
Review of Nam Theun 2 Hydroelectric Dam, Lao PDR

FINAL REPORT TO AUSAID

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CURRENCY EQUIVALENTS

| Year | Lao PDR kip | USD | AUS \$ |
|---------------|-------------|------|--------|
| 1996 | | 1.00 | 0.783 |
| 1997 | | 1.00 | 0.742 |
| 1998 | | 1.00 | 0.628 |
| 1999 | | 1.00 | 0.645 |
| 2000 | 7,670 | 1.00 | 0.580 |
| 2001 | 8,586 | 1.00 | 0.517 |
| 2002 | 9,810 | 1.00 | 0.543 |
| 2003 | 10,636 | 1.00 | 0.648 |
| 2004 | 10,577 | 1.00 | 0.760 |
| To 31/11/2004 | | 1.00 | 0.773 |

MEASURES

| | | |
|--------------------------------|---|------------------------|
| GWh | : | giga watt hour |
| kWh | : | kilo watt hour |
| km | : | kilometre |
| km ² | : | square kilometre |
| m | : | metre |
| m ³ | : | cubic meter |
| m ³ s ⁻¹ | : | cubic metre per second |
| Mw | : | mega watt |

ABBREVIATIONS

| | |
|---------|--|
| ADB | Asian Development Bank |
| AFD | Agence Française de Développement |
| AusAID | Australian Agency for International Development |
| BOOT | build-own-operate-transfer |
| EAMP | Environmental Assessment and Management Plan |
| EDL | Electricite du Laos |
| EDF | Electricite de France International |
| EGAT | Electricity Generating Authority of Thailand |
| EGCO | Electricity Generating Public Company Limited |
| ESMP | Environmental and Social Management Plan |
| GoL | Government of Lao PDR |
| IUCN | International Union for Conservation of Nature |
| Lao PDR | Lao People's Democratic Republic |
| MIGA | Multi-lateral Investment Guarantee Agency |
| NGO | Non-government organisation |
| NGPES | National Growth and Poverty Eradication Strategy |
| NIB | Nordic Investment Bank |
| NT2 | Nam Theun 2 Hydroelectric Dam |
| NTPC | Nam Theun 2 Power Company Limited |
| OP | Operational Plan |
| PPA | Power Purchase Agreement |
| PRSD | Poverty Reduction Strategy Paper |
| RAP | Resettlement Action Plan |
| SDP | Social Development Plan |
| SEMFOP | Social and Environmental Management Framework and First Operational Plan |
| SESIA | Summary Environmental and Social Impact Assessment |
| SEIA | Summary Environmental Impact Assessment |
| SMEC | Snowy Mountains Engineering Corporation |
| UNDP | United Nations Development Program |
| WB | World Bank |
| WCD | World Commission on Dams |
| WMPA | Watershed Management and Protection Authority |

EXECUTIVE SUMMARY

Background

The Government of Laos is seeking loans and financial guarantees from the World Bank and Asian Development Bank for the Nam Theun 2 hydroelectric dam. Despite numerous social, economic, and environmental analyses, there remains considerable public opposition to the dam. The World Bank may seek to share project development risks through donor partnerships and, as a member of both the World Bank and Asian Development Bank boards, Australia will be asked to vote on whether or not to support the dam in late March and early April 2005 respectively. Following approval from the Minister for Foreign Affairs in November 2004, AusAID commissioned a group of four consultants (Review Team) to review available project documentation. The Department of Foreign Affairs and Trade, the Treasury Department, and the Department of Environment and Heritage provided input to the review.

Following the Asian financial crisis in 1997, the World Bank is moving towards re-entering the field of funding large infrastructure projects. In this regard, Nam Theun 2 is seen as a flagship project and has thus attracted significant international attention. The World Bank sees the Nam Theun 2 project as an opportunity to significantly improve the development status of Laos. Nonetheless, it is a high-risk high-return project.

Governance is a key concern in Laos, where systemic corruption is exacerbated by low levels of remuneration within Government, a lack of human resources and skills, and control by vested interests within the one party system. Transparency is minimal and development efforts in Laos have generally performed poorly. Poorly implemented policies, weak institutions for effective poverty reduction, lack of basic social services in many areas and ineffective government outreach are all contributing factors. The Government's commitment to the reforms necessary to change this situation is uncertain.

Review of Nam Theun 2

Key factors taken into account by the Review Team included: the extent to which the project would contribute to poverty alleviation; economic (technical, financial, commercial, fiscal), environmental and social considerations; Government of Laos' capacity to meet its obligations under the Concession Agreement and Millennium Development Goals; and compliance with World Commission on Dams findings and the World Bank and Asian Development Bank safeguards.

The World Commission on Dams findings released in 2000 provide an independent review of the development effectiveness of large dams. These guidelines are an internationally accepted set of criteria and standards, for the planning, design, appraisal, construction, monitoring and decommissioning of dams. The guidelines, however, have done little to stem the dam controversy of the last decade. The World Bank and Asian Development Bank policies and procedures, which embrace the World Bank's 10 safeguards for large infrastructure projects including dams, now take into account the lessons learnt and recommendations made by the World Commission on Dams. Environmental and social aspects of these have been diligently incorporated into the Nam Theun 2 Concession Agreement. Enormous efforts have been made to meet World Bank and Asian Development Bank safeguard requirements.

Outcomes

The Review Team found that Nam Theun 2 would provide significant benefits to Laos that could facilitate poverty alleviation. These include:

- An immediate and significant stimulation of economic activity and growth by increasing gross domestic product during the construction period, as well as earning foreign exchange. The increase in the services and industrial sectors would also encourage foreign investment. Nam Theun 2 is a financially and commercially attractive project with a strong and resilient economic rate of return of about 17%. This is very high relative to hydroelectric projects elsewhere.
- The financial cost of the Government of Laos' equity is about USD30 million. This would provide a USD1 billion facility that Lao PDR would own outright at the end of the 25 year concession period and would contribute about 3% of total Government of Laos revenues during the concession period after debt servicing.
- Nam Theun 2 would improve the ability to effectively implement Lao PDR's National Growth and Poverty Eradication Strategy.
- Nam Theun 2 would provide ongoing funding for the protection of the Nakai Nam Theun-National Biodiversity Conservation Area and would provide funding for a range of social development activities (village level water supplies, schools, health, access, and power).
- Nam Theun 2 would provide a vehicle through which other support could be assigned to address capacity and other specific concerns related to project impacts - many of which have broader national and international applications.
- Nam Theun 2 meets the broader level recommendations of the World Commission on Dams guidelines, and does not trigger the Australian Environment Protection and Biodiversity Conservation Act or any other international treaties of concern to Australia or Laos. In addition, the project substantively meets the policies of both the World Bank and Asian Development Bank.

The Review Team also identified critical concerns that remain to be addressed. These include:

- The Nakai Plateau is unlikely to support the increased pressures of the relocation package. Given the expressed desire of the displaced villages to remain on the plateau rather than move to more productive lowland sites, the Plateau will need to support a reservoir, the livelihoods of 5000 resettled villagers and part of a National Biodiversity and Conservation Area. Specifically:
 - Due to the poor quality of soils in the resettlement area, the agricultural package is unlikely to meet the subsistence requirements for the majority of households. In addition there would be a dramatic livelihood transition, which is not consistent with safeguard policies on indigenous people.
 - The Social Development Plan includes many small business activities to supplement livelihoods. However, these appear optimistic and are unlikely to be met.

- Given the likelihood that the livelihoods package is inadequate, the planned resettlement may result in increased use of resources within the Nakai Nam Theun-National Biodiversity Conservation Area. This would jeopardise its planned conservation potential.
- Adaptive management and appropriate indicators need to be fully incorporated into the Concession Agreement. Compliant rolling milestones need to be developed to provide a moving datum against which the monitoring can: independently evaluate the progress of each Concession Agreement activity; evaluate the progress of the Government of Laos capacity building; identify and address the need, nature and cost of any corrective measures; and as necessary call on the Government of Laos to access the letters of credit to implement corrective action through the Panel of Experts. These would also need to address:
 - Use and management rights for the reservoir drawdown area.
 - Compensation demands from people now practicing horticulture and market gardening on the Xe Bang Fai and rice growers in the lower reaches of the Xe Bang Fai floodplain.
 - Management for the closure of the generating system when stream levels approach bank levels. Penalties would be imposed if power supplies are interrupted, so extended shut-downs of the generators would not be desired. This could result in added flooding impact on people and fisheries in the Xe Bang Fai.
 - Adaptive planning for additional resources to replace or compensate for the loss of fish protein, or livelihoods based on fisheries, if there are major reductions to NT2 area fisheries.
- There are inadequate human resources in Laos to effectively implement all the project safeguards.

Conclusions

Given the efficiencies of the NT2 site for hydroelectricity generation, together with the assured market, there is every reason to expect that the NT2 project would be very successful financially and that the GoL would readily cope with its financial commitment. However, NT2 is a project of tradeoffs and despite significant economic benefits, as well as some social and environmental benefits, there are significant social and environmental costs, some of which can not be mitigated.

Overall, the project benefits appear to outweigh costs, and the Review Team acknowledges that documentation and revised mitigation strategies by project proponents are continually being prepared and revised to address costs and concerns. The Review Team suggests key concerns should be raised with the Development Banks, including: the likelihood that the Nakai Plateau would be able to support the increased pressures of the relocation package; that the livelihoods package has some inadequacies; that the planned resettlement may result in increased use of resources within the Nakai Nam Theun-National Biodiversity Conservation Area, limiting its planned conservation potential; and that adaptive management and appropriate indicators need to be fully incorporated into the Concession Agreement.

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1. BACKGROUND

1.1 Introduction

In 1994 the Government of the Laos (GoL) approached the World Bank (WB) for loans to assist GoL acquire a 25% equity in the consortium that would implement Nam Theun 2 (NT2). GoL also requested partial risk guarantees to improve the cost-effectiveness of the c.USD 700 million loans organised by the consortium to finance the balance of the USD 1.3 billion NT2 is currently estimated to cost. In 2003 GoL extended its request for loans and partial risk guarantees to the Asian Development Bank (ADB). For these requests to be approved NT2 has to meet both the WB's and the ADB's lending criteria. The requests are scheduled to go to the WB and ADB Board's in late March and early April 2005, respectively.

The WB's preparedness to consider these GoL requests is considered a test case signalling the re-emergence of WB development assistance for large infrastructure projects. Proponents of NT2 are working hard to make NT2 compliant with WB and ADB lending criteria. Opponents, principally non-government organisations (NGOs), are lobbying hard to have their concerns addressed.

1.2 World Commission on Dams

The impetus to set up the World Commission on Dams¹ (WCD) in 1998 came from the WB and the NGO, International Union for the Conservation of Nature (IUCN) following continued heavy lobbying by several NGO's against large dams per se and the preparedness of the WB to provide assistance to build large dams.

AusAID was one of the 68 members consulted by the WCD, one of the 53 public, private and civil society organisations that pledged support to the WCD and provided one of the 12 WCD commissioners. The WCD's findings were released in November 2000.

The WCD was mandated to (i) review the development effectiveness of large dams and assess alternatives for water resources and energy development; and (ii) develop internationally acceptable criteria, guidelines and standards, where appropriate, for the planning, design, appraisal, construction, operation, monitoring and decommissioning of dams.

The WCD findings "concluded that the 'end' that any project achieves must be the sustainable improvement of human welfare. This means a significant advance of human development on a basis that is economically viable, socially equitable, and environmentally sustainable. If a large dam is the best way to achieve this goal, it deserves support. Where other options offer better solutions, they should be favoured over large dams."

1.3 Proponents and opponents

The WCD found that "Proponents of large dams point to the social and economic development demands that dams are intended to meet, such as irrigation, electricity, flood control and water supply. Opponents of large dams point to the adverse impacts of dams, such as debt burden,

¹ WCD, Dams and Development: A new Framework for Decision-Making, the Report of the World Commission on Dams, an Overview-November 16, 2000.

cost overruns, displacement and impoverishment of people, destruction of important ecosystems and fishery resources, and the inequitable sharing of costs and benefits.”

The specific points raised by NT2 proponents and opponents include all of the points raised by the WCD and more. Some opponents suggest that the WB's and ADB's own Operational Policies and Bank Procedures (which must be met for their respective Board's to approve the GoL's requests), are not sufficiently comprehensive vis-à-vis the WCD's findings and, if they are, are not being rigorously applied to NT2. Subsets of these policies and procedures that cannot be overlooked have come to be referred to as “safeguards”. The WB identifies 10 safeguards and NT2 triggers all 10. Proponents suggest that if GoL's requests to the WB and ADB are not approved and/or delays to approval beyond mid-2005 occur, NT2 could still go ahead without regard for WB and ADB safeguards or the findings of the WCD. Proponents also point to the opportunities NT2 would provide to implement environmental management programs and alleviate poverty. However, opponents suggest the capacity of the GoL is inadequate for these opportunities to be realised if and when they appear. Most proponents also share this concern but claim NT2 provides an opportunity to enhance capacity building endeavours in Lao PDR.

Views for and against NT2 have become very polarised. This polarisation and the direct applicability of NT2 to the WCD's conclusion that the “debate around these dams challenge views of how societies develop and manage water resources in the broader context of development choices” are prime reasons why this review was commissioned.

The primary NT2 proponents are GoL and the Nam Theun Power Company Limited (NTPC). The WB and the ADB are proponents to the extent that they are assisting GoL and NTPC meet bank policies for obtaining financial assistance. Some stakeholders go further and perceive the WB to have already closely aligned itself with the GoL/NTPC perspective given that the WB's Country Assistance Strategy (CAS) is so closely aligned with NT2. The WB intends to submit both NT2 and the CAS to the WB Board at the same time. Project affected people are claimed as proponents by GoL/NTPC according to the consultative processes that have been undertaken.

The primary opponents are NGOs, however, the IUCN, claims the preparation of NT2 is comprehensive and diligent. CARE suggests relocated villagers would be better off under the NT2 relocation package, however, the Review Team assessment has reservations about this.

As a member of both WB and ADB Boards, Australia would be asked to vote on whether or not to support GoL's requests for loans and partial guarantees. The goal of this review is to contribute to the development of a well researched and reasoned Australian Government position.

1.4 Controversial issues

Key areas of debate include: whether revenues will be used effectively for poverty alleviation; whether economic projections are reliable and the benefits are justified by the costs; whether social and environmental impacts can be sufficiently mitigated; whether GoL has the capacity to implement safeguard measures; and whether the project is compliant with WB and ADB safeguards, and WCD findings.

These are addressed in the remaining sections of this report. However, there are a number of inter-related crosscutting issues that need to be considered.

Poverty alleviation and capacity building, for example, have already been flagged as inter-related issues with which NT2 can assist by contributing to GoL revenue collections. However, this

alone is insufficient. GoL must be in a position to choose to increase the social expenditures it makes from the expanded fiscal envelope, and develop the capacity to manage these developments. The capacity, commitment, and willingness of GoL to do this has been repeatedly called into question by NT2 opponents and remains a matter of concern for both NT2 proponents and opponents. The Theun-Hinbourn experience provides an indication of the type of trade-offs that can be involved. Opponents of large dams often cite the fact that some compensation issues associated with Theun-Hinbourn have yet to be resolved. On the other hand, the Theun-Hinbourn post-evaluation report² states that:

“The combined share of education, health, and social welfare increased from 3% in 1994 to 10% in 1998 to 21% in 2001. The expectation that the lending of ADF [Asian Development Fund] to the Lao PDR to finance the Project would indirectly lead to increased expenditures in the social sectors has thus been met.”

1.5 WB and ADB safeguards and Australia's overseas aid program

1.5.1 WB safeguards

The WB's Operational Procedures, Bank Policies, Operational Directives and Operational Policy Notes cover 10 safeguards. Most have been revised since mid-2001 as indicated below and it would be against the latest revisions that the GoL requests would be assessed:

| No. | WB safeguard | WB (OP, BP, OPN, OD)* | ADB (OM Sections) |
|-----|---------------------------------|--|--------------------------------|
| 1. | Environmental assessment | OP 4.01, Jan 1999, BP 4.01, Jan 1999 both revised Aug 2004 | F1/BP, F1/OP, both 29 Oct 2003 |
| 2. | Natural habitat | OP 4.04, BP Jun 2001 both revised Aug 2004 | |
| 3. | Pest management | OP 4.09 Dec 1998 | |
| 4. | Management of cultural property | OPN 11.03, Sep 1986 | |
| 5. | Involuntary resettlement | OP 4.12, BP 4.12, both Dec 2001, OP revised Apr 2004 | F2/BP, F2/OP both 29 Oct. 2003 |
| 6. | Indigenous peoples | OD 4.20, Sep 1991 | F3/BP, F3/OP both 13 May 2004 |
| 7. | Forests | OP 4.36 revised Aug 2004, BP 4.36 both Nov 2002 | |
| 8. | Safety of Dams | OP 4.37, BP 4.37 both Oct 2001 | |
| 9. | International waterways | OP 7.50, BP 7.50 both Jun 2001 | |
| 10. | Projects in disputed areas | OP 7.60, BP 7.60 both Jun 2001 | |

- Table 1: WB Safeguards. *Operational Procedures (OP), Bank Policies (BP), Operational Directives (OD) and operational Policy Note (OPN).

1.5.2 ADB safeguards

The ADB's Operational Policies and Bank Procedures specifically list analogous safeguards for environmental assessment, involuntary resettlement and indigenous peoples as indicated above. Other ADB policies and procedures up-hold similar conditions to those required by the remaining WB safeguards.

Both institutions have overarching needs for any assistance they provide to assist poverty alleviation through technically sound, and economically and financially viable activities that have

² Paras. 40 and 41

broad support from international donors and civil society for the recipient country's development strategy and the involved project.

1.5.3 Australian overseas aid program

The Australian overseas aid program seeks to advance Australia's national interest by assisting developing countries reduce poverty and achieve sustainable development³. This objective is underpinned by six key principles, namely: a focus on partnership; being responsive to urgent needs and development trends; practical approaches that are realistic in assessing what can and cannot be done; greater targeting; retaining an Australian identity and being outward looking.

AusAID's Laos-Australia 2004 Country Strategy focuses on building Laos human capital, promoting the growth of the market economy and reducing the vulnerability of the poor. These objectives directly reflect and support the aims of GoL's National Growth and Poverty Eradication Strategy (NGPES) and complement the WB's and ADB's Lao PDR country assistance strategies.

1.5.4 Congruence of policies, procedures and objectives

The WB and ADB policies and procedures and Australia's overseas development aid program have their own emphases but are technically, economically, financially, environmentally and socially congruent. All three also show deference to the WCD's findings and all three are signatories to the Millennium Development Goals.

