manner to ensure that preferable development options have positive outcomes for conservation. Second, the planning, implementation, and evaluation of development activities is participatory, involving local people in all aspects of decision making. Third, livelihood development strategy follows an evolutionary rather than transformational approach by emphasizing incremental improvements to livelihood systems rather than

introducing an entirely new system. Finally, the development strategy follows a sustainable livelihood approach under which all elements of the livelihood system, not just rice production and agriculture, are considered.

69. Similarly, the average household annual income of the plateau resettlers was estimated at about \$449 in 1998. Only about 17% of families are able to produce sufficient rice for a year, and about half of all families have a rice deficit for more than 6 months. Most adults are illiterate. Approximately 6,200 people on the Nakai Plateau will benefit directly from the Project through resettlement to sites with improved housing, irrigated land, livelihoods, skills development, health and education facilities, and access to markets. Demand for farm produce will rise during construction.

70. The economy in downstream Xe Bang Fai is generally more diversified in relation to sources of income. With average annual household income in this area of \$664, approximately two thirds of the households in the lowland communities are under the national poverty line. Those households that rely solely on agricultural production have the highest incidence of poverty in the lowland communities. By increasing the potential for irrigation during commercial operations, the Project will improve the ability of lowland farmers to increase their irrigable land area and, hence, their household incomes. Communities along the Xe Bang Fai could benefit from reduced flood damage, increased dry season irrigation and reduced pumping costs, and expansion of irrigable lands due to increased irrigation potential.

71. Women and children, particularly from certain marginalized ethnic minority groups and from disadvantaged households on the Nakai Plateau, are decidedly the most vulnerable and overburdened social group. Most of these women and girls used to have limited access to education, off-farm employment, production markets, cash assets, and sociopolitical power. Even slight socioeconomic disturbances could easily overwhelm their household coping mechanisms, deepen their already heavy family burdens, and overstress their psychological welfare. The gender risk is severe and has been recognized in the SDP. A gender action plan and strategy (Supplementary Appendix C) has been designed and gender-sensitive actions have been mainstreamed into the Project.

2. Indirect and Macroeconomic Impacts on the Poor

72. The Project will significantly affect the economy, generating net benefits in the form of accelerated economic growth, reduced poverty, and new jobs. Construction will directly employ about 4,000 people, with more than four times this number of jobs expected to be created as a result of support services and other multiplier effects. Poverty in the project site is severe and the Project could open the area to ecotourism and promote commercial agriculture through access to markets via improved infrastructure. Appendix 7 outlines the summary poverty reduction and social strategy, and Appendix 8 provides the poverty impact matrix. Generally, the Project could have a positive impact on GDP growth, helping to raise many people nationwide above the poverty line. Commissioning of the Project in 2010 will boost export and foreign exchange earnings by generating about \$1.9 billion of revenue for the Government over the 25-year operating period and is expected to significantly improve the country's debt service ratio, allowing it to remain below 10%.

73. The foreign exchange rate implications of the Project, operating through movements in the price of tradable versus non-tradable goods, are expected to be moderate and manageable. It is unlikely that the Project will adversely affect competitiveness of other export sectors through appreciation of the real exchange rate, resulting in a widening trade deficit. Supplementary

Appendix E provides an analysis of potential macroeconomic impacts. Revenue from the Project will strengthen the Government's overall fiscal position, enabling improved education, health, and other support services critical to poverty reduction, especially in remote areas. Revenue from the Project will support reforestation and other environmental conservation measures throughout the country. While most of the generated electricity will be exported to Thailand, the Project will add substantially to domestic supply. ADB and World Bank support for the Project includes a comprehensive PEMSP, which will strengthen the Government's capacity to increase its revenues and to use its resources effectively and efficiently in reaching the goals and targets outlined in the NGPES.

B. Project Benefits

1. Economic and Financial Viability

a. Economic Viability

74. The economic analysis of the Project was undertaken in accordance with ADB's *Guidelines for the Economic Analysis of Projects*. The analysis covers the economic viability from the Lao PDR and regional perspectives (Appendix 9 and Supplementary Appendix F). The costs are based on the lender's financial model and include development and pre-operating expenses, construction costs, operations expense, and social and environmental costs associated with the Project. Economic costs are expressed in constant 2005 prices and exclude taxes and interest during construction. The regional analysis included the Thai cost of dedicated transmission line in Thailand, which is not funded by NTPC. Costs were classified as non-tradable and tradable goods, labor, and services. Tradable costs were converted to the domestic price numeraire using derived shadow prices. The analysis included an annual reduction of 275 GWh for the existing Theun Hinboun hydroelectric power project. In the regional analysis, benefits from electricity sales to Thailand were valued at the average willingness to pay for electricity while sales to the Lao PDR were valued based on the economic cost of importing electricity from Thailand. For the Lao PDR analysis, benefits were valued in terms of the sales to Thailand valued at the Power Purchase Agreement (PPA) tariff, adjusted by the shadow exchange rate factor. The calculated economic internal rates of return (EIRRs) are 15.9% and 15.5% for the Lao PDR and the region, respectively.

75. Sensitivity analyses were carried out with respect to key risk factors that could influence project viability. The results indicated that none of the risk factors would independently undermine project viability. However, under a worst-case scenario with four combined adverse events, the EIRR fell below the opportunity cost of capital. The results of the risk analyses examining a range of possible EIRR outcomes as a result of variations in the values of uncertain factors showed that the regional EIRR would range from 16.9% to 13.5%, with a mean of 15.2%. The Lao PDR EIRR analysis gave similar but slightly lower results.

76. The distribution of net benefits between Thailand and the Lao PDR was analyzed. The analysis shows that the Lao PDR economy is the greatest beneficiary, with net benefits of about \$171 million, of which taxes and royalties to the Government account for 52%. Project investors, including the Government, will receive about \$18 million. The total gains to Thailand amount to \$74 million, of which consumers in Thailand receive \$67 million. Lao consumers also benefit, albeit by a smaller amount. However, the conservative estimate of the annual off-take from the Project to Lao consumers represents a substantial share, about 7%, of total national energy consumption in 2010.

b. Financial Viability

77. Financial projections have been prepared for LHSE in accordance with ADB's *Guidelines on Financial Governance and Management of Investment Projects Financed by the ADB* to assess the sustainability of the company from NTPC dividend income (see Appendix 10). Even though the largest sources of Government revenue, the royalty and income tax, are excluded, the financial projections for LHSE indicate that its capacity to meet its debt service obligations on the ADB and European Investment Bank (EIB) loans is well within a range considered to be satisfactory. Under the base case scenario, total dividends paid to LHSE over the concession are projected to be almost \$640 million, expressed in current prices. Total debt service, including both principal and interest, on the proposed ADB and EIB loans is estimated at \$124 million while LHSE operating costs over the entire concession period are projected to be less than \$4 million. Therefore, with total debt service and operating expense being equivalent to only 20% of net dividend income, LHSE has considerable capacity to service this debt under various scenarios. Consistent with the large differential between the dividend income it receives and its debt service and operating expenses, LHSE's return on equity (ROE) is projected to average a very favorable 38% over the 2011–2034 period.

78. The financial evaluation of the Project was undertaken in real terms using constant 2005 prices. The project cost estimates and financial projections in nominal terms were converted to real terms by adjusting for the projected effects of foreign and domestic inflation and currency fluctuation. The financial evaluation was based on the terms of the concession agreement entered into between the Government and NTPC, which provides for a 54-month project construction period followed by a 25-year operating period. The financial internal rate of return after tax is 12.4%. This compares favorably with the after-tax weighted average cost of capital (WACC) of 10.1%. A financial evaluation, in real terms, was also undertaken from the perspective of Government, as 25% shareholder in NTPC, taking into consideration projected tax, royalty, and dividend payments. The internal rate of return on the Government's investment has been calculated at 21.1%, which compares favorably to the WACC of 6.9%. Sensitivity and risk analysis indicates that financial evaluation is robust under adverse conditions. Based on the financial projections and financial evaluation, the Project is considered financially viable and sustainable.

C. Project Risks

79. The Project is by far the largest implemented or even considered for development in the Lao PDR. As a consequence, it entails project-specific risks covering technical, geological and hydrological, environmental and social risks. These technical, geological, and hydrological risks are mitigated as the Project will be implemented by NTPC and the HCC, which have extensive experience in hydroelectric power projects. To minimize and manage the environmental and social risks, the Project has undertaken comprehensive safeguard planning in accordance with ADB's environmental and social safeguard policies, including detailed implementation and monitoring plans and budgets. The lack of Government experience, capacity to implement such a complex and sensitive project also carries risks for its successful implementation. To minimize these risks, a multi-donor assistance program and funding arrangement will be in place to help the Government improve its institutional and human capabilities for project-related activities, including the PEMSP. The concession agreement provides legal commitments from NTPC to assume management and financial responsibility for the outcomes of environmental and social mitigation, compensation, and restoration programs. The Project provides long-term funding from project-related investment, as well as capacity building program, for Government to implement conservation and watershed management programs for at least 30 years. The

mandate and accountability, and the roles, responsibilities, and authorities of the central, provincial, and district governments with regard to project-related activities and programs have been clearly defined to ensure effective implementation.

80. The risks such as geology, hydrology, sedimentation, and seismology, which can lead to cost overruns and delays, have been studied and evaluated in detail by international experts, who will continue to monitor these parameters during the construction. The project design is sound and consistent with prevailing industry best practice, and the technologies employed for the civil works and electro-mechanical systems are well-known and proven. The risk of inadequate water flows and/or flooding in the Xe Bang Fai may result in the loss of electricity output and revenues. The extensive hydrological studies undertaken by NTPC and the Government using data covering 50 years, and the hydrological modeling of the Project, including future hydroelectric power projects in the region, indicate this risk to be minimal. However, the EGAT PPA include the provision for the intertemporal adjustments of the possible effects of the dry years and the flooding in the Xe Bang Fai.

81. There is a risk that Government revenues from the Project will not be used appropriately for priority poverty reduction and environmental conservation programs. Specifically, risks associated with implementation of Government revenue management arrangements relate to actions that will have to be implemented post-Project decision, including (i) improvements to the chart of accounts and budget classifications to reflect priority programs, (ii) development and monitoring of program performance indicators, and (iii) initiation of program level reporting. Lack of progress in these areas will undermine effective targeting and reporting once Government revenues from the Project start flowing. These risks are mitigated by ensuring that these actions are prioritized in the PEMSP and included as one of the major commitments of the Government outlined in the government letter of implementation policy (GLIP).

82. A detailed discussion on the major risks and mitigation measures is presented in Appendix 11. Risks associated with the technical aspects of the Project are described in the PSOD RRP.

V. ASSURANCES

A. Specific Assurances

83. In addition to the standard assurances, the Government and NTPC have given certain specific assurances, which are incorporated in the legal documents. Among these are the following:

- (i) the Government will carry out, in a manner satisfactory to ADB, all of its obligations under the concession agreement, with due regard to the findings, reports and recommendations of the EAMP, SDP and SEMFOP, and the GLIP;
- (ii) NTPC will implement all its obligations under the concession agreement, and under the common terms agreement it is entering into with the commercial lenders, in each case in a manner consistent with the SDP and EAMP, and having due regard to the findings, reports and recommendations of the SDP, EAMP and SEMFOP;

- (iii) the Government through NTPC will have a detailed downstream mitigation and compensation plan completed by 30 June 2006;
- (iv) for any additional land required during the construction and operation phases of the Project, compensation agreements will be concluded prior to handover and the mitigation principles and objectives set forth in the concession agreement and the relevant additional plans will apply;
- (v) WMPA will be able to operate with sufficient responsibility and authority;
- (vi) WMPA will implement, with specific plans, budget and timetable, the compensatory forestry program introduced into the SEMFOP in accordance with the requirements of ADB's forestry policy;
- (vii) the Government and NTPC will prepare and implement annual implementation plans;
- (viii) the Government and NTPC will maintain the panel of environmental and social experts and the DSRP as required under the concession agreement and furnish copies of their reports to ADB;
- (ix) the Government will implement all activities required under the PEMSP and the NT2 revenue management program; and
- (x) the Government will monitor and evaluate the progress of the program of policies, actions and procedures described in the GLIP.

B. Conditions of Loan Effectiveness

84. In addition to the standard conditions, certain further conditions for the effectiveness of the loan have been incorporated in the Loan Agreement, including the following:

- (i) LHSE shall have been duly established;
- (ii) the subsidiary loan agreement and tri-partite agreement shall have been executed;
- (iii) the core staff of each of the EMU, the RMU, and the executive secretariat of WMPA shall have been appointed;
- (iv) all amendments to the concession agreement shall have become effective; and
- (v) all conditions precedent to the effectiveness of each of the ADB OCR facility agreement, the ADB political risk guarantee facility agreement, the ADB political risk guarantee, and the ADB government indemnity shall have been met.

VI. RECOMMENDATION

85. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve:

- (i) the loan of \$20,000,000 to the Lao People's Democratic Republic for the Greater Mekong Subregion: Nam Theun 2 Hydroelectric Project, from ADB's ordinary capital resources with interest to be determined in accordance with ADB's LIBOR-based lending facility; a term of 30 years, including a grace period of 6 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board; and
- (ii) the request of the Government of the Lao People's Democratic Republic for a limited waiver of the negative pledge clause in existing and future loan and guarantee agreements between ADB and the Lao People's Democratic Republic. The waiver will be limited in application to permit (a) the pledge of the Government's interest in NTPC, and (b) security over the assets of NTPC, and only for the duration of the outstanding debt obligations of NTPC in respect of loans providing funds to NTPC for the Project. When those loans are repaid, the limited waiver shall cease to have any further force or effect.

Haruhiko Kuroda
President

15 March 2005

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact <ul style="list-style-type: none"> Sustainable economic growth Poverty reduction in Lao PDR Environmental conservation 	<p>Sustained gross domestic product growth of 6–7% in Lao PDR throughout the operating period</p> <p>Reduction in the percentage of people living below the poverty line to below 15% by 2020</p> <p>Graduate from being a least developed country by 2020</p> <p>Achieve the national target of 70% reforestation by 2020</p>	<p>Semi-annual consultations involving ADB, the World Bank, and other donors with the Government and developers</p> <p>Consultations with the World Bank and other financiers</p> <p>National trade data</p> <p>Lao expenditure and consumption surveys</p> <p>Progress reports on National Growth and Poverty Eradication Strategy</p> <p>Economic reports and sector statistics of the Government of the Lao PDR (the Government), ADB, and the IMF.</p> <p>Forestry survey and wildlife monitoring reports</p>	
Outcome <ul style="list-style-type: none"> Provide stable and affordable electricity to Thailand and the Lao PDR in an environmentally and socially sustainable way Generate revenue for the Government through the Project for its poverty 	<p>Export 5,354 GWh of electricity to Thailand and provide 200 GWh of electricity to Lao PDR consumers by 2010</p> <p>Revenues clearly reflected in annual budget allocations for eligible priority</p>	<p>Review missions</p> <p>Progress reports</p> <p>Audit reports</p> <p>Annual state budgets and financial statements</p>	Assumptions <ul style="list-style-type: none"> Acceptability by civil society Availability of resources from the donors to help the Government build its public expenditure management capacity

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<p>reduction and conservation programs</p> <ul style="list-style-type: none"> Protection of the NNT-NPA 	<p>poverty and environment programs from 2010</p> <p>Actual spending on eligible priority programs clearly reflected in quarterly budget execution reports and financial statements by 2010</p> <p>Satisfactory implementation of social and environmental programs under SEMFOP throughout the concession period</p> <p>Absence of legitimate claims by project-affected people</p>	<p>Quarterly execution reports</p> <p>Reports from joint ADB, IMF, World Bank review mission</p> <p>ADB/IMF/World Bank public expenditure reviews</p> <p>Public expenditure tracking surveys</p> <p>Reports from the panel of experts and international advisory group</p> <p>Reports from the independent monitoring agency and lenders' technical advisers</p> <p>Reports from the Watershed Management and Protection Agency</p>	<p>Risks</p> <ul style="list-style-type: none"> Problems related to contractors leading to construction delays Reduced power demand in Thailand Inadequate water availability Revenues of the Government are less than expected Unexpectedly high environment and social mitigation costs
<p>Outputs</p> <ol style="list-style-type: none"> Physical infrastructure built for power generation Physical infrastructure built for power transmission Environmental measures implemented 	<p>Construction of dam and power generation facilities by 2009</p> <p>Construction of 138 km of transmission lines to Thai grid and 70 km in Lao grid by 2008</p> <p>Satisfactory implementation of environmental management plan measures under the EAMP and Project</p>	<p>Review mission report</p> <p>Dam safety panel report</p> <p>Panel of experts report</p> <p>International Advisory Group report</p>	<p>Assumptions</p> <ul style="list-style-type: none"> Construction contractors delivering high-quality output Government's commitment in implementing safeguard mitigation measures Effective cooperation between the Government and NTPC Sufficient and appropriate human

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
4. Resettlement and ethnic minority development plans implemented	<p>Implementation Plan</p> <p>1,120 Nakai Plateau families satisfactorily resettled, and incomes improved to the National Rural Poverty Line by 2011</p> <p>Project lands and downstream areas affected people satisfactorily compensated and resettled and alternative livelihoods in place by 2010</p> <p>Ethnic minority development plans satisfactorily implemented by 2015</p>	<p>Progress reports from Lenders' Advisers</p> <p>Reports from independent monitoring agencies</p>	<p>resources effectively applied</p> <ul style="list-style-type: none"> Flexibility and responsiveness to the needs and absorptive capacity of affected people Effective cooperation with Vietnamese authorities on the border control issues Government's commitment to implement and comply with the arrangements agreed on the public expenditure and revenue management Government's commitment to greater transparency.
5. NNT-NPA protected from illegal logging	<p>Provision of alternative livelihoods for 5,800 ethnic minorities (access restriction in NNT-NPA) by 2015</p>	<p>Reports from the Watershed Management and Protection Agency</p>	<p>Risks</p> <ul style="list-style-type: none"> Unfavorable weather leading to construction delays Targeted income from livelihood program not achieved
6. Strengthened public expenditure management system	<p>Fiscal planning, budget preparation, budget execution, accounting and financial reporting by 2010</p> <p>Satisfactory peer review by International Organization of Supreme Audit Institution member by 2010</p> <p>Satisfactory budget and expenditure</p>	<p>Annual state budget, quarterly budget execution reports, annual financial statements, inspection reports, audit reports</p>	

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
	reports prepared by 2010		

Activities with Milestones 1.1 Procurement and installation of equipment and materials Target: Efficient disbursement of funds for construction by 2009, and execution of the construction and engineering contracts by 2009 2.1 Environment and social mitigation activities in EAMP, Social Development Plan, SEMFOP, and the CA Target: Efficient disbursement of funds for implementation of social and environmental mitigations during the concession period 3.1 Protection activities prescribed in the watershed management plan Target: Utilization of resources to protect the NNT NPA during the concession period. Provision of training to Government staff under the CA during the concession period and capacity building component of ADB project preparatory technical assistance by 2006 4.1 Environmental and social capacity building activities agreed in the CA 5.1 Capacity building to support the Government's PEMSP Target: Mobilization of resources (funds and consultants) to support PEMSP.	Inputs Progress reports, review missions, reports from the independent monitoring agencies and panel of experts, audit reports Audit reports ADB/IMF/World Bank review missions
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ADB = Asian Development Bank, CA = Concession Agreement, EAMP = environmental assessment and management plan, GWh = gigawatt hour, IMF = International Monetary Fund, NNT-NPA = Nakai Nam Theun National Protected Area, NTPC = Nam Theun 2 Power Company Limited, PEMSP = public expenditure management strengthening program, SEMFOP = Social and Environmental Management Framework and Operational Plan.



Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

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Committee for Planning and Investment

No: 199/CPI
Date: 7 March 2005

To: Mr. Haruhiko Kuroda
President
Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila
Philippines

Subject: Nam Theun 2 Hydroelectric Project: Implementation Policy Framework

Dear Mr. Kuroda,

1. The Nam Theun 2 Hydropower Project is an important milestone in the development history of Lao PDR. The project has been strongly endorsed by our National Assembly. It symbolizes the hopes and aspirations of the people of our country.
2. The contribution of the project to poverty reduction and improvement of the country's human development indicators is sizeable and the project will also make a significant contribution to our country's other development goals. The preparation of the project has been an enormous learning exercise in terms of building capacity to plan and manage complex multi-sector programs, foster stakeholder participation and strengthen donor coordination. The project will serve as a model for natural resources conservation, trans-boundary cooperation in the Mekong region, and international private-public partnerships. In addition, the project has helped focus attention on building capacity for improving public financial systems, targeting revenues to poverty reduction programs, and strengthening environmental and social safeguard management. The lessons learned will help the preparation of future projects and will be applied whenever opportunities arise to improve existing projects.
3. The main purpose of my writing to you is to reiterate the government's determination to build upon the gains already achieved through our cooperation and to sustain them by adopting an Implementation Policy Framework for the project.
4. In this regard, I invite your attention to the earlier Decision Framework, which we mutually adopted to guide the preparation of the project. You may recall that this framework is founded on three pillars: (i) implementing a development policy framework characterized by concrete performance that aims at poverty reduction and environmental protection; (ii) ensuring

by

that the technical, financial and economic aspects of the project and the design and implementation of safeguard policies are of a standard acceptable to the donor community; and (iii) obtaining broad support from international donors and civil society for the country's development strategy and the Nam Theun 2 Project itself.

5. In order to achieve the full benefits of the project, the government proposes an Implementation Policy Framework that will build further on these pillars and asserts its commitment to:

- continue to build a viable development policy framework and programs for poverty reduction and for social development and environmental protection, using the National Growth and Poverty Eradication Strategy and the Social and Economic Development Plans as drivers;
- focus on effective implementation of the technical, financial and economic aspects of the project, as well as of the environmental and social safeguards activities; and
- further strengthen support from the international donor community and global and local civil society for poverty reduction programs and associated development plans, and facilitate their involvement during the implementation of Nam Theun 2 Project itself.

6. As the centerpiece of our development framework, I wish to reiterate the government's strong commitment to our National Growth and Poverty Eradication Strategy (NGPES). We have set ourselves the goal of reducing poverty by half by 2015 and achieving the other Millennium Development Goals in our country.

7. We recognize the critical role of macroeconomic stability in this effort and value the advisory role of the multilateral institutions. The continued support of the donor community for the NGPES and the Social and Economic Development Plans is imperative for the achievement of our growth and poverty reduction objectives. We look forward to a series of projects in support of our efforts and will also work closely with all donors to restructure the current portfolio as needed to align it better with the NGPES.

8. In this context, I wish to express my appreciation for World Bank support to the first Poverty Reduction Support Credit that is being prepared in parallel with the Nam Theun 2 Project and ADB's comprehensive program of strengthening the State Audit Organization for enhancing the independent audit capacity of the Lao PDR's supreme audit institution. We would like to draw attention to the Letter of Development Policy sent by my colleague, the Finance Minister, to the World Bank wherein the government's plans relating to the strengthening of the development framework are set out. I do not wish to cover the same ground again in this letter but will deal with five critical project-related issues.

9. The important issues I would like to focus in this letter are (i) revenue management, (ii) ensuring adequate environmental and social performance and outcomes, (iii) consultation and participation, (iv) monitoring and evaluation, and (v) activities complementary to the Nam Theun 2 Project.



Revenue Management

10. Improvements in public financial management, especially the effectiveness of public expenditures, will be essential if Lao PDR is to achieve its ambitious development and poverty reduction objectives. In this context, the government has recently approved a Public Expenditure Management Strengthening Program (PEMSP), which aims to improve policy consistency, efficiency, transparency and accountability in public expenditure management by strengthening institutional systems and making progress towards appropriate international financial management standards. The PEMSP encompasses improvements in expenditure planning and budgeting, budget execution, accounting and reporting at both the central and provincial levels in the period to end of FY2009. Implementation of the PEMSP will require technical support from long-term and short-term advisors, as well as extensive training for financial management personnel. The government is seeking the support of external partners for technical assistance and training under PEMSP, complementing on-going projects financed by the World Bank and the Asian Development Bank. The PEMSP will provide a framework for coordinating such external assistance. In order to make an early start on PEMSP implementation, we will draw monies from the ongoing Financial Management Capacity Building Credit of the World Bank to fund program technical assistance requirements until the Ministry of Finance secures grant financing.

