

**UPDATE ON THE
LAO PDR: NAM THEUN 2 (NT2)
HYDROELECTRIC PROJECT**

July 7, 2010

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
CA	Concession Agreement
CEMMP	Company's Environmental Management and Monitoring Plan
COD	Commercial Operations Date
DAFO	District Agriculture and Forestry Office
EGAT	Electricity Generating Authority of Thailand
EMO	Environmental Management Office (NTPC)
EMU	Environmental Management Unit (GOL)
GDP	Gross Domestic Product
GOL	Government of Lao PDR
IAG	International Advisory Group
IFIs	International Financial Institutions participating in NT2
LD	Liquidated damages
LEnS	Lao Environment and Social Project
MOF	Ministry of Finance
MPI	Ministry of Planning and Investment
MW	Megawatt
NSEDP	National Socio-Economic Development Plan
NT2	Nam Theun 2 Hydroelectric Project
NTFP	Non-timber Forest Products
NTPC	Nam Theun 2 Power Company Limited
PDR	(Lao) People's Democratic Republic
PPA	Power Purchase Agreement
PLUP	Participatory Land Use Planning
POE	Environmental and Social Panel of Experts
PRSO	Poverty Reduction Support Operation
RFA	Reservoir Fisheries Association
RMA	Revenue Management Arrangements
RMC	Reservoir Management Committee
SEMFOP	Social and Environment Framework and First Operational Plan
VFA	Village Forestry Association
VFG	Village Fisheries Group
WMPA	Watershed Management and Protection Authority

CURRENCY EQUIVALENTS

(Exchange Rate Effective: June 7, 2010)

Currency Unit	=	Lao Kip (LAK)
US\$1.00	=	LAK 8,226.00
LAK 1	=	US\$0.00012

UPDATE ON THE LAO PDR: NAM THEUN 2 HYDROELECTRIC PROJECT

I. SCOPE OF THIS UPDATE

1. *This Update¹ reports developments since the last annual Update to the Board (dated July 21, 2009) on NT2.* It is based on the findings of a joint NT2 supervision mission mounted by the international financial institutions (IFIs) in February-March 2010 and the ongoing work of the field-based team, and also reflects findings from a comprehensive assessment of progress towards Project objectives² by the Asian Development Bank (ADB) and the World Bank. Since the Commercial Operations Date (COD) was reached on April 30, 2010, and the four Francis turbines generating power for export to Thailand have been in operation since March, the time is opportune to take stock of the current status of implementation and highlight the challenges ahead.

2. *The Lao economy weathered the global financial crisis well in 2009.* It was helped by higher-than-expected commodity prices and significant expansion in public outlays – mainly attributable to expenditures in support of local infrastructure projects and two prominent events: the South East Asia Games and the 450th Anniversary of Vientiane, which have acted as a stimulus. With the global economy on its way to recovery, Lao PDR is poised for another year of sustained economic growth, albeit at a reduced pace, with a real GDP growth in 2009 estimated at 6.4 percent. An extensive review of country economic management is covered in the documentation of the Sixth Poverty Reduction Support Operation (PRSO) which was circulated to the Board of the World Bank in early June.³

3. *This Update focuses on NT2 project-related matters.* It is comprised of three parts, plus annexes: the first part of the Update deals with Project implementation progress. It describes the status of the physical project (hydroelectric power station and related works). It also includes Project finances as well as progress towards the Project's social and environmental objectives, and pays particular attention to key challenges ahead. These include the achievement of improved and sustainable livelihoods for those resettled in the Plateau, successful management of downstream impacts (including water quality), sustainable management and protection of the Watershed and further strengthening of institutional arrangements across a variety of areas – at the local, provincial and national government levels – to support the major transfer of NT2 programs (e.g., livelihood extension and health) and assets (e.g., roads) from the Nam Theun 2

¹ The World Bank and ADB have agreed to keep their respective Boards of Executive Directors informed about NT2 implementation through joint reporting on an *annual* basis, supplemented by *semi-annual* updates. The Project was approved by the Boards of the World Bank and ADB on March 31 and April 4, 2005, respectively.

² The Project objective is to generate revenues through environmentally and socially sustainable development of NT2's hydropower potential to finance poverty reduction and environmental management programs in Lao PDR. The *Comprehensive Implementation Review* document will be available shortly on the World Bank's NT2 website, <http://www.worldbank.org/laont2>.

³ The reader is referred to the Lao PDR Program Document (Report No. 53195-LA) for the Sixth Poverty Reduction Support Operation (PRSO-6), which is available on the World Bank website.

Power Company Limited (NTPC) to the Government and to deal with waste management issues. The next part of the Update reviews NT2 Revenue Management Arrangements. Finally, the Update looks ahead to future project supervision and monitoring needs, highlighting issues that warrant continued attention during the commercial operations phase of the Project. Annex 1 reports on the ADB supported Theun Hinboun project.