1.5.5 Origins

NT2 was first suggested by the then Mekong Secretariate (now the Mekong River Commission, MRC) in the 1970s. In the early 1980s three hydropower projects were investigated on the Nam Theun River.

This was followed by a series of geotechnical studies in the 1980's. In 1991 the GoL, the WB and the United Nations Development Program (UNDP) commissioned a feasibility study that included an Environmental Status Report.

1.5.6 Alternative power sources

Several studies to evaluate potential alternative power sources to NT2 led to the selection of NT2: a choice subsequently endorsed by a WB commissioned study⁴ to rank the potential of all hydropower projects in Lao PDR.

1.5.7 The consortium, Memorandum of Understanding and BOOT

GoL negotiations commenced in 1993 to develop a Memorandum of Understanding for constructing and operating NT2. By early 1994 these negotiations had culminated in a build-own-operate-transfer (BOOT) project concept with a consortium that included GoL equity. With BOOT firmly in place, NT2 was established as a private sector project under which arrangements for the construction and commissioning of work would be under the direct control of the consortium thus minimising the risk of any commissioning delays. The final composition of the consortium is:

³ AusAID: Better Aid for a Better Future, November 1997 p5&6

⁴ Nam Theun 2 Project Economics, Interim Summary Report, August, 2004.

- Electricite de France International (EDF): France (35%) ;
- Electricity Generating Public Company Limited (EGCO): Thailand (25%);
- Italian-Thai Development Public Company Limited (ITD): Thailand (15%); and
- Electricite du Laos (EDL): Lao PDR (25%).

1.5.8 Power Purchase Agreement

Nam Theun 2 Electricity Commission, (replaced in 2004 by Nam Theun Power Company Limited, NTPC⁵) started negotiating with the Electricity Generating Authority of Thailand (EGAT) to sell NT2 power to Thailand. This culminated in a Power Purchase Agreement which was signed in 1996 and amended to its present form in August 2000. Only parts of the Power Purchase Agreement have been made public, the rest remains commercial in confidence. Under the Power Purchase Agreement 93% of the NT2 power output for 25 years would be sold to EGAT and if construction of NT2 does not commence in mid-2005 NTPC would incur penalties.

1.5.9 Funding GoL's equity

In 1996 a WB mission developed an International Development Association (IDA) funded Nam Theun Social and Environmental Project (NTSEP) to provide project-based assistance to be treated as GoL equity. ADB is also contributing towards GoL's equity and there is a proposed grant from Agence Francaise de Developpement.

1.5.10 Environment

In 1993 the GoL gazetted the Nakai-Nam Theun National Biodiversity Conservation Area along with 17 other National Biodiversity Conservation Areas. The proposal to form conservation areas pre-date NT2 considerations and were first suggested by IUCN of which Lao PDR has been a member since 1969.

Since NT2 triggers WB safeguards, all the environmental and social assessment work that was undertaken from 1994 and after was targeted to address the prevailing versions of the WB and, following the involvement of the ADB in 2003, ADB safeguard requirements.

A preliminary environmental assessment was released in November 1994 followed by a second in April 1995. Both were carried out by TEAM Consultants of Thailand. The first draft of a full Environmental Assessment and Management Plan (EAMP) was completed in May 1997 by Seatec International of Thailand in association with Sinclair Knight Merz of Australia. It was reviewed by the GoL's Science Technology and Environment Agency, Ministry of Agriculture and Forestry, and Ministry of Industry and Handicrafts and the WB.

Five more drafts of EAMP have been produced, the latest in March 2004. In August and September further advanced drafts of the March 2004 version were used during international

⁵ In January 2004 the responsibilities of NTEC were transferred to the Nam Theun 2 Power Company Limited (NTPC), a special purpose company established under the laws of Lao PDR to further develop, construct, own and operate NT2. NTPC is wholly owned by EDF, EDL, EGCO and ITD.

public consultations. Comments from these consultations⁶ are being incorporated into a subsequent draft along with the findings of the following studies:

- NTPC:
 - an assessment of the policy and legal and administrative framework within Lao PDR. (See SESIA Chapter VII)
 - an analysis of the riparian release and spills from the Nakai Dam
 - an assessment of the current biomass in the inundation zone
 - a revision of the Environmental Management Plan
 - an analysis of flooding in the Xe Bang Fai
- ADB:
 - a cumulative impacts assessment
 - Thai transmission lines environmental impact assessment due diligence (See SESIA Chapter VI)
 - capacity and institutional assessment
- WB:
 - economic issues
 - strategic and sectoral assessment
 - sources of growth studies

Other studies that were prepared in order to undertake NT2 include: the Resettlement Action Plan (RAP), the Ethnic Minorities Development Plan (EMDP), a Social Development Plan (SDP, that includes the RAP and the EMDP), an Environmental and Social Management Plan (ESMP) for the Nakai-Nam Theun National Biodiversity Conservation Area, and an updated Operational Plan (OP). The ESMP and the OP formed the basis for the development of the Social and Environmental Management Framework and first Operational Plan (SEMFOP). The EAMP, the SAP and the SEMFOP form a suite of documents addressing environmental and social issues in the NT2 area. The Summary Environmental and Social Impact Assessment (SESIA) is an integrated summary of the EAMP, SDP and SEMFOP.

1.5.11 Concession Agreement

A Concession Agreement was signed by NTPC and GoL in October 2003. It contractually defines the environmental and social obligations (including compensation) that must be followed by NTPC and the GoL for 25 years after the implementation of NT2. Only parts of the Concession Agreement have been made public.

⁶ See SESIA, Appendix 3, Table 3.2, ADB Nov 2004 for a list of the concerns and issues raised during the 2004 international stakeholder workshops and Appendix 3, Table 3.1 for a summary of stakeholder concerns and their influence on project planning

1.5.12 Poverty alleviation/eradication

A key argument for NT2 is in its ability to contribute to poverty alleviation in Laos.

The NGPES, also referred to by IDA as the Poverty Reduction Strategy Paper (PRSP), provides a poverty diagnosis and presents sector programs and policy measures for sustainable economic growth and poverty reduction over the 2004-2006 period.

The WB Board commented, *inter alia*, that the implementation of the NGPES would require sustained structural and sectoral reform and improved public expenditure management. It also stated that the NGPES provides a sound basis for continued IDA assistance to Lao PDR but is ambitious in relation to Lao PDR's limited institutional capacity.

The WB Board also noted that "Improving public sector management capacity both at the national and local levels, including addressing governance concerns, would also be critical."

The International Monetary Fund⁷ recognises the contribution NT2 can make to poverty reduction but emphasises that to maintain fiscal sustainability it would be necessary for GoL revenue mobilisation as a percentage of Gross Domestic Product (GDP) to rise from 11.3% in 2004 to c.13% in 2008/09 and c.14.5% in 2018/19. Shortfalls would squeeze the fiscal envelope for social expenditures, greatly impeding the government's poverty reduction strategy and adversely affecting the attainability of the Millennium Development Goals.

Revenues from mining projects and the hydropower sector would fill only part of the need for additional revenue. Revenues from gold and copper mining projects by the Australian company Oxiana are projected to gradually increase revenues by 0.5% of GDP. Revenues from existing hydropower, notably Theun-Hinboun Power Company are projected to contribute a further 0.3% of GDP after completion of a restructuring plan for the state-owned electricity company (EDL) and expiration of certain tax exemptions. Revenues from NT2 are projected to provide an additional 0.5% shortly after the completion of the project in 2009/10. (Review Team assessment suggests more than 0.3%).

Revenues from these sources may be largely offset by a decline in customs revenues as a result of tariff reductions under the ASEAN Free Trade Arrangements. The bulk of the net increase in revenues over the medium term would therefore have to come from reforms to broaden the tax base and improve revenue administration nationally. Hence the emphasis placed on improving Lao PDR's revenue collection performance by the WB and the ADB. International comparisons suggest the revenue effort in Lao PDR is below its long-run potential. However, when the revenue effort in Lao PDR is compared on a non-agricultural GDP basis (the share of agriculture in GDP in Lao PDR is the highest (around 50%) in the group of countries compared) Lao PDR does not compare unfavourably with its neighbours. Indeed, the ratio of tax revenues to non-agricultural GDP is broadly comparable to Vietnam and Thailand, and significantly higher than in Cambodia. This leads the Review Team to conclude NT2 is but one of many factors in Lao PDR's attempts to reduce poverty with the capacity building required to achieve improved revenue collection being a national issue.

1.5.13 Financing

The financing for NT2 is being mobilised on a limited recourse basis. About 72% is being funded through debt and the debt would be denominated 50% in Thai Baht and 50% in USD in order to match the tariff paid by EGAT and EDL.

⁷ IMF, Lao People's Democratic Republic: Selected Issues and Statistical Appendix, January 2005.

Lenders to NT2 include:

- international commercial lenders (a club of 7 international banks from Europe and Asia;
- Thai commercial lenders (a club of 8 leading Thai banks);
- ADB;
- Agence Francaise de Development (AFD, owned by the French Government)
- Proparco (an agency of the AFD);
- European Investment Bank (EIB), and
- Nordic Investment Bank (NIB).

International commercial lenders would be covered by an International Development Assistance partial risk guarantee; ADB partial risk guarantee; Multi-lateral Investment Guarantee Agency guarantees and the Export Credit Agencies.

Collectively, the financing requested would amount to as much as USD200 million in guarantees and about USD203 million equivalent in direct and indirect project financing.

1.6 Organisation and management

The organisation and management of NT2 has been comprehensively and convincingly prepared. Details are presented in SESIA Chapter 9, ADB Nov. 2004. The organisation and management arrangements and the institutional responsibilities listed are well designed to manage the implementation of the environmental and social plans that have been prepared to mitigate adverse impacts of the dam.

The Panel of Experts and International Advisory Group provide further independent reviews. The Panel of Experts has the right to recommend remedial action if it determines any non-compliance. NTPC has to provide letters of credit to GoL as security if, for example, the Panel of Experts deem that NTPC has failed to comply with the environmental and social commitments and to mitigate or compensate against any unforeseen project impacts. The International Advisory Group was appointed by the President of the WB in 1997 and would report directly to the President and Board of the WB.

NT2 management arrangements present an opportunity for the GoL to meet the Concession Agreement requirements by providing:

- 5 to 25 years to implement the various requirements of the Concession Agreement;
- a Panel of Experts to act as arbitrators, coupled with the right to call for additional resources from the NTPC;
- a solid platform and vehicle to attract additional assistance from, for example, the international development aid community that is interested in helping Lao PDR succeed in achieving what needs to be done.

1.6.1 Monitoring

The organisational and management arrangements include detailed monitoring arrangements for environmental impacts and would make recommendations to GoL on any steps needed to rectify problems. Furthermore, GoL in consultation with NTPC, would engage an independent monitoring agency (funded by NTPC) to externally monitor and evaluate the environmental measures implemented. This would be done on an annual basis and at other times as required by GoL. The IAG would report its findings to GoL and NTPC.

For social impacts, internal monitoring would be conducted according to the schedule in the Social Development Plan (SDP). Independent external monitoring would also be carried out by a third party, focusing on changes in social and economic conditions of individual households. A set of indicators would be developed for affected households and villages. The wellbeing of ethnic minority groups on the Nakai Plateau and the Xe Bang Fai areas would be closely monitored. Such external monitoring would be carried out for the duration of the SDP implementation, which is likely to extend over 9 years with a grievance procedure.

In addition, an adaptive management approach would be adopted for environmental and social management. However, this suggests monitoring indicators would need to be adjusted regularly.

The current monitoring provisions would need a rolling set of annual milestones (to accommodate changes that evolve from the adaptive management) for: each Concession Agreement activity and the associated human resources the Lao PDR government agencies would need to have in place in order to effectively support these activities. This rolling set of annual milestones would provide a moving datum against which monitoring can independently:

- evaluate the progress of each Concession Agreement activity;
- evaluate the progress of the GoL capacity building;
- identify the need, nature and cost of any corrective measures;
- seek the resources to identify, prepare and cost corrective action; and
- as necessary call on the GoL to access the NTPC letters of credit held by GoL to implement the corrective action through the Panel of Experts.

To incorporate these adjustments into current proposals would require a revised Panel of Expert's terms of reference and an adjustment to the skills and experience represented on the Panel of Experts in order to effectively carry out the above annual milestones so that they remain compliant.

GoL and NTPC are bound under the CA to implement the plans, provided the Concession Agreement (CA) reflects the EMAP, the SDP, and SEMFOP⁸. However, the EMAP, the SDP, and SEMFOP are still to be updated to incorporate changes in response to ongoing studies, consultations and the appraisal processes of the WB and ADB and it is assumed these changes would be incorporated into the CA with appropriate budgetary adjustments.

What remains to be seen is whether the capacity of the organisation and management structure and the prevailing capabilities of the incumbents to fulfill their responsibilities would be up to

⁸ There are some reservations identified in the above comment on monitoring, and the economic, environmental and social sections of this review

delivering a sustainable result. It is not possible to answer this now but what can be said is that a concerted effort has been made and sustained for over a decade by all concerned in order to meet the WB and ADB requirements for loans and guarantees. This reflects a considerable commitment by the GoL and NTPC and may, given the support indicated in Appendix 2, provide the momentum needed to carry this commitment/capability into meeting CA obligations.

A key concern is ensuring on-going leverage that could be applied to GoL and NTPC to ensure they continue to meet their obligations under the CA when the partial risk guarantees expire in 2009. This leaves almost two decades of CA obligations to be met with no other leverage than that carried by whatever on-going programs of assistance the WB and ADB put in place in the future.

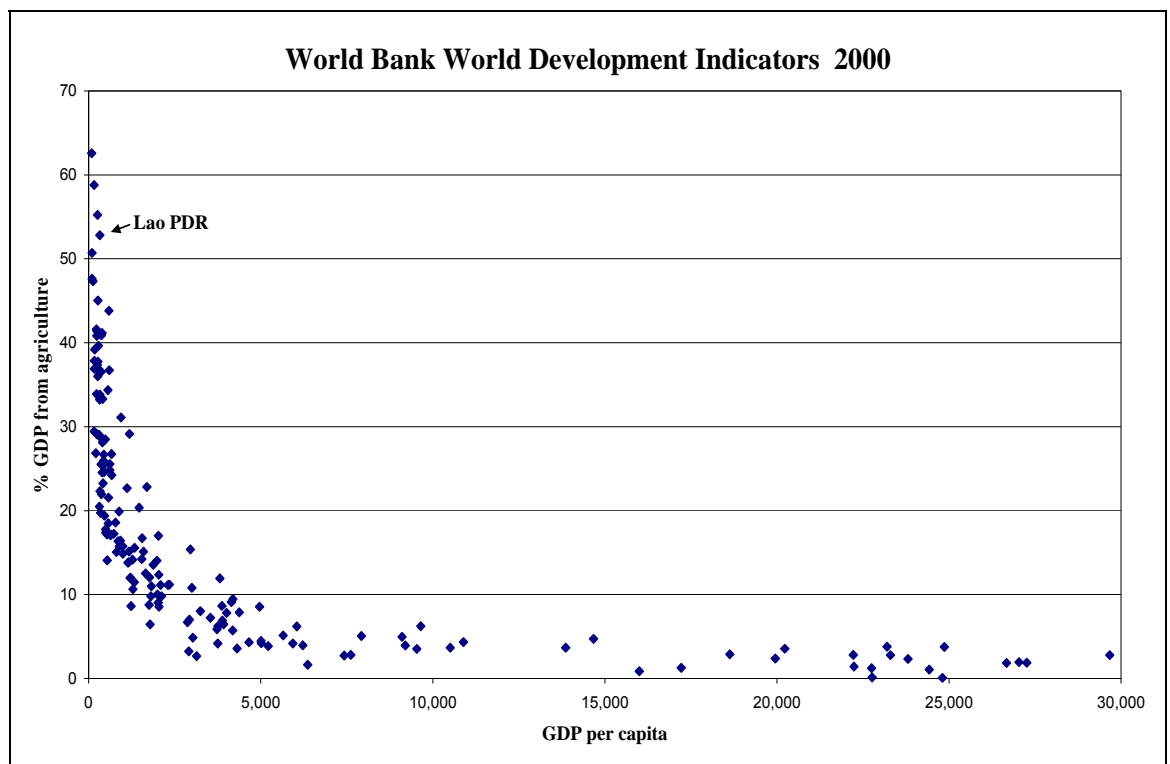
There is, however, a set of 'performance criteria' against which governance can be monitored and GoL has indicated it would sign the Letter of Development Policy that:

- Articulates commitment to SEMFOP and to assuring the integrity of Nakai-Nam Theun National Biodiversity Conservation Area.
- Reasserts commitment to controlling immigration into the reservoir area.
- Confirms intention to implement complementary capacity building activities.
- Covers issues not in the safeguard documents (ethnic minorities in the watershed, impacts below Theun-Hinboun dam).
- Describes mechanisms for independent monitoring and evaluation.
- Articulates a vision for further development of the power sector and regional energy and conservation agenda.

2 ECONOMICS

2.1 Introduction

Many reports on Lao PDR include in their introduction that average income per capita is about USD320 and that agriculture makes up about 50% of GDP. When considering poverty alleviation and economic development it is useful to see how the Lao PDR stands relative to other countries. Figure 1 relates per capita GDP and the proportion of GDP from agriculture for 160 countries for which data is available.



• Figure 1: Development Indicators.

Examination of Figure 1 suggests that if poverty is to be overcome in Lao PDR there must be significant change in the structure of the economy. Substantial growth in the service and industrial sectors is necessary. Growth in education, health, transport, communications, research, construction and marketing services requires revenue. Sustainable exploitation of mining, forestry and hydropower resources appears to be the best hope for increasing the revenue base. If poverty is to be alleviated social and environmental impacts are inevitable. The challenge is to identify projects that can bring about necessary economic restructuring and to anticipate impacts in order to mitigate as far as practicable anticipated adverse impacts.

NT 2 can be a significant step to help to bring about necessary economic restructuring and alleviation from poverty. The NT2 site is remarkable in that it requires only a 42m high dam (48m

from the lowest point of foundation) to achieve 350m head for electricity generation (elevation difference between FSL and tailwater level of 374m). Few sites offer such energy potential at equivalent cost. The SESIA suggests an average financial cost is about 1.6 US cents per kWh, including allowance for social and environmental costs⁹, while its contracted sale price is of the order of US 5.0 cents per kWh. Compared to alternative electricity generation possibilities in the region, and indeed the world, NT2 energy has a very low production cost and an advantage that it is renewable and clean. Project preparation is being taken to unprecedented lengths in trying to minimise adverse impacts and to maximise positive outcomes. The Project's social mitigation strategy is trying to ensure that all affected persons are better off than before the project.