11. The revenue management arrangements described in an attachment to this letter describe the arrangements the government will adopt to utilize revenues derived from the Nam Theun 2 project. These arrangements will complement and support implementation of the Public Expenditure Management Strengthening Program. The government is committed to ensuring that *all* Nam Theun 2 revenues, net of the costs of the NT2 shareholding and overseeing the implementation of the NT2 project, are used to finance incremental spending on eligible poverty reduction and environmental protection programs, reflecting the priorities identified in the NGPES and its successors. Nam Theun 2 revenues will be channeled through a dedicated “NT2 Revenue Account” and released to the Central Treasury Account for the purposes of budget execution. Nam Theun 2 revenues will be used to finance: the repayment of debt incurred by the Government for the purpose of acquiring equity in NTPC; expenditures related to the exercise of its rights and the performance of its obligations under the Concession Agreement and the Project Documents; and eligible poverty reduction and environmental management programs that meet required financial management, financial reporting and performance monitoring standards.

12. Publication of estimates and allocations of Nam Theun 2 revenues to eligible programs in the annual budget, as well as quarterly budget execution reports, annual financial statements, summaries of inspection reports and audit reports, will ensure high standards of transparency in resource allocation. A program of public expenditure reviews and public expenditure tracking surveys, undertaken in collaboration with the World Bank, the Asian Development Bank and other development partners, will monitor progress in the development of financial management systems and the impact of eligible programs’ spending at the field level. An annual report will be prepared on the implementation of the Nam Theun 2 revenue management arrangements and serve as the basis for consultations with external partners.

13. In order to manage the Government’s shareholdings in the NTPC project efficiently and transparently, we have established a special purpose company, the Lao Holding State Enterprise

(LHSE). While LHSE may play an important role in the future of development of other independent power producers in Lao PDR, its primary function in the medium-term will be to support implementation of the NT2 project. In this context, LHSE's operating budget, financed from NT2 related income, will cover only costs directly related to its obligations as an NTPC shareholder, NT2 project oversight and implementation costs. The Government of Lao PDR will also ensure that LHSE's shareholding in NTPC is fully protected from any risks associated with LHSE's broader development activities.

Ensuring Environmental and Social Performance and Outcomes

14. We have worked closely with the World Bank, the Asian Development Bank and other partners to ensure that the decision making process, detailed project design, and implementation program have adopted measures to adequately manage potential environmental and social impacts and risks. The Nam Theun 2 Project has been prepared to adhere to the environmental and social policies of Lao PDR, the World Bank, the Asian Development Bank and other partners.

15. We fully subscribe to the vision developed for addressing environmental and social aspects of the project through the Environmental Assessment and Management Plan (EAMP), Social Development Plan (SDP) and the Social and Environmental Management Framework and First Operational Plan (SEMFOP). We will spare no effort, in cooperating with our project partners, the Nam Theun 2 Project Company (NTPC), to anticipate, monitor and effectively mitigate environmental and social impacts and risks, on the plateau and in the watershed and downstream areas of the project. We commit to ensuring the integrity of the project's watershed (Nakai Nam Theun National Protected Area and its two corridors) and will strictly promote and abide by the guiding principles for its medium-to-long-term development set forth in the SEMFOP. Specifically, we will ensure that there is no commercial development (including roads, logging, mining and other resource extractive activities) in the Nakai Nam Theun National Protected Area and the two corridors which together comprise the NT2 watershed, and that all land use within the watershed is fully consistent with the community-based forest and land use planning and management (FLUPAM) process described in the SEMFOP.

16. We will also monitor and regulate in-migration into the watershed and reservoir areas, resolve the legacy of resettlement of affected ethnic groups in the watershed, and ensure adequate management of cumulative impacts downstream of the Theun Hinboun dam. We have addressed the above-referenced resettlement issues in a letter directed to the World Bank by my colleague, the Minister of Agriculture and Forests in November 2004. As for the impacts downstream of the Theun Hinboun, we intend taking a long-term, strategic and integrated approach to the management of the Nam Theun/Nam Kading river basin, to address and mitigate cumulative impacts caused by different development projects, including the suite of planned hydropower and other development projects. This will serve as a pilot for river basin management that will be extended over time to other basins within Lao PDR. We will be seeking donor support to implement such an initiative, including the establishment of an appropriate institutional structure.

17. The government will ensure that capable and qualified staff are assigned to work on a permanent basis in the Watershed Management and Protection Authority, the Resettlement

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Management Unit and the Environmental Management Unit, to achieve the outcomes specified in the EAMP, SDP, SEMFOP and Project Implementation Plan, in partnership with NTPC. As indicated in these documents, we have designed, in collaboration with the World Bank, the Asian Development Bank and other partners, detailed mechanisms for grievance resolution, as stated in the SDP, and arrangements for continued consultations with project-affected persons throughout implementation. We will mobilize the resources and accord the priority needed to successfully implement these arrangements.

Consultation and Participation

18. We will build on the lessons learned from the local consultations in the preparatory phase of the Nam Theun 2 Project. In this context, may I reiterate that the government will conduct direct consultations with communities and individuals in the project area during the implementation and operation phase to seek their views on a diversity of issues, covering impacts, mitigation measures and outcomes of the project. These consultations and the associated disclosure of information will be used to make adjustments to project design and to refine mitigation and monitoring programs.

19. Let me also stress the government's continued strong commitment to seeking support for the project from the international donor community and from civil society. We value their involvement in our poverty reduction programs and development plans and will continue to facilitate their access to information and participation in discussions on the project in the future. We will support the use of the Government-led and UNDP-supported Roundtable Mechanism for monitoring the NGPES and progress on the Nam Theun 2 Project. We will convene periodic meetings of co-financiers for review of: (i) the physical progress in implementation of project investments, (ii) results of monitoring and evaluation of social and environmental impacts and outcomes, (iii) measures taken to address unforeseen events, and (iv) other dimensions of the project. The government has definite plans to further improve its capacity in the area of public communications and media relations in respect of the project and will continuously update its website.

Monitoring and Evaluation

20. To support effective implementation of the Nam Theun 2 Project, we will implement the project monitoring and evaluation (M&E) framework, described in an attachment to this letter, comprised of five complementary components:

- supervision and systematic monitoring of physical implementation of the hydropower project, including the environmental and social safeguard programs;
- monitoring of conditions and outcomes on the Nakai plateau (reservoir and resettlement areas) and in the downstream and watershed areas as defined in the EAMP, SDP and SEMFOP;
- monitoring of revenue management arrangements;
- maintaining a Panel of Environment and Social Experts to advise the government on implementation of the project; and
- maintaining a Dam Safety Review Panel.

21. We welcome the fact that these efforts will be complemented by several other M&E measures financed by the NTPC and the financing partners:

- systematic monitoring of the technical and safeguards components of the project and its impacts by one or more professional firms on behalf of the private and public sector financial institutions;
- regular supervision by staff of the World Bank, the Asian Development Bank and other development partners; and
- visits from the International Advisory Group that advises the senior management of the World Bank.

22. Let me also assure you that the government will continue to ensure that staff of the financial institutions involved in the project and their advisors and consultants will have full access to the project area and to information about the project and its numerous activities throughout the implementation period.

Activities Complementary to the Nam Theun 2 Project

23. The Government's commitment to conservation goals, to better managing the environmental and social aspects of development programs, and to improving rural livelihoods goes well beyond the scope of the Nam Theun 2 Project. We recognize the importance of strengthening our policies and institutional capacity in these areas and will be taking several measures in this regard during the project implementation period. We are working with the Asian Development Bank on the establishment of a Lao Environment and Conservation Fund by June 2005. We will use this Fund to apply part of Nam Theun 2 revenues to support priority environmental protection and conservation programs. In the intervening period, we will ensure that the fund follows financial management and reporting practices that are consistent with the Government's public expenditure management system. We are also seeking support from the World Bank, for two other projects. The first is a nation-wide Environmental and Social (LEnS) Project, addressing the need to mainstream environmental and social safeguards in infrastructure development, strengthen biodiversity conservation in Central Lao, and increase the public's knowledge of and support for environmental management. The second is the Rural Livelihoods Project, for the vicinity of the Nam Theun 2 Project, that would address resource management and rural development challenges at the community level. Both will place strong emphasis on broader and longer-term capacity building.


24. We will also work on plans for the further development of the Lao power sector, including measures to promote energy conservation. We will continue our cooperation with other riparian countries directly and through the Mekong River Commission to optimize decisions on water resources management and hydropower development, taking into account trans-boundary benefits and costs, including environmental and social aspects. In addition, we will work with the World Bank, the Asian Development Bank and other partners to improve the governance and management of hydropower planning and development within Lao PDR. Through the LEnS Project and other instruments we will seek support to improve our capacity to conduct and apply the findings of environmental assessments, resettlement action plans, ethnic minority development plans and other related instruments in the hydropower sector.

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25. In closing, let me reiterate that the government is fully committed to the implementation of the Nam Theun 2 project so as to meet Lao PDR's development aspirations and international standards on project procurement, technical aspects and safeguards. We will not hesitate to mobilize technical expertise to achieve this end, both by strengthening our own professional cadres, and by tapping the capacity of consultants and non-government organizations with the required experience and demonstrated record of commitment, where needed to address our own capacity constraints. We will extend our full cooperation to the donor community by working in partnership, as we have in the past.

26. Please be assured of the government's deep appreciation of the role of the World Bank and the Asian Development Bank and other donors in mobilizing financial resources and support for the Nam Theun 2 Project. Because of their interest in the project, we are copying this letter to the other co-financiers. Also, an identical letter has been addressed to the President of the World Bank.

With best regards.

Yours Sincerely, 



Dr. Thongloun Sisoulith
Deputy Prime Minister
Government of Lao PDR

Attachments:

1. Nam Theun 2 Revenue Management Arrangements
2. Nam Theun 2 Environmental and Social Issues
3. Nam Theun 2 Monitoring and Evaluation Arrangements

Technical Annex to GLIP NT2 Revenue Management Arrangements

The NT2 revenue management arrangements seek to ensure that NT2 revenues are applied transparently and efficiently in financing of poverty reduction and environmental conservation programs reflecting the Government of Lao PDR's policy priorities as laid out in the National Growth and Poverty Reduction Strategy and its successors. These revenue management arrangements complement the broader Public Expenditure Management Strengthening Program. The NT2 revenue management arrangements will be applied for the duration of the Concession Agreement or as mutually agreed between the Government and the NT2 GoL equity financiers. The NT2 revenue management arrangements described below comprise four pillars: the first pillar addresses the allocation of NT2 revenues; the second pillar addresses the flow of funds; the third addresses mechanisms for reporting on the application of NT2 revenues; and the fourth addresses mechanisms for monitoring and consultation with NT2 GoL equity financiers.

First Pillar: Allocation of NT2 Revenues

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| 1.1 Allocation of NT2 revenues | Allocations of NT2 revenues ¹ will be determined through the Government's expenditure planning and budget process, as part of the allocation of overall public resources. The repayment of debt incurred by the Government for the purpose of acquiring equity in NTPC, and any associated charges, and expenditures related to the exercise of its rights and the performance of its obligations under the Concession Agreement and the Project Documents, shall be financed from NT2 revenues. All remaining NT2 revenues will be allocated to eligible programs. |
| 1.2. Identification and revision of eligible programs. | The Government will prepare a list of eligible programs that may benefit from NT2 revenues. The selection of eligible programs will be consistent with the criteria identified in 1.3 below. Indicative eligible programs have been identified to reflect the Government's current priorities, as laid out in the NGPES, in order to focus attention of capacity building efforts in the period before NT2 project commissioning. This list will be adjusted as the Government prepares successors to the NGPES: some eligible programs may be dropped others that meet the selection criteria may be included. The number and scope of eligible programs is expected to gradually expand as financial and program management capacity is strengthened. NGPES successors will identify the NT2 eligible programs and include |

¹ NT2 revenues are defined in the Development Grant Agreement, to include: resource usage charges and taxes payable by NTPC; part of the payments under Article 19.1 of the Concession Agreement; taxes and dividends payable by the Lao Holding State Enterprise relating to its equity holding in NTPC.

indicative allocations to these programs. A revised list of indicative programs, indicating their objectives and key performance indicators, will be prepared by the start of FY2008 or the start of fiscal year before the year in which project is to be commissioned, whichever is earlier.

1.3. Criteria for the selection of eligible programs

The selection of eligible programs to be financed with NT2 revenues will be based on the following criteria:

- a) Programs identified as priorities in the Government's National Growth and Poverty Eradication Strategy, and its successors;
- b) A significant and verifiable poverty reduction impact, providing public goods, services and infrastructure used by the poor in rural areas, including public services which aim to promote economic growth by increasing productivity and incomes of the poor; and / or
- c) A significant and verifiable conservation or environmental impact; and, additionally,
- d) clearly defined objectives, performance indicators and systems in place for monitoring performance in terms of the volume and quality of services provided;
- e) established mechanisms for program performance evaluation, involving key stakeholders at or close to the field level;
- f) programs will be clearly distinguished in the Government's budget and chart of accounts (through a detailed administrative / organizational or program classification) at all levels of administration, with institutional responsibility for program management clearly assigned;
- g) Administrative and financial management arrangements in place that would allow them to meet financial reporting requirements (see 3.1 to 3.3), and have demonstrated compliance with these financial reporting requirements;
- h) Programs will have benefited from budgeted expenditures prior to selection and have a continuing recurrent financing requirement over the medium to long-term, and with a medium-term financing plan. In some cases, the Government may introduce new medium to long-term programs, reflecting policy initiatives launched under NGPES successors.

- 1.4. Identification of indicative eligible programs on basis of current NGPES. Indicative eligible programs have been identified on the basis of the Government's current policy priorities. These indicative eligible programs will benefit from capacity building initiatives to strengthen program and financial management capacity in the responsible agencies. The list of indicative eligible programs will be subject to change as successors to the NGPES are prepared. The indicative eligible programs are:
- a) basic education;
 - b) basic health care;
 - c) rural roads, including the Road Maintenance Fund;
 - d) local development initiatives identified through a participatory planning process, including the Poverty Reduction Fund;
 - e) environmental protection initiatives (the Government is in the process of establishing an Environment Fund).
- 1.5 Additionality of expenditures financed with NT2 revenues. NT2 revenues will provide additional resources to support eligible programs and will not substitute for financing from other sources. Additionality of budgeted and actual expenditures for eligible programs will be verified against base expenditures. Base expenditures are the expenditures on eligible programs financed from general revenues (ie. excluding externally financed projects and NT2 revenues). Base expenditures will be determined as, whichever is greater: a) budgeted expenditures in the previous year expressed in real terms for the comparator year; b) the average expenditures in the three previous years, again expressed in real terms for the comparator year and c) eligible programs' percent share of budgeted and actual total expenditures, excluding expenditures related to debt servicing, in the previous year. The basis for determining additionality of NT2 financed expenditures will be reviewed three years after project commissioning, thereafter as deemed necessary, and agreed with NT2 GoL equity financiers, in order to ensure policy consistency and efficiency in the application of NT2 Revenues.
- 1.6 Allocation of proceeds under Section 19.1 of the Concession Agreement Proceeds to Government of Lao PDR under section 19.1 of the Concession Agreement that are NT2 revenues, will be allocated to a) financing of eligible programs in the fiscal year in which such proceeds are made available or in subsequent years; and b) capital projects consistent with the objectives of the eligible programs.
- 1.7 Documentation of NT2 allocations of funds Allocations of NT2 revenues to eligible programs will be identified in an annex to MTEF documents and state budget. This annex will present detailed estimates of NT2 revenues, the corresponding allocations to each of the eligible programs, the expenditures financed from general revenues to each of these programs and demonstration of additionality in these allocations. A MTEF and budget documents identifying allocations to eligible programs will be prepared and

published in FY2008. Thereafter, budget documents identifying allocations to eligible programs will be prepared and published annually, and the MTEF will be published as updated.

Second Pillar: Flow of Funds

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| 2.1. Treasury NT2 revenues will be deposited in a dedicated “NT2 Revenue Account”, held and managed by Treasury | NT2 revenues will be deposited in a dedicated Treasury account held at the Bank of the Lao PDR (“NT2 Revenue Account”). This account will be managed by Treasury as one of the Government’s treasury accounts. The Tax and State Property Departments will administer revenue payments according to applicable legislation. NT2 revenues payable by NTPC will be paid directly by NTPC to the NT2 Revenue Account. NT2 revenues payable by the Lao Holding State Enterprise (LHSE), will be paid through an onshore escrow account opened by the LHSE directly to the NT2 Revenue Account. |
| 2.2 Transfer of NT2 revenues from the “NT2 Revenue Account” to the Central Treasury account. | Treasury will transfer funds from the “NT2 Revenue Account” to the Central Treasury Account on a monthly basis, for the purpose of budget execution. Transfers of funds from the “NT2 Revenue Account” will be authorized by the Budget Department on the basis of apportionments for each of the eligible programs, reflecting budget allocations and budget execution, apportionments for the repayment of debt incurred by the Government for the purpose of acquiring equity in NTPC, and expenditures related to the Government’s exercise of its rights and the performance of its obligations under the Concession Agreement and the Project Documents. Funds transferred to the Central Treasury Account will be disbursed following procedures foreseen under applicable legislation. |
| 2.3 Annual financial statement of “NT2 Revenue Account” | The Ministry of Finance will prepare an annual statement of balances, receipts and transfers for the “NT2 Revenue Account”, starting from the fiscal year in which the Government of Lao PDR first receives revenues from the NT2 project. |
| 2.4 Withholding of funds in the NT2 revenue in the “NT2 Revenue Account” | <p>In exceptional circumstances, the Minister of Finance will withhold NT2 revenues in the “NT2 Revenue Account”, corresponding to all or part of the allocations and related apportionments of eligible programs where the Ministry of Finance considers that one or more of the following applies:</p> <ul style="list-style-type: none"> a) the application of funds is no longer justified or appropriate; b) the agencies responsible for eligible programs have not complied with financial reporting, inspection and audit requirements on a timely basis; c) there has been a serious financial control failure by an agency, as demonstrated by audit, inspection reports or information received from monitoring program implementation; d) budget execution has slowed significantly and the Ministry |

- considers that it will no longer be able to apply funds efficiently;
- e) the agencies responsible for eligible programs do not apply their allocation of NT2 funds for purposes consistent with the criteria established under the fund and /or the objectives of the eligible programs.

2.5 Reallocation of NT2 revenues during budget execution	The Ministry of Finance may reallocate NT2 revenues between eligible programs during the fiscal year in order to ensure efficient budget execution. The Ministry of Finance may reallocate allocations and apportionments withheld as described in 2.4 above. Reallocations of funds will be authorized following procedures laid out in applicable legislation and will be reflected in published quarterly budget execution reports.
2.6 Application of "NT2 Revenue Account" balances	Any end-of-fiscal year balances of the "NT2 Revenue Account" will be retained in the account and applied in apportionments for eligible programs in the following fiscal year as described in 2.4 and 2.5 above, ensuring that the application of revenues is consistent with additionality requirements in 1.5 above. This may include funds retained to meet commitments carried forward for eligible programs. It is not intended that there should be an accumulating balance on this account. However, balances resulting from the payments of NT2 revenues under Section 19.1 of the Concession Agreement (see 1.6 above) be retained in the account for the purposes of leveling expenditures on eligible programs.

Third Pillar: Reporting

3.1 Budget and accounting registers for eligible programs	The published statutory chart of accounts and budget nomenclature will clearly identify all eligible programs (following a detailed administrative / organizational or program classification) so that the application of NT2 revenues can be tracked (see criteria in 2.2). A revised chart of accounts will be implemented for eligible programs in the preparation of the FY2008 budget.
3.2 Reporting on budget execution for eligible programs	The Ministry of Finance will prepare and publish, from FY2008: quarterly budget execution reports, providing summary information on expenditures for each eligible programs, within sixty days of end of period; and end-of-year financial statements covering each of the priority programs within the time frame specified in legislation. The financial reports and financial statements for priority programs should be prepared on both a cash and a modified-cash (including reporting commitments) in accordance with international public sector accounting standards.
3.3 Reporting on internal control in	The Ministry of Finance's Inspection Department and other relevant Departments will undertake an annual program of internal audits of

eligible programs	eligible programs and from FY2008 publish a summary report outlining the financial management, control weaknesses and irregularities identified, cases of non-compliance in the proper use for funds for eligible purposes, recommendations made to address these concerns and the management actions taken by the responsible agencies.
3.4 Audit of "NT2 Revenue Account" and eligible programs	The State Audit Organization will conduct and publish, each year starting with financial statements for FY2008: an audit opinion on the statement of receipts and transfers of the "NT2 Revenue Account"; and an audit opinion on the financial statements of eligible programs and compliance with the Government's financial management and procurement procedures, and that funds have been applied for the purpose of the eligible program. In addition to audit opinions, the auditors will provide a summary of audit findings and the management response highlighting the principal weaknesses and irregularities identified by the auditor and corrective action to be taken to strengthen management systems.
3.5 Audit standards	Audits will be conducted in accordance with international public sector accounting standards issued by IFAC for financial audits and INTOSAI standards for performance audits. As part of its capacity building efforts the State Audit Organization will commission a peer review by an INTOSAI member to advise on progress towards meeting applicable standards. Steps will be taken to implement peer reviewer's recommendations. Peer reviews will be conducted: in FY2006; in the fiscal year in which the Government of Lao PDR first receives revenues from the NT2 project; and every three years thereafter.
3.6 Annual report on implementation of NT2 revenue management	The Ministry of Finance will publish an annual report within six months of the end of each fiscal year in which it will confirm that NT2 revenues have been allocated to priority programs, consistent with the fund criteria, and that these programs have complied with reporting and Government financial management requirements. The report will also detail corrective measures have been taken to ensure that eligible programs meet allocation and reporting requirements. The report will also include summary information on the performance of eligible programs in relation to their objectives and performance indicators.

Fourth Pillar: Monitoring and Consultation

4.1 Implementation of Public Expenditure Review and Public Expenditure	The PER and PETS will be an on-going process, implemented through a collaborative approach between the Ministry of Finance and NT2 GoL equity financiers. In consultation with the Government, other development partners may be requested to support the PER and PETS. Public expenditure reviews and expenditure tracking surveys will be
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Tracking Surveys	<p>undertaken every two years starting in 2006, in order to assess i) progress in implementation of the NT2 revenue and expenditure management arrangements; ii) progress in strengthening public expenditure management systems, assessed PEMSP performance indicators; iii) the efficiency and effectiveness of spending; and, after commissioning, iv) the impact of NT2 financed eligible program expenditures and the effectiveness of expenditure management and control arrangements. The Government will ensure access to the data, personnel and documentation needed to assess progress in implementing the revenue and expenditure management arrangements, the financial control environment and the performance of programs financed with NT2 revenues. The PER and PETS reports will be published, following standard disclosure procedures.</p>
4.2 Review of status prior to project commissioning	<p>Prior to project commissioning, the Government and NT2 GoL equity financiers will consult annually on progress in implementing the NT2 revenue management arrangements. At least six months prior to the Commercial Operations Date, the Government, in collaboration with the NT2 GoL equity financiers, will assess progress in setting up revenue management arrangements and prepare a report covering the issues addressed in the annual report described in 3.6 above. This review will be informed by analysis of the results of audit peer review process and recommendations (3.5) and PERs and PETs (4.1).</p>
4.3 Annual consultations with NT2 GoL equity financiers	<p>After project commissioning, annual consultations between Government of Lao PDR and NT2 GoL equity financiers will review progress in implementation of NT2 revenue management arrangements and the impact of NT2 financed expenditures. These consultations will be informed by the annual report (see 3.6), financial and inspection reports (see 3.2 and 3.3) and audit reports (3.4), as well as a summary report on the audit peer review process and recommendations (3.5) and PERs and PETs (4.1). In the context of these consultations, NT2 GoL equity financiers may advise on strengthening implementation arrangements.</p>



Attachment 2

Technical Annex to GLIP
NT2 Hydroelectric Project - Environmental and Social Issues

***The Government's Role in Implementation of
Environmental and Social Programs and Activities of the Project***

1. The Nam Theun 2 Project has been designed to ensure full consistency with the environmental and social policies of Lao PDR, the World Bank, the Asian Development Bank and other financing parties. The three safeguards documents -- the Environmental Assessment and Management Plan (EAMP), the Social Development Plan (SDP) and the Social and Environmental Management Framework and First Operational Plan (SEMFOP) -- lay out principles, technical guidelines, procedures and programs which the GoL is fully committed to supporting in the course of project implementation. The Concession Agreement signed with Nam Theun 2 Power Company (NTPC) specifies the obligations of the Government and NTPC to implement the provisions contained in the three documents. The NTPC's Project Implementation Plan and Annual Implementation Plans (AIP) will further detail the modalities, timelines and budgets.

2. The GOL recognizes its dual role in the project:

- (i) *As a party to the Concession Agreement*, the Government will perform the functions stipulated therein, including those involving functions such as land titling, licensing and enforcement of all regulations applicable to any aspect of the project; and
- (ii) *As a shareholder of NTPC*. The Government-owned Lao State Holding Enterprise (LSHE) holds 25 percent equity in NTPC. NTPC is responsible to ensure the achievement of the project's objectives and that its programs and activities are implemented in accordance with the principles, technical standards and procedures embodied in the Concession Agreement, and the safeguards documents, and elaborated in NTPC's Project Implementation Plan (PIP) and the AIPs.