II. PROJECT IMPLEMENTATION PROGRESS

4. ***NT2 civil construction activities are effectively complete, and COD was achieved on April 30, 2010.*** The testing of the Francis turbines (four 250MW turbines generating power for Thailand) revealed significant technical issues, including vibrations at specific operating levels, that required technical remedies. These remedies are now in place, but the process has contributed to delays in reaching the COD defined in the Power Purchase Agreement between NTPC and the Electricity Generating Authority of Thailand (EGAT).⁴ As a result of the delays, NTPC has been: (i) receiving liquidated damages (LDs) from the Head Contractor since mid-September 2009, and (ii) paying LDs to EGAT since mid-December 2009. The delay in COD has also delayed the drawdown of the Nakai reservoir, which in turn delays some of the social programs on the Plateau. NTPC is expected to record lower revenues this year due to the delay in COD, but it will be able to meet its scheduled debt obligations. In the meantime, a vibration problem has also been encountered with the Pelton generating units (two 42 MW turbines generating power for Lao PDR); one unit is in operation, albeit at reduced output. Experts have investigated the Pelton unit vibration problem, and an acceptable solution has been agreed on.

5. ***Consistent with the Concession Agreement (CA), and with the approval of Government and the lenders, NTPC began selling electricity to Thailand in early March, prior to formal COD.*** A pre-generation agreement was signed by the relevant parties for delivery of this electricity to Thailand. The time between early March and formal COD on April 30 was used to complete the various legal steps required, including handover (from the Head Contractor to NTPC) of the power station and other related facilities, and for EGAT to accept the Certificate of Readiness for Operation (which is issued by NTPC and pertains to the four Francis turbines). NTPC has also started generating electricity for sale to Lao PDR, but at a limited capacity until the vibration problem has been fully resolved.

6. ***Revenues from NT2 have started to flow to Government and are being applied to support expenditures in health, education, rural roads, environment and rural electrification programs.*** In June 2010 the first revenue stream equivalent to US\$600,000 from NT2 was received by Government. For FY2009/10 the Government had allocated through the budget process about US\$6 million to investment projects in social and productive sectors, consistent with the NT2 Revenue Management Arrangements. These investment projects are under implementation through the government budgetary systems.

7. ***Commencement of electricity sales to Thailand is important not only for the start of revenue generation, but also for the social and environmental activities of the Project.*** The start of commercial sales of electricity to Thailand – albeit at reduced rates during a pre-COD

⁴ COD was planned for mid-December 2009.

period – marks the point at which revenues start to flow to the Project, and from there to the Government budget. It also marks the beginning of an accelerating water drawdown of the Nakai reservoir. This drawdown will assist villagers to integrate the land exposed by subsiding waters into their livelihood planning (supported via the participatory land use planning process, or PLUP) and will allow completion of the irrigation systems for villagers (see paragraph 18 for further details).

8. ***NT2 construction costs are broadly in line with plans.*** NT2 Project costs during the construction period were planned to be US\$1,250 million, with a further US\$200 million of contingency financing available. NTPC has reported that the Project final costs up to COD amounted to around US\$1.3 billion taking into account projected total revenue (net of expenses to the Head Contractor), which includes pre-COD generation of energy sold to Thailand and revenues from the water release agreement with the Theun Hinboun Power Company. The funding needed beyond the original base costs was covered by the contingency.

9. ***The implementation of NT2 has responded adequately to the complex legal framework.*** The Environmental and Social Panel of Experts (POE), the Independent Monitoring Agency and the Lenders' Technical Advisor are responsible for tracking compliance with the Project's legal agreements on behalf of the Government and lenders, respectively. Their reports to date show broad and substantive compliance with the legal framework. In addition, the ADB and World Bank have also recently completed a Comprehensive Implementation Review with the Government and NTPC that confirms these findings.

10. ***The POE undertook its sixteenth visit in February 2010.*** The POE's report recognizes significant progress in implementing the Project since its last visit. The POE also notes a number of concerns in its report, particularly regarding the need to strengthen protection of the Watershed from external pressures. The POE also makes a number of recommendations aimed at strengthening the Plateau resettlement program – particularly the Village Forestry Association (VFA) – as well as the Downstream Program. Finally, the POE continues to encourage the Government and the IFIs to pursue complementary development programs in the Xe Bang Fai area to take advantage of some of the wider development opportunities that NT2 may create. The full report is available on the Government and NTPC websites.⁵

11. ***The April 2010 report of the International Advisory Group (IAG)⁶ notes that implementation efforts have gone well beyond achieving compliance.*** In making this observation, the IAG took stock of progress on livelihood development, examined issues relating to institutional arrangements for long-term support and protection of the impacted communities, and reviewed the Government's mechanisms and plans for use of its revenues from the Project. A number of detailed recommendations were made relating to areas such as: the role of consultation and participation in the development of plans and policies, information disclosure, micro-credit, support for vulnerable households, fisheries monitoring, protection of resources in and around the reservoir and Watershed, institutional arrangements and handover plans, river

⁵ NT2 information is available via <http://www.poweringprogress.org/>, <http://www.namtheun2.com/>, and <http://www.worldbank.org/laont2>

⁶ The IAG reports directly to the President of the World Bank.

basin planning, and revenue management, *inter alia*. The IAG's report is available on their website.