It is a view of the Review Team that it would be inequitable to deny one of the world's poorest nations the opportunity to benefit from responsible development of its natural resources.

Concern is often voiced about the extent of financial commitment of the GoL and its capacity to cope with NT2. The financial commitment appears to be less in relative terms than it was for the Theun-Hinboun Project which was completed in 1998 and has proven to be very successful financially. When the Theun-Hinboun Project was approved in 1994, it was a USD270 million project with GoL having 60% share (USD162 million) of which 41% was GoL equity; a GoL financial commitment of USD66.4 million compared to annual GoL revenue at the time of USD183 million. In 2004, the NT2 Hydropower Project is a USD1,184 million project with GoL having a 25% share (USD296 million) of which 28% is GoL equity; a GoL financial commitment of USD82.9 million compared to annual GoL revenue of about USD265 million. Of this USD82.9 million, about USD60 million would be covered by grants (USD30 million from NTPC toward equity, USD20 million proposed grant from World Bank, plus a grant from Agence Francaise de Developpement). Exact amounts are not known but it is likely that about USD20 million toward GoL equity would be covered by an ADB concessionary loan involving a repayment commitment of about USD1 million per year through the 25 year concession period. That is USD1 million per year for 25 years during which time revenues to GoL are expected to total about USD2,000 million in nominal terms and at the end of which GoL gains full ownership of a USD1,000 million asset.

A recent International Monetary Fund country report, January 2005, provides a debt sustainability analysis. While recognising that Lao PDR has an elevated debt burden that places it in a high risk category among low-income countries, the report states that medium term debt service is manageable and that the NT2 project would have a substantial positive impact on external public debt indicators.

The review team assessment of the many reports and studies pertaining to the NT2 Project leads it to conclude that, with respect to economics and financial aspects, it is hard to be anything but positive about the project. The remainder of this section examines a number of frequently asked questions regarding economic and financial aspects of the project.

2.2 Adequacy of economic analysis

FAQ. Has economic and financial evaluation addressed sufficiently the impacts identified in NT2 project documentation?

Review Team Assessment. Economic evaluation studies from the Louis Berger 1997 Economic impact Study to the ongoing studies by the ADB and the WB appear to have been

⁹ Review Team calculations suggest nearer to 2.7 cents/kWh. This concurs with the NT2 Project Economics Interim Summary Report. The SESIA figures possibly allow for global cost saving in carbon emission.

comprehensive and diligent, and have taken into account social and environmental costs. All have indicated a strong and resilient economic rate of return.

2.2.1 Summary Statement

Economic assessment of micro and macro economic impacts, social impacts, environmental impacts, contractual and financial risks, risks stemming from market impacts and institutional capacity together with examination of potentials for the project to contribute to poverty alleviation have been examined in much greater depth than is normal. Economic and financial assessments continue to be refined and improved as results of further social, environmental and downstream impact studies become available. All economic evaluations have concluded that benefits outweigh costs by a considerable margin. The most recently published result (NT2 Project Economics Interim Summary Report, August 2004) calculates the economic cost to be USD989 million and the economic rate of return to be 17.1%. This is a very high rate of return, especially considering the extent of costs that have been taken into account.

2.2.2 Electricity demand assessment

NT2 is expected to provide about 5,600 GWh per year to the region from 2009. At that time regional demand is expected to be about 170,000 GWh with demand increasing at about 10,000 GWh per year. When NT2 comes into operation it would represent about 3% of total regional demand and about half of one year's increase in demand.

2.2.3 Least cost power alternative

Examination of 19 alternative hydropower schemes shows NT2 to be the least cost alternative without any doubt. Preliminary results from an ongoing Power Sector Development Strategy study show an economic weighted average cost of generation, calculated using economic, social and environmental evaluation software, to be US1.6 cents/kWh from NT2. The next lowest cost hydro alternative is 60% more expensive per kWh and still cheaper than fossil fuel generation alternatives.

2.2.4 Accounting for social and environmental impacts

The first major economic impact assessment (Berger 1997) valued mitigated impacts as an environmental and social budget commitment of USD70 million at 1996 prices, and unmitigated impacts at USD5 million to USD6 million per year at 1996 prices. Recent studies (SESIA 2004) show environmental and social budget commitment at about USD88.1 million at 2004 prices. Details of values being used for unmitigated impacts in the ongoing economic assessments are not available. Discounted present values of possible social and environment benefits reported in the SESIA 2004 imply annual benefits of about USD20 million mostly accruing from reduced emission of greenhouse gases from the project compared to EGAT's best alternative energy source (combined cycle gas).

2.2.5 Reduction of generation at Theun-Hinboun

Diversion of Nam Theun flows by NT2 would reduce energy output from the downstream Theun-Hinboun hydroelectric facility by about 275GWh per year. This is included as a cost against NT2.

2.2.6 Sedimentation and project life

Sedimentation of the reservoir is expected to be minimal. Studies suggest that if the sedimentation rates measured in the 1990's were to continue, it would take 1,800 years for the reservoir to fill with sediment. If sedimentation were to increase by 25 times, its effects would not be measurable until after 50 years and would be an unlikely cause for generation to cease for a few hundred years after that. If sedimentation were to be 70 times present levels there would be a measurable reduction in electricity production of 11% at the end of 50 years. This would not impact on the present economic assessments and it would still not be a cause for decommissioning. Such extreme sedimentation scenarios can be readily avoided and the NT2 safeguard measures have gone to some lengths to ensure they are avoided.

2.2.7 Cost of decommissioning

By the time decommissioning becomes of relevance, probably in 100 years or more, the whole ecosystem of the reservoir area and the human settlement patterns and human activities downstream would have changed. It is very likely that the environmental and social situations prevailing at that time would be highly valued. There would be no thought of removing all the engineering structures of the NT2 project and returning the Nam Theun and Xe Bang Fai flows to their original state. Decommissioning then would involve removal of the power station, closure of the underground works and some engineering works to sustain flows downstream that the environment and human population had adjusted to. Even if the cost of this, at 2004 prices, was to be as high as USD300 million, discounting over 105 years using the project economic rate of return (17.1%) as the discount rate gives a discounted present value of twenty dollars. Decommissioning has no affect on present economic evaluations.

2.2.8 Risk and sensitivity

Extensive sensitivity testing has been carried out showing the economics of the project to be very robust. Only in the most extreme circumstances of extensive cost overruns, and substantially reduced output the economic returns are reduced to less than 12%. It should be noted here that the NT2 project is a private sector development. In contrast with projects financed wholly or mainly by the public sector, many of the most obvious sources of risk have already been deemed acceptable by the private sponsors.

2.2.9 Non-hydro alternatives

The investment funds for NT2 are not available for alternatives. The money available for NT2 is essentially commercial finance on offer only because NT2 is an efficient and profitable hydroelectric scheme to be built and operated by large and reputable foreign companies.

2.3 Financial and commercial viability

FAQ. Is the project financially and commercially viable?

Review Team Assessment. Exact financial details of the Concession Agreement (CA) and the Power Purchase Agreement (PPA) are held as 'commercial in confidence'. Review of documentation available to the public indicates that the project is financially and commercially very attractive with very low financial and commercial risk.

2.3.1 Summary statement

NT2 is a private sector development. The internal financial rate of return to all capital employed is reported to be 14.4% (Project Economics Interim Summary Report, August 2004). As 72% of the capital is borrowed, at probably about 8% interest, this implies a return on equity of 20% or more to the NTPC. The actual cash outlay on contributions to equity is significantly less than the valuation for equity so that the partner's return to actual cash investment is probably of the order of 30% per year. Financially NT2 is very attractive for the foreign partners. Similarly, it is financially very attractive for the GoL.

2.3.2 Financial cost of the project

As opposed to the economic evaluation, financial evaluation includes all project preparation and development costs to date, financing costs and interest during construction, and allowance for inflation. The financial evaluation excludes the costs of transmission development in Thailand. The total financial capital cost is reported to be USD1,184.6 million (Project Economics Interim Summary Report, August 2004).

Ownership of Nam Theun 2 Power Company Limited (NTPC) is vested in four companies: Electricite de France International (35%), Electricite du Laos (EDL, 25%), Electricity Generating Public Company Limited (25%), and Italian-Thai Development Public Company Limited (15%).

2.3.3 Financing

About 72% of the cost is being funded through debt. Finance is being mobilized through a club of seven international banks, a club of eight leading Thai banks, AFD (owned by the French Government), the European Investment Bank (EIB), the Nordic Investment Bank (NIB), and ADB.

2.3.4 The Power Purchase Agreement

Commercial details of the PPA are not available but from information that is available to the public it appears the PPA is based on the take-or-pay principle, guaranteeing an offtake of 93% of NTPC's power generation estimated to average 5,636 gigawatt-hours per annum. It has a term of 25 years from the start of commercial operation, with an option for renegotiating the tariff after 13 years. The tariff in the first year of operation appears to be near to USD0.05 per kilowatt-hour, and is increased by a fixed rate of about 1% per annum after 2010. The payment is determined half in US dollars and half in baht at a fixed exchange rate of USD1.00 = Baht38.

2.3.5 Equity

Available information suggests that at financial closure NTPC would grant USD30 million toward GoL equity including allowance for USD7.2 million already expended. It likely includes a grant, possibly about USD100 million, as equity to the other sponsors including allowance for developer costs already expended and developer fees. This leaves the GoL to contribute about USD53 million to equity through the construction period mostly through implementation of social and environmental safeguard requirements. It leaves the other shareholders to contribute about USD150 million to equity through the construction period much of which would likely be through engineering services, construction supervision and project administration.

2.3.6 International competitive bidding

NTPC is a private company approved as a sole source contractor to build, own and operate the NT2 for 25 years. World Bank international competitive bidding guidelines do not apply. Shareholder companies would construct and operate the NT2 facility enhancing the commercial viability of the project.

2.3.7 Completion of the concession period

Concession Agreement details relating to how the turnover from NTPC to the Lao PDR is actually to be affected at the end of the concession period are not public. Similarly, Concession Agreement details relating to maintenance requirements, and conditions to be adhered to leading up to handing over the asset at the end of the concession period, are not available. It is therefore not clear whether adequate attention has been given to what happens after the 25 year concession period. If properly maintained and managed, the hydroelectric facility after 25 years would still be relatively new. It should be fully operational and with continued good maintenance should have potential to remain fully operational for many decades. Statements that after 25 years GoL would receive all revenue from NT2 are unlikely to reflect reality. It is more likely that the GoL would privatise the enterprise, selling all or part of the project assets back to the private sector. Royalties and taxes would probably continue to derive about USD60 to USD100 million per year depending on market prices for the power and energy. Dividend income would depend on the extent of any shareholding retained by GoL. After 25 years the total income accruing to the GoL from NT2 is expected to be a small and diminishing proportion of total GoL revenues.

2.4 Macro-economic impacts

FAQ. With such a large project in a small country what are the impacts on the economy; what are the risks of local price inflation; the risks to exchange rate and risk of "Dutch Disease"; and the risks of debt distress?

Review Team Assessment. The magnitude of direct impacts on Government finance and revenue is smaller than commonly imagined. Macro economic risks are minimal while macro economic impacts, both direct and indirect are positive.

2.4.1 Summary statement

The project is a private sector enclave project using mostly foreign equipment, materials, consumables and labour during construction, then exporting most of the revenues in the early years. Impacts on GDP and the macroeconomic risks are more in line with the magnitude of the government's contribution to development and the government's flow of revenues rather than with the size of the project.

2.4.2 Magnitude of Government financing for the project

Lao PDR share of equity in the project is about USD83 million. Of this USD30 million is provided by NTPC on financial closure, plus USD20 million proposed as an IDA grant, plus a grant from AFD (French), with most of the remainder being soft loans from the ADB and EIB. Lao PDR direct budget exposure to the project appears to be not much more than it was for the Theun-Hinboun project and its direct debt exposure is less. Its indirect exposure to debt risk through EDL shareholding in NTPC is about USD200 million. This only comes into play in the unlikely event that the project is abandoned before completion of construction. This is largely covered by the partial risk guarantees proposed by WB and ADB and by MIGA guarantees.

2.4.3 The extent of Government revenues

The magnitude of the government's contribution to the development is not huge in the context of the overall project, and its revenues through royalties, taxes and dividends start in 2010 at about USD13 million rising to about USD150 million in nominal terms. Given the Review Team's expectations of growth in overall government revenues it is not anticipated that NT2 revenues would average much more than 3% of overall government revenues to 2020. It may then increase to 5 % of overall government revenue but diminish as a proportion of the total over the remainder of the concession period to probably about 3 % again¹⁰. The revenues from NT2 would be nothing like the magnitude and importance that the Theun-Hinboun Project revenues were in 1999 and 2000, and still are. NT2 revenues are also expected to be a lower proportion of total government revenue than the revenues GoL are likely to get from Australian mining companies now becoming established in Lao PDR.

2.4.4 Impact on Government debt and inflation

The impact on government debt servicing would be very small and well covered by the revenues accruing to the government. The current account deficit would be marginally higher than otherwise during the construction period and then fall until net inflows from NT2 keep the current account deficit lower than would be the case without NT2. Fears of the project causing inflation also appear unfounded. With the freedom of trade and mobility of labour now existing in Laos, and the enclave nature of the project, it is unlikely to have anything but a short term impact on local prices, and impact on regional or national prices would be nil.

2.4.5 Impact on GDP

Project impacts on GDP during the construction period would derive through procurement of Lao equipment, consumables and materials, and expenditures on Lao products by both Lao and foreign construction workers. This might represent up to USD150 million over four or five years. It might increase GDP growth by about 0.3% per year during construction. Following construction the GoL revenues from royalties, taxes and dividends would also contribute to GDP but they would only increase the growth rate of GDP in years where there are significant real increases in the level of revenues received. Otherwise the growth rate would be much the same as without the project. The project would not directly sustain a higher growth rate in GDP. Indirectly, successful implementation of the project could encourage increased foreign direct investment and also increase local investment capacity thus helping to sustain the higher growth rates.

2.4.6 The risk of "Dutch Disease"

While the project would lead to an increase in net foreign exchange revenues it would be a gradual increase over 25 years and not of a magnitude to lead to a rapid appreciation of the real exchange rate - the so called "Dutch Disease" effect. A strategy to target public investment toward economic restructuring and reform and investments toward relieving human and physical capacity constraints would further guard against the "Dutch Disease".

¹⁰ The proportion of total government revenue derived from NT2 is sensitive to assumptions of GDP growth, revenue collection efficiency, inflation, and USD exchange rate movement.

2.5 Contribution to poverty alleviation

FAQ. How can we be sure the project would contribute to poverty alleviation and that the revenues are spent on poverty reduction?

Review Team Assessment. NT2 would assist overall poverty reduction through its contribution to economic growth, through its contribution to the service and industrial sectors, through encouragement of foreign investment to help sustain broad based growth, and through increased government revenues providing potential to relieve human, physical and institutional constraints to productivity enhancement.

2.5.1 Summary Statement

The most significant contributions of the project to poverty alleviation are likely to be through the indirect contributions to the service and industrial sectors and through encouragement of foreign investment to help sustain economic growth. Direct government revenues from the project are relatively small and their contribution to poverty alleviation can only be ensured if all government revenues are utilised effectively and include investments in education, health, transport, communications, research and extension. The extent of expenditure in these areas can be measured by analysis of public accounts¹¹.

2.5.2 Accounts and transparency

There seems little point in attempting to physically separate NT2 revenues in a separate fund, and to specifically audit this fund to ensure it is spent in these areas. If the vast majority of government revenues are not being utilised effectively the relatively small NT2 revenues would contribute little to poverty reduction.

Given the limited institutional capacity existing in Laos a constructive strategy to ensure that NT2 revenues are spent in poverty reduction is to assist in improvement of expenditure of all government revenues. This requires continual strengthening of public financial management and governance, of public program implementation, of natural resources management and environmental protection. Multilateral and bilateral programs can target these areas with or without the NT2 project.

The World Bank is targeting these areas and has indicated its wish to link its Country Assistance Strategy to the NT2 project through conditionality attached to parallel financing. This approach by the WB would appear to be acceptable if it believes the linkage would help make its other institutional strengthening activities more effective.

¹¹ Examination of Lao PDR public accounts indicate that before Theun-Hinboun about 5% to 6% of revenue was spent on education, health and welfare. Since Theun-Hinboun, about 20% of revenue has gone toward health, education and welfare.

3 ENVIRONMENT

3.1 Introduction

The relative benefits and costs of large dam projects has been a controversial issue for the past decade, and environmental and social impacts have been major sources of such contention. The World Commission on Dams' WCD consolidated Dams and Development report (2000) reviewed and collated the major generic issues of concern, and provided a strategic framework for 'best practice' to address those issues. The majority of work reviewed here was produced or revised after the WCD had completed its study, and follows the strategic guidelines recommended by the WCD. Partly as a result of this, and in part because of the implementation of revised and improved WB and ADB project guidelines, there is more information and more thematic detail available for the NT2 proposal than for other previous dams in the Mekong tributary systems, especially in relation to environmental and social impacts.

NT2 proponents focus on wider-reaching potential benefits, while opponents (mostly NGOs) have used the same data and information but focused on particular problems and local impacts and concerns. In general NGOs are ambivalent about the proposal. Hydropower is clean power, with no additional greenhouse gas emissions, so provided the physical and social impacts of the infrastructure development can be mitigated, most NGOs have no objections to the scheme in principle. Numerous international NGOs have, however, expressed concerns over several specific aspects of the proposal. Consistent objections have been expressed by the International Rivers Network (IRN) with concerns for iterative and cumulative impacts on the Mekong River system and the incremental impacts from this proposal, and by Environmental Defence with concerns for people in the immediate area of the proposed dam and reservoir, who would bear the socioeconomic costs of the scheme. The union¹² making up the International Union for the Conservation of Nature (IUCN), of which Lao PDR has been a member since 1969, has some members for and some members against the NT2 proposal.

There are uncertainties in impact projections because of inadequate information, and anticipated cumulative impacts have not yet been addressed (although a forthcoming ADB report would address them). Cumulative environmental impacts fall into two categories – iterative or overlapping impacts within the project, and the incremental impacts that result from a succession of dam projects in the Mekong watershed. The major environmental concerns with this project are cumulative (iterative) and include the impact of the dam and reservoir on surrounding landscape, and the consequent impacts on natural and agricultural or managed fisheries resources. The incremental effect of this proposed project would be real, but minor, as the current management plans would mitigate anticipated negative impacts, and the downstream impact on the Mekong system would be minimal.