Joint Responsibilities

3. As a party to the Concession Agreement, the Government will ensure that adequate facilities and resources are available in a timely manner to support project implementation. This includes qualified staff in sufficient numbers, assigned or recruited to work in the Resettlement Management Unit (RMU), the Environmental Management Unit (EMU), and the Watershed Management and Protection Authority (WMPA). To this end, the Concession Agreement sets out the respective obligations of both the Government and NTPC, as summarized below:

- (i) LSHE, jointly with the other shareholders of NTPC, will implement, the social and environmental programs on the plateau and in the downstream areas.
- (ii) NTPC will contractually obligate the Head Construction Contractor, civil contractors and sub-contractors to implement environmental and social mitigation measures under its guidance.

- (iii) NTPC will also assist the Government's RMU and the EMU in carrying out those activities of the SDP and the EAMP which have been attributed to government agencies, on the basis of arrangements that will be reviewed at the time of preparation of each AIP and as needed in the course of the year.
- (iv) In the case of the programs on the Nakai Plateau and the downstream areas, it is envisaged that the role of government agencies will gradually increase as project implementation proceeds and the agencies' capacity is strengthened.
- (v) In the case of the NT2 Watershed, the Government, through the Watershed Management Authority (WMPA), will have sole responsibility for implementing SEMFOP, and will seek assistance from NTPC for project management (procurement and financial management) expertise.
- (vi) WMPA will work in close coordination with sectoral agencies, and provincial and district authorities.
- (vii) NTPC will provide the financing for SEMFOP implementation and will carry out procurement and financial management activities on behalf of WMPA.

4. As indicated in the documents, the Government, in collaboration with the World Bank, the Asian Development Bank and other financing parties of the NT2 Project, has designed arrangements for continued consultation with and participation of project-affected persons throughout the course of project implementation. The Government has also developed detailed mechanisms for grievance resolution in anticipation that a project of the scale and complexity of NT2 may give rise to unforeseen impacts and disputes which will need to be channeled and resolved in a timely and fair manner. The grievance mechanisms currently foreseen in the SDP and the EAMP (including the HCC-EMMP) will be carefully observed in the course of the first year of implementation. The Government proposes to explicitly review the effectiveness of these grievance mechanisms with the Social and Environmental Panel of Experts (POE) by June 30, 2006, and adjust them, as needed, thereafter.

Exclusive Responsibilities

5. With respect to areas where the Government has exclusive responsibilities – such as land titling, licensing and enforcement of regulations – we commit similarly to ensuring timely and competent performance in support of the project. To this end, a number of ministries, agencies and provincial administrations will play an important role in implementation of the project. These include: (a) the Ministry of Agriculture and Forestry and agencies under it, including Department of Fisheries, Agriculture, Forestry and Forest Resources Conservation; (b) the Ministry of Industry and Handicrafts, and agencies under it, including the Bureau of Secretariat for the Lao National Committee on Energy and Electricity of Laos; (c) the Science, Technology and Environment Agency, and the Department of Environment under it; (d) the Ministry of Finance; (e) the Ministry of Labour and Social and Welfare; and (f) the Administrations of Khammouane, Bolikamxay and Savannakhet Provinces.

6. To ensure effective coordination in project implementation, the Government has established a steering committee, integrated by the above-referenced ministries, agencies and local authorities, supported by a full-time secretariat. The Government has assessed the strengths and weaknesses of the the key implementing agencies, with special focus on the RMU,

EMU, WMPA LHSE, and accordingly GOL has developed an institutional strengthening program where needed. This program will be implemented over a period of three years and paid for by the Project, as provided for in the Concession Agreement. The program will include a menu of capacity building options and will be undertaken by staffing up on critical skills, conducting in-house training, and/or bringing in external assistance (such as consultants or NGOs). Government agencies are in contact with operational NGOs to assist in these capacity building efforts and in some cases work has already begun. The Government intends to widen the involvement of these operational NGOs in project activities, eventually leading up to their possible involvement in other projects..

The Government also highlights the following specific activities, complementary to the NT2 project, where it has sovereign authority:

Controlling migration and land use on the Nakai Plateau: The Government, through the Khammouane Provincial Governor, will control and regulate in-migration into the plateau and more specifically the reservoir area, ensuring that (a) the updated census undertaken in 2003 is accepted as the basis for identifying those who will need to be relocated and are thus eligible for compensation measures defined in the CA; (b) maintaining the reservoir area, once the area is cleared and before the reservoir filling operations are complete, will be absolutely ensured; and (c) once resettlement villages and the reservoir is formed, these areas and the resources therein will be for the exclusive use of resettlers. In addition, the Government, through the relevant district authorities, will revise and update urban development plans to take into account the likely influx of population arising out of construction activities. Plans will be updated for Gnommalat and Oudumsouk Towns by May 1, 2006; and thereafter for any others, as identified in the Annual Work Plans or as otherwise agreed to in the course of project implementation.

- (ii) ***Legacy of past resettlement of ethnic groups in the Watershed.*** As confirmed by the Minister of Agriculture and Forestry in his letter of November 2004 to the World Bank, the Government will address pending issues of past resettlement in the Watershed. It proposes to: (a) by March 30, 2006, identify and consult with the ethnic groups, who were previously displaced from the Watershed through past resettlement; and (b) by December 30, 2006, develop appropriate plans as needed to resolve pending issues, including the option for households to return to their previous ancestral and cultural territory; and to benefit from the SEMFOP program. The Government also commits to not resettle any other inhabitants from the Watershed area.

Management of cumulative impacts in Nam Theun/Nam Kading (NTNK) River Basin. In keeping with the decision of the Government's Water Resources Coordination Committee, relevant agencies are collectively pursuing the task of establishing a national approach for the integrated management of the country's river basins, including the main tributaries of the Mekong. Developing and implementing such an approach, in line with international practices, is resource-intensive and will take many years. With assistance from the Asian Development Bank and the Agence Française de Développement, the Government is already preparing such a plan for the Nam Ngum River. Similarly, the Government proposes to take a long-term, strategic and integrated approach to the management of the NTNK Basin, to address and mitigate cumulative impacts caused by

different development projects, including the suite of planned hydropower and mining projects. Specifically, the Government will seek support from IDA through the proposed Lao Environment and Social Project for this initiative. The Government envisages that: (i) the scope of work to design such an integrated approach would be agreed by December 31, 2005; (ii) an institutional framework for river basin management of the NTNK Basin will be designed by June 30, 2007; and (iii) a specific agreement with the Thin Hinboun Power Company on the management of the cumulative impacts downstream of the Theun Hinboun dam would be reached by December 31, 2007.

8. In addition to the above, the Government sees in the NT2 Project a model for testing guidelines and approaches that, with suitable adaptation, could be applied more broadly in the country. In the medium term, the benefits from such an approach would lead to the strengthening of our capacity to manage large infrastructure projects, biodiversity conservation, management of social and environmental safeguards of development programs, and improvement of rural livelihoods, as mentioned in this letter.

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Attachment 3

Technical Annex to GLIP
NT2 Monitoring and Evaluation Arrangements

1. The NT2 project is large and complex, encompassing three distinct geographic areas within the overall project area: the Nakai Nam Theun National Protected Area and two corridors linking it to other NPAs (the NT2 Watershed), the Nakai Plateau, and the downstream areas of the Nam Theun and Xe Bang Fai rivers. The monitoring and evaluation (M&E) arrangements for the project seek to ensure that information on physical progress and the impacts and outcomes expected from the project are adequate in scope and detail, accurate, timely and relevant to the needs of the Government of Lao PDR (GoL), project sponsors, financial institutions and other stakeholders involved in the project, so as to ensure that effective arrangements are in place for regular oversight, monitoring and evaluation of project implementation.
2. The purpose of this annex is to describe the Government's obligations and commitments with regard to the M&E framework that have been agreed between the GoL, the Nam Theun 2 Power Company (NTPC) and the international financial institutions acting as lenders and/or guarantors to the project.
3. Under the project agreements, the GoL has the sole responsibility for management and protection of the NT2 watershed, as described in the SEMFOP document, and shares responsibility for some of the resettlement activities on the Nakai Plateau and for some of the social and environmental impacts in the downstream areas with NTPC. It also has a national responsibility to ensure that the terms of the Concession Agreement between it and NTPC are honored in full and that there are no material impacts on its citizens, the environment or the economy in the project area that are caused by the project and left unmitigated. Finally, the GoL is concerned to maintain a high degree of interest and involvement of the international financial and development institutions and civil society in progress on the NT2 project and, more generally, in the development of Lao PDR.
4. Accordingly, the GoL acknowledges the following responsibilities which fall to it under the M&E framework and intends to take the following actions to meet these responsibilities:
 - a. *Ensure the accurate collection and analysis of data and information by government bodies involved in project implementation.* These bodies include the Environment Management Unit (EMU), the Resettlement Management Unit (RMU) and the Watershed Management and Protection Authority (WMPA) under the respective authority of the Science, Technology and Environment Agency (STEA), the Resettlement Committee (RC) of the Khammouane Provincial Government and the Ministry of Agriculture and Forestry (MAF). To do so, the GoL will ensure that these implementing bodies are staffed with qualified professionals and that the scope and frequency of the data to be collected and the reporting formats for each of these bodies will be agreed with the Lenders prior to project effectiveness. GoL will also grant external M&E bodies full access to the project sites and other affected areas.



- b. *Ensure the prompt dissemination of that information in the form of periodic progress reports of agreed scope, detail and format to the independent monitoring agencies (IMAs) which are charged with monitoring and evaluating the performance of these bodies, expert advisors to the Government, including the Government's Engineer (GOLE), the Dam Safety Review Panel (DSRP), the Panel of Experts (POE), and to the Government bodies involved in direct project oversight: the Lao National Committee on Energy (LNCE) and the National Steering Committee on NT2 Implementation (SC).*
- c. *Ensure the prompt dissemination of all information on project progress, in the form of periodic progress reports of agreed scope, detail and format, to the participating financial institutions and their advisor, the Lenders' Technical Advisor (LTA). The LTA will receive information on project progress directly from NTPC and from all government implementing agencies through the Secretariat of the LNCE as these reports become available. These reports would cover physical progress, environmental and social aspects of the project, revenue management arrangements and progress under the public expenditure management strengthening program (PEMSP), whether produced by project implementing agencies or by the expert advisory bodies and the IMAs. The scope, frequency and reporting formats for each of these bodies will be agreed with the Lenders prior to project effectiveness. The information from Government agencies to the LTA will be for the use of the IFIs and bilateral agencies and will not be made available to the private lenders. We understand that adequate provisions will be put in place by the LTA to ensure the confidentiality of this information and would expect that a suitable confidentiality undertaking would be entered into for this purpose with the Government. Reporting on revenue management issues will be directed to the IFIs and interested bilateral agencies only.*
- d. *Facilitate the timely work of the expert bodies established to advise the Government (these include the DSRP, GOLE, and POE), as well as the IMAs, being financed by NTPC under the CA, to monitor and evaluate the performance of government implementing agencies (EMU, RMU and WMPA). To do so, we will ensure that the expert bodies and the IMAs remain in place, legally empowered, with adequate resources and full access to the information necessary and to the project area so that they can carry out their respective responsibilities during the project period. They will receive copies of periodic reports in their areas of responsibility electronically and as soon as they are published.*
- e. *Facilitate periodic supervision by the individual financial institutions participating in the project and their advisors, in particular the LTA and the International Advisory Group (IAG), providing them full information from Government and non-government sources, and enabling them access to the full project area. The Government will continue to provide full support to the supervision activities of the IFIs, the private financial institutions and their advisors. It understands that the lenders will seek to coordinate their supervision activities so as to minimize the number of requests for information or site visits*



and to utilize information available to project implementing agencies where available.

- f. *Facilitate the work of the international financial institutions to assist the GoL to lay the foundations for robust NT2 revenue management arrangements* through periodic supervision missions by their staff and advisors, and the carrying out of periodic public expenditure reviews and public expenditure tracking surveys, as set forth in the technical annex on revenue management.
- g. *Coordinate the Government's involvement in and oversight of the project* to ensure efficient coordination of all governmental agencies involved in the NT2 project, prompt action on the part of these agencies to meet the government's commitments under the project agreements, and act as liaison to the financial institutions participating in the project, as well as local, regional and international stakeholders. To carry out these functions, the Government has established two bodies to oversee implementation of the NT2 project. The Lao National Committee on Energy (LNCE) is responsible for ensuring that NTPC and the Government meet their respective responsibilities under the CA. Through its secretariat, it will coordinate Government oversight of implementation of the NT2 project, receive reports from project implementation entities and expert advisory bodies and disseminate information to lenders and, through its website, to the public. The Chairman of the LNCE is the Deputy Prime Minister. The Lao Holding State Enterprise has been established as a new state-owned enterprise, wholly owned by the Ministry of Finance, to hold the Government's shares in NTPC. It will build a specialist staff with the necessary technical skills sufficient to act as shareholder. The Government has a third entity, which is the National Steering Committee on NT2 Implementation. It brings together all concerned government departments involved in the NT2 project to ensure smooth, cross-ministerial cooperation and coordination between agencies of the central government and the provincial and local governments involved in the project. The Secretariat of the LNCE will assume the responsibility to coordinate the inputs of all concerned government agencies and to follow up to ensure that the Committee's decisions are implemented efficiently.
- h. *Join with the participating financial institutions in annual consultations to review progress on technical, environmental, social and other project-related matters*, including the public expenditure management strengthening program and NT2 revenue management arrangements, as well as an in-depth review of all aspects of the project six months prior to the commercial operations date (COD). The Government intends to entrust this responsibility to the LNCE which will act as the Government's international representative on the project. The Government plans to take the lead in calling for and chairing an annual consultative review of project progress, bringing together the GoL, NTPC and the participating financial institutions, with the support of the IFIs involved in the project.
- i. *Inform interested stakeholders, including civil society, about project developments* through the UNDP Round Table Process, or alternative mechanisms, and an updated Lao Government project website and other

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measures. The LNCE will represent the Government in the UNDP Round Table Process, which brings together development organizations beyond the scope of the NT2 project. Finally, it plans to maintain a periodic dialogue with civil society on the project. The LNCE will update its current project website to post periodic reports on project progress, including the reports of the expert advisory bodies (DSRP, GOLE and POE) and the IMAs.

5. The GoL expects to be able to continue to draw freely on the advice and support of the participating financial institutions, and in particular the support of the IFIs, to build its institutional capacity for the purposes described above, to ensure that the progress reports are complete, objective and timely, and to maintain a constructive dialogue with all project stakeholders and civil society.



LESSONS LEARNED AND INCORPORATED IN THE PROJECT

Table A3.1 describes how the major lessons learned from previous hydropower projects in the Lao People's Democratic Republic and major infrastructure projects in other parts of the world have been taken into account in the design of the Project.

Table A3: Lessons Learned

Lessons Learned	How Incorporated into the Project Design
1. Undertake a study for project alternatives and design options	<ul style="list-style-type: none"> Two comprehensive analyses of alternatives were carried out in 1999 and 2004 to consider different options for power generation in Thailand and the feasibility of hydropower development in Lao PDR for export of power to Thailand.
2. Integrate the environmental and social impacts with the economic and technical dimensions of the project	<ul style="list-style-type: none"> These analyses also looked at alternative configurations for the project site on the basis of social and environmental impacts (dam and reservoir size, the number of persons to be resettled) and technical and economic analyses.
3. Carefully assess downstream environmental and social impacts	<ul style="list-style-type: none"> Downstream impacts in the Nam Kading, Nam Kathang, Nam Theun and Xe Bang Fai drainage areas have been identified and quantified as part of the environmental and social impact assessment.
4. Collect adequate baseline data	<ul style="list-style-type: none"> Where feasible and economical, baseline data were collected as part of the EIA process. Long-term studies on the impacts of fisheries in the Xe Bang Fai and upstream of the Nakai Dam will include data collected throughout the construction period.
5. Develop adequate mitigation and compensation programs covering all project areas, with associated financial commitments, before construction	<ul style="list-style-type: none"> A proactive mitigation-compensation program is being developed with a dedicated budget and contingencies for the resettled population on the Nakai Plateau and in the downstream areas. Mitigation measures are expected to compensate fisheries impacts, loss of riverbank structures and gardens, and other effects. The developer is financing all resettlement costs, because the Government has limited counterpart funds. The specific level of funding is being finalized. Project financing includes contingency funds to cover cost overruns, costs of unanticipated impacts, and failure to achieve agreed program targets. The adequacy of funds for these activities is being determined.
6. Identify, prepare and implement development and mitigation measures in consultation with project-affected people. Involve	<ul style="list-style-type: none"> Formal and informal public briefings have taken place throughout the project preparation period. Major public consultations and workshops took place in 1997. More local consultations began in 2004, followed by international workshops with representatives of civil society. The views expressed have been documented and are being taken into account in project decision-making. Location of resettlement villages has reflected the preference of

Lessons Learned	How Incorporated into the Project Design
concerned civil society through participatory dialogue and be proactive in response to issues raised; periodically disseminate project-related information.	<p>affected people. Citizens' concerns led to a change from relocation on the Gnommalat plain to relocation on the Nakai Plateau, so that relocated villages are generally within "spirit village" areas. Village layout design has also been changed based on stated preferences.</p> <ul style="list-style-type: none"> • The Government of the Lao PDR and NTPC have provided considerable project information on their respective websites with a view to engaging civil society in dialogue on the Project. • Informed and meaningful participation of project-affected persons, and outreach to local populations, will continue throughout the remaining preparation and implementation periods.
7. Clearly define the roles and responsibilities of all entities involved in implementation; address capacity gaps; develop adequate monitoring arrangements with task plans, budgets and sufficient long-term funding for all tasks to be certain that supervision continues long after project completion.	<ul style="list-style-type: none"> • Project includes establishing and strengthening Government institutions so they can carry out conservation and social and environment oversight. The project has been instrumental in establishing the NNT WMPA for watershed management, which will be funded by project revenues over a 30-year period. • Extensive monitoring, by the Government, NTPC, IFIs, IAG, DSRP and POE, and independent monitors is an integral part of the project design. • An independent professional firm will monitor key project issues for the lenders throughout the construction and operational periods, potentially until the commercial debt has been fully repaid—a period of about 17 years from financial close.
8. Carefully scrutinize procurement aspects to minimize the risk of cost and time overruns and inferior long-term operational performance. Scrutinize contractor selection.	<ul style="list-style-type: none"> • Specialist consultants completed a review of the procurement process and the structure and cost of the head construction contract (HCC) and subcontracts in April 2004. • Review concluded that there was adequate competition for two of the three civil works subcontracts and the two electromechanical subcontracts, and that the agreed prices of all six contracts were generally consistent with, or better than, the prices that might have been expected from greater competition. • Thorough staff supervision by IFIs involved. • Qualifications of HCC and subcontractors have been vetted. Financial institutions will need to approve qualifications of key operational personnel.
9. Hydrological uncertainties have plagued previous hydroelectric power projects in Lao PDR and elsewhere.	<ul style="list-style-type: none"> • Project preparation has included detailed hydrological modeling, dam safety planning, and protection of the watershed to prevent sedimentation. • The PPA includes clauses to shelter NTPC from output losses due to Xe Bang Fai flooding and dry years. • Active monitoring and timely warning of Xe Bang Fai flooding is an important feature of the Project operations.

Lessons Learned	How Incorporated into the Project Design
10. Geological uncertainties, due both to the paucity of investigations undertaken and the rigors of the terrain, have been the single largest cause of cost and time overruns in past projects.	<ul style="list-style-type: none"> • Extensive, in-depth geological investigations have been carried out; geological risks in the near-vertical water conduits from the reservoir to the powerhouse have been well catalogued and provisions made in the contract documents to accommodate design changes. • Powerhouse design has been changed from under- to above-ground at some additional cost. • A target price mechanism has been included in the HCC so that the subcontractor absorbs cost overruns up to 125% of the particular milestone, while the owner covers overruns beyond that amount.
11. Ensure that the Government revenue from the Project is targeted and used transparently and national systems strengthened by making specific arrangements on the weak areas of governance and expenditure management systems.	<ul style="list-style-type: none"> • Proposed revenue management arrangements will target Government revenues from the Project to indicative priority programs in the Government's NGPES. • Parallel PEMSP is being designed to strengthen commitment to PEM reform program and improve implementation with multi-donor financial support.

DSRP = dam safety review panel, EIA = environmental impact assessment, IFI = International Financial Institution, IAG = International Advisory Group, Lao PDR = Lao People's Democratic Republic, NGPES = National Growth and Poverty Eradication Strategy, NNT WMPA = Nam Theun 2 Watershed Management and Protection Authority, NTPC = Nam Theun 2 Power Company Limited, POE = panel of experts, PEM = public expenditure management, PEMSP = public expenditure management strengthening program, PPA = power purchase agreement.

Sources: Asian Development Bank and World Bank staff assessments.

SUMMARY ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT, ENVIRONMENTAL MANAGEMENT AND RESETTLEMENT PLANS AND MONITORING

A. Overview

1. Impact Assessment Process

1. The Nam Theun 2 (NT2) Hydroelectric Project (the Project) is classified as a category A project under ADB's environmental, indigenous peoples and involuntary resettlement policies. For a project of this scale, the Asian Development Bank (ADB) and World Bank require comprehensive environmental and social impact assessments. The Project has undergone numerous environmental and social analyses since the late 1980s.

2. Legislative, Regulatory and Policy Requirements

2. The process and documentation described below are in response to the regulatory and policy requirements of the Government of the Lao People's Democratic Republic (Lao PDR) (the Government), ADB, the World Bank, and other partners in the financing consortium, such as the Agence Française de Développement and the European Investment Bank. Because the Government requirements for environmental and social analyses are less well articulated than those of the donor community, it has generally been accepted that the policies of the international financial institutions (IFIs) would guide the overall evaluation process. The Government has expressed its environmental requirements through a number of specific instruments, including the National Environmental Action Plan and legal reforms such as the Environmental Protection Law, Law on Water and Water Resources, Forest Law, the NT2 Project Resettlement Policy, and the Land Law. These laws form the regulatory foundation for the implementation of the Project.

3. The Government has established basic institutional responsibilities in key environmental and social areas. It has designated specific agencies to be responsible for the implementation of environmental and social safeguards. The Science Technology and Environment Agency (STEA) is the Government's key oversight agency for the environment. STEA has established the environmental management unit (EMU) specifically to manage Government responsibilities for the Project. The Government has also created a Watershed Management and Protection Authority (WMPA) as well as a resettlement committee to oversee implementation of the Government's social obligations throughout the project.

B. Key Safeguard Documents

4. The package of safeguard documents prepared for the Project comprises three core documents: (i) the environmental assessment and management plan (EAMP); (ii) the social development plan (SDP)—which includes the resettlement action plan (RAP) and ethnic minorities development plan (EMDP) for reservoir inundation on the Nakai Plateau, the RAP and EMDP for land acquisition for project civil works and downstream channels, and the resettlement and livelihood restoration and EMDP for impacts in the downstream areas; and (iii) the social and environmental management framework and operational plan (SEMFOP) for the Nakai Nam Theun–National Protected Area (NNT-NPA).

5. Each of these documents provides background and technical information on the management and mitigation measures proposed to address adverse impacts, the institutional responsibilities for implementation, and the monitoring and supervision programs designed to

ensure compliance with all commitments made by the developers and the Government. The core safeguard documents are supported by a large number of specialized technical analyses that have been carried out on a variety of subjects over many years.

C. Summary of Environmental Impacts and Mitigation

1. Nakai Plateau

6. The major environmental impacts in this zone will result from the inundation of approximately 450 km² of the Nakai Plateau. The principal adverse environmental impact will be the loss of terrestrial and aquatic habitats on the plateau. This loss of habitat will increase population pressures on wildlife that are dependent on these habitats. There are also potentially serious water quality issues associated with the NT2 reservoir. These arise from the decomposition of organic matter in the reservoir, which will create low oxygen and high nutrient levels. Under such conditions, problems would be created both in the reservoir itself and in downstream receiving waters. Most importantly, poor water quality in the reservoir would affect the viability of reservoir fisheries programs. Other issues, such as the influx of construction workers into the project area, could create potential health, safety, and natural resource management problems. The reservoir also has the potential to modify the tributaries that feed it. Finally, greenhouse gas emissions from the reservoir would contribute to global carbon dioxide levels.