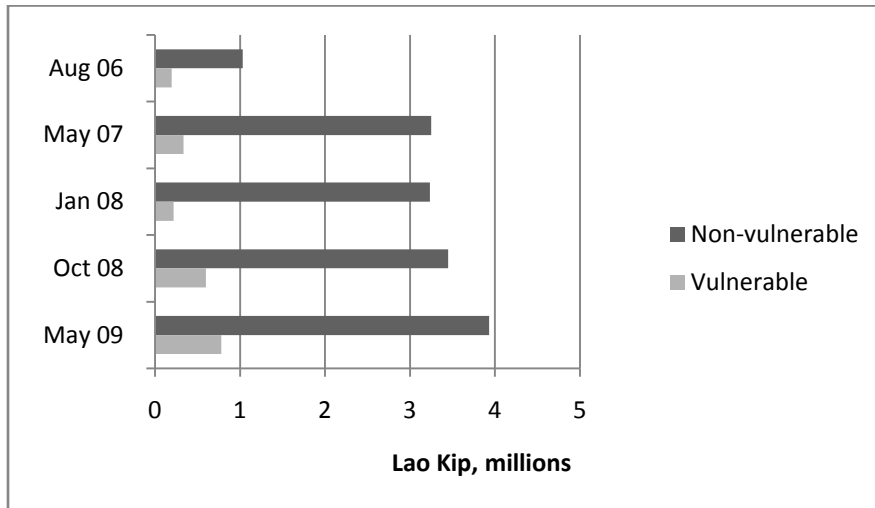
Environmental and Social Aspects

12. ***Environmental and social objectives will continue to be important, and will remain a key focus during the operations phase.*** Now that the turbines are running, the Xe Bang Fai downstream is being impacted. The full nature and extent of these impacts will only be clear after several seasons. Monitoring is in place to ensure that emerging impacts are satisfactorily addressed. Progress towards Plateau resettlement objectives is being monitored as well, and achievement of the livelihood targets will be measured in 2011 and 2013. Protection and sustainability of the Watershed will remain an issue for the full lifespan of the CA and beyond, and progress on institutional arrangements and activities are also being supported.

Plateau

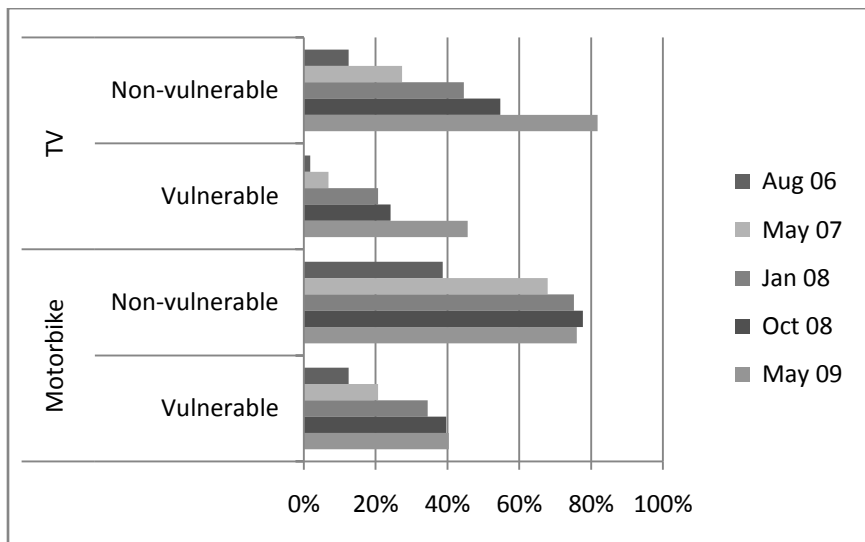
13. ***Physical resettlement was completed in 2008, and community infrastructure and services are functioning well.*** Villagers greatly appreciate their new physical surroundings, are developing assets (see Figure 1), and many are investing in improving their homes and buying new assets such as televisions and motorbikes (see Figure 2). Villagers are also taking advantage of improved education, health and transportation facilities. Issues that require ongoing attention include the expansion of some granaries, village waste management, and finalizing compensation payments for selected assets. While a range of initial compensation and interim support has been provided, finalizing additional compensation for assets such as fruit trees has been delayed by the need to confirm assets with households in their new locations, and to ensure that bank accounts and appropriate investment opportunities exist. A budget has been set aside for compensating villagers for buffalo losses, but final payments have also not yet been made due to unrealistic claims; the Government and NTPC are working on this issue and payments should be made shortly. Increasing numbers of relatives of resettler families are also moving into the villages. While this reflects the attraction of new opportunities provided in the resettlement area, it has also resulted in increased demand for land and the need to clarify land tenure opportunities. The Vietic families of Old Sop Hia all moved to their new village during 2009, and several individuals from this community are now moving back and forth between their old and new villages according to their wishes. In addition, new housing for villagers living in Ban Phonpanpaek (who were not relocated) is also complete.