There are, however, uncertainties in cumulative impacts, as the hydraulic and hydrological projections are based on less-than-adequate time-series baseline information to underpin predictive models. Fisheries projections are uncertain, as although discontinuous species occurrence data exist and have been collated, there is little quantitative information on abundance or on subsistence use, so projections have been based mainly on correlates or models from elsewhere in the Mekong Basin.

¹² IUCN has 1078 members from 143 countries, including 82 states, 112 government agencies, 768 national NGOs and 34 affiliates.

The studies and recommendations are all predicated on the assumption that the conservation area management plans would be implemented, that WB and/or ADB guidelines would be followed in the implementation of this project and that the Concession Agreement (CA) would be implemented. WB and ADB guidelines require monitoring and feedback and hence an adaptive approach to environmental management. If the dam were to be constructed simply under Lao PDR legislation and regulations, the environmental safeguards would be unlikely to be applied.

The major environmental impacts would be:

- The demand pressure from construction-accelerated access and anticipated human population increase as a result of resettlement, on the natural resources and biodiversity conservation values of the Nakai Nam Theun- National Biodiversity Conservation Area (Nakai-Nam Theun National Biodiversity Conservation Area). Those pressures are, however, increasing as a result of increasing access and mobility, and planned safeguards may in fact enhance the protection status in the Nakai-Nam Theun National Biodiversity Conservation Area.
- The change from a riverine to a lacustrine environment for 450 km² of the plateau area in the Nam Theun catchment that would be inundated to form a reservoir when the dam is constructed.
- Changes in downstream hydrology and hence in the frequency and extent of the annual flood regime of the Xe Bang Fai, use of riverbank and immediately adjacent land, changes in fish populations and changes in the channel form of the alluvial reaches of the Xe Bang Fai with a significant increase in discharge to that channel.
- Less significant changes in the Nam Theun below the dam due to reduced flows when the dam is constructed. The reason for less significance associated with the impact of what are likely to be hydraulically significant reductions in flow is because there is an existing dam on the Nam Theun below the NT2 site, so this impact would be 'incremental' not new.
- Resultant changes to fisheries in all areas impacted.

3.2 Nakai Nam Theun-National Biodiversity Conservation Area

FAQ: Is the proposed management of the Nakai-Nam Theun National Biodiversity Conservation Area viable?

Review Team Assessment: The management regime proposed is sufficient to ensure that high biodiversity values would be protected and that the land would be well-managed, provided resettled villagers do not encroach beyond their allocated resettlement sites, or others enter along new access routes, to access additional subsistence resources from Nakai-Nam Theun National Biodiversity Conservation Area.

3.2.1 Summary statement.

As compensation for other environmental impacts a watershed protection and biodiversity conservation area would be managed on the north-eastern side of the NT2 reservoir. The total size of the Nakai-Nam Theun National Biodiversity Conservation Area would be 3,500km². It is highly likely that the Nakai-Nam Theun National Biodiversity Conservation Area would not be viable without the NT2 management package. Although the management regime proposed would ensure the protection of high biodiversity values, and a well-managed watershed, this is

contingent on the agricultural livelihood package being viable (assessed as doubtful in Section 4) and there being no uncontrolled access by 'outsiders' who may wish to use the area's natural resources.

The package is 'conservation management' oriented, however, and bears little relationship to watershed protection for control of the reservoir. Given the projected population increase and the inherent difficulties of large area, and previous protective inaccessibility compromised by new access the proposed project currently presents, these are optimistic but untried management solutions. After the 25-year conservation area management plans has finished there is no guarantee that the GoL would continue to manage the area for conservation (or would be able to afford to do so financially, even with goodwill). The NTPC, WB and other contributors to the conservation management plan have taken all possible steps to ensure appropriate habitat management within the context of the proposed development.

3.2.2 Impacts resulting from plateau inundation

The Nakai Plateau reservoir would convert a length of approximately 200 km of riparian landscape and the associated catchment area to a lake approximately 450 km² in area. Loss of habitat in this area would include wetlands and various types of forest cover. Much of the forest cover is degraded as a result of agricultural activity and logging. The inundation area includes habitat areas for the endangered Asian elephant and white winged duck. Management programs for these two key endangered species based on the outcomes of proposed ecological investigations are signalled, but the detail is not clear. Water in the impoundment area is likely to become thermally stratified and in the lower levels, oxygen depleted. The management plans include re-oxygenation (aeration) of outflows entering the Xe Bang Fai system.

3.2.3 Status of conservation area

The Nakai-Nam Theun National Biodiversity Conservation Area is the largest and most important of Lao PDR's twenty national protected areas, with 12 categories of forest/habitat types. It is internationally recognised for its high biodiversity values with a substantial number of globally threatened species (SESIA: 14). There is a (pending) World Heritage nomination for the Nakai-Nam Theun National Biodiversity Conservation Area and the contiguous Vu Quang protected area in Viet Nam. It is widely recognised that without substantial management support this area is very likely to degrade as a result of multiple use pressures. Laos has one of the highest percentages of protected lands in the world, but most are not managed actively for protection and capacity and resources for research, planning and monitoring are weak.

3.2.4 Funding, management and protection

NT2 would provide a funding contribution of USD31.5 million over 25 years for the management of this area. The government of Laos has established a Watershed Management and Protection Authority (WMPA) that came into force on 1 January 2005. The SEMFOP sets out a management plan for the Nakai-Nam Theun National Biodiversity Conservation Area. It is proposed police, army and forestry staff would protect the Nakai-Nam Theun National Biodiversity Conservation Area (this would meet the World Bank's habitat protection guidelines) and efforts would be made to monitor and closely regulate access.

3.2.5 Threats to conservation outcomes

Numerous threats to sustainable resource use in the Nakai-Nam Theun National Biodiversity Conservation Area have been identified, for which a range of management strategies is

proposed. These include threats from communities living within the conservation area; communities living on its periphery; transboundary incursions from Viet Nam; improved access with new routes opened (including water routes that would become available with the new reservoir); increasing numbers of sawmills in the area; uncontrolled extraction of wildlife and non-timber forest products; internal population increase; lack of zoning or rules for management. Key management strategies include logical and adaptive management plans to be based on ongoing research, and with responsibilities for action defined, the identification and management of wildlife corridors, close control of priority areas including the habitats of endangered species, and on-the-job training and mentoring of local enforcement personnel.

As discussed in Section 4 of this review there are substantial concerns about the viability of the plateau resettlement package. If components of this package are not successful there is a real possibility that plateau re-settlers may resort to hunting, forest product extraction and even farming in the Nakai-Nam Theun National Biodiversity Conservation Area. These activities would increasingly compromise the protected status of the Nakai-Nam Theun National Biodiversity Conservation Area.

3.2.6 Management capacity

To date, the conservation status of Nakai-Nam Theun National Biodiversity Conservation Area has been ensured passively, by remoteness and poor access, not by good or active management. The likelihood of sustained protected area management of the extensive area by national authorities after the 25-year support program must be questioned. This is especially the case given the tenuous link between biodiversity conservation and watershed protection. Although the rationale for the NBCA is to protect the watershed, and minimise sedimentation to the reservoir, this is not demonstrated, but is based on the assumption that conserved land would remain vegetated, with the soil undisturbed. Given identified needs and past observations, biodiversity/environmental conservation is unlikely to receive priority status for training requests, or in the allocation of sparse national budgets, even with increased income from power sales. The longer-term sustainability of the Nakai-Nam Theun National Biodiversity Conservation Area is contingent on good environmental governance, or institutional capacity.

3.2.7 Other potential funding sources for protection

Proponents of the project argue convincingly that NT2 provides the best basis for the protection of the Nakai-Nam Theun National Biodiversity Conservation Area given the lack of alternative funding sources. This has been disputed by those opposed to the project. The International Rivers Network (2000), for example, suggested that the NT2 watershed area 'was being considered for grant funding by GEF (with German and Dutch Government assistance) until it became clear the World Bank was seriously considering backing NT2 and flooding some 40% of the plateau.' No specific details of such proposals are available, and given the number and extent of land areas classified as Conservation Areas in Lao PDR, it is very unlikely that many would receive adequate and timely external funding to ensure their viability, so the likelihood of sufficient alternative external funding being available for biodiversity conservation in the Nakai-Nam Theun National Biodiversity Conservation Area at this time is dubious.

3.3 Sedimentation and erosion

FAQ: Are there substantial sedimentation or erosion problems associated with NT2, either within the reservoir or downstream?

Review Team Assessment: There is no significant sedimentation problem associated with the project. However, there would be increased erosion as a result of higher flows along the Xe Bang Fai.

3.3.1 Summary Statement

The inundation area has been cleared of trees for some years, so a stable low vegetation cover is now established, and little sediment mobilisation is expected as the reservoir fills. Erosion within the watershed is possible, depending on the land use that results from re-settlement on the Nakai Plateau. Poorly managed tree clearing or ground disturbance for gardening could result in sediment mobilisation.

A major impact of the project would be to double the discharge of the Xe Bang Fai downstream of the dam. This would result in alluvial channel adjustment – projected to be channel widening – and would result in local sedimentation, from bank collapse, into the stream. The new channel bed and banks are expected to restabilise after several flood seasons, but in the short-term seasonal sediment slugs are anticipated to occur in the Xe Bang Fai.

3.3.2 Reservoir sedimentation

The finding of the hydrological studies is that little sediment mobilisation is expected as the reservoir fills, but even if sedimentation rates greatly higher than currently estimated are experienced there would be no substantial impact on the long term viability of the dam. Conservation and development activities in the watershed area place priority on reduction of sediment mobilisation. Concerns expressed by the Panel of Experts about current rates of sedimentation arising out of shifting cultivation in the watershed area appear to be based on superficial aerial inspection and carry little credence, however, there is a risk that sedimentation from the catchment would exceed projected levels if there is poorly managed tree-felling and ground disturbance from gardening in the resettlement areas on the Nakai Plateau.

3.3.3 Nam Theun River

Flows would decrease in the Nam Theun below the dam, and bed sediments are expected to be less mobile than under the natural regime. There is already a dam system downstream on this river, constructed without the level of scrutiny and control being applied to NT2, and the river's remaining environmental values would be further compromised by this proposed scheme. The natural ecosystem of the relatively short reach of the Nam Theun below the dam is in effect being sacrificed (or is an environmental cost) for the power generating schemes.

3.3.4 Xe Bang Fai River

This issue has been investigated in the hydrological studies, the environmental assessments and is addressed in the environmental management plan and safeguard documents, but the hydrological predictions remain uncertain because of the limited duration of the recorded flow data for the system. There would be increased bank erosion in the Xe Bang Fai due to increased flows, low sediment load in the diverted water and daily variation in discharge (especially on weekends). It is estimated that the river would widen by up to 20 metres, with impacts most marked in the upper reaches. Erosion management plans have been developed for the Xe Bang Fai at key points, particularly the point where the diverted waters enter the main stream. Compensation and mitigation arrangements are proposed to address the social impacts of river-bank erosion. In the entrenched reaches in the lower Xe Bang Fai below Mahaxai, there

should be very little additional sedimentation after the first flood seasons, when the river widens in its alluvial reaches.

3.3.5 Mekong system

It has been suggested by opponents of the scheme (Community Aid Abroad 2004) that reduced discharge in the Mekong with no reduction in sediment load is likely to result in sediment being transported to and deposited in the sump basin of Tonle Sap in Cambodia (already under extreme pressure from accumulating sedimentation and chemical contaminants). This would be a real issue of concern, but the incremental change from NT2 is negligible. For the Mekong, the reduction in flow to be caused by the NT2 scheme would be spatially limited. The Mekong river discharge (and capacity to transport sediment) would be reduced (see hydrology section below) over a defined reach of the channel, but would recover below the Xe Bang Fai.

3.4 Downstream hydrology impacts

FAQ. What would be the impacts on downstream hydrology in the Nam Theun, the Xe Bang Fai and the Mekong?

Review Team Assessment: The impacts would be significant for the Nam Theun, significant but managed and mitigated to the extent possible for the Xe Bang Fai, and negligible for the Mekong.

3.4.1 Summary Statement

The Nam Theun, with the combined impacts of the Theun-Hinboun and the NT2 dams would become a sacrificial channel reach, or an environmental cost of the projects. It is unlikely that environmental flows would be maintained in the Nam Theun below the dam, as this would require a significant reduction in flows through the generators, and its environmental values are already severely compromised by the existence of the Theun-Hinboun dam. The expected impacts on the Xe Bang Fai are acknowledged in all reports, and management plans are in place to mitigate those impacts. The effect on the Mekong would be minor, and would occur within only a limited reach of that stream channel.

3.4.2 Nam Theun River

Once NT2 is built it is estimated that flow below the dam on the Nam Theun would be $2 \text{ m}^3\text{s}^{-1}$ averaged over a week in dry periods, and $392 \text{ m}^3\text{s}^{-1}$ over five weeks during flood spills. The WCD review: Financial Economic and Distributional Analysis (Draft, July 2000) suggested a risk-averse strategy would be to provide for an environmental flow 2-3 times larger than the 'guesstimate' of the level required to maintain ecosystem function. Based on a collation of catchment observations and studies over a wide geographic distribution, they suggested a safe minimum standard for any stream is the stochastic low flow. In the absence of good long-term flow data, an alternative environmental flow objective would be approximately equivalent to twice the average dry season flow. The review team acknowledge this would have high operational costs. Except during the wettest five weeks, the proposed discharges (monthly average of apparently less than $10 \text{ m}^3\text{s}^{-1}$) fall well short of safe minimum standard environmental flows for the Nam Theun channel. A flood frequency analysis on 17 years stream-flow data at the dam site, undertaken by SMEC (2003), indicated the low flow for the driest month (April) is on average $31.9 \text{ m}^3\text{s}^{-1}$. An environmental flow target of at least $31 \text{ m}^3\text{s}^{-1}$ (approximately three times the lowest monthly flow of $10.3 \text{ m}^3\text{s}^{-1}$ recorded in April 1986), but preferably about $400 \text{ m}^3\text{s}^{-1}$ (twice the dry season average flow) for the Nam Theun channel below the dam site, would be

indicated. It must, however, be acknowledged that environmental values along the Nam Theun channel are already compromised by the existence of a dam downstream, so it would almost certainly be widely perceived as acceptable to plan for lower flows, and regard the Nam Theun reach as an environmental cost of the project.

3.4.3 Xe Bang Fai River discharge and flooding

The major downstream impact would be on the Xe Bang Fai, and especially for communities now practicing agriculture or horticulture on the levees along its upper alluvial reaches. Diversions through the power station would almost double the annual discharge in the upper reaches of the Xe Bang Fai. This would result in an increased water level of about five metres in the dry season and 1.5 metres in the wet season. Normal dry season very low flows would be changed to increased dry season flows. The impact in terms of flooding does not appear to have been studied in great detail (probably because of uncertainties due to the relatively short-duration data set), but it is stated that overall flood levels in the Xe Bang Fai and its floodplain could increase by approximately 0.5, 0.4 and 0.2 metres in the upper, middle and lower reaches, with an estimated increase in the flooded areas of 3.75% (SESIA: 27). Bank-full discharge for the Xe Bang Fai (with its present cross-section) at Mahaxai is $2,270 \text{ m}^3\text{s}^{-1}$ (recurrence interval of about 2.5 years) and the 100-year flood discharge is $3,190 \text{ m}^3\text{s}^{-1}$. Discharge is difficult to measure at unconfined or shifting channel sections, so the stable channel section at Maxahai is used as the hydrologic monitoring station. Proposed flood mitigation is to restrict outflows from the regulating dam when discharge at Mahaxai approaches bank-full level (ie $2,270 \text{ m}^3\text{s}^{-1}$). With stream discharge effectively doubled, it is expected this would be necessary at least once each year. Environmental Defence (2004) have (very validly) questioned the economic viability of the proposed mitigation method and suggested this closure was extremely unlikely for flood periods that could persist for one month or more. The environmental management plan does not address this issue adequately. The hydrologic projections are uncertain on what the relationship is between the shutdown water level trigger at Mahaxai and flood events or levels in the lower reaches, but it is likely that the lower parts of the catchment would also experience annual overbank floods as a result of the increased discharge. The lower parts of this catchment are amongst the most productive paddy-rice areas in Laos, and compensation demands can be anticipated if flooding reduces the productivity of these gardens. There is currently inadequate planning for the increased flooding that can be anticipated.

3.4.4 Xe Bang Fai channel and floodplain water quality

Risks for water quality in the channel arising from discharge of high organic loads or agricultural chemicals as a result of agricultural land use by re-settled villagers have been taken into account in management planning. Mitigation measures include early partial clearance of the reservoir to maintain soil stability as it fills, and an aeration weir and riffle structures in the downstream channel to redress potentially low levels of dissolved oxygen in water from the reservoir. There is a plan to fund the construction of tube wells for drinking water if the river water becomes contaminated. Arsenic is known to be widespread in groundwater in Laos, and all donors should ensure that tube well construction would be implemented only within a framework of water quality risk assessment and avoidance, through the use of appropriate drinking water quality guidelines (for example, World Health Organisation, AusAID).

3.4.5 Mekong River

The reach of the Mekong between its confluences with the Nam Kadang and the Xe Bang Fai would be affected by the combined diversion of the NT2 and the existing Theun-Hinboun dam. Except in floods, reduced flows would occur year-round, with an average reduction between the Nam Kadang and the Nam Hinboun of $302 \text{ m}^3\text{s}^{-1}$ (a mean-flow reduction for the Mekong reach

of less than 1.2%) and between the Nam Hinboun and Xe Bang Fai of $220 \text{ m}^3\text{s}^{-1}$ (that is, well under 1% of mean flow). Below the Xe Bang Fai discharge would be supplemented, and normal discharge in the Mekong is expected, so there should be no persisting or transboundary flow impact.

3.5 Fisheries impacts in the immediate area and the Mekong

FAQ: What would be the impact on fisheries in the immediate area and the Mekong?

Review Team Assessment: This is an area of uncertainty. There would be major local hydrologic changes that would undoubtedly affect existing patterns of species distribution and abundance, but the limited data available indicate that fish extinctions are unlikely, and that a viable fishery can be re-established.

3.5.1 Summary statement

Current data on fisheries are abundant, but not systematic. Various studies (social and environmental impact assessments, safeguards documents, and environmental management plan) have demonstrated a wide variety of fish species present in the NT2 impact area, and have given a good indication of the distribution of some species. Comparative data are also available for similar areas in the Mekong Basin. There are, however, no reliable indications of species abundance.