7. The EAMP provides a thorough analysis of habitat types that will be lost on the Nakai Plateau. As compensation for the impacts on natural habitats, the Project will finance the long-term management of the NNT-NPA and corridors, in addition to species-specific management programs for the plateau area. Other key initiatives will focus on (i) management of water quality in the reservoir through possible vegetation clearing; (ii) avoiding or minimizing the impacts of the resettlement area, the headrace channel, and access roads; and (iii) the relocation and upgrading of Road 8b. Mitigation measures for these and other impacts have been incorporated into the project design.

8. **Compensatory Forestry.** In addition to the environmental offset to be provided by the Project to protect the NNT-NPA, the Project will restore the forest area that will be lost because of the inundation of the reservoir area. The degraded areas with a crown cover less than 20% where compensatory forestry work could be undertaken have been earmarked. They consist of: (i) the degraded forests within the NNT-NPA; (ii) the area reserved for the sustainable forestry component of the Nakai Plateau RAP; and (iii) degraded forests on the Nakai Plateau that will not be affected by the inundation. If these areas are not sufficient, degraded forests outside the area affected by the Project could be considered. The preliminary assessment of degraded forests in the Project area found approximately 32,000 ha of degraded forest within the NNT-NPA, out of which about 28,000 ha could be set aside for natural regeneration. It is believed at this stage that several hundred hectares could qualify under the sustainable forestry component of the RAP. A preliminary assessment estimates about 15,000 ha would qualify for natural regeneration with very limited interventions required; 5,000 ha for reforestation and/or rehabilitation interventions; and 8,000 ha for low-intensity silvicultural interventions.

9. After financial closure, the Government and Nam Theun Power Company Limited (NTPC) will develop a more detailed implementation plan and cost estimates for compensatory forestry activities. The Government and NTPC will identify specific areas where compensatory forestry work will be undertaken. Specific activities include (i) site selection, (ii) a survey of the degraded area and potential compensatory forestry sites in consultation with the people of the

area, (iii) establishment of appropriate arrangements for managing the new forestry assets, and (iv) groundwork to cause rehabilitation/reforestation of the degraded land for assisted natural regeneration, enrichment planting, seed broadcasting, and planting. Since there are many activities that will require NTPC's immediate attention after financial closure, such as the resettlement of the project-affected people on the Nakai Plateau and mitigation measures for the impact in the Xe Bang Fai basin, compensatory forestry activities on the ground should take place around the time of inundation of the reservoir. NTPC has agreed to provide adequate funds and human resources to undertake the work.

2. Nakai Nam Theun National Protected Area

10. The establishment of project construction work camps, reservoir clearance activities, upgrading and development of roads, and the formation of the reservoir will create additional threats to the NNT-NPA and its corridors. The Project will lead to increased access to the watershed area and will require the conversion of a small portion of natural habitats. The main challenges for the successful implementation of the conservation program of the NNT-NPA and corridors are: control of illegal wildlife trade, commercial and illegal nontimber forest products collection, and limiting habitat conversion that results from resource extraction such as logging and mining as well as some agricultural practices. The management plan for the area (SEMFOP) is designed to address these issues. The project also provides secure 30-year financing for the management of the NNT-NPA and the adjacent corridors linking the region's protected areas.

3. Downstream of the Powerhouse in Xe Bang Fai Basin

11. The impacts in this zone relate to the increase in water flow in the Nam Phit and Xe Bang Fai as well as to construction activities associated with ancillary developments such as the powerhouse, the regulating pond, construction work camps, and the conveyance channel. The water flow in the Xe Bang Fai will increase by an average of about 260 cubic meters per second (m^3/second), which represents a near doubling of the current monthly average flows (minimum mean about 20–30 m^3/second and maximum mean 940 m^3/second). Because of the Project, the mean dry season flows will increase by about 10 times and the mean wet season flow by about 35%. Powerhouse operations will require changes in the weekly flow variations, with low flows on Sundays when power will not be produced.

12. The new flow conditions in the Xe Bang Fai will eliminate the current low flow period during the dry season and are that is likely to result in increased streambank erosion. Dry season aquatic habitats such as rapids and shallow areas which may be favored by fish during this season will be permanently submerged. In addition, once the powerhouse is operational, water with different quality characteristics—including dissolved oxygen and nitrogen content, biological oxygen demand, temperature, and turbidity—would mix with the water of the Xe Bang Fai. At a minimum, these changes are expected to lead to sharp, short-term declines in fish productivity along the length of the Xe Bang Fai. The nature, scope, and time implications are difficult to model with any precision. However, experience from the nearby Theun-Hinboun dam indicates that these impacts are likely to be serious. Fisheries losses of 50–80% can reasonably be expected.

13. There will be large-scale activity in this zone during construction of the powerhouse, substations, regulating pond, downstream channel, and transmission lines. These construction works and the associated infrastructure such as worker camps, access roads, and quarries will

result in some conversion of natural habitats and other impacts related to construction activities such as dust, noise, land acquisition, air quality, site erosion, waste, and work camp.

4. Downstream of Nakai Dam in Nam Theun-Nam Kading Basin

14. The flow of the Nam Theun at the dam site will decrease significantly from a mean flow of 260 m³/second (range 25 to 3,000 m³/second) to a proposed 2 m³/second. The main impacts will be experienced in the areas between the dam and the Theun Hinboun Headpond, approximately 50 km downstream of the Nakai dam. The reduced flow in the Nam Theun will reduce the habitat for fish and aquatic organisms and cut off migration of fish in the Nam Theun. The reduced flows in the Nam Theun would also weaken the dilution effects for incoming tributary flows downstream of the dam. This would lead to more acute water pollution problems in the longer term as tributary inflows become more degraded from upstream pollution sources in and around Lak Sao. Combined with the effects of the Theun Hinboun dam, this is expected to reduce the productivity of fish and other aquatic organisms in the area significantly. In addition, pollution caused by unrelated mining, industrial and domestic activities is becoming more problematic.

15. In the upper tributaries of the Nam Theun, unlike downstream Nam Theun or Xe Bang Fai, the Project will not affect the overall hydrological characteristics. The dam will be a barrier to the migration of fish from the lower Nam Theun and Mekong up to the tributaries. Migration from the reservoir will continue, although it will be a number of years before this is possible. The EAMP and SEMFOP provide for the establishment of special conservation areas for parts of the reservoir as important seasonal nursery ground for fish. Although specific data are not available on which species migrate into the tributaries, it is expected that migration declines in the upper tributaries in the NNT-NPA, and that the local populations who depend more on the sedentary fish which will not be affected.

16. Downstream of the Theun Hinboun dam, flows will also decrease because of the change in the spills over the dam into the Nam Kading, further affecting fish habitats in that area, and probably reducing populations of fish. Also, the number of days with the current minimum flow of 5 m³/s will increase from the current 120 days to about 175 days. The combined effects of the Project together with the pre-existing conditions of Theun Hinboun will contribute to regional cumulative effects by further reducing migration and requiring Theun Hinboun to modify its minimum flow regime below the dam. In this zone there will also be impacts from the construction of the dam and road upgrading. The construction works and the associated infrastructure such as work camps, access roads, spoil disposal, and quarries will result in some conversion of natural habitats, and impacts related to construction activities, such as local air quality, erosion, waste, and work camp management.

5. Mekong River

17. The project operations will result in changes to the seasonal flows in the Mekong between the confluence of the Nam Kading and the Xe Bang Fai. A reduction in both wet season (approximately 7 cm) and dry season (23–29 cm) flows in that stretch of the Mekong River is expected. Flows below the confluence of the Xe Bang Fai will also be affected but will be attenuated as one moves further downstream. Due diligence assessment undertaken by the World Bank's task team indicates that the social, economic and ecological impacts of these changes are likely to be insignificant, particularly in the Song Kram river in northeast Thailand. Development of planned hydro upstream on the Mekong is considered to be much more significant in the long run.

18. It is estimated that the Mekong at Phnom Penh will be 2 cm higher in the dry season and 8 cm lower in the wet season, and that the maximum height of the wet season in the Tonle Sap will decrease slightly (i.e., 3 cm as opposed to 2.5–3.0 m normal fluctuation in the wet seasons). While it is possible to estimate some of the hydrologic and hydraulic implications of these changes, it is virtually impossible to isolate the results of the changes and their impacts on the ecology of the Mekong system.

D. Summary of Social Impacts and Mitigations

19. **Scope of Resettlement Impacts.** Land acquisition and resettlement and related social impacts are anticipated in four geographic zones.

20. **The Nakai Plateau.** The communities of the plateau will be affected by the creation of the NT2 reservoir and approximately 1,120 households in 17 villages will be physically relocated. Relocation will entail loss of rice fields, fields for other crops and vegetables, forest land, and fishing grounds; associated social stress; and changes in lifestyles and livelihoods. Resettlement of the reservoir-affected villages is described in detail in volumes 1 and 2 of the SDP, which includes a RAP, and the EMDP.

21. **The Nakai Nam Theun Watershed.** The 1,150 households in the NNT-NPA and the 3,750 households in the peripheral impact zone (PIZ) could experience adverse social impacts as a result of limitations placed on currently unrestricted access to the natural resources of the NNT-NPA. The Government has developed a management framework and operational plan to effectively protect the watershed and its forests, habitats, wildlife and biodiversity values, and at the same time safeguard the well-being, traditional livelihoods, and culture of its human inhabitants. Resource management plans developed through the community planning process may impose restrictions on quantities, timing, and types of resources that can be extracted by local communities. They may be affected by improved enforcement of existing legislation, such as those concerning wildlife hunting, and the establishment of regulations concerning land and resource use. In general, however, villages in the NNT-NPA and PIZ will benefit from enhanced land and resource use rights, improved livelihoods through participatory natural resource management activities, and improved access to infrastructure and services. ADB's policy on involuntary resettlement is triggered by the potential resource access restrictions for these ethnic minorities and a resource access restriction framework and an EMDP have been prepared and included in the SEMFOP. In addition to the possible resource access restriction, it is expected that fish migration in the Nam Theun upstream of the dam will be reduced, as described in the downstream areas resettlement and livelihood restoration and EMDP, volume 3 of the SDP.

22. **Downstream of the Powerhouse in Xe Bang Fai Basin.** The impacts in this zone relate largely to the increase in water flow in the Nam Phit and Xe Bang Fai during project operation, as well as from construction activities associated with ancillary developments such as the powerhouse, the regulating pond, construction work camps, and the conveyance channel. It is estimated that approximately 40,000 people living along the mainstream Xe Bang Fai will be directly affected by fisheries losses due to the Project. Approximately 15,000 of these may also be affected by losses to riverside assets, gardens, domestic water supply, and access. Approximately 10,000 more people in hinterland villages not located on the mainstream Xe Bang Fai river also use the Xe Bang Fai for fishing and collection of aquatic products. Impacts on property and livelihood will be fully compensated and restored, as described in more detail in volume 3 of the SDP.

23. **Downstream of Nakai Dam in Nam Theun-Nam Kading Basin.** No permanent villages are located on the main stem of the river in the area downstream of the NT2 dam until the head-pond of the Theun Hinboun dam. However, there are villages, mainly inhabited by ethnic minorities, that live on the tributaries and nearby areas that use this area of the Nam Theun for fishing. About 40 villages with 22,000 people have been identified as occasionally fishing in the main tributaries of the Nam Theun. The reduced flow in this area could affect these fisheries by reducing the habitat and restricting fish migration. The impacts on village livelihoods with respect to fisheries have been estimated to range from 10% to 35% in tributaries and as much as 60% in the main stream of the Nam Theun. These estimates are considered to be worst-case scenarios and are described in more detail in volume 3 of the SDP, which also includes an EMDP.

24. **Project Construction Lands.** The Project will require exclusive use of up to 6,480 ha of land (during the construction phase) for project infrastructure, including the transmission lines, affecting approximately 1,100 households (6,700 people). This land will need to be acquired with associated compensation and income restoration to current owners. The main impact areas will be: (i) Oudomsouk town on the Nakai Plateau, where approximately one-third of the town (approximately 220 households with 1,890 people) will need to be relocated to make way for saddle dams and other project construction; and (ii) the Gnommalat Plain where 150 households will be relocated, mainly for the transmission line, and another 500 households will lose agricultural land for construction of the 27-km long downstream channel. Land acquisition for project construction land is addressed in the resettlement plan for project lands, volume 4 of the SDP. Volume 4 also includes an EMDP to address the issues related to the Vietic and Hmong populations along the transport corridor of national road 8B, which will be improved under the Project; in Oudomsouk; and on the Gnommalat Plain.

25. **Scope of the Resettlement Plans and Resource Access Restriction Process Framework.** As part of project preparation, a social and gender analysis was carried out in the project areas. A census, an inventory of losses, and a socioeconomic survey were carried out for the Nakai Plateau and project lands. A population count, inventory of land and assets, and socioeconomic survey were undertaken for the downstream Xe Bang Fai areas that might be affected by erosion or flooding, and a population count, a fisheries survey, and a socioeconomic survey were conducted on fishers in the Xe Bang Fai and the Nam Theun and their tributaries. A population count was undertaken in the NNT-NPA and PIZ. The following resettlement and ethnic minority planning documents have been prepared as part of the SDP: (i) Nakai Plateau RAP and EMDP; (ii) downstream areas resettlement and livelihood restoration plan and EMDP; and (iii) project lands RAP and EMDP. As part of the SEMFOP, a resource access restriction framework and EMDP have been prepared for the watershed. The various RAPs and EMDPs will be updated, and an RAP will be prepared for the SEMFOP after detailed design and participatory planning for any resource access restrictions or land acquisition. A gender assessment was also undertaken for the Project, and a gender action plan and strategy was prepared and mainstreamed into the SDP and SEMFOP.

26. **Legal Framework.** The three RAPs and a resource access restriction framework have been prepared for the Project in accordance with the requirements of ADB's policy on involuntary resettlement and the World Bank's Operational Directive 4.12 on involuntary resettlement. These plans have been prepared in compliance with laws of the Government of Lao PDR, principally the Constitution (1991) and the Land Law (2003), and follow the NT2 Resettlement Policy, which was prepared for the Project in 1998 and revised in 2002. Provisions and principles adopted in the SDP and SEMFOP for the Project will supersede the provision of relevant decrees currently in force in Lao PDR wherever a gap exists. In addition,

the social component requirements and commitments of the Project are laid out in schedule 4 of the concession agreement that has been revised to cover the final SDP and SEMFOP. The concession agreement acknowledges that the SDP and its Plans have been developed and that the Government is responsible for the SEMFOP, and NTPC and Government are jointly responsible for the SDP. The concession agreement also states that where higher standards than those in the NT2 Resettlement Policy exist, the higher standards shall apply.

27. **Entitlements.** The Project entitlements have been designed to provide for compensation, resettlement and rehabilitation for lost land, assets, infrastructure, resources, income sources, and services, so affected people would be at least as well off after the Project as they would have been in the absence of the Project. Resettlers affected by reservoir flooding will be assisted to materially improve their standard of living above the national poverty line within 4 years of relocation. Other poor and vulnerable households affected by land acquisition for project lands or affected in the downstream areas will be helped to improve their socioeconomic status. Nonvulnerable households will be assisted to restore their preproject socioeconomic status. People with and without legal title to land will be treated equally. Proof of residency or traditional use from the village administration is required to establish the right to compensation. A separate entitlement matrix has been prepared for each RAP and included in the concession agreement.

28. **Ethnic Minorities and Other Vulnerable Groups.** All resettlers in the reservoir area and in the NNT-NPA and PIZ are members of ethnic minorities, as are the majority of the resettlers in Oudomsouk and the Gnommalat Plain, and Mahaxai, and a significant proportion of the population in the Xe Bang Fai basin. The overall aims of the social safeguard planning documents are to: (i) address the important issue of culturally-sensitive development for project-affected people, (ii) significantly improve the livelihoods and standard of living of project-affected people from ethnic minorities, (iii) provide effective safeguard against adverse impacts, and (iv) ensure that the affected people have been consulted fully and have participated in the decisions that affect them. The resettlement and livelihood development in the Nakai Plateau involves considerable changes to cultures and livelihoods, whereas the compensation for loss of land and restoration of production in the downstream areas will not have such a strong impact. Households may be vulnerable for a variety of reasons, including poverty levels (the majority of households affected by the Project live below the official poverty line), ethnicity (some ethnic groups make have difficulties adapting to sedentary agriculture) and household characteristics (such as households headed by a widow, female, handicapped person or male over 60 years of age). Special attention will be given to addressing the special needs of vulnerable groups and households. This may include provision of labor to build houses, provision of rice and protein supplement during the transition to stability, culturally-sensitive and appropriate consultation, and livelihood programs.

29. **Resettlement Strategy.** The only area where significant relocation of affected people will occur is on the Nakai Plateau. Fifteen and a half villages will relocate from the reservoir area to fully-serviced resettlement sites on 20,800 ha of land and forest on the edge of the plateau. These sites have been allocated to the reservoir resettlers by prime ministerial decree. Each resettled household will be given title to residential and irrigated agricultural land. One and a half villages (Nam Nian and the Brou half of Sop Hia) have chosen to move off the plateau back to Nam Pan in Bolikhamxay Province from where they originated. The host village of Nam Pan will benefit from shared irrigation, education, and health services. The people from the Vietic half of Sop Hia have chosen to join another Vietic village in the plateau resettlement area. Resettling villages will participate in detailed village planning before relocation. Resettlement sites will be contain a complete infrastructure, including domestic and irrigation water supply and finished

houses before people move into the sites. Resettlers have the option of being employed by NTPC to build their resettlement sites, thereby taking on a sense of ownership, or of having NTPC hire contractors to develop and build the sites. All potential sites have undergone environmental assessment.

30. NTPC and the Government moved three plateau hamlets onto one resettlement site (Nong Boua), with the agreement of the World Bank and the panel of experts before there was an approved RAP. ADB has conducted due diligence and confirms that the resettlement implementation is in compliance with ADB's social safeguard policies. This first resettlement site (termed the pilot village) is included in the approved RAP for the plateau. The resettlers in this at this site will continue to benefit from the full resettlement program together with all other plateau resettlers.

31. One-third of Oudomsouk town on the Nakai Plateau will also be displaced to make way for project construction activities and 219 households and businesses and some affected services will be relocated to fully-serviced sites within an expanded and improved Oudomsouk. Another 105 households will move from under the transmission lines and back onto remaining land beyond the right of way. All relocating households will be given title to their replacement land.

32. **Livelihood Restoration.** The approach to resettlement throughout the SDP is livelihood restoration, or improvement in the case of vulnerable groups. The approach to resettlement of the reservoir-affected resettlers is based on restoring and improving livelihoods using verifiable income targets established in the concession agreement and subject to independent monitoring. This approach to income restoration and livelihood improvement uses a set of farming and livestock models, plus exclusive access to forest and fishery resources which have been combined with other land use and employment options to make up the household livelihood mixes. Resettlement planning and the resettlement program have been developed on the basis of detailed technical analysis of the livelihood models. The resettlement package for reservoir resettlers aims to significantly improve the livelihood of villagers to be relocated and provides a comprehensive package of housing, infrastructure, land, social services, and a livelihood program. The current livelihood plan will be incorporated into village and household level plans during implementation. Some villages, particularly the Vietic and, to a lesser degree, the Brou and Bo, are more vulnerable than the Tai and may have more difficulties adapting and benefiting from new and improved livelihood systems. Measures to assist such villages and other vulnerable households have been incorporated into the project design.

33. Options for income restoration in downstream and project lands communities have also been designed in consultation with affected people. For land-based losses, replacement land will be a priority. Where replacement land is not available, or where cash compensation is preferred and can be managed, other options will be considered that revolve around options for self employment or other non-land-based livelihoods that will enable restoration of preproject socioeconomic status. Income and protein from downstream fisheries losses will be restored through alternative livelihood options, such as replacing fish loss with fish ponds. These will be developed through a participatory process and put in place before commercial operations.

34. **Transitional Support and a Phased Exit Strategy for Plateau Resettlers.** The Project is taking a development approach by aiming to improve living standards and livelihoods, rather than just resettling people and restoring their impoverished preproject conditions. To do this, a package of livelihood activities that are similar to the pre-project livelihood activities is being made available. This may include some dry and wet season rice and dry season gardens,

some livestock, some fishing, some nontimber forest product harvesting for subsistence and sale. To make these activities more productive, the Project is providing inputs, initially fully subsidized, but with a plan to gradually phase out subsidies as families become able to support themselves. This is combined with land tenure, improved health and education to make them secure and able to work and absorb the new concepts. Households without labor will be helped to enter into income-generating activities that are not labor-intensive. Vulnerable households will be provided with food support until they can become self-sufficient. Resettlers and construction workers and camp followers will be provided with education about social risks of sexually transmitted diseases, especially (HIV/AIDS),¹ drug use, alcoholism, and trafficking. Resettlers will also be provided with household crisis support to cope with changing social conditions.

35. Participatory Process, Disclosure and Grievance Mechanism. The planning approach followed to date has enabled full participation of the resettlers in the detailed resettlement planning process so that their concerns and needs are fully reflected in the project design. This approach allows flexibility and adaptability, particularly in the design of the household livelihood activities, so they are tailored towards the needs and situation of each individual household. Local level consultations on the draft SDP and SEMFOP began early 2004 and have been targeted at the affected villagers. Information on compensation, resettlement and livelihood options has been presented to all affected people by trained community and district facilitators through radio broadcasts in minority languages, easily understandable visual materials together with verbal explanations, site visits to proposed and pilot resettlement areas, and open discussions and feedback on proposals, concerns and preferences. All affected persons have been informed and consulted about the impacts, proposed mitigation and rehabilitation measures. A detailed summary of all final resettlement planning documents will be disclosed to affected people. To ensure that the basic rights of project-affected peoples are protected and their concerns adequately addressed and entitlements delivered, a grievance procedure will be implemented. A senior provincial official will head a project grievance committee which will include members of the Justice Department, Lao Women's Union, the Ethnic Council, resettlement committee, civil society, and representatives of project-affected people. The first level of complaint will be the village resettlement committee; the last resort will be the court. In the event that the grievance mechanism is not effective, the panel of experts will be the final arbiter.

36. Monitoring and Evaluation. Monitoring will determine whether the resettlement programs undertaken by NTPC and the Government are achieving their objectives. Monitoring will be carried out both internally and externally in accordance with schedule 4 of the concession agreement. Internal monitoring by the NTPC resettlement office and the Government's resettlement management unit will focus on the process and physical progress of resettlement implementation against the schedule in the SDP, following a participatory approach. External monitoring will be carried out by an independent monitoring agency, focusing on changes in social and economic conditions of individual households. The concession agreement requires an independent assessment of whether SDP implementation has met the plateau RAP's objective of ensuring that its specific income targets have or will be reached. These assessments will be made by two independent monitoring and evaluation bodies. The first assessment will be made by the independent monitoring agency with extensive experience in socioeconomic surveys and analysis and rural development. Second, an international panel of social and environmental experts will provide reports to NTPC and the Government stating whether environmental and social safeguards and funding agency guidelines have been complied with and whether mitigation measures and resettlement procedures adequately

¹ Human immunodeficiency virus/acquired immunodeficiency syndrome.

protect both the environment and the interests of those affected by the Project. Project socioeconomic impacts, including the well-being of ethnic minority groups on the Nakai Plateau, the watershed, and the Xe Bang Fai downstream areas, will be closely monitored. Such external monitoring will be carried out for the duration of SDP implementation, which is likely to extend over 9 years. The independent monitoring agency will send reports directly to ADB and the World Bank.

37. **Implementation Schedule.** Annual work plans will be prepared for all resettlement activities. Resettlement activities will be coordinated with the civil works schedule, so that adequate time will be allowed for resettlement activities to be satisfactorily implemented before the relevant civil works begin. For project lands, before civil works begin on a particular project land or group of project lands, all compensation will have been paid, relocation will have been completed satisfactorily, and rehabilitation measures will be in place. Relocation to resettlement sites will begin only when the sites have been prepared, the infrastructure and domestic and irrigation water supply is in place, and houses are ready for occupancy.

38. **Cost Estimates.** NTPC has agreed to comply with, implement alone or jointly with another party, and bear the cost of the environmental and social commitments laid out in the concession agreement. The NTPC is therefore responsible for covering the cost of all mitigation and management measures, including the financing of Government agencies established for the purpose of the Project. Based on the concession agreement, NTPC will provide \$47.7 million towards implementation of the SDP. About \$9 million more will be made available for institutional capacity building: \$1 million for environmental and \$8 million for social issues. NTPC will provide a further \$31.5 million to support the SEMFOP. NTPC has to provide letters of credit to the Government as security in case, for example, the panel of experts deems that it has failed to comply with the environmental and social commitments and to mitigate or compensate any unforeseen project impact. Table A4.1 presents the current amounts committed by NTPC to cover resettlement costs. The project lands budget is still being adjusted upwards to reflect the inventory of losses and necessary livelihood restoration accurately.