Figure 1: Median value of assets per household (excluding boats provided by NTPC)
 Data from the Living Standards Measurement Surveys, NTPC



Vulnerable households are those identified by district and NTPC staff as being likely to find it difficult to increase incomes because of household characteristics such as lack of labor or disability.

Figure 2: Percentage of households owning motorbikes and televisions
 Data from the Living Standards Measurement Surveys, NTPC

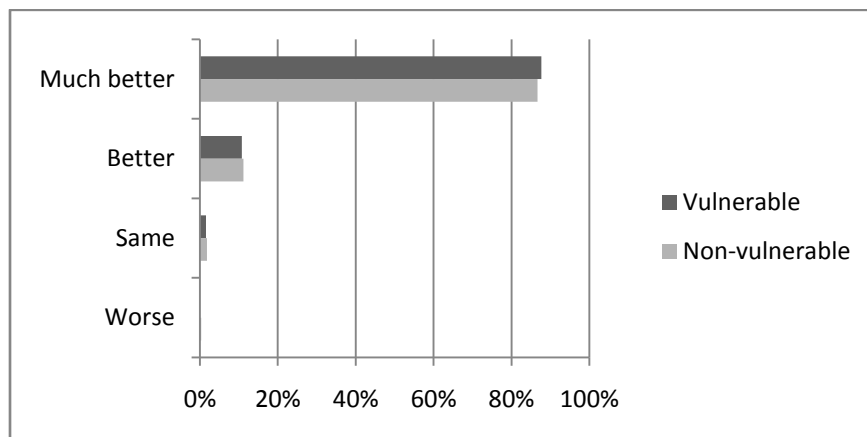


14. *Socio-economic monitoring data shows that villagers believe that they are better off following resettlement.* Analysis of five rounds of the Living Standards Measurement Survey conducted between August 2006 and June 2009 provides a rich set of insights into the lives of resettled people. In short, very high proportions of resettled people consider themselves much better off following resettlement (see Figure 3), but there is a range of issues that some remain concerned about – most particularly access to additional land, and access to forests and non-timber forest products (NTFPs). The relatively positive views resettlers have about their overall welfare is good news. However, the issues that they are concerned about confirm that there is

some way to go before most resettled people will feel that they have fully adapted to their new livelihoods.

Figure 3: How does life now compare with life before resettlement? Percentage of respondents, May/June 2009

Data from the Living Standards Measurement Surveys, NTPC



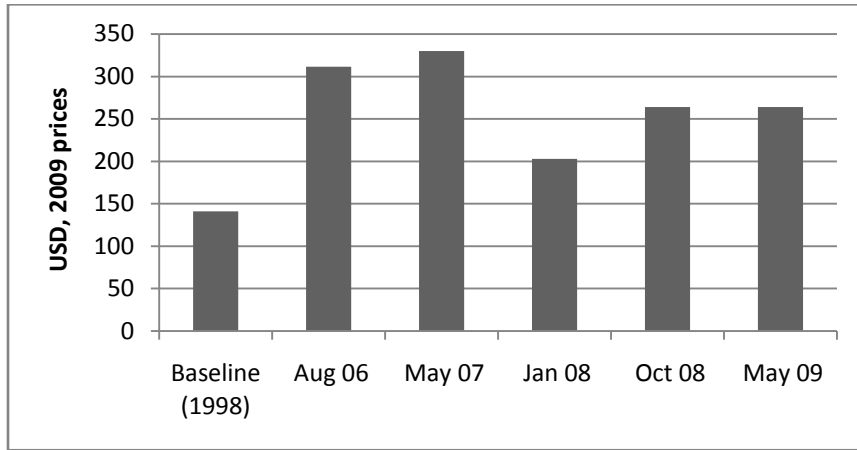
15. ***The emphasis on livelihood development continues.*** The overall approach is comprehensive and it includes: (i) setting *clear targets* – representing a significant increase in real income and consumption, that needs to be achieved five years after physical resettlement (2013) – and embedding these targets in the CA;⁷ (ii) providing a mixture of *assets* (e.g., land, community forest area, and protected access to the reservoir) and clarifying rights and responsibilities over these assets, *technical assistance* (e.g., demonstration of new approaches and technologies; market analysis), *inputs* (e.g., fertilizer, irrigation, skills training), and *community development* processes (e.g., PLUP); (iii) *monitoring* progress and *adapting* the livelihood program in response to realities on the Nakai Plateau; and (iv) providing a *safety net* for vulnerable people, designed to help those in genuine need but not undermine traditional family ties or create disincentives to building new livelihoods.