In terms of impact on villagers, as few studies of fish consumption have been undertaken it is not possible to predict the impact of the changes that are expected to occur as a result of dam construction. Comparisons have been used, by both proponents and opponents, from elsewhere in the Mekong Basin to project impacts. All studies have been cognisant of fisheries issues and a current monitoring program is underway, with adaptive management proposed, on the basis of the study's findings.

3.5.2 Fish stocks in the Nam Theun reservoir

It is anticipated that a viable fisheries ecosystem would become established in the Nam Theun reservoir and the streams and wetlands on its margins. The above-dam change from lotic (fast moving water) to lentic (slow moving water) habitats would have an impact on fish. Three genera and five additional species of fish dependent on fast-flowing water would disappear from the reservoir area, and at least two additional species feeding on stone-based algae, or which spawn in rapids would also disappear. None is rare or of limited distribution. A few wetland species are expected to adapt. It is expected that populations of edible fish would become established in the reservoir/watershed system.

3.5.3 Fish stocks in the Nam Theun

Fish stocks in the Nam Theun have almost certainly been affected by the Theun-Hinboun Dam which was constructed without fish access structures to permit normal spawning patterns, and they are expected to be affected by further reduced flows following NT2 dam construction. One endemic and two other species may suffer reduced numbers due to reduced flows in the Nam Theun, and seven species may have their migration patterns impeded. In effect the Nam Theun riverine system and its ecosystems would be altered significantly.

3.5.4 Fish stocks in the Xe Bang Fai

International River Network (2000) claims fisheries and associated livelihoods risks have not been assessed, and no opportunities have been provided for 'involuntary risk takers' who depend on fish for protein to participate in decisions. Nevertheless, fisheries have been taken into consideration in all studies, but somewhat belatedly for systematic investigations. The fisheries study underway (Terry Warren for NTPC and previously NTEC) gathered baseline information on the pre-dam situation (2001-2002), that involves annual monitoring (most recently reported for 2002-2003). That monitoring would continue during and after dam construction. The Theun-Hinboun dam demonstrated an improvement in the habitat range for some edible fish species, and it is anticipated NT2 would have a similar impact. Discharges in the Xe Bang Fai would increase and fish stocks common to larger faster-flowing streams may increase in that river, with no significant change for the Mekong projected as a result. Although there would be habitat changes there are refuge areas, and it is expected many fish would migrate to such refuges. Migrations of large fish species from the Mekong and Xe Bang Fai to flooded forest areas are not expected to be impacted. Deeper river water generally results, however, in diminution of fish species, so the current Xe Bang Fai fisheries are threatened by the changes. Shallow gravel bed habitats in that river would be destroyed, with the anticipated local loss of six species – all of which are expected to colonise other areas of similar habitat in the local region. The Social Development Plan (31:35) states 'It is predicted that the NT2 discharges in the Xe Bang Fai would cause a collapse in the aquatic food chain' but this stands in contrast to the physical/biological resource studies, reflecting uncertainty due to inadequate baseline information.

3.5.5 Cumulative impacts

One anticipated major impact on fish stocks, including in Tonle Sap, is stated to be an overall reduction (Osborne 2004). He reported that giant catfish (*Pangasianodon gigas*) spawning sites are already cut off from the main Mekong flow, and this situation would become progressively worse with more dams. Fish catches along Mekong in 2003-2004 reportedly dropped by 50% after a 15% drop in the previous year. If this trend is due to major hydrologic and land use changes in the Mekong Basin, the NT2 would have a further small incremental impact.

3.6 Contribution to climate change

FAQ: Will NT2 have an impact on climate change?

Review Team Assessment: Negligible.

3.6.1 Summary statement

NT2 would not make a significant contribution to greenhouse gases, particularly when compared to forms of power such as coal, oil, and gas-fueled generators.

4 SOCIAL

4.1 Introduction

There are three main groups of people impacted by the NT2: those living on the Nakai Plateau who would be relocated as a result of the reservoir; downstream communities on the Xe Bang Fai who would be impacted by increased water flows; and upstream communities in the National Biodiversity Conservation Area (which would comprise the bulk of the reservoir watershed) who would be impacted by conservation and development activities. It is clear to the Review team that an enormous—and perhaps unprecedented—effort has gone into developing mitigation and compensation plans for these various affected people. It is also clear that these various social management plans have been developed with close attention to the overall spirit and content of World Bank social safeguard policies. Nevertheless, there are a number of areas of concern.

The key concerns relate to the adequacy of the resettlement package for the farmers to be displaced on the Nakai Plateau (who number over five thousand). In large part this weakness derives from the expressed desire of the displaced villages to remain on the plateau rather than move to more productive lowland sites. This has given rise to significant resource constraints. As a result the agricultural component of the resettlement package is weak, largely as a result of poor soil quality in the resettlement area. This is compounded by the small size of the agricultural plots, which are provided as a standard allocation of 0.66 hectare regardless of household size or current land ownership. It is quite clear that the agricultural package would not be capable of meeting subsistence requirements for the majority of households. It is also clear that a substantial number of households would receive less land than they currently farm.

The agricultural problems associated with the resettlement program are recognized by the proponents and they have put forward a range of other livelihood activities to supplement incomes. These include fisheries, forestry, wage labour and various craft and business activities. However, the local viability of these options is unproven and it seems that the assumptions behind the proposed business activities, in particular, are highly optimistic. Moreover, even with the proponent's assumptions built in, it is evident that the livelihood packages would not meet livelihood targets for substantial numbers of households. More generally, the dramatic livelihood transition that is envisaged appears ambitious. Most people to be relocated currently depend on subsistence agriculture and forest product collection but they are expected to rapidly adopt mixed livelihood packages with a strongly commercial orientation. This does not appear consistent with the World Bank's Indigenous Peoples policy that "development activities should support production systems that are well adapted to the needs and environment of indigenous peoples."

Should the resettlement package be unsuccessful there is the possibility of increased resource pressure on the nearby Nakai Nam Theun-National Biodiversity Conservation Area (Nakai-Nam Theun National Biodiversity Conservation Area). The resettlers have economic, social and kinship links with the communities in the Nakai-Nam Theun National Biodiversity Conservation Area and, in the event that resettlement livelihoods are perceived inadequate, there is a real likelihood that they would seek to supplement incomes from hunting, forest product collection and even cultivation in the Nakai-Nam Theun National Biodiversity Conservation Area. There is, then, some risk that one of the key benefits of the NT2 project—protection of the Nakai-Nam Theun National Biodiversity Conservation Area—may be undermined by resource pressures that arise out of an inadequate resettlement package.

There are also some weaknesses in the downstream package of compensation. First, no compensation is proposed for increased downstream flooding, about which there appears to be considerable hydrological uncertainty. Second, some aspects of compensation for riverbank gardens also warrant review. Third, the costs of downstream compensation are only partly covered by the Concession Agreement. These issues need to be addressed if an adequate compensation package is to be put in place.

Planning for other aspects of social mitigation and compensation—including the social development plans for the Nakai-Nam Theun National Biodiversity Conservation Area—are at a relatively early stage but, on the whole, the frameworks and approaches proposed appear adequate.

4.2 Nakai Plateau relocated villages

FAQ: Has the current livelihood status of villagers to be relocated been adequately assessed?

Review Team Assessment: The agricultural component of current livelihoods has been only superficially assessed.

4.2.1 Summary statement

Considerable emphasis is placed in the Social Development Plan on the low level of current subsistence-oriented lifestyles. The figure from a CARE study undertaken in 1996 that only 17% of households can meet rice requirements is often quoted. But floods significantly affected yields in 1996. Further surveying in 2002 (in which it was estimated that the villages only produced 20% of their rice needs) also seems to have been affected by flooding. There has not been any year-to-year monitoring of agricultural performance nor any detailed analysis of agricultural systems. Areas of agricultural land to be inundated by the NT2 reservoir may have been substantially underestimated.

4.2.2 Shifting cultivation

Unfortunately, discussions of shifting cultivation throughout the world tend to be polarised between those who condemn and those who romanticise such systems. The former approach is taken in the Social Development Plan that echoes the GoL's desire to reduce shifting cultivation. Regular statements are made that shifting cultivation practised by the plateau villagers is unsustainable. However, no detailed studies have been undertaken of (1) the various types of shifting cultivation practiced in the region; (2) plot level yield; (3) local management systems, including fallow management; (4) residual crop harvests from fallow plots; (5) the impact of recent widespread logging on the plateau; (6) the impacts of demographic trends.

4.2.3 Paddy production

Similarly no detailed analysis has been undertaken of irrigated paddy cultivation on the plateau.

4.2.4 Rice production

The Social Development Plan draws attention to the low rate of rice production in plateau villages. The CARE survey from 1996 is regularly cited to the effect that only 17% of households meet their rice requirement. Similarly, Table 11.8 of the SDP indicates that only 19.4% of the rice requirement is met and Table 10.1 indicates that per capita rice production is only 60 kilograms. On the face of it, it seems somewhat implausible that long-term farming settlements (who are

reported to place a very high priority on rice-based food security) would produce such a small percentage of their rice requirement. Indeed, it seems likely that the baseline surveys took place in exceptional years. The CARE survey was undertaken in 1996 when yields were greatly reduced by floods, the most severe in the area since 1959 (SDP 13.3). Similarly, low yields recorded in 2002 also appear to reflect the impact of flooding. This is not to suggest that other activities, such as forest product collection, are not crucial in generating income that can be used to purchase rice. But the fact that forest product collection increased dramatically in 1997 suggests that the very low yields of 1996 may have been somewhat exceptional (SDP 11:21). It is also possible that subsistence production is supplemented by the cultivation of other crops, such as cassava, but there is no mention of this in the Social Development Plan.

4.2.5 Agricultural land—variation in ownership

The Social Development Plan provides estimates of land ownership at village level. No indication is provided of variation in levels of household ownership within villages, apart from the statement that current ownership ranges from 0.4 to 2.0 hectares. This variation is likely to be a key issue given the proposal to allocate all relocated households plots of the same size (0.66 hectares).

4.2.6 Agricultural land – overall extent

The Social Development Plan states that, in 2002, 91 hectare of wet season paddy were cultivated along with 520 hectare of upland crops, mainly rice (10:10; Table 11.7; 25:1). It appears likely that upland fields, in particular, have been underestimated. A footnote suggests that the upland figures “are incomplete as they only cover around half of the villages” (10: 11). It is interesting to note that the SEMFOP states that 488 hectare of agricultural fields in the old National Protected Area would be inundated (SEMFOP 1:9), but this only includes agricultural fields on the northern bank of the Nam Theun and “most agricultural fields on the plateau lay to the south of the river” (SEMFOP 1:7). It is possible that under-reporting of agricultural fields has arisen as a result of concerns about payment of land tax and local awareness about negative official views of shifting cultivation (SDP 15:2). It is also likely that no consideration has been given to fallow land, which is a key component of the agricultural production system. It is also likely that many farmers are not able to provide accurate areal estimations of upland fields, relying on measures such as the number of days required for clearing or the amount of seed required for planting. It is somewhat puzzling that other data sources (satellite imagery, aerial photos) have not been used to provide independent assessments of the extent of agricultural land to be affected by reservoir inundation.

4.2.7 Indirect project impacts

There is no concerted assessment of the extent to which indirect project impacts have compromised current livelihood systems. In particular, there has been extensive logging within the reservoir area over the past decade. Also, there are some indications that routine development activities have not been undertaken in anticipation of the relocation.

4.3 Viability of livelihood package

FAQ: Is the agriculture livelihood package for relocated villages on the Nakai Plateau viable?

Review Team Assessment: The information provided in the Social Development Plan itself raises considerable doubts about the viability of the agricultural livelihood package.

4.3.1 Summary statement

Villagers who are currently subsistence rice farmers (supplemented by forest product collection, livestock and fisheries) are expected to adopt new agricultural practices based on permanent mixed cropping undertaken on poor soils. Rice production would be well below household requirements despite strong indications that rice-based food security is an important local priority. Alternative crops are largely untested and where trials have been undertaken results are poor. The viability of the proposed irrigation systems is not yet confirmed.

4.3.2 Resettlement site

Villagers to be resettled have expressed a strong desire to remain on the Nakai Plateau, rather than move to a lowland site as initially envisaged (SDP 14:6). This has raised considerable difficulties for the resettlement process given the "unique and challenging conditions for agriculture in the resettlement area" (SDP 21:2).

4.3.3 Quantity of land

Each resettled household would be allocated 0.66 hectare of irrigated land of which 0.16 hectare would be developed for irrigated paddy. This lies at the lower end of current reported land ownership that is said to range from 0.4 to 2.0 hectares (SDP 11:16). The amount allocated would be the same for all households regardless of current land ownership or household size. The number of households receiving less land than they currently own is not specified but would be substantial. The total amount of land to be provided is 650 hectares (SDP 10: 15). This is about equal to the amount reported as currently cultivated, but there are indications that this is an underestimation (see 4.1.1 above, Issues in detail, point 5). In recent consultations, villagers have requested larger land allocations (SDP 14.8).

4.3.4 General quality of land

It is clear that the quality of agricultural land in the resettlement areas is marginal. It is not currently farmed by villagers in the area, despite the proximity of many of the resettlement sites to current villages. Currently, the villagers have selected the most favourable areas of land for cultivation (in low lying areas where alluvial deposits are greatest). These better quality agricultural areas would be lost as a result of the inundation (SDP 25:4).

4.3.5 Soil quality

Detailed soil surveys have not yet been undertaken except in the pilot village area. The result of that survey was that "the soils in the resettlement area are very poor. Nutrient content is very low and organic matter is also low. The area has limitations for agricultural production, at least until the nutrient content is increased and a higher level of organic matter is reached in the soils. This would be a long process, which could take 10 years or more." (SDP K: 3) Other general surveying suggests that soil quality is poor throughout the entire resettlement area (SDP 19:11), though with some better soils located in the northern resettlement sites. Inputs would be provided by the project for only the first three years (SDP 21: 20-22).

4.3.6 Irrigation viability

General irrigation planning has been undertaken for each of the resettlement sites. This makes clear that full development is dependent on initial irrigation system development being "feasible and sustainable" (SDP 22:1). There are significant concerns about high levels of infiltration in the

generally sandy soils of the resettlement area (SDP 22:6). The amount of land with sufficiently high clay content to support irrigated paddy production is not clear. The irrigation planning assumes such areas would be available adjacent to the farm plot areas (SDP 22:25). Irrigation planners express significant doubts about the viability of dry season paddy—“unless there is significant clay content in the soil it is recommended that dry season paddy rice irrigation is not considered.” Dry season rice trials at the demonstration farm were not successful (SDP 22:6).

4.3.7 Rice production

Consultations have indicated that food security (based on rice production) is a very high priority for villagers (SDP 14: 5-7; 15:2, 15:13). Average current rice requirements are 1,500 kilograms per household (based on an average household size of 5 and annual consumption of 300 kilograms of unmilled rice). The Social Development Plan states that assuming a yield of 3 tonnes per hectare on the 0.16 area of paddy would provide up to 70% of household requirements if cropped in both wet and dry seasons. However, the figure of 3 tonnes is more than double that currently reported for paddy on the Nakai Plateau and somewhat higher than that achieved in adjacent lowland areas. Also, irrigation planners recommend that dry-season production of rice not be considered at this stage (SDP 22:6) (even though it is included in most of the agricultural scenarios considered—SDP 21:9-10). Dry season rice trials at the demonstration farm have not been successful (SDP 21:7; 22:6). A more reasonable assumption may be that wet season paddy production would produce about 160 kilograms (at a rate of 1 tonne per hectare). This would provide 10% of the rice requirement for the average sized family. Even if the full land area of 0.66 is allocated to rice the yield (and assuming that non paddy areas of the land would have the same yield as paddy areas) then the entire yield would be around 660 kilograms, about 44% of the household requirement.

4.3.8 Other crops

The agricultural livelihood packages propose a range of other cropping alternatives. There have been only limited local trials of these alternatives. Production of maize and peanuts in the pilot village in the wet season of 2003 resulted in yields that “were only fair, and would have to be improved if the cropping of these crops would prove to be a viable alternative to rice growing” (21:24). Indeed in the following year most farmers in the pilot village abandoned these crops and reverted to upland rice cultivation (SDP 21: 24).

4.3.9 Other agricultural areas

It may be possible to develop agriculture on degraded forest areas and in the reservoir draw down area. But the Social Development Plan makes it clear that investigation of agricultural options in these areas is at an early stage and while possible land allocations in these areas are signalled they are not included in the current livelihood packages.

4.4 Overall livelihood package and capacity to meet agreed targets

FAQ: Is the overall livelihood package for relocated villages on the Nakai Plateau capable of meeting agreed targets?

Review Team Assessment: There are considerable uncertainties about the viability of the overall livelihood package and its ability to meet income targets.

4.4.1 Summary statement

The livelihood modelling provided in the Social Development Plan indicates that many households may not meet the income targets set out in the Concession Agreement. Those that do reach income targets are often heavily dependent on livelihood options that are “unknown in terms of productivity” (SDP 19:23). Overall, agricultural cultivation plays a modest role in the livelihood packages, despite the fact that all resettlers are subsistence farmers.

4.4.2 Income targets

The Concession Agreement sets out various income targets for the resettled villagers. Household income targets are to be achieved within four years of relocation while village income targets are to be achieved within 7 years of relocation. In its detailed analysis of livelihoods six years after relocation the Social Development Plan has used the village income target, that is an average of USD207 per person.

4.4.3 Overall livelihood modelling

The Social Development Plan provides detailed income calculations based on a wide range of livelihood scenarios embracing various household sizes and various combinations of agricultural and non-agricultural activity. 110 scenarios are considered for Year 6 following relocation. Of these 26% do not meet the income targets. A detailed analysis of the livelihood modelling highlights several key issues.

Agriculture (including livestock) makes a limited contribution to meeting income targets. If only agricultural income is considered only 19% of the household scenarios meet income targets.

The full livelihood packages are particularly inadequate for “average” and “smaller households”. These households make up 55% of the population. For average households (6 members) income targets are not met in 16 of the 22 livelihood scenarios. For the smaller households (4 members) incomes are below target in 12 of the 22 scenarios.

The livelihood scenarios for large and larger households are heavily dependent on income from business/craft and permanent forest labour. Contributions from these activities range from 54 to 77% of total household income. There are uncertainties about both of these income sources.

4.4.4 Agricultural component

As discussed previously there are considerable problems with the agricultural livelihood options. Agriculture may make an even more modest contribution to income targets than indicated by the scenario modelling if yield assumptions are not met or if farmers revert to rice cropping rather than the production of cash crops.