Table A4.1: Resettlement Cost Estimates
(\$ million)

Item	Up to COD	Up to end of Concession
Nakai Plateau	18.8	27.4
Project Lands	2.0	2.0
Downstream (Xe Bang Fai and Nam Theun)	7.0	16.0
Total	27.8	45.4

COD = commercial operation date

Source: Nam Theun 2 Power Company Limited estimates.

39. **Health.** NTPC has undertaken a comprehensive health impact assessment following a World Health Organization model, and prepared a preliminary public health action plan (in the SDP) for construction and operation phases. This is designed not only to mitigate all identified significant risks to acceptable levels, but to improve local conditions. The public health action plan includes a resettlers health program and a regional health program. The head construction contractor is finalizing a staff health program to ensure preventive and curative measures safeguarding health and safety of workers and their families, and to prevent and mitigate potential health effects, such as communicable diseases, of the influx of project staff on the local population. The plans include HIV/AIDS and drug use awareness and preventive

education programs for communities, workers, and spontaneous settlers. A detailed public health action plan is being prepared by SOS International and implementation will begin immediately after financial closure.

40. **Construction Phase Social Management Plan.** Approximately 4,000 workers and up to 16,000 camp followers (families of workers and services providers) could have a significant impact on the social, health, and economic dynamics of all project land areas, especially in Nakai, Gnommalat and Lak Sao. The combination of the potentially dramatic population influx, the sudden increase in eating and drinking establishments, and the availability of employment cash could produce extremely high risks and negative impacts. Gender concerns that often emerge during large infrastructure projects include: (i) an increase in sexually transmitted infections, most importantly HIV/AIDS; (ii) the introduction of illegal trafficking, especially involving women and adolescents; (iii) inflation of local market prices caused by high levels of demand and limited supply; (iv) a rise in alcohol-related diseases; and (v) higher levels of physical abuse and mental illness (caused by the first four concerns and by the social traumas associated with habitat and cultural changes). Strong social regulations and serious enforcement procedures are essential to avoid putting the security and health of the local population at risk. The Khammuane governor has issued a Decision on Social Order Management for the Nam Theun 2 Construction which sets this in place. A social management plan has been prepared (in the SDP) and this includes a recruitment policy for local labor; a social management and mitigation program for camp followers that addresses issues related to health, population management and security, infrastructure, and strengthening the capacity of local organizations to control and support camp followers; a human trafficking awareness and preventive education plan; and an appropriate budget. The head contractor also has contractual obligations to control and care for the construction workers.

41. Details of expected social and environmental impacts are contained in Supplementary Appendix B.

E. Implementation Arrangements

1. Institutional Framework

42. The Project will be implemented jointly by the Government and NTPC. The concession agreement specifies the respective responsibilities, which were further clarified and strengthened during the project appraisal mission. Within NTPC, overall responsibility for implementation will rest with the Environmental and Social Management Division. Supervision of construction site management will rest with the head construction contractor (HCC). Within the Government an environmental management unit (EMU) has been set up within STEA and a resettlement management unit (RMU) has been established which reports to the resettlement committee chaired by the governor of Khammuane Province. The NT2 watershed is managed by the WMPA, chaired by the Minister of Agriculture and Forestry. The NTPC division and the three Government units are currently operational. Core staff are being hired. The institutional arrangements, staffing and budgets are detailed in the safeguard documents (EAMP, SDP, and SEMFOP) and summarized below:

43. **NTPC.** The company has established an environment and social division to implement its obligations under the concession agreement, which include the implementation of the resettlement and livelihood restoration programs with RMU, monitoring the performance of the HCC, providing technical assistance to EMU, financing the conservation offset, and reporting progress to Government and IFIs. The Division, headed by a director, will have offices in Nakai,

Thakek and Vientiane, and about 70 staff. It has about 40 staff at present and the entire complement will be hired within 6 months of financial closure. NTPC also plans to outsource work to private consultants and operational nongovernment organizations (NGOs), which will be engaged after financial closure.

44. **HCC.** The HCC, under the oversight of NTPC, will be responsible for implementing measures to control or minimize impacts during the construction period and will supervise the work of construction contractors and their subcontractors. This will include among other important measures: meeting effluent standards, noise control, erosion control, on-site waste management, and implementing a worker health program. A full description of these measures is provided in the EAMP and the HCC EMMP.

45. **EMU.** The Government's EMU is responsible for: oversight of NTPC's environmental activities, review and approval of the HCC-EMMP, coordination within Government of the implementation of various aspects of the environmental plan, monitoring and supervising the environmental measures of NTPC, appointing an independent monitoring agency, monitoring NTPC compliance, and disseminating communications and information to external parties. The EMU will have offices in Vientiane as well as in the field, and will have around 15 staff.

46. **RMU.** The Government's RMU and NTPC will have joint responsibility for implementing resettlement and livelihood restoration programs. The range of tasks includes: day-to-day management of the resettlement process with NTPC, facilitating the participation of government authorities in resettlement planning, carrying out public consultations and information dissemination throughout the resettlement process, managing the Government budget for the resettlement process, and relocating project-affected persons. The RMU reports to the resettlement committee, and is supported by district resettlement working groups and village resettlement and development committees. The RMU will execute the Government's responsibilities relating to land acquisition, resettlement, and restoration of livelihoods.

47. **WMPA.** WMPA oversees the implementation of SEMFOP. It is headed by a board of directors representing various stakeholders, and managed by an executive secretariat, headed by a director. The WMPA was established by Government Decree 25, 2001, and has a broad management mandate for the Nakai Nam Theun watershed area. Its activities will be guided by the SEMFOP. Its responsibilities include: conservation, maintenance and promotion of the biodiversity of the NNT-NPA, building and strengthening capacity of communities, districts and WMPA staff, facilitating improvements to livelihoods of inhabitants of the watershed area, managing activities specified in the operational plans of the SEMFOP, partnering with NGOs to implement SEMFOP activities, and employing an independent monitor to assess its performance. It is expected to have about 50 staff, who will be hired over a three-year period after financial closure.

2. Budget and Contingency

48. The budget for implementing environmental and social safeguards and managing the conservation offset is estimated to be \$90 million over the life of the project. Detailed estimates are provided in the safeguard documents and summarized below.

Table A4.2: Environment and Social Cost Estimates
(\$ million)

Item	To the end of Concession
Social	47.7 ^a
Environment	3.8
Watershed Management	31.5 ^a
Social and Environment Remediation Fund	7.5
Total	90.5

^a Includes resettlement costs of \$45.4 million as indicated in Table A4.1.

Source: Nam Theun 2 Power Company Limited estimates.

49. The NTPC is also making provisions to cover a range of contingencies through the use of cost over-run allowances, performance guarantees, and various forms of insurance. If costs are exceeded for those items limited by costs, NTPC has provided for a letter of credit of up to \$2.5 million to be used by Government. For those items limited by scope, NTPC will continue to finance activities until the objectives of the scope of the activity are achieved and endorsed by the panel of experts. NTPC will also obtain insurance cover for implementing some of the mitigation measures, when available. NTPC is also providing \$7.5 million in letters of credit for breach or failure to fulfill its obligations under the concession agreement. NTPC is also setting up an environmental and social remediation fund for the benefit of the resettlement villages during the post-Commercial Operation Date period to operate communal facilities. For the resettlement program, NTPC is obliged to extend the implementation period until the outcome (household income) targets have been met without a financial cap.

50. In addition, NTPC is providing a further \$10 million as a guarantee for dealing with unanticipated impacts stemming from project implementation. The eligibility and mechanisms for use of these funds have been reviewed and changes to the concession agreement will be introduced by the Government and NTPC.

3. Risk Management

51. It is recognized that there are risks associated with the proposed resettlement program. The risks are two-fold: the first is further impoverishment of resettlers who are already well below the poverty line; the second is the failure to achieve the outcome targets. The targets for the plateau resettlers are (i) the household income target (to be achieved by each household in all villages no later than 4 years after the village has been relocated), and (ii) the village income target (to be achieved by all villages no later than 7 years after relocation of the village). The risk for project lands and downstream area affected people is that they will be worse off socially and economically. The resettlement risks are reflected in the relatively weak capacity in Lao PDR to implement a development-oriented resettlement program, and the difficulty of mobilizing critical staff within a required time-frame in order to execute the program satisfactorily. The substantial change in livelihoods for the plateau resettlers and the ambitious targets add to the risk of achievement failure. A long-term risk of the plateau resettlement program is the heavy external support required by resettlers during the transitional period. This could result in dependency that could affect their livelihood sustainability. The influx of population following the construction camps could also have broad impacts in the project areas, particularly on the host ethnic minority groups. If not properly managed through anticipatory and pro-active measures, the construction camps could have long lasting social impacts upon the host population. In

recognition of these risks, the project has responded by developing a number of strategies to mitigate or manage risks.

52. **Institutional Capacity Build-up.** In the concession agreement, NTPC and the Government agreed to share responsibility for implementing the SDP. They have developed a detailed plan for institutional development and staffing. Human resources will be mobilized from within Government and the private sector. The NTPC resettlement office will mobilize international assistance to strengthen implementation of the SDP. NGOs will be engaged to implement some of the programs.

53. **Baseline Planning and Budgeting.** The project developers have invested heavily in preparatory work to understand and plan for the environmental and social risks of the Project. Funding for the proposed programs appears satisfactory and the organizational division of labor and accountabilities appropriate.

54. **Adaptive Management.** The proposed mitigation measures are based on best estimates of likely impacts. However, not all impacts can be anticipated nor all future opportunities predicted. It is accepted by all stakeholders that some adjustments to the mitigation program may be needed during the course of project implementation. The project budgets and work plans will be reviewed annually and adjustments to scope and nature of work made if necessary. Flexibility is key to success of the mitigation plans.

55. “Adaptive management” is a key element in the overall environmental management approach. The principles of adaptive management involve modifying environmental programs based on monitoring and evaluation of the environmental performance of specific actions. By definition, this is an iterative process which requires intensive monitoring. The EAMP and concession agreement both recognize the need for a flexible approach to environmental management that accommodates periodic changes in scope or the objective of a specific measure.

56. **Continuous Stakeholder Consultation.** One of the most important mechanisms of the adaptive management approach is a continuous, ongoing stakeholder consultation process. This will help to identify issues as they emerge so that appropriate modifications can be made to budgets, staff resources, and technical assistance. Ongoing consultation will be an essential element of the Project's overall monitoring mechanisms.

4. Disclosure, Local Consultations and International Workshops

57. Public consultation and disclosure of environmental and social information prepared for the project were, and will continue to be, undertaken in accordance with ADB, World Bank and Government requirements. To date, the project design has benefited from an open public consultation and disclosure process unprecedented in the Lao PDR. During the project preparation phase, NTPC and Government conducted a large number of community briefing sessions intended to solicit feedback on the project concept and the design of resettlement and environment mitigation measures.

58. The draft safeguard documents were made available in the Lao PDR between May and August 2004. The summary environment and social impact assessment was circulated to ADB's Board of Directors on 29 November 2004 in accordance with ADB's environment policy.

59. The latest SDP documents have been prepared in full consultation with affected people. Resettlement information on project impacts and entitlement options has been disclosed to affected people in the various project areas in local commune offices, public meetings, and individual households.

60. Feedback from stakeholders has influenced or been incorporated into project planning and design. For example, the following project design features are attributed to public consultations: (i) location of the power station to avoid resettlement, (ii) routing of the downstream channel to minimize resettlement and other impacts, (iii) construction of the regulating pond to minimize fluctuations in daily discharge into the Xe Bang Fai, (iv) embankment protection at the confluence of the downstream channel and the Xe Bang Fai, (v) inclusion of aeration structures to improve water quality in the regulating pond and downstream channel, and (vi) commitment to shut down operation before natural over bank flooding in the upper Xe Bang Fai.

61. The consultative process during project preparation is only part of the overall project communications and consultation strategy. There are specific plans for continuing a pro-active program of public meetings throughout the project implementation period. The goal of these public briefings is to ensure that people's concerns are being heard and that appropriate information is shared at all stages. These consultations are in addition to highly participatory implementation processes where the affected people play a major role. Details of the consultation efforts are provided in Appendix 5.

5. Monitoring and Evaluation

62. A description of the monitoring and evaluation framework for the project is provided in Technical Annex 3 of Appendix 2. It has three levels: (i) internal, (ii) external, and (iii) independent. Internal monitoring will be undertaken by NTPC and the relevant Government units, which are in the process of establishing acceptable monitoring protocols. External monitoring will be composed of the Lender's technical adviser and the Government's independent monitoring agencies for EAMP, SDP and SEMFOP. Independent monitoring will be continued by the panel of experts, the international advisory group and the dam safety review panel.

CONSULTATION AND DISCLOSURE

A. Overview

1. The public consultation process undertaken during preparation of the Nam Theun 2 (NT2) Hydroelectric Project (the Project) has provided an opportunity to engage project-affected people and stakeholders at the local, national, regional, and international levels. The principal objectives of this process have been to (i) facilitate detailed project planning, design, and implementation by taking into consideration community perspectives; (ii) reduce negative and enhance positive community impacts from the project through the participation and involvement of directly affected stakeholders; and (iii) increase public awareness and understanding of the Project.

2. Consultations with directly affected people, carried out since 1996, have taken a number of forms. These meetings were intended to share information with project-affected people on the nature, scale, and timing of planned developments, as well as to solicit feedback and inputs to important elements of the environmental assessment and management plan (EAMP), the resettlement action plan (RAP), and the ethnic minority development plan (EMDP) for the Nakai Plateau. These consultations were documented by the Government of Lao People's Democratic Republic (the Government) and the Nam Theun 2 Power Company Limited (NTPC) and were used to design major aspects of the social and environmental management plans. By the end of 2003, NTPC and the Government had organized several hundred public meetings and information exchange events throughout the project area.

3. Consultations carried out since early 2004, covering the entire project, have taken into account the lessons learned from the previous period and have been guided by the basic tenets of transparency, balance, and meaningfulness. All impacts and risks, both positive and negative, mitigation and compensation measures for negative impacts and risks; general concerns of the affected population; and grievance procedures were discussed.

4. A series of national and international workshops were organized, addressing questions on the basic design, economic analysis, environmental and social impacts, and proposed mitigation measures of the Project. These workshops discussed the macroeconomic context for the Project, including sources of economic growth and strategies for poverty reduction available to the Lao PDR, Thai power demand scenarios, hydropower development options in the Lao PDR, and management of Government revenues from the Project.

B. ADB Policies and Expectations

5. Information disclosure and consultation are important to ensure development effectiveness and sustainability of development projects. They create opportunities for informed debate, enhance transparency and accountability, strengthen public support, reduce risks, facilitate collaboration among parties concerned, and improve the quality of project design and implementation. Conceptually, disclosure and consultation are mutually supportive activities.

6. A number of policy statements describe the Asian Development Bank's (ADB's) expectations with regard to disclosure and consultation with affected groups and concerned stakeholders. The ADB's new Public Communication Policy, which is expected to be approved by the Board in 2005 provides detailed guidance on disclosure of project documents to the public. The goal is to ensure that affected people and interested stakeholders have access to information about a project to improve their understanding and facilitate their participation in a

meaningful process of consultation. Such information should be available in a timely manner and in a format and content understandable to project-affected people and other stakeholders. ADB's safeguard policies on environment, involuntary resettlement and indigenous peoples development as well as sector policies, including the water policy provide guidance in effective consultation with the project-affected people.

C. Challenges to Meaningful Consultation in the Lao PDR Context

7. It is not an easy task to conduct meaningful consultation in the Lao PDR. It is one of the poorest countries in the world. Only half the population can read; 70% of the population comprises ethnic groups who speak different languages and dialects. Basic infrastructure to facilitate public access to information and services is still limited in various parts of the country. The Lao PDR has no indigenous organizations that might be viewed as the beginnings of a civil society independent from the Government. Organizations affiliated to the Communist Party, such as the Lao Front for National Construction, the Federation of Trade Unions, the People's Revolutionary Youth Union, and the Federation of Women's Unions, are considered to be civil-society organizations. Their functions are to help the Government to "unite and mobilize the people" but they also represent villagers' interests and concerns. Members of these organizations were, and continue to be, actively involved in consultation decision-making processes, especially at the local level. The Government does not encourage local non-government organizations (NGOs), and has limited capacity to effectively disseminate information and organize public consultation.

8. Although decision making is generally a top-down process in the Lao PDR, the Government has made recent efforts, often with international support, to improve its participatory planning methods and strengthen capacity of village- and district-based institutions to participate in decision making on development interventions and public planning. The Project is one such instance, having followed a consultation process unprecedented in the country.

D. Identification of Key Stakeholder Groups

9. Five target groups were identified as key stakeholders: (i) the project-affected people; (ii) district, provincial, and national government officials; (iii) civil society, NGOs operating in the Lao PDR (particularly those in the project area), and international NGOs; (iv) international financial organizations; (v) industries; and (vi) other interest groups. These target groups were also further categorized as follows:

- (i) **Local.** All households and villagers in the Nakai Plateau, downstream communities in the project area (downstream channel, Xe Bang Fai, Nam Theun, the transmission line corridor, etc.) who are directly affected by project implementation.
- (ii) **Regional.** Community leaders, district agencies, provincial agencies, mass organizations and businesses and contractors who have implementation responsibilities for various aspects of the mitigation and compensation programs.
- (iii) **National.** Government ministries, other government organizations, academia, NGOs, and the media.
- (iv) **International.** Other international power utilities and dam developers, international financial institutions (such as the World Bank, ADB, Agence Française de Développement (AFD), European Investment Bank (EIB), NTPC investors and financial institutions, international NGOs, and international media.

E. The Local Consultation Process up to 2003

10. The Government and NTPC have conducted and documented more than 200 public meetings and consultations from 1996 to 2003. The consultation process was reviewed during this period. Most of the activities were organized during 1996–1997, when the basic socioeconomic and cultural research was being undertaken predominantly by CARE and The World Conservation Union (IUCN). Although most consultations at that time were concentrated on the Nakai Plateau, other project areas were also covered:

- (i) **Nakai Plateau.** It is reported that all villages in the reservoir area were consulted and involved in the resettlement study.
- (ii) **NT2 watershed.** Twelve villages were involved in the socioeconomic and culture survey in 1996; 17 sites were included in the IUCN study in 1997 of the environmental and social action plan; and 27 villages within the Nakai Nam Theun National Protection Area (NNT–NPA) were involved in the information and consultation workshop in 1997.
- (iii) **Downstream channel.** Twenty-one villages in Gnommalat, Mahaxai, and the upper and lower Xe Bang Fai were consulted in 1997.
- (iv) **XBF River.** Twenty-four villages along the upper, middle and lower segments of the river were consulted in 1997.
- (v) **Transmission line corridor.** Representatives of 128 villages were consulted.

11. Methodologies and techniques for public consultation were designed to suit the needs of each target audience, such as by making use of visual and pictorial graphics where literacy rates were low, setting up focus groups separating males and females, inclusion of consultation staff of different ethnic groups. NTPC visited the demonstration resettlement farm, and the resettlement village of the Theun Hinboun dam. Project documents and summaries were translated in Lao for local leaders and regional officials and placed in the NTPC offices in Vientiane, Nakai, and Thakhek, and on the NT2 website.

12. Concerns and recommendations of stakeholders provided through these consultations influenced the EAMP and especially the social development plan (SDP) [the resettlement action plan (RAP) and the EMDP] on such matters as the location of resettlement villages, house design, village layout, livelihood models, compensation plan and design of the downstream channel. Nonetheless, one criticism was that the 1996–2001 consultation process was biased toward promoting the positive benefits of the project while the negative impacts and risks were largely downplayed. Meetings of this sort in the Lao PDR, at the time, felt more like official forums. The consultation process did not necessarily reflect accurately village social structure or cultural practices where decision-making is concerned. Cultural differences, languages, and facilitating skills played an important role in these meetings. Limitations lay not so much in the willingness of people to speak out, but rather in the lack of a process wherein government and project officials would be explicitly responsive to what people were saying. Given that the interaction with the government is through district level officials from rural backgrounds, the potential for success has always been there.

F. The Local Consultation Process Since 2004

13. Consultations carried out since 2004 have taken into account the lessons learned from the previous period and have been guided by the basic tenets of transparency, balance and meaningfulness. It was felt that the consultation process must be valuable for all stakeholders: villagers, the Project, the private sponsors, and the Government. All impacts and risks, both

positive and negative, needed to be made clear at the outset. Mitigations for negative impacts and risks, including appropriate compensation, needed to be agreed upon. Grievance procedures should be firmly in place to allow affected people to appeal and resolve issues if agreements are not implemented.

14. The basic reorientation was made to promote a process where local people spoke out more and project and government officials mostly listened. Village facilitators, selected from a cross-section of society, were trained to carry out the consultations, speaking in their own language, and proceeding in accordance with their own cultural norms. Since a large portion of the villagers in the reservoir and watershed areas are illiterate, a range of written and graphic materials were made available for use by the village facilitators, including information manuals and pictorial posters. A village forum, composed of small groups, carried out a dialogue on a range of topics, aiming to achieve consensus at the village level. At the end of the forum, there was a wrap-up meeting among the district resource team and village facilitators, where the findings and next steps, to be shared with NTPC, were discussed and agreed to. The village reports were made available through the village information centers. Subsequently, NTPC teams returned to the villages to explain the design changes to the local consultations.

15. Consultations covered all project areas:

- (i) **Nakai Plateau.** All 17 villages in the area that will be inundated by the reservoir.
- (ii) **NT2 watershed.** Thirty-one villages (through 12 consultation sessions) and four villages of the peripheral impact zone.
- (iii) **Xe Bang Fai.** Seventy of the 89 villages in the mainstream, backwaters, and tributaries.
- (iv) **Nam Theun.** A representative sample of villages (15) located on the tributaries.
- (v) **Project lands** (acquired for ancillary works including transmission lines). All villages in sites that have already been identified.

16. The process was coordinated by an experienced ADB consultant from Thailand, who trained the village facilitators and followed the process throughout. The process was also observed by an independent World Bank consultant, well acquainted with the area and the Lao language. Both have reported on the process and attest to the unprecedented level of transparency and participation achieved.

G. National Workshops

17. **Provincial and National Government Agencies.** Because project implementation involves various government jurisdictions and organizations, the consultative process focused considerable attention on briefing and seeking inputs from community leaders, and from district, provincial, and national government agencies. A series of workshops have been organized for government entities in order to fully inform them of the project activities as well as to inform them of their responsibilities during project implementation.

18. **Nongovernment Organizations.** While there are a number of international NGOs active in the Lao PDR, few domestic NGOs work at the national level. Thus, effective consultation with Lao civil society remains highly constrained. Nevertheless, the project sponsors have created numerous opportunities for international NGOs and Lao mass organizations such as the Lao Women's Union and the Lao Front for National Construction to participate actively in the review process. This has been accomplished through specific targeted events to share information and seek input from NGOs, and by establishing channels of communication such as websites,

responding to written inquiries, directly involving NGOs in field research, and by organizing occasional site visits.

H. International Workshops in Bangkok, Paris, Tokyo, Washington DC, and Vientiane

19. The Government, project sponsors, and international financial institutions organized workshops to brief international interest groups including conservation NGOs, human rights groups, government representatives, other financial institutions, parliamentarians, and the media, in Thailand, France, Japan, the United States, and the Lao PDR. These meetings took place in August and September 2004 and attracted nearly 800 participants. The workshops were designed to share important information about the nature of the Project (including aspects pertaining to the rationale for the Project, the cost–benefit analysis, and management of Government revenues from the Project), and to discuss the issues and the actions taken to minimize or eliminate potential risks associated with the project. The international workshops were conducted by independent moderators, who issued reports on the proceedings and summary of the discussions in each venue. A full discussion of these consultations—times, places where meetings were conducted, participants, and issues raised and discussed—can be found in the three safeguard documents.

I. Changes to Project Design

20. Feedback from local consultations and from national and international workshops have significantly informed and modified project design. The EAMP, social and environmental management framework and operational plan (SEMFOP) and SDP document the changes introduced to the Project. Some specific examples are as follows: project works have been sited so as to minimize resettlement and environmental impacts; resettlement sites have been chosen in response to preferences expressed by the affected population on the plateau; a regulating pond has been included in the overall scheme and will be operated in a way which minimizes daily fluctuations in the downstream area; aeration structures were included to improve water quality in downstream channels; the powerhouse and reservoir will be operated so as to limit natural over-bank flooding in the Xe Bang Fai. An adaptive management program has been introduced, based on extensive monitoring and adjustment of program design as needed during implementation.