16. ***A solid start has been made on building new livelihoods, but this will require close attention for a number of years to come.*** Household income levels were well above baseline levels (see Figure 4) in over five surveys undertaken between August 2006 and June 2009. The chart shows a decline in consumption off a temporary high in 2006 and 2007, which appears to be caused by a reduction in Project wages (Project wages were paid early in the resettlement process for clearing land and assisting with construction of new villages) as well as changes in the time of year measured – May being the lean season for rural livelihoods in Lao PDR. More positively, compositions of incomes have been shifting over this survey period towards more sustainable sources of income. Figures 5 and 6 show composition of incomes across the five surveys to date and demonstrate that fisheries incomes have grown most sharply over this period, while NTPC support and non-Project wages have collectively shrunk over the same period.

⁷ These targets go beyond the usual safeguard related obligation to ensure income restoration.

Figure 4: Yearly income per person, 1998-2009

Data from the Living Standards Measurement Surveys, NTPC



17. *As the livelihood program is implemented, problems encountered are being addressed.* Some challenges warrant special attention. These include: (i) delays in the provision of irrigation; (ii) protection of natural resources and local assets for the benefit of resettlers; (iii) viability of the VFA; and (iv) sustainability of the fishing operations. The following paragraphs address each of these challenges in turn.

Figure 5: Average income share of each livelihood pillar, Aug/Sep 2006

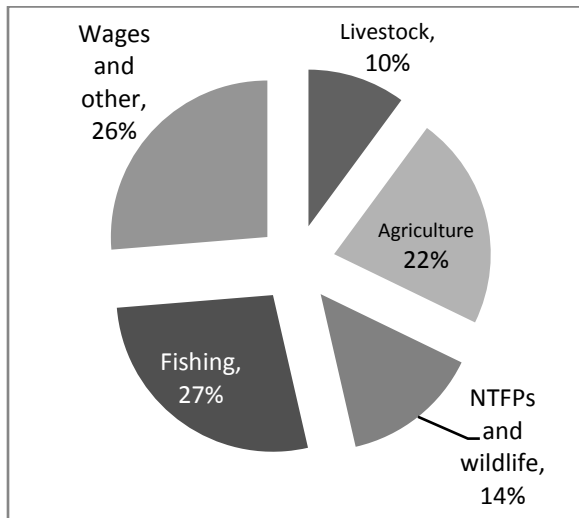
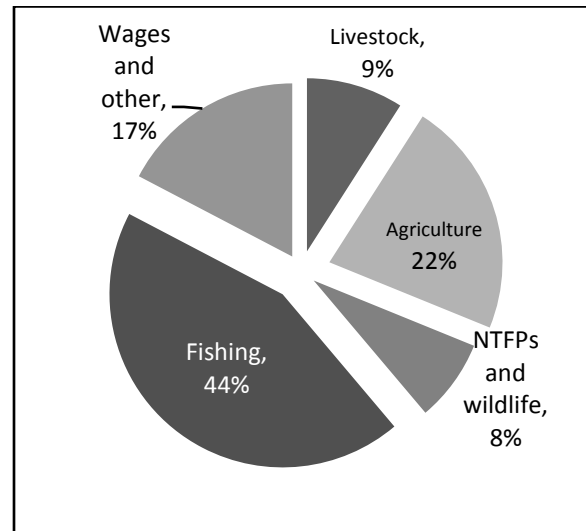


Figure 6: Average income share of each livelihood pillar, May/June 2009



18. ***There have been delays in the provision of irrigation to Nakai resettlers, but progress continues to be made in addressing this important issue.*** Responding to the experiences with irrigation in two pilot villages, the planned irrigation arrangements were improved and are now being implemented. It is critically important to have locally appropriate and sustainable irrigation systems that will continue to boost livelihoods over the longer term. The irrigation systems were planned to be finalized before COD to meet the objective of ensuring that resettled people had opportunities for reasonable livelihoods by that point in time; however, implementation delays were encountered due to: (i) a re-design of the approach to better meet community needs (the pilot experiences showed that the originally envisioned system was over-designed, unsustainable and did not sufficiently support farmers in taking an integrated approach to agriculture across their 0.66 hectare plots and the drawdown zone of the reservoir; the new system emphasizes simpler technology, enabling integrated agriculture on the 0.66 hectare plots and the drawdown zone areas, and features greater participation of farmers in designing and operating their local system); and (ii) the need for a full reservoir drawdown to complete the re-designed system tube wells need to be dug deeper once the reservoir level is lower, the drawdown area land needs to be exposed to complete gully dams and to enable villagers to visualize the areas to finalize their land-use planning. Irrigation systems are already installed in several villages, with the remainder expected to be in place this year. Socio-economic monitoring shows that resettlers are already better off following resettlement (see earlier paragraphs). With that in mind, the CA provides for the use of adaptive management (adjusting project implementation to shifting realities on the ground), and it is being applied in this situation to support more sustainable outcomes for the longer term.