4.4.5 Livestock component

The Social Development Plan specifies that each non-livestock holding household would be allocated two large livestock (SDP 21:2). This is an important component of the livelihood scenarios for average, smaller and small households where it makes up, respectively, 18, 23 and 28% of total income. Several issues relating to this livelihood component warrant consideration. (1) The Social Development Plan indicates that almost 60% of households currently own no large animals (SDP 11:19). The viability of these households effectively managing large livestock after resettlement is not explored in detail. Nor has the social and

technical rationale underlying high levels of non-ownership been explored. (2) Inundation would greatly reduce the area available for livestock grazing. Sustainable management of anticipated livestock numbers appears dependent on a comprehensive program of fodder improvement, however, this is constrained by the low level of soil fertility (SDP 21:34). (3) Given that over 500 currently non-owning households would be allocated two large animals there would be a substantial increase in current livestock numbers unless the herds of large owners are reduced. Given fodder constraints, this is signalled as a possibility, but the social viability of this action is not explored nor is compensation proposed. It is important to note that large livestock owners are commonly members of village elites (SDP 14:11). The possibility that these large operators would monopolise the best and most convenient grazing areas, posing further difficulties for new livestock owners also needs to be considered. Further, the possibility that allocated livestock would soon be acquired by large operators as a result of purchase, foreclosure or other social mechanisms needs to be considered.

4.4.6 Fisheries component

The Social Development Plan envisages the establishment of a reservoir fishery and households would be assisted to become involved in subsistence and commercial fishery. Overall the livelihood modelling suggests that fisheries would contribute an average of 13-14% of income in average larger and large households (who are expected to become involved in commercial fishing) and 4% in smaller and small households (subsistence fishing). Estimates for fisheries yield appear reasonable, based on comparison with other reservoir fisheries in Laos and Thailand. However, the International Advisory Group noted in its second report that it "remains to be convinced that the reservoir area would sustain the larger fishery being predicted by NTEC" (18).

4.4.7 Forestry component

The Nakai Plateau Village Forestry Association has been established. It is proposed that the NPVFA would harvest up to 600 cubic metres from 5,590 hectare of production forests (SDP 22:3). Revenues are estimated to be sufficient to support a USD100 annual dividend to each household. Forestry activity is also estimated to provide 411 temporary jobs and 105 permanent positions for resettled villages (SDP 25:20). Most of the resource is lower value pinewood and other low-density hardwoods, partly as a result of previous logging of better quality tree species. (SDP 23: 22). Given low values (and government taxes) sale of logs is not viable. It is proposed that the pine be milled and chemically treated (SDP 23:23). Special tax rates would be negotiated with GOL (SDP 23:25). At this stage the NPVFA has not yet obtained a logging license (SDP 15:1). It is important to note that income from forestry labour is included in the livelihood scenarios covering 729 households. This seems to exceed the total number of positions available, as the Social Development Plan itself indicates (SDP 25:18).

4.4.8 Business and craft component

The estimates for the level of local business activity appear ambitious: 79 small shops, 12 pharmacies, 30 small restaurants, 12 blacksmiths, 40 tailors, 12 bicycle and tyre repair shops, 12 engine repair shops and 119 basket and mat making enterprises. These estimates are based on figures of number of households per business unit, though no justification for these figures is provided. Half of the livelihood scenarios for larger and large households are heavily dependent on income from these sources. If the business/craft component is removed from these scenarios they all fail to reach income targets.

4.4.9 What if resettlement objectives are not met?

It is important to note that the income targets (for “stability” scenarios) used in the Social Development Plan are village income targets. The Social Development Plan indicates that not every household in the village is expected to reach this target that is an average for the whole village. However, it does state that “no person or household would experience a level of income below the National Rural Poverty Line” and that no household would fall below their pre-relocation income level (SDP 25: 4). The Concession Agreement provides for a review (at the end of the resettlement implementation period) by the Panel of Experts to determine if resettlement objectives have been met. If the Company is unable to demonstrate that the objectives have not been met then the GoL may require an extension of the resettlement implementation period and that Panel of Experts’ recommendations be implemented at the Company’s cost (Concession Agreement Schedule 4 Part 1 2.3 and 2.4). Note that the NTPC web site states that “rice supplements would also be provided in the first few years, as a safety net, but at no time would the Government or NTPC actually supplement incomes.” There is also a grievance procedure with villagers able to appeal to the Village Grievance Committee, the District Grievance Committee and then the Provincial Court (SDP 8:16).

4.5 Downstream, mitigation measures/compensation

FAQ: Is the compensation package for downstream social impacts adequate?

Review Team Assessment: Development of the compensation package is at an early stage. Some problems are identified, particularly in relation to downstream flooding and compensation for riverbank gardens. These issues need to be addressed if a viable compensation program is to be put in place.

4.5.1 Summary statement

Overall the Social Development Plan provides a flexible and adaptive compensation package to deal with downstream social impacts. A budget of USD14 million is proposed, though the Concession Agreement makes provision for only USD1.5 million. The key limitations in the compensation package are (1) the lack of any provision for compensation for increased downstream flooding and (2) some need for further consideration of compensation issues in relation to riverbank gardens.

4.5.2 Fisheries compensation

The Social Development Plan estimates that the annual reduction in fish catch on the Xe Bang Fai would amount to 731,838 kg valued at USD585,471 (SDP 32: 8). A multifaceted compensation framework is proposed which sets out a range of compensation options: aquaculture development (“fish for fish”); livestock development (“protein for fish”); and improved fisheries management. Some initiatives would be piloted prior to dam operations to enable fine-tuning of the compensation program. Compensation would be provided, over an estimated 9 year period, in the form of investment in alternative production, first year operating costs for these investments, technical assistance and monitoring (SDP 40: 15). The overall budget for the fisheries program is USD10 million of which USD7.4 million is budgeted for direct compensation (investment and operations). It would be important to monitor the ability of these compensation programs to provide for a similar level of equity to that provided by current fishing practices.

4.5.3 Riverbank gardens

The Social Development Plan estimates that about 206 hectare of riverbank gardens would be impacted, though provision is made for more detailed studies (SDP 41: 8). In the framing of the compensation budget it is assumed that 50% of these gardens “can be re-established on land currently in possession of the affected villagers” (SDP 40: 16). This seems to imply that no compensation would be provided for 50% of the gardens. For the other 50% new land would be purchased. Additionally irrigation systems would be extended or developed for all re-established gardens. The total budget for land acquisition and irrigation extension is estimated at USD633 thousand. Several issues appear to warrant further consideration. (1) Riverside gardens are often particularly productive given annual replenishment of soil as a result of sediment deposits. Quality, rather than quantity, is the key. As such the adequacy of “one for one” compensation needs to be assessed, preferably in the light of detailed studies of yields and incomes. (2) There may be some important gender implications. Riverbank gardens are often managed by women (and children) and their replacement with “standard” agricultural land may amount to some lessening of the role of women in agricultural management and crop choice. (3) The nutritional implications of a possible reduction in riverside vegetable production need to be assessed.

4.5.4 Domestic water

Where villages are impacted by a reduction in water quality (as a result of reservoir biomass breakdown or increased turbidity) compensatory water supply in the form of town water or wells would be provided. A detailed survey would be undertaken prior to scheme operations to “decide on the best way and best system to address this problem” (SDP 40: 18). Concerns have been expressed about arsenic content in groundwater. In response NTPC has indicated that there is no history of arsenic in the Xe Bang Fai region but that, nevertheless, the situation would be carefully monitored (NTPC News Release 16 December 2004).

4.5.5 Cross-river access

High dry-season flows would impede cross-river access for some villagers. Mitigation measures would include the purchase of canoes (with long-tailed motors) and some bridge construction.

4.5.6 Riverside structures

Riverside buildings of low value would be relocated. Budget provision is made for purchase of land and construction costs. Irrigation pumps that may also be affected by riverbank erosion would be relocated. River bank protection works would be undertaken to protect three culturally significant temples (SDP Annex 40-1). Whether or not the proposed length of these works is sufficient for full protection appears to require further investigation.

4.5.7 Flooding

No compensation is envisaged for increased flooding, based on the premise that carefully timed shutdown would mean that the project would make no contribution to over-bank flooding. This appears to be a high-risk assumption for several reasons. First, the “shut down” trigger is based on the likelihood of flooding in the upper-reaches of the Xe Bang Fai. However, there are indications that there would be some increased flooding impacts in the lower and middle reaches of the river (SESIA: 27). Second, the viability of shutdown to cover extended flood periods is unknown. The specific provisions relating to shutdown in the Power Purchase Agreement have not been released. The downstream area of the Xe Bang Fai is a very important rice production area.

4.5.8 Compensation financing

The overall Social Development Plan budget for downstream impact mitigation and compensation is USD14.5 million. However, the Concession Agreement only identifies USD1.5 million for the Xe Bang Fai. This raises the issue of enforceability in relation to the budgeted amount. (The Project Information Document for the World Bank's USD20 million NTSEP indicates that funding would not be provided to support Xe Bang Fai costs.) There is also the issue of the additional funding that would be necessary if the current impact and compensation estimates prove inaccurate.

4.6 Impacts in watershed biodiversity area and mitigation measures

FAQ. Have the potential social impacts in the Nakai Nam Theun-National Biodiversity Conservation Area (Nakai-Nam Theun National Biodiversity Conservation Area) been adequately assessed and are proposed mitigation measures appropriate?

Review Team Assessment. The SEMFOP provides a flexible and adaptive framework for dealing with social impacts in the Nakai-Nam Theun National Biodiversity Conservation Area, though capacity and commitment would be key challenges.

4.6.1 Summary statement

There are around 5,000 people resident in the Nakai-Nam Theun National Biodiversity Conservation Area. These people are likely to be indirectly impacted by the NT2 project as a result of restrictions on resource access arising out of watershed protection and biodiversity conservation initiatives. The SEMFOP sets out a framework for wide-ranging conservation and community development activities to be implemented in a participatory manner in the Nakai-Nam Theun National Biodiversity Conservation Area. The development package appears to provide adequate compensation for any resource use restrictions.

4.6.2 Baseline data

Several studies over the past decade have assisted in the compilation of reasonable baseline data on culture and livelihoods in the Nakai-Nam Theun National Biodiversity Conservation Area. The SEMFOP acknowledges that this data collection is still at a preliminary stage and proposes a range of participatory processes for further information collection and analysis.

4.6.3 Shifting cultivation

While there is considerable emphasis on "stabilisation" the SEMFOP takes a balanced approach to shifting cultivation recognising that not all forms of shifting cultivation are environmentally degrading.

4.6.4 Conservation and community development

The overall framework set out in the SEMFOP is the Participatory Integrated Conservation and Development approach which provides for the use of a range of participatory methodologies in the implementation of conservation and development initiatives. The framework appears to be sufficiently flexible and adaptive to respond appropriately to local issues.

4.6.5 Possible impacts from resettlement area

Given doubts about the viability of the proposed livelihood package for the plateau resettlement area there are real risks that resettled villagers would place resource pressures on the Nakai-Nam Theun National Biodiversity Conservation Area, increasing competition with villagers already living there.

4.6.6 GoL Ownership

The key weakness of the SEMFOP is that it reads very much as a plan put together by foreign organizations based on objectives (biodiversity conservation) and approaches (a bewildering array of participatory acronyms) that may have limited support or understanding in key areas of GoL. Clearly the recruitment and training of appropriately skilled and committed people to the Watershed Management and Protection Authority would be a key challenge.

4.7 Adequacy of treatment of other social aspects

FAQ: Have the other social aspects of the project been dealt with adequately?

Review Team Assessment: Though there are some weaknesses in other social aspects of the project, overall their treatment is adequate.

4.7.1 Consultation program

There has been an extensive consultation process undertaken with the various stakeholders. As in any such process there have been imperfections but, overall, the process is probably as good as could be expected given political, cultural and capacity constraints in Laos. The point made by some critics that the consultation has focused on the resettlement, compensation and mitigation packages—rather on the decision to build the dam itself—is reasonable. However, it is somewhat difficult to envisage how “free prior and informed consent” (to use the World Commission on Dam’s term) could have been meaningfully obtained given the scale and complexity of the project, variety and number of stakeholder and the multiple trade-offs involved in making an informed decision.

4.7.2 Project lands

In addition to those displaced by the reservoir there would be a number of people whose houses and/or agricultural land would be affected by various project components (particularly saddle dams in the vicinity of Oudomsouk). To date, a resettlement framework rather than a resettlement plan has been prepared (SDP 43:2). Stage 1 of a baseline study of these project-affected people has been completed based on satellite imagery. The Social Development Plan sets out a detailed methodology for stage 2 of this baseline study and for the development of compensation agreements that would be consistent with entitlements set out in the Concession Agreement. Overall, the management of these issues is at an early stage (necessarily so, as detailed impacts would not be known until construction plans are finalised) but the overall framework appears reasonable.

4.7.3 Construction period impacts

Considerable social challenges would emerge in the construction period with a substantial influx of workers and camp followers. There would be three main construction camps: the Nakai River (the dam itself), the camp in Oudomsouk township (saddle dams, diversion structures), the camp

at Gnommolat (power station). The Nakai site is remote, while the other two are close to current settlements. Overall, it is estimated that the peak labour force would amount to 4,200 (SDP 44: 11). There are also expected to be large numbers of camp followers. The Social Development Plan's most probable scenario is that there would be around 6,000 camp followers, with a worst-case scenario of over 10,000 (SDP 44: 12-13). The overall effect would be substantial, "with populations at least doubling in the vicinity of Oudomsouk and Lak Sao and increases by almost 4 times in the Ban Gnommalath area." (SDP 44: 13). The SDP states that "It is clear that the existing social environment within the primary impact area have virtually no social carrying capacity to absorb and service the estimated workforce and camp followers." (SDP 44: 15)

4.7.4 Mitigation of construction period impact

Only preliminary work has been done in relation to the management of social impacts during the construction phase. The Head Contractor is preparing the Head Construction Contractor's Environmental Management and Monitoring Plan and NTPC (with the GoL) would prepare a Spontaneous Resettlers Plan. Key components of construction period management include a local labour recruitment policy (with 1,610 of the peak labour force of 4,200 to be locally recruited) and integration of camp management with town planning processes in Oudomsouk and Gnommalath. The Resettlement Management Unit has also prepared a Camp Follower Management policy and decrees would be issued by the relevant provincial Governors on the basis of this policy. A draft decree attached to the SDP makes provision for regulation of settlement, business activities, health, sanitation, construction, vehicle registration etc. Construction workers would also be banned from participating in hunting, fuel gathering or the collection of forest products, though how effective such bans would be is open to question. One weakness of current planning is that attention is not given to the local resource pressures that could arise if a proportion of this construction population remains in the area. There are some protections for resettlement villagers (such as restrictions on the sale of land for a period of 8 years—SDP 19: 32) but these may not be effective in preventing informal transfer and expropriation. There may also be a degree of inter-marriage—with its associated settlement and migration—and the demographic implications of these have not been considered. This is an important issue given significant resource constraints in the resettlement area.

4.7.5 Health planning

A detailed health impact assessment has been undertaken which has formed the basis for the development of a Resettlement Health Program and a Regional Health Program. These programs are the responsibility of the NTPC but are based on supporting and enhancing the capacity of village, district and provincial health service providers. A Program Management Unit based in the provincial health office would coordinate both programs. A detailed surveillance and monitoring program is proposed. Specific activities are proposed for the prevention and control of sexually transmitted infections. The key weakness of the health planning is the lack of a clearly identified budget and the possibly ambitious assumption that "the Ministry of Health assures the required staff both in number and by qualifications" (SDP 5: 63).

4.7.6 Human Trafficking

Some concerns have been expressed about the impact of NT2 and associated construction works (and improved access) on human trafficking. This is a complex issue that has been addressed briefly in the Social Development Plan. There are some risks that social disruption and improved access may increase cross-border movement (some of which may be classed as "trafficking") from districts close to the dam and also some danger of more localised trafficking to cater for services industries generated by the construction workforce. To address these issues a program based on monitoring at some likely destination points within Laos and an information

program is proposed (SDP 44: 16-17). Villages may also be assisted to join the “anti trafficking network” that is already active in the region (SDP 44: 17).

5 GoL CAPACITY

5.1 Introduction

Under the BOOT arrangements there is confidence that the dam and hydropower facility would be constructed and operated as specified in the contractual documentation governing these aspects.

It is GoL's capacity to implement other aspects of NT2 that is of more concern to both NT2 proponents and opponents. These aspects relate to the capacity of GoL to provide the staffing and other resources needed to meet the demands that would be imposed under the management arrangements to be put in place for the Nakai-Nam Theun National Biodiversity Conservation Area, the Concession Agreement, and to manage its revenue collections and public sector expenditure.

The concerns also extend to the maintenance of GoL's commitment and willingness to continue the efforts needed after the loans and partial risk guarantees are approved (if they are approved), and in the face of impacts that call for adjustments to planned (specified in the Concession Agreement) mitigation and compensation efforts in the light of implementation.

These concerns are significant, however, they are associated with unprecedented efforts to gather (notably the WCD and stakeholder concerns) and apply world-best-guidelines and practices to identify and overcome recognised weaknesses. Where the weaknesses can only be alleviated over protracted periods of time programs that seek to do this have been devised and advised by NTPC (reference the Nakai-Nam Theun National Biodiversity Conservation Area management program, the resettlement program and the program to mitigate adverse downstream impacts on fisheries). NTPC has also published the raft of NT2 planning and design adjustments made in response to stakeholder concerns. GoL has published its admittedly ambitious NGPES. There has been strong support in the form of the WB and ADB project preparation assistance and the selection of their pipelines for future assistance. There is also the technical assistance and guidance provided by the IMF particularly with regard to spelling out the central role more effective GoL revenue collection and public sector expenditure management has to play in poverty reduction and placing NT2's role in poverty reduction in perspective.

The elucidation of national strategies for poverty reduction, for which the key document is the NGPES, highlights the importance of NT2 in contributing to overall economic growth and GoL revenues. However, NT2's contributions would not be sufficient on its own for Lao PDR to realise, for example, its Millennium Development Goals. NT2 does, however, provide a vehicle that has already called forth a level of GoL commitment and willingness that has produced an enormous and perhaps unprecedented effort in developing environmental management, and mitigation and compensation plans for the various affected people. If implemented it provides an opportunity to continue this and make an important contribution to future GoL revenue collections, environmental protection and social livelihood and equity issues.

The Review team concludes that while capacity concerns remain the NT2 preparation has provided a timeframe, a platform, the resources and (if the loans and partial guarantees are approved) an environment in which these concerns would be acknowledged, can be better identified, addressed and progressively rectified.

5.2 Environment

FAQ: Can GoL continue the sustainable management of NT2 safeguards?