21. The local consultation process has confirmed general community support for the project and for a diverse package of livelihood options. It has documented local preference with respect to sensitive cultural sites such as spirit forests, and has helped to identify local priorities in areas such as flood protection, electricity supply, fisheries etc. The consultations also helped clarify rights and responsibilities of various stakeholders, and the Government has accordingly enacted specific legal measures to protect such rights of the affected people. Change matrices have been prepared by the developer and will be disclosed jointly with the final version of the safeguard documents.

J. Disclosure of Information

22. The draft safeguards documents (EAMP, SDP, SEMFOP, and summary environmental and social impact assessment) and several technical, economic and contractual documents have been widely disclosed in country at the Science Technology and Environment Agency (STEA), and NTPC public information centers, in Nakai, Thakek and Vientiane, and through the World Bank's InfoShop and public information centers. They were also posted on the Lao National Energy Committee (www.poweringprogress.org) and that of NTPC

(www.namtheun2.com). Translated versions of these documents and/or substantial summaries were prepared in Lao and made available in other languages.

23. Notification informing the public of the availability of these documents, inviting public comments and announcing public meetings, was made in a timely manner. For international stakeholder meetings, documents were made available 30-90 days in advance. In addition to making available technical documents, the project sponsors and the Government have also made available illustrations and graphics in an easy-to-understand form, given the ethnic diversity and low levels of literacy of population in the Project area.

K. Ongoing Consultation During Project Implementation

24. Public consultation and disclosure of environmental and social information prepared for the project and will continue to be undertaken during project implementation. The consultative process followed during project preparation is only part of the overall project communications and participation strategy. The SDP, SEMFOP, and EAMP explain the participatory planning, implementation and monitoring methods that will be employed in different areas of the Project. There are specific plans for continuing a proactive program of public meetings and dissemination of information through the project implementation period. Participatory planning processes (e.g., forest and land use planning and management in the NT2 watershed, village planning in the plateau, and participatory design of the downstream program), local radio programs, resettlement committees at the local and provincial levels and other mechanisms will continue to play key roles in providing information and gathering inputs from affected people. It should also be noted that the consultation process that has been put in place since 2004 is recursive. It (i) continually revises and adapts itself to better meet the needs of villagers, and (ii) learns from ongoing discussions and the perceptions of the affected persons, providing inputs to project design. It will be continued after financial close and effectiveness of the ADB operation, as the project moves into the detailed design and implementation phase.

25. The Government plans to use the United Nations Development Program (UNDP)-supported roundtable mechanism for monitoring the National Growth and Poverty Eradication Strategy and progress on the Project. It also plans to convene periodic meetings of co-financiers for review of (i) the physical progress in implementation of project investments, (ii) results of monitoring and evaluation of social and environmental impacts and outcomes, (iii) measures taken to address unforeseen events, and (iv) other dimensions of the Project. Periodic workshops at the national and international levels will be conducted involving the international community and civil society to allow exchange of information and discussion of the project. In support of these processes, the Government has plans to further improve its capacity in public communications and media relations for the Project and will, among other actions, improve its project website and ensure that it is provided with up-to-date information on the Project.

SUMMARY OF PROJECT COST ESTIMATES
(\$ Million)

Item	Foreign Exchange	Local Currency	Total
A. Construction Costs			
1. Head Construction Contract	94.1	29.1	123.2
2. Civil Works	112.3	239.7	352.0
3. Electro-Mechanical	181.1	45.0	226.1
4. Project Implementation and Management	8.7	1.5	10.2
Subtotal (A)	396.2	315.3	711.5
B. Development Costs			
1. Pre-Operating and Working Capital	16.6	8.0	24.6
2. Environment & Social Mitigation	48.8	0	48.8
3. Compensation to Gov't. and Gov't. Works	32.2	0	32.2
4. NTPC Administration	29.6	4.0	33.6
5. Project Preparation	72.2	2.0	74.2
Subtotal (B)	199.4	14.0	213.4
C. Financing Costs			
1. Interest During Construction (IDC)	98.4	98.0	196.4
2. Insurance and Bonding	30.1	0	30.1
3. Other Financing Charges	44.5	8.3	52.8
Subtotal (C)	173.0	106.3	279.3
D. Contingencies			
1. Head Contract	6.1	5.8	11.9
2. Financial	21.0	12.9	33.9
Subtotal (D)	27.1	18.7	45.8
Total Project Base Costs	795.7	454.3	1,250.0
Contingent Costs			
A. Debt Service	50.0	52.5	102.5
B. Administrative Costs	6.6	0.9	7.5
C. Physical Cost Overruns	17.5	17.5	35.0
D. Liquidated Damages	42.5	12.5	55.0
Subtotal - Contingent Costs	116.6	83.4	200.0
Total Costs (Base + Contingent)	912.3	537.7	1,450.0

Gov't. = Government of Lao People's Democratic Republic, NTPC = Nam Theun 2 Power Company Limited (NTPC).

Notes:

1 Local Currency Costs are in Thai baht and Lao kip.

2 Under the Concession Agreement, GOL is to be compensated \$30 million for lost of biodiversity and eco-tourism assets.

3 Contingent Costs have been estimated on a 12-month delay scenario due to NTPC/contractor fault.

4 Under Contingent Costs, debt service includes additional IDC and first year principal repayment.

5 Project Preparation costs have been verified by independent audit before being accepted by lenders.

Source: NTPC.

SUMMARY POVERTY REDUCTION AND SOCIAL STRATEGY

A. Linkages to the Country Poverty Analysis

Is the sector identified as a national priority in country poverty analysis? <div style="text-align: right;"> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </div>	Is the sector identified as a national priority in country poverty partnership agreement? <div style="text-align: right;"> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No </div>
<p>Contribution of the sector or subsector to reduce poverty in Lao People's Democratic Republic:</p> <p>From a national perspective, the Project represents a very large injection of foreign investment, providing a major stimulus to the economy. While an "enclave project," whereby most of the capital investment will be for imported machinery and equipment, civil works will still be significant and growth of gross domestic product (GDP) could be boosted by as much as a full percentage point during the 4–5 year construction phase. In turn, this will lead to increased per capita incomes, lifting an estimated 60,000 people above the poverty line. Once commissioned in 2009/10, the Project will considerably boost Lao exports and foreign exchange earnings. Most importantly, the project will provide a major new source of revenues to the Government of Lao PDR (the Government), an estimated \$1.9 billion cumulative revenue during the concession period. The current weak fiscal position of the Government has meant poor access to and quality of public services. While international assistance has been important in helping overcome this constraint, a stronger revenue base is the long-run solution. The Project is an important component of this strategy, whereby private sector investment strengthens the revenue base and overall economic performance, laying the basis for Lao People's Democratic Republic (Lao PDR) to graduate from least developed country status.</p> <p>For the site area, the Project will create jobs (e.g., in commercial farming and eco-tourism) and improve facilitate better transportation, education, health, and other services critical to poverty reduction. Khammuane Province, the principal site of the Project, has a high incidence of poverty 42% in 1997/98); Nakai district, where the water reservoir will be created, is one of the poorest districts identified in the Government's National Growth and Poverty Eradication Strategy (2004) for priority action. Ethnic minority groups in the district are heavily dependent on subsistence farming and non-timber forest products. The construction phase will directly employ 4,000 people, with more than double this number of jobs created as a result of support services and other multiplier effects.</p>	

B. Poverty Analysis

Targeting Classification: General Intervention

What type of poverty analysis is needed?

Poverty in the Lao PDR, and in the site area, has been extensively analyzed, using quantitative and qualitative methods. The ethnic and cultural dimensions of poverty have also been extensively analyzed, although there is still much to learn regarding adaptation to new economic opportunities and the Lao understanding of poverty.

Lao PDR is described as the least developed of the Greater Mekong Subregion countries and one of the poorest countries in Asia, both in terms of per capita income (about \$330) and in terms of various social indicators (life expectancy at birth, 54 years, adult literacy 65%, and high infant and maternal mortality rates). According to the Lao expenditure and consumption survey (LECS) undertaken in 1997/98, 38.6% of the population was below the poverty line (based on food and non-food requirements); 10.4% of the poor suffered deep poverty, while 4% was severely poor. Khammuane Province had a slightly higher incidence of poverty than the national average, but the depth and severity of poverty was slightly less.

Analysis of the LECS III data (collected in late 2003 and early 2004) is not sufficiently advanced to provide updates on the above findings, except perhaps at the aggregate level; the overall incidence of poverty is indicated as having declined from 38.6% to 32.0% currently. Social and economic indicators from the LECS III indicate a more equitable growth pattern for 1997–2003, in contrast to 1992–1998 when the lowest income quintile experienced a drop in consumption while the upper income quintiles experienced sharp increases. The LECS III indicators also indicate that Khammuane Province has a population of about 320,000, with an average household size of 5.8 persons. Less than 20% of the population is urbanized. There is relatively good rice availability but food consumption still accounts for 64 of overall consumption, compared to 55% nationally. Health services in the province are weak, with only one third of the population with access to medical staff, a pharmacy or medical kits; maternal mortality rates are among the worst in the region. The low quality of education services is reflected in low enrolment rates, and high dropout and repetition rates.

The project area is divided into three main zones. The Nakai Nam Theun National Protection Area (NNT–NPA) and the Nakai Plateau zones have low population densities, characterized by pronounced ethnicity, dependence on subsistence farming and limited or no access to infrastructure and services such as education, health, electricity and

water supply. The main ethnic groups are the Brou, Tai Bo, Vietic, and Tai Kadal. Women are especially affected by poverty, as they have burdensome family and farm duties (e.g., fetching water and fuelwood). In contrast, the Xe Bang Fai basin zone has a relatively large population and per capita income well above the national average, reflecting better access to essential services and to markets, a more diversified economy, and higher agricultural productivity due to irrigation. The main ethnic groups are the Lao Loum and Lao Theung.

The participatory poverty assessment undertaken in 2000 and updated in 2002 indicated that the fundamental concern of poor households is food security, notably the availability of rice. Land acreage and quality, and animal diseases are important determinants of household well-being. The desire for road access and electricity registered strongly in the participatory poverty assessment, as they so directly help improve household income. Education did not register as a priority for households; health services are used by only a third of the population, due to their inaccessibility and low quality.

Connecting the Poor

Responses for ensuring that the environmental and social concerns are fully addressed include the following:

- environmental assessment and management plan;
- social development plan, which makes provision for the resettlement action plan and ethnic minorities development plan for resettlers displaced by reservoir inundation; resettlement action plan and ethnic minority development framework for project lands; resettlement, livelihood restoration, and ethnic minority development plan for downstream areas; regional and resettlement health plans; gender strategy and action plan;
- social and environmental management framework and first operational plan, which address issues related to the NNT–NPA;
- approximately \$90 million built into the project costs to fully manage and mitigate the environmental and social effects.

Connecting the poor on a national basis will occur through careful management of the Nam Theun 2 (NT2) revenues that accrue to the Government. ADB and World Bank support for the Project includes a comprehensive public expenditure management program, so as to strengthen the Government's capacity to use its financial resources effectively and efficiently in reaching the goals and targets outline in the National Growth and Poverty Eradication Strategy.

C. Participation Process

Is there a stakeholder analysis? ☒ Yes ☐ No

Is there a participation strategy? ☒ Yes ☐ No

D. Gender Development

Strategy to maximize impacts on women:

A gender action plan and strategy (GAPS) has been prepared and mainstreamed into the social development plan (SDP) and social and environment management framework and operational plant (SEMFOF). A more detailed plan will be prepared during project implementation after more detailed gender assessments have been carried out. A major focus of the GAPS is the gender sensitivity awareness and training of project staff, as well as gender-targeted interventions such as health and gender-balanced livelihood training and gender-sensitive actions with support institutions. The GAPS includes gender-disaggregated data collection and gender monitoring. The Nam Theun 2 Power Company Limited (NTPC) will recruit an international institutional and gender specialist to provide periodic guidance. NTPC and the Watershed Management and Protection Authority (WMPA) will both recruit full-time Lao national gender specialists.

Has an output been prepared? ☒ Yes ☐ No

E. Social Safeguards and Other Social Risks

Item	Significant/ Not Significant/ None	Strategy to Address Issues	Plan Required
Resettlement	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Three resettlement plans have been prepared: one each for the reservoir area, the downstream areas, and the project lands. A resource access restriction process framework has been prepared as part of the SEMFOP for the watershed.	<input checked="" type="checkbox"/> Full <input type="checkbox"/> Short <input type="checkbox"/> None
Affordability	<input type="checkbox"/> Significant <input type="checkbox"/> Not significant <input checked="" type="checkbox"/> None		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Labor	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	The Government has developed a workforce local labor recruitment policy which includes the following provisions: (i) targets for skilled and unskilled Lao nationals, (ii) recruitment at the project site only for Lao nationals resident in the project impact zones, (iii) 300 positions reserved for Nakai resettlers as set out in the SDP, (iv) head construction contractor and subcontractor constructions camps to provide at least the mid shift meal sourced from a catered mess, (iv) training to be provided to workers to improve their skills, and (v) gender-balanced recruitment targets and no ethnic or sexual discrimination.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Indigenous Peoples	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	Three ethnic minority development plans have been prepared as part of the SDP for the reservoir area, the Project construction areas and the downstream areas. An EMDP has also been prepared as part of the SEMFOP for the watershed.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Other Risks and/or Vulnerabilities	<input checked="" type="checkbox"/> Significant <input type="checkbox"/> Not significant <input type="checkbox"/> None	<p>The Project is expected to generate significant revenue for the Government. But proper channeling of the revenue to the intended use, particularly to the poverty reduction measures, is in question. Policy framework is being implemented to create macroeconomic stability and promote good governance (institutional and financial). Public expenditure management capacity-building assistance is being provided. Close monitoring and assistance is needed in this regard.</p> <p>The Project will increase the risk of health and other social impacts such as HIV/AIDS and human trafficking. A health impact assessment has been conducted and a draft public health action plan and a trafficking awareness plan have been prepared, to be finalized before financial close. The head contractor has also prepared a staff health plan for the thousands of workers.</p>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

HIV/AIDS = human immunodeficiency virus/acquired immunodeficiency syndrome.

POVERTY IMPACT MATRIX FOR LAO PDR

Channel		Type of Effect			Major Groups Affected	Risk/Assumption for Benefits
General	Specific	Short term	Medium term	Long term		
Labor market	Employment opportunities	More jobs for unskilled and semiskilled local labor during construction		More jobs created because of economic growth resulting from the project	Project site beneficiaries and Lao PDR population	Economic growth effects are realized
Prices	Electricity			Reduced electricity prices for end consumers through a reduction of cost of supply	Electricity consumers in the Lao PDR	The cost of power supply from the Project is less than domestic alternatives and imports from Thailand.
	Wages	Increased wages for labor at the construction site	No effect on general wages in Lao PDR	No effect on general wages in Lao PDR	Project site beneficiaries	Wages for local labor offered by NTPC are higher than the existing wages in Lao PDR.
	Exchange rate/ terms of trade	Some appreciation of the exchange rate could occur because of the high import content of inputs for the construction site.	No effect	No effect	Lao PDR population	Increased general demand for unskilled and semiskilled labor is not expected to result in a general wage increase, because the country has surplus labor Exchange rate effects of imports during the construction period are short-term and do not have sustainable terms of trade effects. Foreign exchange revenue earnings from the Project are small in comparison to GDP and current export earnings.
Access	Electricity services	Increased access to reliable electricity for project site beneficiaries	Increased access to reliable electricity to consumers	Increased access to reliable electricity to consumers	Project site beneficiaries and Lao PDR population	The Lao PDR share of the Nam Theun 2 power output is 200–300 GWh per year. This amounts to a 7% increase in available power supply.
	Other infrastructure and social services	Increased access to irrigation, water supply, education, and health services	Increased access through the fiscal allocation of resources made	Increased access through the fiscal allocation of resources made possible by	Project site beneficiaries and Lao PDR population	Effective implementation of measures for people affected by the project site Effective fiscal management

Channel		Type of Effect			Major Groups Affected	Risk/Assumption for Benefits
General	Specific	Short term	Medium term	Long term		
		for project site beneficiaries	possible by increased fiscal revenue	increased fiscal revenue		and efficient targeting of fiscal funds to priority sectors
Transfers	Transfers to the Government of Lao People's Democratic Republic (the Government)	NTPC to allocate \$31.5 million to the Government of Lao PDR to protect the watershed area, NNT-NPA. NTPC to compensate \$30 million to the Government for use of land and water resources NTPC to allocate \$2.4 million for capacity building of the Government agencies	NTPC to allocate 31.5 million to Government to protect the watershed area, NNT-NPA	Increased fiscal revenue through tax and royalties Increased fiscal revenue stemming from the Government 25% equity in the Project		NTPC committed to fulfill contractual obligations .
	Transfer to domestic private sector	Increased as a result of project construction			Local contractors	Capacity of local contractors to fulfill commitments
	Foreign direct investments		Increased interest in Lao PDR due to improved investor confidence lower perceived country risk	Increased interest in the Lao PDR due to improved investor confidence and lower perceived country risk	Lao PDR population	The Project successfully implemented and sustained commitment to PPA and contractual arrangements

GWh = gigawatt-hour, Lao PDR = Lao People's Democratic Republic, NNT-NPA = Nakai Nam Theun National Protected Area, NTPC = Nam Theun 2 Power Company Limited, PPA = power purchase agreement.

Source: Asian Development Bank staff analysis.

ECONOMIC ANALYSIS

1. The economic analysis undertaken for the Nam Theun 2 (NT2) Hydroelectric Project (the Project) examines project economic viability from the perspective of both the subregion and the Lao People's Democratic Republic (Lao PDR). The analysis includes assessment of recent studies on electricity demand and the role of the Project in least-cost generation expansion planning for each country. The economic costs and benefits associated with the Project, including the cost of a dedicated transmission line in Thailand, cover the construction period (2005–2009) and a 25-year operating life (2009–2034). All values are expressed in domestic prices in constant 2005 dollars and discounted over 30 years using a discount factor of 12%. Financial values given in baht are converted at an exchange rate of B40/\$. Risk and sensitivity analyses have been undertaken with respect to key risk variables to examine the robustness of the economic results. Finally, a regional distribution analysis has been prepared.

A. Demand Forecasts

2. An annual total of 5,354 gigawatt-hours (GWh) of electricity from the Project is intended to serve the Thai electricity market. Thailand had an average annual gross domestic product (GDP) growth rate of 2.8% during 1993–2002, when electricity demand grew by 6.4% annually. The load forecast for Thailand is prepared as a collaboration of all key stakeholders; the August 2002 load forecast is based on an annual economic growth of 4.7% and incorporates a demand reduction of 928 megawatts (MW) as a result of demand-side management.¹ Growth in electricity demand is expected to rapidly absorb existing excess capacity resulting from the economic downturn in 1997. During the period 2005–2010 capacity increases on the order of 1,500 MW and 9,500 GWh annually will be required to meet demand. Despite the substantial capacity of the Project, it will supply Thailand with less than 7 months of a single year's additional generation requirements.

3. The Lao PDR is committed to purchase 200 GWh per year from the Project, but may buy up to 300 GWh. The Lao PDR power system is smaller than the Thai system. It consists of four grids, none interconnected. Current electricity consumption is estimated at 211 kilowatt-hours (kWh)/capita per year and household electricity access is among the lowest in Asia, about 40%. Historically, domestic consumption has been small in relation to domestic production and exports. However, in the last decade imports have increased as a share of domestic production, and the share of exports has declined. In 2003, electricity exports (in GWh) were less than half the level of domestic consumption.

4. The Project will primarily supply consumers in Khammuane and Savannakhet provinces in Central Region 2 (CR2) and consumers in Central Region 1 (CR1), including Vientiane, as there are plans to interconnect the two grids. While per capita consumption in CR2 (169 kWh/year) is below the national average, this is expected to change with the location of new industries and mines, increased incomes, and grid extension. Energy consumption in CR2 is about 200 GWh per year with a maximum demand of 48 MW. Demand in CR2 is met by imports from Thailand, and to a lesser extent by domestic off-take from the Theun Hinboun hydro project. By the time the Project is commissioned, CR1 will have a demand of 938 GWh. The least-cost strategy is to add capacity only when it can be fully absorbed by the system, balancing any temporary deficit with imports from Thailand.

¹ A revised version of the load forecast was prepared in January 2004, considering more optimistic economic growth expectations. However, the earlier, more conservative load forecast was adopted as the base case for least cost analysis.

B. Least-Cost Expansion

5. Thailand's domestic natural resources for generation include natural gas, lignite, and hydropower. Electricity capacity consists of combined cycle gas turbine (CCGT) (71%), thermal (ignite and oil, 19%), hydropower (9%), and other smaller sources (1%). While it is likely that Thailand will continue to rely on natural gas as a major fuel source, diversification of fuel sources is advantageous since heavy reliance on one fuel source may result in undesirable price fluctuations in the power sector. Continued reliance on natural gas will also require further investment in the gas pipeline network and increased imports.

6. As part of due diligence for the Project, the World Bank and Electricity Generating Authority of Thailand (EGAT) undertook an economic expansion planning evaluation of the Thai power system in which the Project was modeled as a candidate competing for a place in the expansion plan along with a range of fossil-based alternatives.² The base-case analysis concluded that the Project should be included in the least-cost generation expansion plan from 2010, and that CCGT capacity would be the next best alternative to the Project. A cost-risk framework was employed to determine whether the Project investment decision would still be justified taking into account the probability of different outcomes for key risks. Base, high, and low scenarios were developed for power demand, natural gas prices and project cost, and probabilities assigned to each outcome. The cost-risk analysis found that the probability-weighted accumulated present value of real resource savings as a result of the development of the Project is \$269 million as compared with the CCGT-based alternative, close to the base case result of \$277 million. In present value terms, these savings are equivalent to \$0.012 per kWh sold from the Project.

7. The *Power System Development Plan* (PSDP) for Lao PDR³ analyzed 33 separate hydroelectric power projects and two thermal projects that had been identified in previous studies. These candidates included projects with potential to provide foreign exchange earnings and meet domestic power needs. Projects were initially evaluated solely on the basis of their weighted average cost of generation. Environmental and social impact assessments were then incorporated for the short-listed projects. These projects were ranked according to their relative economic performance adjusted for social and environmental impacts. The proposed Project ranked first among all candidates evaluated, with an expected generation cost of \$0.016/kWh, about two thirds of the cost of the next-ranking project.

C. Valuation of Costs and Benefits

8. The basis for the project evaluation is the comparison of discounted benefits and costs between the with- and the without-project cases. The analysis considered the costs and benefits over the pre-development period (2004), construction period (2005–2009) with project commissioning in November 2009, and over the 25-year operating life until 2034. The total project investment cost in financial terms, including the separately funded transmission line in Thailand but excluding the costs of project financing and interest during construction, is estimated to be \$1,099 million at constant 2005 prices. Annual operating costs, including environmental and social costs, NTPC administration, the Project operating costs, and

² World Bank. 2004. *Nam Theun 2 Project Economics Interim Summary Report*. Washington, DC.

³ Meritec Limited in association with Lahmeyer GmbH. 2004. *Power System Development Plan for Lao PDR—Final Report*, Lao PDR.

maintenance, are estimated to be an additional \$16 million–\$21 million annually.⁴ The economic evaluation of project costs exclude taxes and interest during construction and are subject to shadow pricing. The regional economic analysis includes the cost of dedicated transmission line in Thailand to be separately funded by EGAT.

9. System losses in the Lao PDR and Thailand are excluded from the analysis since they are common in the with- and without-project cases. However, losses associated with the NT2 dedicated transmission line estimated at 1% per year are included. Costs for operation and maintenance of the transmission line are estimated at 1% of capital expenditure for the line plus 2% for the substations and amount to US\$1.9 million per year. The analysis includes an annual reduction of 275 GWh for the existing Theun Hinboun hydroelectric power project (THH), which shares the catchment area with the Project.

10. Costs were classified as non-tradable and tradable goods, labor and services. Tradable costs were converted to the domestic price numeraire using derived shadow prices. Tradable goods, including capital, fuel and skilled foreign labor were converted using a shadow exchange rate factor (SERF) of 1.05.⁵ The Project location specific shadow price for domestic labor to be employed at the construction site of 0.71 was applied to unskilled labor. Taxes and duties were excluded from natural gas prices.

11. For the regional analysis, benefits were evaluated on the basis of defining electricity consumption from the Project as non-incremental for replacing existing supply of energy, and incremental for induced demand. Benefits from electricity sales to Thailand were classified as incremental while sales to the Lao PDR were defined as non-incremental since they replace imports from Thailand. Non-incremental benefits of electricity are valued based on the economic cost of supply without the project, whereas incremental benefits are valued at an average of the cost of electricity with and without the Project. The benefit for non-incremental electricity is based on the economic cost of imported electricity. Incremental benefits are valued at the average willingness to pay for electricity estimated as the weighted average of the cost of the alternative energy source and the anticipated electricity tariff.