19. ***Securing the natural resource base remains important to support achievement of sustainable livelihoods.*** The Project has made good progress in pursuing this through the PLUP, which has started in the southern villages and is working its way north, village by village. This process has involved villagers and local authorities in clarifying village boundaries, zoning land, and laying the foundation for village-level livelihood planning and management. Of note is that it has been undertaken under a Government policy framework by district and provincial line agency staff (with support from NTPC), and represents an important contribution to support both local and national capacity development. Continued follow-up is necessary to complete the process in the remaining villages. Additionally, the Reservoir Management Committee (RMC) needs to clarify use of both the drawdown area and the reservoir islands, while the VFA needs to clarify with villagers the use and patrolling of forest areas now lying within the new village boundaries. In addition, and in line with the CA, land titles have been issued by the Government of Lao (GOL) for housing and agriculture land.

20. ***Enforcement of sustainable natural resource usage remains a challenge.*** Inevitably, with improved infrastructure and facilities come new opportunities, and the IFIs note that great care needs to be taken to safeguard the natural resource base for resettlers as mandated in the CA. There is growing pressure on these resources from resettlers (and the natural growth of their families) as well as from outside interests. This has already presented an enforcement challenge. The PLUP process described above is addressing the community dimensions of this challenge by helping communities clarify their own land-use patterns and rules for natural resource use. However, enforcement against outside interests needs to be strengthened, *inter alia*, to preserve livelihood opportunities for resettlers. The IFIs have urged the Government to provide stronger leadership to address this challenge, both in terms of clarifying which policies and legislation are

relevant and important to prevent outsider encroachment in the resettlement area, and to ensure these are practically applied there. The Governor of Khammouane shares this concern, and has asked the Resettlement Management Unit to work with NTPC and the IFIs to address it.

21. ***The IFIs are increasingly concerned about the overall viability of the VFA***, which is an essential livelihoods pillar and is especially important as a source of support for vulnerable households. Though laudable progress has been made in organizational strengthening (e.g., new VFA Board members have been voted upon and VFA is poised to register as a Limited Liability Company), the VFA continues to be hampered by problems beyond its control, such as: (i) the lack of a multi-year logging quota, which limits the ability of VFA to plan and operate effectively. Harvesting and processing in 2009 were significantly diminished because of a delay in receiving a quota. Multi-year quotas are not yet a national norm, but given that the VFA land and forests have been provided for the exclusive benefit of the resettlers for a 70-year period, it makes sense to take a multi-year outlook in the VFA for both operational and sustainability reasons; (ii) continuing operation of non-VFA sawmills on the Nakai Plateau, which undermines resettlers' exclusive right to benefit from timber operations; (iii) extraction of timber belonging to the VFA by a contractor preparing the Nam Malou road, including well beyond the road right of way. During the February-March 2010 mission, the IFIs recommended that an independent assessment be undertaken immediately to estimate the volume, species and value of lost timber and that the VFA be compensated for its losses, including the value that would have been added through timber processing; and (iv) inaccurate grading of VFA timber, which resulted in overpayment of taxes by VFA in 2009. The VFA will also need to significantly strengthen the understanding and support of all the resettlers if it is to encourage appropriate NTFP development and agro-forestry activities, as well as strengthen enforcement activities within its boundaries. At the invitation of the Provincial Governor, an assessment of the Nam Malou road impacts is currently being undertaken by the Department of Forest Inspection and local officials, with technical support from the World Bank. The same team will also look at the timber grading process.

22. ***Fisheries contribute strongly to resettler livelihoods, but momentum must be maintained in regard to improvements in fisheries management and regulation.*** Fish stocks remain robust, providing many resettler households with a readily available source of income and consumption. The emergence of village fishing groups and their umbrella Reservoir Fisheries Association (RFA) is also a positive development, and some of the village fishing groups are now functioning, including collecting fees to improve local fisheries management. Based on the findings of the recent mission, the IFIs urge the Government to support the RFA, the RMC and the Watershed Management and Protection Authority (WMPA) in ensuring effective fishing enforcement in order to enhance prospects for sustainable fisheries management over the longer term. Local institutional capacity building will also be key to better protection of the fishery resources.