Review Team Assessment: Past performance is not encouraging but enormous efforts to put the lessons learned in to practice are equally and positively impressive. With 5 to 25 years to further refine the reality of sustainable management. There is also an on-going development aid community interest in helping Lao PDR succeed, and NT2 provides a good opportunity to test the practicalities of the concept in a developing country.

5.2.1 Summary statement

On past records of performance this question must be asked. The answer is dependent on whether the measures to be put in place under the Concession Agreement can: build the institutional strength required over the next 5 to 25 years and beyond; and attract additional support from other donors including on-going WB and ADB assistance. With NT2 the safeguards are at least in place against which GoL's capacity to sustainably manage them can be monitored and any shortfalls recognised and addressed to the extent GoL (with donor assistance¹³) is able and prepared to marshal and allocate the required resources.

5.2.2 Compensation for Nam Theun-Hinboun Dam

The government has no demonstrated capacity to develop strategies or plans. There has never been any analysis of how the resources of the area could be managed to balance watershed protection and enhance livelihoods while avoiding the serious negative impacts expected from NT2.

Although declared and gazetted, National Biodiversity Conservation Areas are not protected by the GoL and are subject to high levels of illicit and unplanned logging. This raises the question of whether the NT2 watershed and Nakai-Nam Theun National Biodiversity Conservation Area can be protected. The reservoir area was clear cut by Bolosat Pattana Khet Phou Doi (Mountain Area Development Company – a military logging company that according to a report by Probe International 2002 has commercial interests in over-logging / unsustainable logging).

With resettlement and increasing demands for livelihood uses on the infertile / unproductive plateau, and better access routes, and as the Nakai-Nam Theun National Biodiversity Conservation Area lies on an international border, human pressures on the area can be expected to increase. Protection status has been ensured by remoteness and poor access, not by good management. The likelihood of sustained protected area management of the extensive area by national authorities after the 25 year support project must be questioned.

Biodiversity conservation appears to bear little relationship to watershed protection. Although the rationale for the Nakai-Nam Theun National Biodiversity Conservation Area is to protect the watershed, and minimise sedimentation to the reservoir, this is not demonstrated.

The resettlement of as many as 5,000 people in the area would have a major impact on natural resources – especially as the soils are infertile, and subsistence agricultural potential is limited. Large swidden areas, unsustainably short fallow periods and exploitation of local wildlife are likely to result.

¹³ The bilateral (including AusAID) and NGO communities have a wealth of experience that can be brought to bear on most of these areas of concern and on a case by case specific basis may be encouraged to do so.

The reservoir area was logged several years ago, so vegetation cover should prevent sedimentation during filling.

WB (2004) notes that legislation, policy and practices are poor in terms of land capability assessment, agricultural management, forestry and mining.

Environmental Defence, 2004, questions GoL's capacity and political will: the record with WB and IMF projects is poor, inadequate pro-poor policies, poor governance with other dams (environmental and social impacts from Nam Mang 3, Houay Ho, Nam Son, Nam Leuk, Theun-Hinboun have caused significant environmental and social damage), multilateral bank safeguards were not implemented effectively.

NGO's believe decommissioning costs of USD300 million need to be included in use of revenue. The life-span of the dam would exceed the license agreement (25 yrs) so this is a GoL issue, but it does not appear to have been considered (see Section 2.2.7).

Given identified needs and past observations, biodiversity/environmental conservation is unlikely to receive priority status for training requests, nor in the allocation of sparse national budgets, even with increased income from power sales.

There is a set of performance criteria against which governance can be monitored. The GoL has indicated it would sign the Letter of Development Policy that:

- Articulates commitment to SEMFOP and to assuring the integrity of Nakai-Nam Theun National Biodiversity Conservation Area;
- Reasserts commitment to controlling immigration into the reservoir area;
- Confirms intention to implement complementary capacity building activities;
- Covers issues not in the safeguard documents (ethnic minorities in the watershed, impacts below Theun-Hinboun dam);
- Describes mechanisms for independent monitoring and evaluation;
- Describes mechanisms for stakeholder consultation; and
- Articulates a vision for further development of the power sector and regional energy and conservation agenda.

Countries with riparian rights to the Mekong River have been notified and none have expressed an objection to NT2.

5.3 Social

FAQ: Does GoL have the capacity to provide the support needed to implement the requirements of the Concession Agreement?

Review Team Assessment: The team believes there maybe some shortfalls in the relocation package technical assessment and budgetary support. There may also be a need for some additional downstream impact compensation which has not as yet been budgeted. However, as with environmental aspects of this capacity concern, the enormous efforts to meet WB and ADB safeguard requirements are impressive. With 5 to 25 years to implement the various

requirements of the Concession Agreement, underpinned by the Panel of Expert's role as arbitrators being coupled with the right to call for additional resources from NTPC (and an on-going development aid community interest in helping Lao PDR succeed in achieving what needs to be done) NT2 provides a good opportunity for GoL to go very close to meeting the Concession Agreement requirements.

5.3.1 Summary statement

Given past records of performance the capacity to implement social safeguards is dependent on whether the measures to be put in place under the Concession Agreement can: build the institutional strength required over the next 5 to 25 years and beyond; and attract additional support from other donors including on-going WB and ADB assistance. With NT2 the safeguards are at least in place against which GoL's capacity to sustainably manage them can be monitored and any shortfalls recognised and addressed to the extent GoL (with donor assistance¹⁴) is able and prepared to marshal and allocate the required resources.

Clearly Laos has very limited capacity for the assessment and management of social impacts arising out of development projects. One indicator of this is the extraordinarily low number of people in key government agencies with social science qualifications.

Commentary, by both NGOs and funding agencies, on other dam projects in Laos suggests that the social impacts of previous hydroelectric projects have not been dealt with adequately.

The World Bank is developing a Lao Environmental and Social Project "to strengthen GoL's overall regulatory, management and enforcement capacity in environment and resettlement at the national and provincial levels, and biodiversity conservation in protected areas, with special focus on Central Lao" (World Bank Aide Memoire May 17-18, 2004).

The ADB report on "Capacity building for Environmental and Social Mitigation for NT2" underlines limits on existing capacity, especially in relation to management of social issues. It also highlights the significant staffing demands (in some cases in excess of existing staffing) that would be made on GoL agencies to implement the various provisions of the social and environmental plans (21, see also Social Development Plan 7:1). The report makes the key point that capacity building initiatives from previous infrastructure projects are "seldom institutionalised beyond the design and construction of the project." (23). It proposes a training and mentoring program to address capacity issues. A draft TOR for implementation of this capacity building program is proposed. The report also suggests that the Australian Development Scholarships scheme is "potentially very valuable to NT2 CB [capacity building] program."

The NTPC itself proposes a range of capacity building and staff training activities (SDP 7).

Schedule 4 (Part 1) of the Concession Agreement sets out the company's commitments in relation to the social component. The key summary table at section 15.6c sets out the "Summary and Limitations of Company's Funding Obligations" The total comes to about USD44 million, most of which is used up by the Plateau Resettlement (USD37 million). Note that in this table only USD1.5 million is allocated for Xe Bang Fai "entitlements" (budget items j and k).

The Concession Agreement (30.7(e)) makes provision for an "overrun allowance" of USD2.5 million where "limited by cost" social and environmental objectives have been underestimated

¹⁴ Bilateral (including AusAID) and NGO communities have a wealth of experience they can bring to bear on most of these areas of concern and on a case by case specific basis may well be encouraged to do so.

and section 30.9 makes USD10 million provision for “unanticipated project impacts.” There are also insurance provisions.

As such some provision is made for social (and environmental) contingencies. But it is important to note that total social and environmental measures are currently costed at USD89 million (SESIA: Table 15). The SESIA notes that this is “an increase of approximately USD54.8 million from the budget presented in the 2002 Concession Agreement.” As such, more than half of the proposed social and environmental expenditure does not appear to be covered by the provisions of the current Concession Agreement. The inclusion of these amounts in the relevant social and environmental plans does amount to a “commitment” but the legal status of this commitment is somewhat unclear.

The bilateral (including AusAID) and NGO communities have a wealth of experience that can be brought to bear on most of the aspects of concern and on a case by case specific basis may well be encouraged to do so.

5.4 Revenue Management

FAQ: Would NT2 make a significant contribution to poverty reduction and if so would GoL’s public expenditure management and capacity to manage the revenues generated enable this contribution to be realised?

Review Team Assessment: NT2’s contribution to GoL’s revenue collections would be significant but on its own not sufficient for Lao PDR to realise, for example, Millenium Development Goals poverty targets for Lao PDR. IMF projections suggest the combined contributions to revenue contributions of the hydroelectricity and mining sectors would be largely offset by a decline in customs revenues as a result of tariff reductions under the ASEAN Free Trade Arrangements. Hence, the bulk of the net increase in revenues over the medium term would therefore have to come from reforms to broaden the tax base and improve revenue administration nationally.

5.4.1 Summary Statement:

Given the limited institutional capacity existing in Laos a constructive strategy to ensure that NT2 revenues are spent in poverty reduction is to assist in improvement of expenditure of all government revenues. This requires continual strengthening of public financial management and governance, of public program implementation, of natural resources management and environmental protection. Multilateral and bilateral programs can target these areas with or without the NT2 project.

The World Bank is currently working with GoL on both general public expenditure management and NT2 specific revenue management (WB Aid Memoire May 17-18 2004).

The NGPES highlights the importance of NT2 in contributing to overall economic growth and GoL revenue. The IMF and IDA, Joint Staff Advisory Note, on this document makes some key points:

- “Capacity constraints, weak governance, and a difficulty translating strategic objectives into concrete actions, are the main obstacles to the reform process.” This is described as a “serious risk” (Point 3).
- “While the NGPES highlights the importance of these two sectors [hydroelectricity and mining], more work is needed to establish a transparent and clearly defined

framework governing the investment decisions in these sectors and manage the public revenues that they would generate.” (Point 18)

- “Successful implementation of the NGPES would depend on improving the effectiveness of public expenditure management.” (Point 23)
- “Achieving sustained improvements in social outcomes would require bold steps.” (Point 26)
- “More resources need to be directed to education and health, redirecting limited resources to ensure greater access of the poor to quality basic services.” (Point 27)
- “The NGPES proposal to use ‘focal sites’ as a means of delivering more efficient services, stabilizing shifting cultivation, and reducing poverty, needs to be reviewed in light of implementation.” (Point 28) This is a reference to real concerns about the impact of GOL action in resettling upland populations.
- “The NGPES acknowledges that substantial capacity building efforts would be needed.” (Point 31).

6 COMPLIANCE

6.1 Introduction

NT2 is compliant with the Operational Policies and Bank Procedures of the WB and ADB and in particular meets all safeguard requirements. It meets the requirements for Australian support. However, it has not fulfilled all WCD recommendations.

6.2 Economics

FAQ: Is NT2 technically sound and economically, financially and commercially viable ?

Review Team Assessment: Yes

6.2.1 Summary statement

With respect to economic assessment of micro and macro economic impacts, social impacts, environmental impacts, contractual and financial risks, risks stemming from market impacts and institutional capacity together with examination of potentials for the project to contribute to poverty alleviation NT2 is compliant with the requirements of the WB and the ADB and it meets the requirements for Australian support. With respect to economics and financial aspects, it is hard to be anything but positive about the project.

6.3 Environment

FAQ: Have NTPC fulfilled all WB and ADB environmental requirements for a large dam proposal?

Review Team Assessment: Yes

FAQ: Are there Australian environmental legislative or policy constraints on support for the NT2 dam?

Review Team Assessment: Yes under specific circumstances.

FAQ: Given the Lao PDR Australia Development Cooperation Program and if Australia supports the Lao PDR requests for loans and guarantees would this require referral under Australia's Environmental Protection and Biodiversity Conservation Act?

Review Team Assessment: No

FAQ: Does NT2 fulfil all WCD recommendations?

Review Team Assessment: No

6.3.1 Summary statement

There appears to be no Australian policy requirement that WCD guidelines are followed, however, Australia supported the WCD process and endorsed the findings of the WCD report. The Department of Environment and Heritage requested confirmation that all WCD recommendations have been met in the NT2 proposal. This is not the case.

The WB has stated that the WCD produced guidelines not prescriptive recommendations. The WCD does not have any legal status but is a document considered useful, and lessons learnt and recommendations have been taken into consideration in the safeguard documents.

Lahmeyer in a 2001 response for ADB to questions on the original NT2 documentation addressed WCD core values and chapter recommendations, but provided reasons for not covering them all, or addressing all the recommendations systematically. These are summarised in the table below.

| WCD recommendation | NT2 compliance issue (source) |
|--|--|
| Grouped general recommendations | |
| Multi-criteria assessment to screen and select (on policy, program and project alternatives) the preferred option from the full range of identified alternatives | Lahmeyer (1997) study commissioned by WB addressed options for how Lao PDR could meet its commitments to provide electricity to Thailand, but did not consider other options for utilisation of water or other natural resources. Did not address watershed protection or livelihoods issues (International Rivers Network, IRN, 2000) Lahmeyer (2001) notes that all inputs and issues need to be clarified and agreed in advance and GoL should support local communities in this. |
| Stakeholders participate in project design and negotiation of outcomes that affect them. Indigenous people give free, prior, informed consent – with timely access to information, legal, and other necessary support | IRN (2000) claims this has not been fulfilled. Lahmeyer (2001) notes that GoL should support local communities in this. That consent should be obtained at village level to avoid outside interference. |
| Strategic impact assessments would be undertaken. | Intersectoral studies should be the responsibility of the GoL (Lahmeyer 2001), the objective of total integration of technical, environmental, social, economic and financial disciplines should be emphasised but the costs are prohibitive for a developing country. Suggest review by Panel of Experts is sufficient. |
| Risks identified, articulated and addressed explicitly, and involuntary risk-bearers provided with legal means to engage equitably with risk-takers, with collective process to identify what are acceptable risks | International Rivers Network (2000) claims fisheries, livelihoods risks not assessed, and no opportunities have been provided for “involuntary risk takers” to participate in decisions. Acknowledged climate change risks are not assessed, but infrastructure can be modified (Lahmeyer 2001) |
| Outstanding social and environmental issues associated with existing large dams identified, assessed, and remedied with community supported mechanisms, and environmental impacts from past projects evaluated and incorporated into needs assessment. | Nam Theun-Hinboun Dam (50 km downstream) ADB-funded, completed 1998 has had impacts on livelihoods of 25,000 people downstream. Claims of reduced fish catches, destruction of vegetable gardens, reduced dry-season drinking water, transport difficulties. Compensation not yet paid. (several reports including IRN review 2000) |
| Recommendations specific to construction stage | |
| Avoidance of major impacts | The Lahmeyer 2001 update advocates multi-criteria analyses rather than simple “avoidance” of major impacts. |
| Maintaining productive fisheries and Providing fish passages for all dams | Maintaining fish productivity is unlikely in the Nam Theun, but fish populations in the Xe Bang Fai may increase. The fisheries studies underway for the project are to produce baseline information and monitor change, they are not management models, or studies to test alternative fisheries management. Lahmeyer 2001 suggests fish passages are inappropriate for NT2 as the downstream Theun-Hinboun dam is already an obstruction to fish, and fish passing the NT2 dam structure would then have to negotiate 70 km of lake – an |

| | |
|--|--|
| | environment to which they are unlikely to be adapted. |
| Including climate change impacts (Greenhouse Gas, GHG, assessments and carbon, C, change inputs) | Not considered, and regarded as unknown, so suggest (Lahmeyer 2001) infrastructure modifications if necessary. GHG emissions and C would not be measured unless there are C credits available. |
| Agreed operating rules | Need to follow the contract agreement, so not always negotiable (Lahmeyer 2001). |
| Independent social and environmental impact assessments | Claimed this is covered by having contracted experts, then review undertaken by a Panel of Experts (Lahmeyer 2001). |
| Economic risk assessment for hydrological change | A 50 year scenario was investigated in which dry season flows were gradually reduced to half their historic average (Lahmeyer 2001). It gave 0.5% reduction in present value of benefits. This may not be sufficient. An issue of more concern should be increased flows in the Xe Bang Fai, and whether the compensation proposed is adequate for the hydrologic impacts that would occur. |
| Test flow and quality scenarios against ecosystem responses | All modelling was on real use assumptions – 2 m ³ s ⁻¹ spills to the downstream Nam Theun and significantly increasing flows in the Xe Bang Fai. |
| Panel of Experts to have at least one host country national and one member supported by the Project Affected People. | There is no national representative on the panel. Panel of Experts comprises “3 world renowned experts, all foreign”. They are accompanied by a local expert in resettlement and by local people. |
| Lifecycle analysis | Not considered appropriate (Lahmeyer 2001). Decommissioning cost of USD300 million needs to be included in use of revenue. The life-span of the dam would exceed the license agreement (25 yrs) so this is a Lao PDR issue. (See Section 2.2, this Review) |

• Figure 2 ADB assessment of NT2 compliance with WCD guidelines

6.4 Social

As far as social impact issues are concerned there is broad compliance with the various WB, and ADB policies and WCD guidelines. However, there are two specific problematic areas: the extent to which the Nakai Plateau resettlement complies with some specific provisions of the WB Operational Policy 4.12 (OP 4.12) and Operational Directive 4.20 (OD 4.20) and the ADB policies on involuntary resettlement and indigenous peoples; and the lack of community or individual level ‘performance contracts’ as recommended by WCD.

6.4.1 WB OP 4.12 Involuntary Resettlement

It is clear that the resettlement planning for the Nakai plateau villagers has been undertaken in a way that seeks to abide by both the spirit and the content of OP 4.12. However, there are some specific areas where, despite good intentions, the resettlement plan does not appear to meet the provisions of OP 4.12.

At 6a (iii) OP 4.12 requires measures to ensure that the displaced persons are “provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.” At 6b (ii) OP 4.12 requires measures that ensure the provision of “agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.”

However, in the proposed resettlement plan a substantial (but unspecified) number of people would be allocated less land than they currently own. Similarly, all the current indications are that the land would be of a lower quality.

OP 4.12 does, however, provide for situations where “sufficient land is not available at a reasonable price.” In such cases it requires that “non-land-based options built around opportunities for employment or self-employment should be provided in addition to cash compensation for land and other assets lost.”

The resettlement plan does make provision for non-land-based options, though there are uncertainties surrounding a number of these. However, no compensation is proposed for those experiencing a reduction in land area (or quality).

6.4.2 Downstream Villages

The Social Development Plan sets out a compensation program for the loss of land and river assets. However, the budget for compensation of riverbank gardens assumes that half of them would be re-established on the owner's land. No compensation would be provided, though irrigation would be extended to the re-established fields.

6.4.3 Watershed Area

Villagers would experience some loss of access to resources. This would be planned for and managed in a participatory manner. Planned local development activities seem to amount to reasonable compensation.