12. Without the Project, consumers would obtain substitute sources at the avoided cost of supply. The CCGT alternative to the Project represents an avoided cost of \$0.050/kWh for Thai consumers while the Project average tariff is \$0.039/kWh. Incremental benefits are valued at the willingness to pay for electricity of \$0.045/kWh estimated as the average of the cost of the CCGT alternative and the tariff. For Lao consumers, the weighted average cost of imported electricity is estimated at \$0.062/kWh, including EGAT sales to the Lao grid and cross-border sales by Thailand's Provincial Electricity Authority.

13. For the Lao PDR economic analysis, benefits were evaluated on the basis of sales to Thailand, valued at the PPA tariff and adjusted by the Lao PDR shadow exchange rate factor.

14. The regional analysis yields an average incremental economic cost of \$0.036/kWh. The economic net present value (NPV) is estimated \$269 million or \$0.013/kWh. The economic internal rate of return (EIRR) is 15.9%. A summary of cost and benefits for the regional analysis are presented in Table A9.1. For the Lao PDR, the average incremental economic cost is

⁴ Environmental costs include catchment area management, resettlement commitments, monitoring and mitigation, and a contingency for unanticipated requirements; NTPC operating costs include administration, insurance, and a budget for other direct costs.

⁵ The calculated SERF ranged between 1.01–1.08 for the Lao PDR and between 1.00–1.02 for Thailand.

estimated at \$0.032/kWh. The economic net present value (NPV) is estimated \$218 million or \$0.010/kWh. The economic internal rate of return (EIRR) is 15.5%. The details of the Lao PDR analysis are in Supplementary Appendix F.

D. Sensitivity Analysis

15. Sensitivity analysis was undertaken with respect to key risk factors and assumptions that could influence the viability of the Project. The sensitivity analysis undertaken for the regional analysis, shows that the NPV would decrease by 51% to \$133 million and EIRR to 13.7% if investment cost were increased by 20%. A 5-year reduction in the operating life of the project would reduce the EIRR marginally to 15.6%. A 20% reduction in benefits or a 1-year delay of benefits would reduce the EIRR to 13.0% and 14.2%, respectively. Adjustments in the assumptions of conversion factors and discount rates have only a minor impact on EIRR. None of the risk factors would independently undermine the conclusion of the economic viability of the Project. However, if the cost increase of 20% is combined with a 20% reduction in benefits, the EIRR would fall just below the opportunity cost of capital. If this scenario is combined with a 1-year delay of benefits and a 5-year reduction in operating life, the EIRR would fall to 9.1%. A parallel sensitivity analysis of the Lao EIRR was also prepared and is reported in Supplementary Appendix F. Estimated EIRR's reported for each Lao PDR test were from 0.2 to 0.4% lower than the regional results, reflecting the lower base case Lao-specific EIRR.

16. A risk analysis was undertaken to examine a range of possible EIRR outcomes as a result of variations in the values of uncertain factors, including capital costs, operations and maintenance costs, sales to EGAT and incremental benefits. The values of the regional EIRR range from a maximum of 16.9% to a minimum of 13.5% with a mean of 15.2%. The Lao PDR analysis produced similar but slightly lower results, paralleling the lower base case for the Lao PDR EIRR.

Table A9.1: Economic Internal Rate of Return—Regional

Year	Electricity Consumption							Gross Benefits				Economic Costs			
	Net	Non	Incre-	Thai	T/L	Theun	Total	Non	Incre-	Theun	Benefits	Capital	O&M	Total	Economic
	Generation	Incremental	mental	Losses	Hinboun	Export	Consum-	Incremental	mental	Hinboun		Investment	\$ mill.	Cost	Benefit
	GWh	GWh	GWh	GWh	GWh	GWh	GWh	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.
2004	0	-	-	-	-	-	-	-	-	-	-	73.0	-	73.0	73.0)
2005	-	0	0	0	0	0	0	0	0	0	0	186.5	-	186.5	(186.5)
2006	-	-	-	-	-	-	-	-	-	-	-	207.2	-	207.2	(207.2)
2007	-	-	-	-	-	-	-	-	-	-	-	220.2	-	220.2	(220.2)
2008	-	-	-	-	-	-	-	-	-	-	-	200.9	-	200.9	(200.9)
2009	833	24	808	(8)	(275)	24	550	1.5	37.2	(7.1)	31.6	124.1	2.4	126.6	(94.9)
2010	5,603	165	5,438	(54)	(275)	165	5,274	10.5	250.3	(7.1)	253.7	7.3	18.5	25.8	227.9
2011	5,532	178	5,354	(54)	(275)	178	5,203	11.3	246.4	(7.1)	250.6	-	17.7	17.7	232.9
2012	5,546	192	5,354	(54)	(275)	192	5,217	12.2	46.4	(7.1)	251.5	-	17.9	17.9	233.7
2013	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	15.9	15.9	236.2
2014	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	14.6	14.6	237.5
2015	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	19.0	19.0	233.0
2016	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	13.5	13.5	238.5
2017	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	14.0	14.0	238.0
2018	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	13.1	13.1	239.0
2019	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	13.1	13.1	238.9
2020	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	16.4	16.4	235.6
2021	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	24.4	24.4	227.6
2022	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	15.6	15.6	236.4
2023	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	15.6	15.6	236.4
2024	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	13.8	13.8	238.2
2025	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	14.0	14.0	238.1
2026	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	12.6	12.6	239.5
2027	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	18.7	18.7	233.4
2028	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	12.3	12.3	239.8
2029	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	13.8	13.8	238.2
2030	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	13.3	13.3	238.8
2031	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	15.5	15.5	236.6
2032	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	16.2	16.2	235.9
2033	5,554	200	5,354	(54)	(275)	200	5,225	12.7	246.4	(7.1)	252.1	-	17.4	17.4	234.7
2034	4,628	167	4,462	(45)	(275)	167	4,309	10.6	205.4	(7.1)	208.9	-	14.8	14.8	194.0

Electricity Consumption								Gross Benefits				Economic Costs			
	Net	Non	Incre-	Thai	Total			Non	Incre-	Theun		Capital		Total	Economic
	Generation	Sales	Sales	Losses	Hinboun	Export	Consum-	Incremental	mental	Hinboun	Benefits	Investment	O&M	Cost	Benefit
Year	GWh	GWh	GWh	GWh	GWh	GWh	GWh	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.	\$ mill.
NPV @ 12%		778	21,695	(217)	(1,232)	778	21,025	49.6	998.6	(31.9)	1,016.3	681.4	65.9	747.3	269.0
NPV / kWh Consumed								0.002	0.047	(0.002)	0.048	0.032	0.003	0.036	0.013
Average Incremental Economic Cost = 0.0355 USD/kWh														EIRR =	15.9%

GWh = gigawatt-hour, mill. = million, NPV = net present value, O&M = operations and maintenance T/L = transmission line.

Notes: (i) Thai incremental share is 100%; (ii) Lao Incremental share is 0%; (iii) Non-incremental benefit (\$/kWh) = 0.064; (iv) Incremental benefit (\$/kWh) = 0.046; (v) Theun Hinboun annual firm GWh loss = (275); (vi) Thai CCGT energy value per kWh = 0.026; (vii) Thai transmission line losses = 1%; and (viii) Thai transmission line O&M (\$ mm) = 1.98

FINANCIAL ANALYSIS

A. Introduction

1. A financial analysis¹ of the Nam Theun 2 (NT2) Hydroelectric Project (the Project) and Government of Lao People's Democratic Republic (Lao PDR) (the Government) equity investment has been completed in three parts: (i) financial projections of the Lao Holding State Enterprise (LHSE), the Government equity shareholder of the Project, to assess its financial viability and sustainability, (ii) a financial evaluation of the Project to assess the financial viability of the overall Project investment, and (iii) the return on Government's investment (ROI) in Nam Theun 2 Power Company Limited (NTPC) to assess the viability of investment from Government's perspective. The financial analysis was calculated over the Project's economic useful life, which includes the Project construction period (May 2005–November 2009) and the 25-year operating period (November 2009–November 2034).

2. The financial projections of LHSE are expressed in current terms. The financial evaluations (financial internal rate of return [FIRR] and weighted average cost of capital [WACC]) of both the Project and the ROI of Government were undertaken in real terms using constant 2005 prices with project cost estimates, excluding financing costs, and financial projections in nominal terms converted to real terms by adjusting for the projected effects of foreign and domestic inflation. Both the FIRR and WACC were computed after tax.

B. LHSE Financial Projections

3. The Government has agreed to establish LHSE to receive all dividends from this shareholding so as to ensure a transparent and efficient flow of the Government revenues from the Project to poverty reduction initiatives. Given that equity injections by shareholders are limited to base equity, the cost of this 25% share is estimated at \$87.5 million. The Government has decided to finance its required equity injection through an Asian Development Bank (ADB) loan (\$20.0 million), an International Development Association (IDA) grant (\$20.0 million), a European Investment Bank (EIB) loan (€40.0 million), and an Agence Française de Développement (AFD) grant (€5.0 million). LHSE revenues will consist entirely of the NTPC dividends, which will be paid in direct proportion to the Government shareholding. After deduction of a 10% withholding tax by the Government, LHSE will apply the net dividend revenue meet its own operating costs and to cover debt service on the ADB and EIB loans. Annual operating expenses are estimated at \$100,000 and include staff salaries, legal services, financial advisory service, accounting services, office rental, office supplies and services, and vehicle rental. After meeting all debt service and operating expenses, and funding any reserve accounts required to manage risks, any remaining cash is transferred to the NT2 revenue account under the revenue management arrangements.

4. Financial projections have been prepared for LHSE over the entire operating period of the concession under a Project base case scenario and are summarized in Table A10.1. This base-case scenario is defined as that the project sponsors and financial advisors deem to be a most likely set of outcomes regarding the financial position and performance of NTPC and, therefore, its dividend payments to LHSE. Based on the NTPC projections, it will declare its first dividend at the end of 2010 and continue to issue dividends on a semi-annual basis over

¹ As the basis for preparing the financial analysis, a detailed review of the Nam Thuen 2 Power Company Limited (NTPC) lenders' financial model was undertaken. This model was initially prepared for NTPC by its financial advisors, and has since been refined and modified by the commercial lenders as a common basis for due diligence.

the entire remaining period of the concession. Financial projections for NTPC are provided in Supplementary Appendix H.

Table A10.1: LHSE Summary Financial Projections
(\$ million – current)

Item	2009/10 ^a	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Income Statements													
Revenue	0.5	13.7	13.7	14.3	15.4	14.8	14.1	15.0	15.4	15.9	31.6	42.2	45.4
Operating Expenses	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Interest Expense	2.4	3.4	3.3	3.2	3.2	3.1	3.0	2.9	2.8	2.7	2.5	2.4	2.3
Dividend Tax	0.1	1.4	1.4	1.4	1.5	1.5	1.4	1.5	1.5	1.6	3.2	4.2	4.5
Net Income	(2.0)	8.8	8.9	9.5	10.6	10.1	9.6	10.5	11.0	11.5	25.8	35.4	38.5
Cash Flow Statements													
Net Cash Flow from Operations	25.1	5.5	12.2	12.4	13.2	13.5	12.9	13.0	13.6	13.9	20.4	32.5	39.1
Net Principal Repayments	(0.1)	(1.6)	(1.7)	(1.8)	(1.9)	(1.9)	(2.0)	(2.1)	(2.2)	(2.3)	(2.5)	(2.6)	(2.7)
Interest Paid	(3.4)	(3.4)	(3.3)	(3.2)	(3.2)	(3.1)	(3.0)	(2.9)	(2.8)	(2.7)	(2.5)	(2.4)	(2.3)
Dividends Paid to the Government of the Lao PDR	(19.6)	(0.02)	(7.2)	(7.4)	(8.2)	(8.5)	(7.9)	(8.0)	(8.5)	(8.9)	(15.4)	(27.5)	(34.1)
Net Cash Flow	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ending Cash Balance	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Balance Sheets													
Assets													
Current Assets	2.2	9.4	9.4	9.7	10.3	10.0	9.7	10.1	10.3	10.6	18.5	23.9	25.5
Long-Term Investments	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4	87.4
Total Assets	89.7	96.8	96.9	97.1	97.7	97.4	97.1	97.5	97.7	98.0	105.9	111.3	112.9
Liabilities and Equity													
Current Liabilities	1.6	1.7	1.8	1.9	1.9	2.0	2.1	2.2	2.4	2.5	2.6	2.7	2.8
Long-Term Debt	68.5	66.8	65.0	63.2	61.2	59.2	57.1	54.8	52.5	50.0	47.4	44.7	41.9
Equity	19.6	28.4	30.1	32.1	34.5	36.2	37.9	40.5	42.9	45.5	55.9	63.8	68.2
Total Liabilities and Equity	89.7	96.8	96.9	97.1	97.7	97.4	97.1	97.5	97.7	98.0	105.9	111.3	112.9
Key Performance Indicators													
Debt Service Coverage Ratio	5.56	1.11	2.44	2.49	2.63	2.69	2.58	2.59	2.71	2.78	4.07	6.49	7.81
Debt - Equity Ratio	3.58	2.41	2.22	2.03	1.83	1.69	1.56	1.41	1.28	1.15	0.89	0.74	0.66
Return on Equity (%)	(10.4)	36.8	30.5	30.5	31.7	28.7	26.0	26.9	26.3	26.1	50.9	59.2	58.3

Lao PDR = Lao People's Democratic Republic, LHSE = Lao Holding State Enterprise.

^a Period from 9 November 2009 to 8 January 2011.

Source: Asian Development Bank estimates.

5. The LHSE projections significantly underestimate the overall financial viability of the Project for the Government because only dividend income is included in these projections, which represent only about one-third of the total Government revenue from the Project. Royalty and income tax paid by NTPC directly to NT2 Revenue Account, which are projected to be over \$1.25 billion over the concession, are excluded from the LHSE projections. These revenues are incorporated in the Government return on investment analysis presented in part D of this appendix. However, the LHSE projections have assumed that any amount remaining on the contingent equity release date from the \$30 million payment from NTPC to Government

as compensation for loss of biodiversity and ecotourism assets would be transferred to LHSE. If no contingent equity is required, this balance of this amount would be paid in 2009 based on the current schedule for the project completion date under the concession agreement. It is assumed that a portion of these funds would be held by LHSE to ensure that it can meet its debt service obligations over the first few years of NTPC operations. The remaining amount would be paid to Government.

6. Even though the largest sources of the Government revenue, the royalty and income tax, are excluded, the financial projections for LHSE indicate that its capacity to meet its debt service obligations on the ADB and EIB loans is well within a range considered to be satisfactory. Under the base-case scenario, total dividends paid to LHSE over the concession, after deduction of the 10% withholding tax, are projected to be almost \$640 million, expressed in current prices. Total debt service, including both principal and interest, on the proposed ADB and EIB loans is estimated at \$124 million while LHSE operating costs over the entire concession period are projected to be less than \$4 million. Therefore, with total debt service and operating expense being equivalent to only 20% of net dividend income, LHSE has considerable capacity to service this debt under various scenarios. This capacity to meet its debt obligations is measured by the debt service coverage ratio, which averages 5.2 over the loan repayment period, well above the 1.2 minimum level normally considered acceptable. In 2011, the first year of full debt service on both the ADB and EIB loans, the projected debt service coverage ratio (1.11) may be slightly below this threshold due to initially low NTPC dividends. However, LHSE revenue is still sufficient to service debt.

7. Consistent with the large differential between the dividend income it receives and its debt service and operating expenses, LHSE's return on equity (ROE) is projected to average a very favorable 38% over 2011–2034. In 2009/10, ROE is anticipated to be negative because the LHSE share of NTPC dividend is projected to be only about \$0.5 million. However, as noted above, LHSE's financial obligations during this period can be fully met from a portion of the contingent equity release.

8. Dividend payouts by LHSE to the NT2 Revenue Account will progressively increase in line with its own dividend income from NTPC, from \$7.1 million in 2011 to \$34.1 million in 2022. Even assuming these maximum payout rates to Government, the proportion of equity in LHSE's capital structure will increase over the forecast period as the ADB and EIB loans are repaid. The debt–equity ratio will decline from an estimated 3.6 in 2009/10 to only 0.7 by 2022. The loans would be fully repaid by the end of the concession in 2034.

C. Project Financial Evaluation

9. Under the same base-case scenario as in financial projections, the project FIRR is calculated as 12.4%, while the WACC² (or discount rate) is estimated at 10.1% with Project's NPV of \$166.6 million showing that the Project is financially viable. The calculations underlying these results are summarized in Table A10.2, Table A10.3 and Table A10.4.

² The WACC for the Project was calculated based on the weighted average of the estimated cost of equity and debt comprising the NTPC capital structure.

Table A10.2: NTPC - Financial Internal Rate of Return
(\$ million - 2005 constant prices)

Year								Net Present Value (NPV)		
								WACC	8.1%	10.1%
								NPV	381.7	166.6
Year	Electricity Sales (GWh)			Costs				Sales Revenue	Net Cash Flow	FIRR
	EGAT	EdL	Total	Capital	O&M	Taxes & Royalty	Total			
2005	0	0	0	(324.1)	0.0	(0.5)	(324.6)	0.0	(324.6)	12.4%
2006	0	0	0	(206.5)	0.0	0.0	(206.5)	0.0	(206.5)	
2007	0	0	0	(197.1)	0.0	0.0	(197.1)	0.0	(197.1)	
2008	0	0	0	(136.6)	0.0	0.0	(136.6)	0.0	(136.6)	
2009	808	24	833	(144.9)	(2.7)	(0.3)	(148.0)	30.9	(117.1)	
2010	5,438	165	5,603	0.0	(18.9)	(10.8)	(29.7)	207.0	177.3	
2011	5,354	178	5,532	0.0	(18.0)	(10.7)	(28.7)	205.9	177.2	
2012	5,354	192	5,546	0.0	(18.2)	(10.8)	(29.0)	208.0	179.0	
2013	5,354	200	5,554	0.0	(16.0)	(10.9)	(26.9)	210.0	183.1	
2014	5,354	200	5,554	0.0	(14.5)	(11.0)	(25.5)	211.5	186.0	
2015	5,354	200	5,554	0.0	(19.5)	(15.3)	(34.8)	213.2	178.4	
2016	5,354	200	5,554	0.0	(13.3)	(16.1)	(29.4)	214.0	184.6	
2017	5,354	200	5,554	0.0	(13.9)	(16.5)	(30.4)	214.8	184.4	
2018	5,354	200	5,554	0.0	(12.8)	(17.1)	(29.9)	215.6	185.8	
2019	5,354	200	5,554	0.0	(12.9)	(17.5)	(30.4)	216.5	186.1	
2020	5,354	200	5,554	0.0	(16.6)	(17.7)	(34.3)	217.2	182.9	
2021	5,354	200	5,554	0.0	(25.6)	(17.7)	(43.2)	218.1	174.9	
2022	5,354	200	5,554	0.0	(15.7)	(32.5)	(48.1)	218.9	170.8	
2023	5,354	200	5,554	0.0	(15.7)	(32.8)	(48.4)	219.7	171.3	
2024	5,354	200	5,554	0.0	(13.7)	(33.3)	(47.0)	220.5	173.6	
2025	5,354	200	5,554	0.0	(13.8)	(52.0)	(65.8)	221.4	155.6	
2026	5,354	200	5,554	0.0	(12.3)	(52.3)	(64.5)	222.3	157.8	
2027	5,354	200	5,554	0.0	(19.1)	(51.5)	(70.6)	223.1	152.6	
2028	5,354	200	5,554	0.0	(11.9)	(72.5)	(84.4)	224.0	139.6	
2029	5,354	200	5,554	0.0	(13.7)	(72.2)	(85.8)	224.8	138.9	
2030	5,354	200	5,554	0.0	(13.0)	(96.3)	(109.3)	225.6	116.3	
2031	5,354	200	5,554	0.0	(15.5)	(95.6)	(111.1)	226.5	115.3	
2032	5,354	200	5,554	0.0	(16.3)	(95.6)	(111.9)	227.3	115.4	
2033	5,354	200	5,554	0.0	(17.6)	(95.7)	(113.3)	228.2	114.9	
2034	4,462	167	4,628	0.0	(14.8)	(81.1)	(95.8)	190.7	94.8	

EdL = Electricité du Lao, EGAT = Electricity Generating Authority of Thailand, FIRR = financial internal rate of return, NPV = net present value, NTPC = Nam Theun 2 Power Company Limited, O&M = operations and maintenance, WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

Table A10.3: Calculation of WACC for the Project

Item	Financing Component		Total
	Equity	Debt ^a	
Amount (\$ million)	350.0	900.0	1,250.0
Weighting (%)	28.0	72.0	100.0
After-Tax Nominal Rate (%)	14.7	9.5	
After-Tax Real Rate (%)	13.6	8.8	
Weighted Real WACC (%)	3.8	6.3	10.1

WACC = weighted average cost of capital.

^a For dollar debt under base-case drawdown, average lending terms: 16.4-year term, 4.5-year grace period, 6.80% interest rate after swaps. For baht debt, average lending terms: 15.0-year term, 4.5-year grace period, 8.58% interest rate.

Source: Asian Development Bank estimates.

Table A10.4: Projected Government of the Lao PDR Revenue and Debt Service
(\$ millions, current prices)

Item	2009/10	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Royalty Tax	37.5	10.9	11.1	11.2	11.4	11.6	11.7	11.9	12.0	12.2	12.4	12.5	12.7
Income Tax	0.0	0.0	0.0	0.0	0.0	4.4	5.2	5.7	6.3	6.8	7.1	7.0	23.6
Dividends	0.5	13.7	13.7	14.3	15.4	14.8	14.1	15.0	15.4	15.9	31.6	42.2	45.4
Total Revenue	38.0	24.6	24.8	25.5	26.8	30.8	31.1	32.6	33.7	34.9	51.0	61.8	81.7
Debt Service: ADB	0.0	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)
Debt Service: EIB	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)
Net Revenue	34.5	19.6	19.8	20.5	21.8	25.8	26.1	27.6	28.7	29.9	46.0	56.7	76.7

Item	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Totals
Royalty Tax	12.9	13.1	38.2	38.8	39.3	39.8	40.4	81.9	83.0	84.2	85.4	72.0	808.1
Income Tax	24.1	24.9	21.6	22.0	21.1	46.1	46.1	34.6	33.9	33.9	34.0	30.1	438.4
Dividends	46.3	47.5	42.8	42.1	43.6	38.8	39.4	32.4	32.1	32.0	32.1	27.6	708.6
Total Revenue	83.3	85.4	102.6	102.9	104.0	124.7	125.9	148.9	148.9	150.1	151.4	129.7	1,955.1
Debt Service: ADB	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(35.6)
Debt Service: EIB	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(3.5)	(88.1)
Net Revenue	78.3	80.4	97.6	97.8	99.0	119.7	120.8	143.9	143.9	145.1	146.4	124.7	1,831.4

ADB = Asian Development Bank, EIB = European Investment Bank, Lao PDR = Lao People's Democratic Republic.

Source: Asian Development Bank estimates.

10. The cost of equity incorporated into the WACC has been estimated on the basis of the capital asset pricing model, which provides a methodology for estimating the required equity return as a function of the relative risk of the investment. The cost of equity is the rate of return on a risk-free investment, such as Government bonds, plus a risk premium appropriate for the project. Therefore, the cost of equity for a higher risk project is greater than that having a lower level of risk. Estimating both the risk-free rate and risk premium for NTPC is complicated by the lack of functioning debt and equity markets in the Lao PDR as well as the cross-border nature of the Project. With 94% of the electricity being exported, the cost of equity estimated for the Project needs to reflect the lower level of commercial risk associated with business operations in Thailand relative to the Lao PDR. On this basis, a weighted average risk-free rate of 7.4% has been estimated which incorporates the different individual rates applicable to the Lao PDR and Thailand. The risk premium has been estimated on the basis of an analysis of standard

risk indicators for 87 United States power utilities, 13 international power utilities and the two publicly listed independent power producers in Thailand. Adjustments have then been made to reflect the additional market, tax and country risks of Lao. Based on this methodology, the risk premium is estimated to be 7.3%. Therefore, the estimated cost of equity is 14.7% in nominal terms, which after adjusting for inflation is equivalent to a real cost of equity of 13.6%.