23. ***Noteworthy progress has been made on fisheries management.*** Four regulations were developed and signed by the Khammouane Governor in April 2009: (i) *Village Fisheries Group Regulations*, which allows for a (5-member) Village Fisheries Group (VFG) for each of the 16 resettled villages; (ii) *Fishing Regulations*, which state that only registered resettler villagers can fish commercially. They have to apply for a license for this and have no catch limit. Everyone else (e.g., Watershed villagers or other local people who previously fished in the local rivers) can

fish for subsistence with a 5kg limit per day per license. There is also a Tourist license, which lasts for one day with a 5kg limit per day per license. The regulations have gear restrictions and restrictions on some species (e.g., turtles, endangered species), and largely match the recent Lao Fisheries Law; (iii) *Fish Marketing Regulations*, which allow for anyone with a legal business license to trade fish, and require all fish to be traded through the landing sites so that a management fee can be collected to provide sustainable financing for fisheries management and enforcement; and (iv) regulation establishing the *Reservoir Fisheries Association*, which is comprised of members of the VFGs and has a coordinating role with main responsibility for developing and implementing a Fisheries Management Plan. These regulations were developed through a process that included consultations with villagers, with positive feedback, and reflecting an understanding that reservoir fish are for resettlers. The regulations can be changed if needed, upon formal request by the RFA.

24. ***The main threat to fisheries is outsiders doing commercial fishing in contravention of regulations.*** The reservoir is also being used as a new point of access to the protected areas in the Watershed. Effective enforcement in the reservoir will require active cooperation from the RMC, the WMPA, as well as the VFGs. The RMC has worked with the District to create a joint *ad hoc* patrol taskforce of the District Agriculture and Forestry Office (DAFO), RMC, VFGs and village militia. Patrols started in June 2009 and DAFO issued a number of warnings plus 17 fines in one month. Patrolling is unfortunately not happening often enough, but when it occurs it appears to be effective. A permanent patrol is planned, to be jointly undertaken by the VFG and village militia, and the authority to fine will need to be clarified. Patrolling obligations will also need revision with villagers after village boundaries have been finalized and registered. The IFIs would like to see greater coordination between the RMC and WMPA on issues of patrolling and law enforcement given their common interests, and recognize that the Province is gradually addressing this.

25. ***A good water quality monitoring system is in place on the reservoir and across downstream areas, and quick response to any emerging issues will be important.*** Water is sampled by NTPC regularly at multiple locations and tested at the onsite Aquatic Environment Laboratory in Nakai. Chemical parameters tested include total iron, ammonia, nitrate, and nitrite, while dissolved oxygen levels are also tested. Fish are tested for mercury levels. Thus far, water quality shows no significant problems to date, with all parameters tested falling within the standard limits at most sites. However, the data show a strong stratification pattern in some parts of the reservoir at times, and relatively high iron in some locations, caused by naturally occurring iron leaching from the soil into the water column. Iron levels will likely decrease with the reservoir drawdown, and increase as it refills, but will likely taper off over time. Looking ahead, total iron in the reservoir could temporarily become an issue, as it can cause fish kills (if at sustained levels higher than those presently observed) and poor water quality for the downstream users. Presently, total iron is within the compliance limit, but needs close ongoing monitoring. The Aquatic Environment Laboratory has begun testing greenhouse gas emissions from the reservoir as part of long-term research effort on the impacts of tropical reservoirs on climate change, but it is too early to build a picture of results.

Downstream Areas

26. *Downstream impacts on the Xe Bang Fai will become a more central issue as power generation brings changes in water flows.* While the Xe Bang Fai is the most significant zone with respect to size and nature of impacts, it is important to remember that the NT2 “Downstream Areas” designation formally covers three zones: (i) downstream of the power station, including around 150 villages along the Xe Bang Fai River and in its hinterland; (ii) downstream of the Nakai Dam, including 38 villages along the Nam Theun River; and (iii) upstream of the reservoir, including 31 villages in the Watershed area (discussed in the Watershed section of this Update).

27. *A number of Project impacts on the Xe Bang Fai were anticipated at the time of Project preparation.* These included increased erosion, changes in water quality, loss of some riverbank gardens, reduction in fish catch, and increased duration and depth of the annual flood cycle. A number of mitigation and compensation measures were put in place to address these, including:

- (i) *Project infrastructure design measures*, including a large regulating pond, a 27km long downstream channel, and several aeration structures. Together, these measures are designed to reduce fluctuations in water levels and downstream erosion and to improve water quality, and represent a roughly US\$80m investment by the Project in avoiding downstream impacts. In addition, the CA requires (and the PPA similarly reflects) that water releases into the downstream channel be stopped when predefined water levels are reached in the upper part of the Xe Bang Fai.
- (ii) *A Downstream Program*, which started several years in advance of Project impacts with strong community participation. This includes, *inter alia*: (1) a water, sanitation and hygiene program; (2) a livelihoods improvement program that includes village funds and technical support; (3) specific compensation for riverbank gardens; (4) measures to relocate or compensate for assets that are impacted by Project-related erosion; and (5) a grievance procedure.
- (iii) *A range of monitoring systems* that will assist the Government, NTPC and Project oversight agencies in tracking impacts on the natural environment and the people who live in the area.