6.4.4 WB OD 4.20 Indigenous Peoples

The Social Development Plan and the SEMFOP have been prepared with close attention to the provisions of OD 4.20. The one area of concern is in relation to the provision in 14(d) that "development activities should support production systems that are well adapted to the needs and environment of indigenous peoples" given the limited emphasis on subsistence agriculture in the Nakai Plateau resettlement plan (despite what appears to be a strong local emphasis on food security).

6.4.5 ADB Policy on Involuntary Resettlement

Overall the Social Development Plan and the SEMFOP comply with the ADB policy on Involuntary Resettlement. In relation to the above mentioned concerns about resettlement planning for the Nakai Plateau it should be noted that the ADB policy appears considerably looser in its wording. For example, it recommends "appropriate land" that is "comparable to the without project situation" (page 10).

6.4.6 ADB Policy on Indigenous Peoples

Like the World Bank's policy, the ADB policy on indigenous peoples calls for "viable and sustainable production systems that are adapted to the needs and local environments and circumstances of indigenous peoples." The general principle is that interventions should be "consistent with the needs and aspirations of affected indigenous peoples" and "compatible in substance and structure with affected indigenous peoples' culture and social and economic institutions." Again, the limited emphasis on subsistence agriculture in the Nakai Plateau resettlement plan (despite what appears to be a strong local emphasis on food security) seems somewhat inconsistent with this policy.

6.5 World Commission on Dams

The WCD sets out seven strategic priorities and for each of the priorities there are a number of guidelines (26 in total). The following sections consider each of the strategic priorities and, where relevant, comments refer to the specific guidelines.

6.5.1 Gaining Public Acceptance

There has been an extensive consultation process undertaken with the various stakeholders. As in any such process there have been imperfections but, overall, the process is probably as good as could be expected given political, cultural and capacity constraints in Laos. The point made by some critics that the consultation has focused on the resettlement, compensation and mitigation packages—rather on the decision to build the dam itself—is reasonable. However, it is somewhat difficult to envisage how “free prior and informed consent” (to use WCD’s term) could have been meaningfully obtained given the scale and complexity of the project and the variety and number of stakeholders.

6.5.2 Comprehensive Options Assessment

Alternative energy projects appear to have been thoroughly assessed and detailed social, environmental and economic assessment has been undertaken of the preferred option.

6.5.3 Addressing Existing Dams

The WCD states that there are opportunities to address “outstanding social issues and strengthen environmental mitigation and restoration measures” in relation to existing dams. Clearly there are a number of outstanding issues in relation to existing dams in Laos but the WCD does not appear to explicitly recommend that such outstanding issues should be addressed before new dams are built.

6.5.4 Sustaining Rivers and Livelihoods

The Nam Theun river is already compromised by the Theun Hinboun dam and will be further affected between this dam and NT2.

6.5.5 Recognizing Entitlements and Sharing Benefits

The WCD recommends “mutually agreed and legally enforceable mitigation and development provisions.” Further, it states that “accountability of responsible parties to agree mitigation, resettlement and development provisions is ensured through legal means, such as contracts, and through accessible legal recourse at the national and international level.” The Concession Agreement provides a legal basis for the implementation of mitigation and compensation measures; however, this Agreement does not include all the compensation and mitigation measures currently included in the Social Development Plan, particularly in relation to downstream communities. The WCD also recommends “performance contracts” at community and affected person level setting out entitlements, timing, obligations of the parties and recourse procedures. There does not appear to be any provision for such contracts in relation to NT2, a concern raised by the International Advisory Group in its report of April 2001. This report recommended that “the company gives early consideration to this measure, bringing them further into line with the WCD standards.” (17)

6.5.6 Ensuring Compliance

The Concession Agreement contains provisions for independent review and enforcement. However, as stated above, the Concession Agreement does not appear to include all the social and environmental measures currently included in the various mitigation and compensation documents.

6.5.7 Sharing Rivers for Peace, Development and Security

The provisions for prior notification of downstream Mekong states have been met.

7 CONCLUSIONS

Given the efficiencies of the NT2 site for hydroelectricity generation, together with the assured market, there is every reason to expect that the NT2 project would be very successful financially and that the GoL would readily cope with its financial commitment. However, NT2 is a project of tradeoffs and despite significant economic benefits, as well as some social and environmental benefits, there are significant social and environmental costs, some of which can not be mitigated.

Overall, the project benefits appear to outweigh costs, and the Review Team acknowledges that documentation and revised mitigation strategies by project proponents are continually being prepared and revised to address costs and concerns. The Review Team suggests several follow-up activities:

- To review proponent and opponent reports that are released subsequent to the completion of the review; and
- To raise key concerns with the Development Banks that include:
 - The Nakai Plateau is unlikely to support the increased pressures of the relocation package.
 - Given the likelihood that the livelihoods package is inadequate, the planned resettlement may result in increased use of resources within the Nakai Nam Theun-National Biodiversity Conservation Area. This would jeopardise its planned conservation potential.
 - Adaptive management and appropriate indicators need to be fully incorporated into the Concession Agreement. Compliant rolling milestones need to be developed to provide a moving datum against which the monitoring can: independently evaluate the progress of each Concession Agreement activity; evaluate the progress of the Government of Laos capacity building; identify and address the need, nature and cost of any corrective measures; and as necessary call on the Government of Laos to access the letters of credit to implement corrective action through the Panel of Experts.

1. Appendix A: Project Description

NT2 would dam the Nam Theun River near Ban Sop Hia, Khammouane Province on the Nakai Plateau about 150 km east of Vientiane. It would impound 195km of the river. The reservoir would have a surface area of 450km² at full supply level, a capacity of 3,910 million m³ and would flood about 40% of the Nakai Plateau but less than 100km² when drawn down. Eighty eight per cent of its catchment falls within the Nakai Nam Theun-National Biodiversity Conservation Area (Nakai-Nam Theun National Biodiversity Conservation Area). More than 5,000 people would have to be resettled on the Nakai Plateau from inundated areas and there are about 5,000 people resident in the Nakai-Nam Theun National Biodiversity Conservation Area.

Water from the reservoir would drop 350m through a tunnel to a power station on the Gnommalat Plain at the base of the escarpment, pass through a regulating pond and a 27km downstream channel into the Xe Bang Fai River. Water would also be released from the regulating pond into the Nam Katang River.

The main area to be affected by NT2 is the Nakai Plateau. NT2 would also impact areas between the plateau and the Mekong River, along the Xe Bang Fai and Nam Theun and along the alignment of transmission lines.

The power station would have a generating capacity of 1,080MW (net 1,070MW); 995MW (93%) of which would be delivered to Thailand via a 138km transmission line. Lao PDR would receive 75MW (7%) via a 75km transmission line to Thakhek although about 20MW of this (2% of 1,070MW) can be directed by existing and NT2 built transmission lines to local areas including the resettlement sites.

2. Appendix B: WB, ADB and AusAID Lao PDR activities

The loans and guarantees in the financing package for NT2 would expire in 2009 when NT2 is commissioned. Thereafter, the “appropriate covenants” mentioned below would also expire and direct WB and ADB leverage on GoL and NTPC would be dependent on on-going programs of assistance to GoL that are in place.

Current loans and guarantees include:

2.1. WB

- USD50 million (m) partial guarantee to 2009 (to help cover international commercial lenders to NT2);

1.2.1. IDA

- USD20 m NTSEP to finance GoL equity
- USD ? m partial risk guarantee (to help cover international commercial lenders to NT2)
- The operation supported by (a) (i) and (ii) would focus on the technical, economic, and managerial aspects of NT2 and ensure, through appropriate covenants on the project company (NTPC) and GoL (and hence the NTPC and GoL obligations under the Concession Agreement), that WB standards are met in regard to the implementation of environmental and social safeguards as agreed in the safeguard documents. Though the WB’s financial contribution is small, its participation is seen, both by the developers and the GoL, as critical to securing the financing package and gaining international credibility.

1.2.2. Multilateral Investment Guarantee Agency (MIGA) guarantees

- USD50 m to cover LPDR risk;
- USD100 m for Thai political risk;
- USD ? m partial risk guarantee (to help cover international commercial lenders to NT2).

1.2.3. Project and TA implementation periods that could run past 2009

Nam Theun Social and Environmental Project (NTSEP). IDA grant of USD20 million (conceived 1996 but approval and completion dates not stated) for environmental and social mitigation programs would be provided to GoL to finance GoL’s equity by supporting: (i) the implementation of the SDP, EAMP, SEMFOP; (ii) the Panel of Experts including an Environmental and Social Panel of Experts and a Dam Safety Review Panel to be employed by the GoL to monitor impacts and mitigation measures under NT2; and (iii) the independent project monitoring and evaluation arrangements.

Poverty Reduction Support Credits (PRSC) to support the Lao PDR's NGPES. These support the public management reform necessary to secure proper use of NT2 revenues. A series of PRSCs is envisaged. Presumably IDA.. Amounts, approval and closing dates not available.

Lao Environment and Social Project (LEnS). IDA. Likely amounts, approval and closing dates not available. LEnS would encourage the design of sustainable environmental and social policies and build institutional capacity to implement those policies beyond the NT2 project area. LEnS has two goals: (i) is to assist government institutions at central level and in selected provinces to improve their capacity for environmental assessment, resettlement planning, monitoring and enforcement, protected area management and raising environmental awareness; and (ii) supporting the establishment and operation of a pilot financing vehicle for protected area management in central Lao PRD, which would be scaled-up in the long term to become a permanent entity eligible to use NT2 revenues for environmental protection activities in the country.

Xe Bang Fai Rural Livelihoods Project IDA. Likely amounts, approval and closing dates not available. XBFRLP would enhance opportunities for villagers living near, but not within, the areas impacted by NT2 in the Xe Bang Fai basin to participate in the expected economic growth in Khammouane province.

1.2.4. Existing projects

- Financial Management Capacity Building Credit . IDA USD8.5 million. Approved 25 June 2002. Closes 30 April 2008. As at May 27, 2004 this credit had performed sufficiently well to enable disbursements to continue but some NGOs have pointed to WB mission supervision reports that have indicated unsatisfactory progress.
- Poverty Reduction Fund Project (PRFP) IDA USD 19.5 million. Approved 25 Jun 2002. Closes 31 March 2008.

These 2 projects are among 9 active projects in the current WB Lao PDR port folio. The overall status of the portfolio is satisfactory and the disbursement ratio was 26% (against a target of 20%) in 2004 – although a more recent WB/GoL Quarterly Portfolio meeting reported it had dropped to 22.8%.

2.2. ADB

- USD50 m guarantee for NT2 (to help cover international commercial lenders to NT2);
- USD ? m partial guarantee (for international commercial lenders to NT2);
- USD ? m loan to support GoL's equity in NT2.

New and existing WB and ADB loans, credits and grants to GoL include a series of free-standing projects and/or technical assistance. The ADB new projects include some projects and technical assistance for NT2, however, these appear to be additional to the NT2 financing arrangements.

2.2.1. New project and TA implementation periods that could run past 2009

Project's planned for 2005-2006 (US\$36.5 million total) are:

- Two sub regional projects for the NT2;

- Communicable diseases control in the border regions of the Greater Mekong Region.
- Improving transportation, infrastructure and services, including water supply and sanitation, in the northern region;
- Forest plantation for livelihood improvement and participatory livestock project;
- Developing the agriculture and natural resources sector;
- Small and medium enterprise development.
- TA grants amounting to US\$3.5 million annually focussing on project preparation, governance and capacity building, and policy development support.

2.2.2. Existing project's and TA's

TA grants include US\$700,000 (November 2004) and US\$1 million (April 2004) to GoL to prepare NT2. (These have funded the studies etc listed in 1.5, Origins and current status, Environment above).

Projects. There are 21 (ADB claims 23 but lists 21 on their website) active projects in the following sectors: 4 in Agriculture and Natural Resources ; 4 in Finance; 1 in Energy; 1 in Health, Nutrition and Population; 5 in Water, Supply, Sanitation, and Waste Management; 4 in Transport and Communications; 1 in Industry and Trade; and 1 in Education.

ADB ranks Lao PDR as “one of the region’s best performers in portfolio management. As of end-2003, 21 of 23 ongoing projects, or 91.3% of the total, were classified as satisfactory, compared to the ADB average of 85.7%. No ADB project has been classified as unsuccessful in the past five years.”

2.3. AusAID

AusAID's current country strategy for Laos¹⁵ focuses projects on capacity building, reducing the vulnerability of the poor, and promoting the growth of the market economy. Current bilateral activities include: education for minority girls co-financed with the ADB, scholarships, an agricultural project assisting small scale livestock holders, the second phase of a land titling project co-financed with the WB (2003-2008), and a NGO program. The NGO program and the agricultural project would be completed in mid-2005, as would the majority of current NGO activities.

The Australian Development Scholarships (ADS) scheme is a major bilateral component, representing approximately 26% of the bilateral flows. Through the ADS program 600 students have completed tertiary courses in Australia. A recent impact study (in 2003) found that 78% of graduates currently live in Laos and 20% are overseas (many undertaking further studies). Approximately 69% of the returned students are employed within the government system.

Regional aid flows to Lao PDR address transboundary issues including people trafficking, drug trafficking, HIV/AIDS and providing assistance to the Mekong River Commission. There are currently six Australian NGO Cooperation Program projects, five Humanitarian and Emergency activities. Australia has provided food aid assistance through the World Food Program in response to specific disasters such as floods and project specific support for household food

¹⁵ AusAID, Laos Australia Development Cooperation Program, 2004-2010

security. Other Australian Government flows include nine Australian Centre for International Research (ACIAR) activities, a recent Department of Defence Representatives (ex Hanoi) activity and a Department of Immigration, Multicultural and Indigenous Affairs activity relating to immigration and small scale border security assistance.

3. Appendix C: Project Chronology

| Year/s | Event | Comment |
|--------|--|--|
| 1969 | Lao PDR joined IUCN | & have since remained a member |
| 1970s | Identification | By Mekong Secretariate |
| 1980s | 3 Nam Theun hydroprojects identified | By Motor Columbus, Switzerland. |
| | Geotechnical studies | By SMEC of Australia |
| 1991 | Feasibility Study & Environmental Status Report with WB & UNDP support | By SMEC of Australia for GoL. (Since then US\$ 0.5 billion of WB adjustment and loans have been made to LPDR.) |
| 1993 | Memorandum of Understanding negotiations (led to BOOT) start. | SMEC & Transfield of Australia with GoL |
| 1993 | Nakai-Nam Theun National Biodiversity Conservation Area& 17 other NBCAs gazetted by GoL. | Environmental (EIA) and Social Impact Assessments (SIA) to WB standards required for GoL to get WB support. |
| 1994 | BOOT concept for NT2 with GoL equity firmly in place. | EDF, ITD, and two Thai companies (et al) replaced SMEC & Transfield before the BOOT concept was finalised. |
| | NTEC formed & starts negotiating to sell power to EGAT of Thailand. | This culminates in the Power Purchase Agreement (PPA) |
| 1994 | GoL seek WB loan & guarantee support & 1st Environmental Impact Assessment produced | EIA & SIA required EIA by TEAM (Thailand) |
| 1995 | 2nd EIA produced. | EIA by TEAM (Thailand) |
| 1996 | Power Purchase Agreement signed | |
| 1996 | ADB loans to GoL | Not for NT2 at this time |
| 1997 | 1st draft Environmental Assessment & Management Plan (EAMP) produced. | Seatec Int. (Thailand) & Sinclair Knight Mertz (Aust.) |
| | 1st draft of RAP released | RAP=Resettlement Action Plan |
| 1997 | Economic Impact Study carried out. | By Louis Berger Int. |
| 1998 | Study of Alternatives. | By Laymeyer & Worley Int. |
| 1998 | Environmental & Social Action Plan (ESMP) for NNT-NCBA produced | By IUCN |
| 1999 | RAP updated. ESMP updated. | |
| 2000 | ESMP & Operational Plan (OP) | Updated |
| 2000 | PPA amended (August) | |
| 2001 | EAMP 2nd & 3rd drafts. EGCO replaces "et al" in NT2 consortium. | |
| 2002 | RAP update. Ethnic Minorities Dev. Plan (EMDP) & SDP produced | Social Development Plan (SDP) includes RAP & EMDP |
| 2002 | Social Env. Man. Framework & first Operational Plan (SEMFOP) produced | Based on ESMP & updated Operational Plan |
| 2003 | SEMFOP updated | |
| 2003 | EAMP 4th draft | Seatec & Dr John Bizer |
| | RAP updated. EMDP released | |
| 2003 | ADB 1st NT2 Technical Assistance | USD 700,000 |
| 2004 | NTPC replaces NTEC | NTPC wholly owned by EDF, EDL, EGCO, & ITD. |
| | EAMP 5th draft | Dr John Bizer |
| 2004 | Local public consultations criticised. | WB communication strategy put in place. |
| 2004 | ADB 2nd NT2 Technical Assistance | US\$1 million |

| | | |
|------------------------------|--|---|
| 2004 | NT2 Project Economics- Interim Summary Report | Check on economics & commercial viability of Thai power alternatives. |
| | International public consultations in August and September. | Bangkok, Paris, Tokyo, Washington DC. |
| 2004 | Aspects of Concession Agreement (CA) underway | Viz., the Pilot resettlement village |
| 2005 | GoL prepared to sign a Letter of Development Policy | See Section 1.6.1. Letter sets out "performance criteria" against which governance of NT2 can be monitored. |
| 2005 May | WB & ADB Board decisions on loans and public risk guarantees for NT2. | If not passed or delayed NTPC penalised under PPA. GoL would need to seek alternative arrangements. |
| 2005- 2029 | Nakai-Nam Theun National Biodiversity Conservation Area management gets USD1 million per year from NTPC. | The payment continues for 25 years to fund IUCN's, Nakai-Nam Theun National Biodiversity Conservation Area management plan. |
| 2005 2006 2007 2008 | Loans and guarantees in place. NT2 Construction CA implemented | EAMP, SDP & SEMFOP implemented in line with CA. WB and ADB leverage on GoL & NTPC from NT2 loans and partial risk guarantees declines. |
| 2008/9 2009 | NT2 commissioned NT2 Power generation & PPA re NT2 starts. CA implementation | See Chapter 2 for economic, financial & commercial impacts |
| 2009- 2030 | Meeting of CA obligations up to commitment of GoL & NTPC. CA closes 2030. | Only leverage available would be from prevailing WB & ADB and perhaps bilateral assistance programs. |
| 2034 | PPA closes. | |
| 2035 | NT2 transferred to GoL | See Chapter 2 for after 2034. |

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