11. The cost of debt is estimated to be 9.5% in nominal after-tax terms, which is equivalent to a real after-tax rate of 8.8%. The cost of debt is estimated as the internal rate of return calculated from projected cash inflows and outflows on all NTPC debt. Cash inflows are the projected drawdown on each planned loan to NTPC. Cash outflows include principal repayment, interest expense, and all applicable upfront, commitment and guarantee fees. The terms of each loan have been derived from the NTPC borrowing plan, as incorporated into the financial model. This borrowing plan is based on somewhat conservative assumptions regarding the terms of each loan and, therefore, may slightly overestimate the overall cost of debt. However, even if less conservative assumptions are employed, the cost of debt to NTPC would remain relatively high for a number of reasons. First, the non-recourse financing structure employed for the project increases borrowing costs, not only through higher interest rates, but also through the need for loan guarantees. The upfront and commitment fees on the various loans also increase overall borrowing costs. Furthermore, under NTPC's borrowing plan, it is envisaged that all dollar and a portion of baht floating rate debt is swapped to a fixed rate, which increases the effective interest rate on these loans.

D. Return on Investment to the Government of Lao PDR

12. The objective of this analysis is to assess the financial viability of the Project from the perspective of the Government, as a shareholder in NTPC as well as the authority that taxes NTPC revenues and profits. Cash outflows and inflows are limited to those directly incurred or received by Government. Cash outflows consist of the equity injections made by the Government into NTPC. Cash inflows to the Government consist of three components: (i) shareholder dividends paid by NTPC to the Government through LHSE; (ii) the royalty paid by NTPC on its operating revenues; and (iii) income tax paid by NTPC on its profits. Income to the Government that would be generated indirectly as a result the project, such as increased tax revenues resulting from project induced economic growth, is not considered in this financial analysis.

13. The Government receives royalties for each unit of energy sold by NTPC over the 2009–2034 project operating period. In addition to these royalties, the Government will also receive a \$30 million payment from NTPC as compensation for loss of biodiversity and ecotourism assets and for the project development cost. Some of this payment may be reserved to meet the Government's contingent equity obligations. This contingent obligation would arise if additional equity injections were required to cover any cost overruns during project construction. After any such obligations were met, the remaining balance would be paid to the Government after the contingent equity release date. In the base case scenario, an initial payment of \$4.2 million is paid in the first six months of construction to cover a small portion of base equity. An additional \$0.8 million has already been allocated to the Government expenses during project development. This leaves a remaining amount of \$25 million to be paid to the Government at the commercial operation date (COD) in 2009. These payments are treated as a royalty payment for the purposes of the financial analysis.

14. The Government will apply income tax on profits earned by NTPC after the expiry of the income tax holiday at the end of 2014. The rates of tax are then increased in three steps as

discussed in Supplementary Appendix H. NTPC's projected income tax expense is based on pre-tax income after depreciation. According to the concession agreement, the calculation of depreciation for tax purposes is the same as that for accounting purposes; on a straight-line basis over the 25-year operating period of the concession. Therefore, there is no opportunity for NTPC to reduce tax payments to the Government by deferring recognition of depreciation to the later part of the concession when tax rates are highest.

15. At the end of the concession in 2034, the project assets will be transferred by NTPC at no cost to the Government. Given that the economic life of the assets should extend well beyond 2034, the Government could then use the facility to generate power for consumption within Lao and/or for sale to Thailand. Therefore, the project should generate net cash flows to the Government beyond the end of the concession. This terminal value could be estimated as the NPV of these cash flows over the remaining operating life of the project. However, given that the use and value of the power over this post-concession period are uncertain, the terminal value is very conservatively assumed to be zero.

16. Expressed in nominal terms, total Government revenues from dividends, royalties and income tax receipts are projected to be \$1.9 billion over the life of the concession, almost 15 times greater than total debt service on the ADB and EIB loans used to finance the Government's shareholding in the Project. Therefore, the project will generate a very large cash surplus for the Government, estimated at \$1.8 billion, which provides a significant reserve margin against any potentially adverse events during the debt repayment period. Projected revenues and debt service in each year over the concession period is shown in Table A10.4.

17. Reflecting the projected large cash surplus accruing to the Government, the FIRR on its equity investment in the Project is calculated as 21.1%, which is well above the estimated WACC of 6.9% (Table A10.5 and Table A10.6). Therefore, from the perspective of the Government as defined above, the investment is considered to be financially viable. Discounted at the WACC, the NPV is estimated to be \$333.7 million, which also indicates that the project will generate a significant net return to the Government. The WACC has been calculated on the basis of the proposed financing plan for the Government equity injection. The proposed IDA and AFD grants, as well as the NTPC contribution, have been valued at their opportunity cost, which is assumed to be the cost of the Government's equity in NTPC, estimated to be 13.6% in real terms. The cost of debt is calculated as 4.9% in nominal terms, equivalent to a real rate of 4.1%, which is based on the proposed terms of the ADB and EIB loans. Even if a conservative discount rate is utilized (i.e., the Project WACC of 10.1%), the NPV of these flows is estimated at \$167.4 million.

E. Sensitivity Analysis

18. An analysis was undertaken to test the sensitivity of FIRR, WACC, and NPV to adverse changes in selected key variables. The variables tested were (i) 6-month and 1-year delays in construction due to nonperformance of NTPC, which would increase project costs; (ii) 6-month and 1-year delays in construction due to nonperformance of EGAT, which would have no impact on project costs; (iii) decrease in power demand so that only primary energy is dispatched, which reduces NTPC revenues; (iv) changes in the Thai Baht and US dollar exchange rate; (v) a "worst case" hydrological scenario which includes a number of low generation (i.e., dry) years early in the project operating period; (vi) a combination of the 1-year delay due to NTPC nonperformance and the decrease in power demand; and, (vii) a combination of the 1-year delay due to NTPC nonperformance and the low hydrology case.

19. The analysis (Table A10.7) indicates that, of the single variable scenarios, project financial viability is most sensitive to construction delays caused by nonperformance by NTPC. This could result in unforeseen cost overruns and liquidated damages payable to EGAT. However, under all four delay scenarios, the Project remains financially viable. Project viability is relatively sensitive to a reduction in power demand, which case can serve as a proxy for a reduction in revenue (e.g., should the Project be integrated into a power pool in Thailand and market prices fall below the contracted tariff schedule). Even assuming only primary energy is sold, thus reducing demand by 17% and revenues by 9% compared to the base case, the Project remains viable. In fact, the Project can endure a 15.2% annual average reduction in revenue over the operating period and still be viable. Changes in the Thai Baht and US dollar exchange rate do not have a significant impact on project viability because currency exposure has been largely hedged by NTPC.

20. For the Government, because its base case return on investment is very high, its investment in the Project remains financially viable under all of the scenarios tested. As was the case for the project FIRR, the Government FIRR is most sensitive to a 1-year delay due to nonperformance of NTPC. However, even under this scenario, the FIRR is 17.0%, well above the 6.9% WACC, which indicates that the financial returns to Government remain very high. The NPV of these returns over the life of the concession under this scenario is estimated at \$258 million. Given these returns, the capacity of LHSE to service the ADB and EIB loans from the dividend income it receives from NTPC remains very satisfactory under all scenarios assessed. The debt service coverage ration (DSCR) is most sensitive to a reduction in power demand. However, even assuming that only PE is dispatched, the average DSCR over the repayment period of the loans is estimated at 4.46, over three times greater than that the minimum level typically considered acceptable. Therefore, even if NTPC is integrated into a power pool and the shareholder's equity is at risk due to fluctuating pool prices, there is sufficient headroom to ensure Government's debt service capacity is not affected.

**Table A10.5: Financial Internal Rate of Return on the Equity
of the
Government of the Lao People's Democratic Republic**
(\$ million - 2005 constant prices)

Year	Equity Injections	Revenue Royalty ^a	Income Tax	Dividends	Net Present Value (NPV)			FIRR
					WACC (%)	4.9	6.9	
					NPV	517.5	334.5	
					Total	Opex Gov't. LHSE	Net Cash Flow	
2005	(69.5)	4.2	0.0	0.0	4.2	0.0	(65.3)	21.1%
2006	(9.8)	0.0	0.0	0.0	0.0	0.0	(9.8)	
2007	(6.6)	0.0	0.0	0.0	0.0	0.0	(6.6)	
2008	(2.0)	0.0	0.0	0.0	0.0	0.0	(2.0)	
2009	(1.0)	26.5	0.0	0.0	26.5	(0.1)	25.5	
2010	0.0	10.8	0.0	0.5	11.3	(0.1)	11.3	
2011	0.0	10.7	0.0	13.4	24.2	(0.1)	24.2	
2012	0.0	10.8	0.0	13.4	24.2	(0.1)	24.2	
2013	0.0	10.9	0.0	13.8	24.8	(0.1)	24.8	
2014	0.0	11.0	0.0	14.8	25.8	(0.1)	25.8	
2015	0.0	11.1	4.2	14.2	29.5	(0.1)	29.5	
2016	0.0	11.1	4.9	13.4	29.5	(0.1)	29.5	
2017	0.0	11.2	5.3	14.1	30.7	(0.1)	30.7	
2018	0.0	11.2	5.8	14.3	31.4	(0.1)	31.4	
2019	0.0	11.3	6.3	14.7	32.2	(0.1)	32.2	
2020	0.0	11.3	6.4	28.9	46.6	(0.1)	46.6	
2021	0.0	11.3	6.3	38.1	55.8	(0.1)	55.8	
2022	0.0	11.4	21.1	40.7	73.2	(0.1)	73.2	
2023	0.0	11.4	21.3	41.1	73.8	(0.1)	73.8	
2024	0.0	11.5	21.8	41.6	74.9	(0.1)	74.9	
2025	0.0	33.2	18.7	37.2	89.1	(0.1)	89.1	
2026	0.0	33.3	18.9	36.2	88.5	(0.1)	88.5	
2027	0.0	33.5	18.0	37.1	88.6	(0.1)	88.6	
2028	0.0	33.6	38.9	32.7	105.2	(0.1)	105.2	
2029	0.0	33.7	38.5	32.9	105.0	(0.1)	105.0	
2030	0.0	67.7	28.6	26.8	123.1	(0.1)	123.1	
2031	0.0	67.9	27.7	26.2	121.9	(0.1)	121.9	
2032	0.0	68.2	27.4	25.9	121.6	(0.1)	121.6	
2033	0.0	68.5	27.3	25.7	121.5	(0.1)	121.5	
2034	0.0	57.2	23.9	21.9	103.0	(0.1)	103.0	

FIRR = financial internal rate of return, Gov't. = Government of Lao People's Democratic Republic, LHSE = Lao Holding State Enterprise, NPV = net present value, OPEX = operating expense, WACC = weighted average cost of capital.

^a Includes \$29.2 million Government payment, of which \$4.2 million is paid in 2005 and \$25.0 million in 2009.

Source: Asian Development Bank estimates.

**Table A10.6: Calculation of WACC for the Equity
of the Government of the Lao People's Democratic Republic**

Item	Financing Component		
	Equity	Debt	Total
Weighting	29.8	70.2	100.0
Nominal Rate	14.7	4.9	7.8
Real Rate	13.6	4.1	
Weighted Real WACC	4.0	2.9	6.9

WACC = weighted average cost of capital.

Source: Asian Development Bank estimates.

Table A10.7: FIRR Sensitivity Analysis

Key Variable	Change	Project		Gov't.	
		FIRR (%)	NPV	FIRR (%)	NPV
Base Case		12.4	166.6	10.1	333.7
1. Construction Delay due to NTPC	6-month delay	11.2	75.4	10.2	295.5
2. Construction Delay due to NTPC	12-month delay	10.4	6.6	10.3	258.0
3. Construction Delay due to EGAT	6-month delay	11.7	115.5	10.1	315.8
4. Construction Delay due to EGAT	12-month delay	11.0	49.9	10.3	286.9
5. Reduction in NTPC Revenue	Only primary energy ^a dispatched	11.3	83.7	10.1	279.4
6. Change in Thai baht/\$ FX Rate	10% baht appreciation in 2005	12.6	193.7	10.1	356.6
7. Change in Thai baht/\$ FX Rate	10% baht depreciation in 2005	12.2	143.9	10.2	314.9
8. Variation in Hydrology	Reduced generation ^b	12.1	147.6	10.1	327.8
9. Combination of 2 and 5		9.5	(65.7)	10.3	209.0
10. Combination of 2 and 8		10.2	(10.6)	10.3	253.4

EGAT = Electricity Generating Authority of Thailand, FIRR = financial internal rate of return, FX = foreign exchange, Gov't. = Government of Lao People's Democratic Republic, NPV = net present value, NTPC = Nam Theun 2 Company Limited, WACC = weighted average cost of capital.

a Only primary energy (PE) dispatched. Therefore, secondary energy dispatched to EGAT, which is included in the base case is assumed to be zero under this scenario. As a result, total power dispatched over the concession period is 17% lower than under the base case, which reduces total revenue by 9%, expressed in constant prices.

b This case was developed to test a "worst case" hydrological scenario. It includes the driest sequence of years in the 50 years of available modeled data. It allows for both above and below average years and includes the lowest generation year and a number of other low generation years early in the operating period.

Source: Asian Development Bank estimates.

MAJOR RISKS AND MITIGATION MEASURES

1. The due-diligence process assessed the major risks and mitigation measures designed in the Project.

A. Technical Risks

2. The Report and Recommendation of the President (RRP)¹ of the Private Sector Operations Department covers technical risks associated with the Project. They are (i) cost overruns and delays during construction, (ii) failure to achieve guaranteed output, (iii) plant energy shortfall, (iv) nonpayment by Electricity Generating Authority of Thailand (EGAT); and (v) project completion.

B. Livelihood Program for Plateau Fail to Achieve Targets

3. There are risks associated with the livelihood programs proposed for ethnic minority communities to be resettled on the Nakai Plateau. These include unproven assumptions regarding income streams from activities such as reservoir fisheries, agricultural, timber production, and access to market for fish, vegetables, and agricultural and timber products. Because of limited exposure of the resettlers to the planned livelihood programs, the pace at which these communities can make the transition from traditional subsistence to more commercial operations may be overstated. There may be significant social preferences that are poorly understood, such as the importance of buffalo in the local social context. Furthermore, disputes between the Government and Nam theun 2 Power Company Limited (NTPC) over responsibilities for livelihood target outcomes, the Government capacity to implement programs, and the resettlers attitude that NTPC would do every thing for them, could undermine livelihood programs. The health and safety problems associated with the influx of a large numbers of outsiders' present risks.

4. The above risks are addressed in several ways. First, livelihoods options include a diverse range of activities with a flexible mix. Appropriate transitional support will be provided during early years of the livelihood program to ensure that no households are made worse off as a result of resettlement. Contingency resources are allocated to support households to adopt new approaches and to ensure achieving livelihood targets by making adjustments in the livelihood programs, addressing cost overruns or unanticipated impacts. Second, the livelihood programs are designed with participatory input from the resettlers' community as well as the individual preferences. This consultative process will continue during the life of the project implementation. Third, the social development plan and the concession agreement outline in detail the implementation responsibilities and accountability for the livelihood results between the Government and NTPC. Fourth, there will be high levels of public accountability and transparency backed by comprehensive monitoring programs including those by the developer, independent bodies such as the panel of experts, and possibly nongovernment organizations. Fifth, after achieving the livelihood targets, NTPC will develop a phased exit strategy to minimize resettlers' dependency on the project company.

¹ ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Political Risk Guarantee to Nam Theun 2 Power Company Limited for the Greater Mekong Subregion: Nam Theun 2 Hydroelectric Project in the Lao People's Democratic Republic*. Manila (RRP 37910, March 2005).

C. Ineffective Conservation Management of National Protected Area under Social and Environment Management Framework and Operational Plan

5. The social and environment management framework and operational plan (SEMFOP) watershed conservation program may face two main risks. The first is the possible lack of effective coordination for the implementation of various elements of the conservation and management work plan. This may result in the failure of patrolling and law enforcement strategies, which are designed to stem the problem of poaching. The community forest and land use planning for the Nakai Nam Theun National Protected Area (NNT-NPA) may not establish effective systems of local land-use management. Incentives from community livelihood programs may be insufficient to reduce unsustainable resource use over time. These risks could stem from poor project design, flawed implementation, inappropriate assumptions about levels of threat, or even lack of community collaboration. The second category of risk is associated with failure at various levels of Government to respect agreements on the “shared vision” regarding limits to development or resource exploitation and extraction within the NNT-NPA. For example, the Government could endorse undesirable land uses such as logging or mining in the NNT-NPA or promote accelerated access through construction of roads in the NNT-NPA.

6. The operational risks outlined above which are associated with the conservation management of the NNT-NPA are addressed under the SEMFOP through a number of mechanisms. First, the SEMFOP program is assured a secured financing of \$1 million per year over 30 years. This is an unprecedented level of financial commitment to conservation issues in Southeast Asia, if not globally. These resources will be managed by the Watershed Management and Protection Authority (WMPA), whose management authority is separate from conventional Government departments, thus reducing risks of insufficient resource flows to meet operational needs. There will be built-in mechanisms of flexibility in allocating budget resources based on actual field requirements during the implementation phase. Second, the SEMFOP builds in high levels of public participation, transparency, and accountability. The community forest and local land-use planning process is designed to ensure that no programs can proceed without strong local endorsement. Land tenure instruments assuring local land-use rights will be essential security for enclave villages. In addition, budgets and annual work programs together with various progress reports will be made publicly available to all concerned groups. Third, the SEMFOP incorporates many elements of good practice and lessons learned from operational experience in the Lao PDR and elsewhere. Fourth, the SEMFOP brings a strong monitoring component to determine levels of land-use activity and to independently track activities on the ground. Fifth, WMPA will partner with operational nongovernment organizations (NGOs) to design and deliver part of its work program, especially those aspects relating to capacity building, patrolling, monitoring, and delivery of social services in enclave and buffer zone villages.

D. Fisheries Compensation Programs in the Xe Bang Fai Fail to Achieve Outcomes

7. The project design recognizes the potential fish loss in the Xe Bang Fai and its tributaries and includes provision for compensation through a comprehensive, multidimensional program of fish production integrated with current farming practices. However, there exists the risk that these programs may fail to meet intended compensatory protein and income targets. These risks stem from a number of design and implementation issues including the assumptions about the levels of community adaptation to new technologies; inability to achieve fish production and yield levels due to poor technical implementation; overestimation of land available for fish production; underestimation of the time period required for the Xe Bang Fai to recover from extended periods of poor water quality in the river; appropriateness of the

institutional arrangements to deliver the livelihood restoration programs to people; and adequacy of funding to soften any impacts caused by shortfalls in the mitigation programs.

8. Risks of downstream impacts will be addressed through a careful participatory planning process to design a compensation framework that is comprehensive, equitable, achievable, and appropriately resourced. An important principle of a downstream program is that it is proactive—not waiting to see what happens before taking action but rather investing in compensation measures 3–5 years in advance of the changes in water flow regimes. The compensation framework will be implemented by adopting existing and familiar models already in place in the Lao PDR under the Asian Development Bank (ADB)- and the World Bank-assisted projects, which will enable more rapid adoption by the project-affected communities. However, the proposed compensation program will make adjustments to reflect the actual situation a few years after commercial operations start. The monitoring of the mitigation and compensation programs will play an important role in evaluating the achievement of outcomes, and if found unsatisfactory, will trigger the formulation of additional measures and the needed resources. Closely tied to monitoring is the utilization of contingency funds. The shortfalls, below what can be delivered by the program, especially in the first 3 years after commercial operation date, will be funded from the regular operating budget of the Project.

E. Delays in Implementation of the Government Revenue Management Arrangements

9. Risks associated with implementation of the proposed revenue management arrangements relate to the following actions that will have to be implemented: (i) improvements in the chart of accounts and budget classifications to reflect priority programs, (ii) development and monitoring of program performance indicators, and (iii) initiation of program level reporting. Failure to make progress in these areas will undermine effective targeting and reporting once Nam Theun 2 (NT2) revenues come on stream. These risks are mitigated by ensuring that these priority revenue management actions are included in the public expenditure management strengthening program, linking program implementation to poverty reduction support credit prior actions as well as broader program-level recourse mechanisms.

F. Program-Level Failure to Comply with the Government Revenue Management Arrangements

10. The revenue management arrangements will entail an annual report on compliance with allocation, additionality,² and reporting requirements for eligible programs. In cases of noncompliance, the responsible body of the Ministry of Finance will inform the line institutions responsible for eligible programs of corrective measures that need to be taken. In cases of persistent noncompliance, the oversight body of the ministry may withhold, or recommend withholding, all or part of NT2 revenue allocations to specific programs which fail to meet criteria and transparency standards. When corrective measures have been taken by the concerned institutions, the oversight body of the ministry will recommend the release of funds from the NT2 revenue account.

G. Government Capacity and Governance Constraints.

11. There are concerns among the international financial institutions, civil society, NGOs, and other stakeholders over the lack of government experience, the institutional and management capacity, and its will to implement key project-related programs and commitments, particularly the watershed, revenue management, environmental, and social mitigation and

² Additionality means in addition to the base year budget allocation.

compensation measures. These are recognized as important and significant risks to long-term project success—moderate on technical issues, substantial on safeguards issues, high on issues relying on the Government's willingness and capacity to act, such as conservation of the project watershed, and high on implementation of public expenditure management and NT2 revenue management arrangements. However, the overall assessment is that these risks are manageable with substantial and careful oversight. Keeping these concerns in mind the Project has been designed with a number of mechanisms to minimize these risks, including (i) multidonor technical assistance and funding to help the Government improve its overall public expenditure management program; (ii) oversight through audits and public expenditure tracking surveys to monitor the utilization and effectiveness of the Government revenue from the Project for agreed priority programs, as well as international expert panels of dam safety review panel, international advisory group, and panel of experts, to monitor dam safety, project effectiveness, and the achievement of income targets and other objectives of key social and environmental programs and commitments of the sponsors and the Government; (iii) long-term funding, as well as technical assistance, for conservation programs from project revenues and project-related investment in the form of Government equity from ADB, World Bank, Agence Française de Développement, and European Investment Bank (EIB) providing concerned Government agencies adequate operational funds to implement conservation and watershed management programs for at least 30 years; (iv) commitments from NTPC to share jointly management and financial responsibility for the outcomes of environmental and social mitigation and compensation programs, including resettlement on the plateau and in the downstream areas; (v) delineation of the roles, responsibilities, and authorities of the central, provincial, and district government agencies of the Government with regard to project-related activities and programs to the greatest extent possible so that confusion over mandate and accountability is minimized; and (vi) a program of transparent monitoring and evaluation of project performance including the publication of project performance evaluations, progress reports, and monitoring data, as well as annual public consultative meetings, to provide a high level of public scrutiny, transparency and accountability—unmatched in Lao PDR—to ensure that key project issues remain high on the Government's agenda.

H. Sustainability

12. Over the past few years, the Government has shown its commitment to the Project and demonstrated its ability to move resolutely and quickly to resolve environmental and social safeguards issues that could threaten to delay or imperil a decision by the donors to support the Project. For example, in 2001 the Government effectively halted illegal logging on the Nakai Plateau and in the NNT-NPA; it has successfully controlled illegal logging since then. In 2004, the Government agreed to terminate a gold mining concession in the Ban Na Kadok area, which threatened the NNT-NPA. To its credit, the Government has been responsive in establishing a new regulatory framework for WMPA and for forestry and natural resource management. It has collaborated effectively with NTPC and external consultants to carry out local consultations that were remarkably open and balanced. According to independent observers, the Government helped create an environment where candid feedback was received from project-affected communities. It also participated effectively and candidly in the international workshops. While these actions are not guarantees of future commitment or performance, they confirm that the Government has the capacity to act swiftly and effectively on the Project as and when required.

13. Outside of the immediate project area, the Government's environmental and social safeguards record has not been as promising. While the Lao PDR laws provide for the conservation of protected areas, wildlife, and forests; prohibits the export of trees; and protects the rights and independence of Indigenous peoples, in practice, enforcement of these laws and

decrees is weak. The Government has been slow to implement some of the existing ADB and the World Bank supported projects in a satisfactory manner. While it has clearly shown that it is able to stop illegal logging on the Nakai Plateau, such activities continue in other parts of the country. To some extent the existing situation can be attributed to the lack of credible enforcement capacity and to serious revenue shortfalls at the provincial and district levels. These issues are addressed in the Project and will be continued in future projects of ADB and the World Bank.

14. There is concern about the Government's likely actions once the Project has been approved. The Government's mixed past record, differing perspectives between the Government and provincial and district administrations, and uncertainty about the Government's commitments on issues essential to the Project's success over the long term—for example, conservation of the NNT-NPA, and the targeting of the Government revenue from the Project to priority poverty reduction and conservation programs—pose substantial risks to long-term project success. Once funds have been disbursed there will be little legal leverage for the lenders. The joint approach of ADB, the World Bank, AFD, and EIB is to use the Project as a vehicle to maintain a proactive dialogue with the Government on the broad reform agenda and project-specific issues and to enmesh that dialogue in an enduring dialogue on the Project with international and local civil society.