28. *Implementation of the Downstream Program was accelerated during 2009 and 2010.* The planned livelihood development and impact mitigation measures (such as village funds, technical assistance and demonstration activities, and the water, sanitation and hygiene program) are on-going with good progress. The Program is active in 77 Xe Bang Fai villages, including all riparian villages. The credit-based livelihood program for the Xe Bang Fai continues to expand and evolve, with 6,100 households (in May 2010) participating (including 1,000 poor households). The grant-based livelihood program in Khamkeut District (along the Nam Theun downstream of the dam wall) is underway in all 18 villages. Monitoring of downstream impacts, covering community livelihoods, fisheries, water quality, and erosion, is also in place.

29. *Early monitoring suggests that impacts to date are largely in line with those anticipated.* It will take some time before the full impacts on the Xe Bang Fai are understood, but preliminary monitoring data suggests that: (i) water quality being released into the Xe Bang Fai meets recently strengthened national guidelines, and so far is similar to what would be experienced

during the wet season (see paragraph immediately below); (ii) most villagers followed Project advice and kept this season's riverbank gardens above the levels indicated during community outreach campaigns; and (iii) there have been no fish kills to date, and fish catch is being impacted differently in different areas of the river; fish, in general, are harder to catch because of increased flow and water level, but some fishermen are adapting to the new situation by using wet season fishing gear or changing fishing grounds. The one unanticipated impact to date is a skin rash that is affecting some villagers who bathe in the Xe Bang Fai (see below).

30. ***The quality of water being released into the Xe Bang Fai will be a key determinant of Project impacts and is therefore being monitored closely.*** There is an extensive system for water quality monitoring for the Xe Bang Fai downstream, including stations transmitting data via satellite every hour. The data shows that Project water releases are having only very small impacts on the natural water quality in the river to date (compared to control stations upstream of the release) and comply with the recently improved national standards for water quality (which are in turn, consistent with relevant international standards). The key change for most villagers so far during the dry season is an increase in total suspended solids (TSS), resulting in TSS levels usually found during the wet season (June-November). Similar water quality monitoring is also taking place in the reservoir (see paragraph 25) and the Nam Theun downstream.

31. ***Several issues on the Xe Bang Fai are receiving close attention from the Government, NTPC and the IFIs at the time that this Board Update is being prepared.*** These include: (i) monitoring and communicating impacts; (ii) riverbank garden compensation; (iii) a skin rash affecting some villagers; and (iv) status of water supply.

- (i) ***Monitoring and communicating impacts.*** Beyond the water quality monitoring system described above, monitoring systems are also in place for erosion, fisheries, health, nutrition, and socio-economic impacts. The Government, NTPC and oversight agencies will follow the results of these monitoring systems closely, as well as monitor the situation through intensive field visits. The World Bank, with inputs from ADB and the other IFIs, is closely coordinating with NTPC to help respond to the emerging situation and adapt the Downstream Program accordingly. In addition to monitoring impacts, NTPC is establishing systems to make some appropriate monitoring information publicly available on a regular basis.
- (ii) ***Compensation for lost use of riverbank gardens is being paid, and implementation is being accelerated from the original schedule.*** Based on the data collected during the process of riverbank garden registration, no household in any village is expected to lose more than 10 percent of its annual total livelihood through Project impacts on riverbank gardens. During implementation so far, in the most severely impacted areas, the impact recorded is about 2 to 3 percent of annual livelihoods. Villagers were informed ahead of the impacts and have largely restricted this season's gardens to land above the new water level. NTPC started the compensation process for impacts to riverbank gardens along the Xe Bang Fai in December 2009, and this process will be completed in the coming months as final compensation is made for the lost livelihood associated with riverbank gardens that have been used in the past but are no longer accessible as a result of the Project. The IFIs have been working

with NTPC to accelerate and prioritize the implementation of this program in order to ensure that all impacted villagers are compensated prior to the next dry season.

- (iii) *A skin rash among some Xe Bang Fai residents is being investigated and addressed.* NTPC is monitoring and investigating a skin rash occurring among a small percentage of residents along the Xe Bang Fai downstream of the Nam Kathang that may be connected to bathing in the Xe Bang Fai. The rash results in itchy skin, but there is no pain, no infection, and residents are able to continue their daily livelihoods. The rash also appears to disappear after a few days. The NTPC health team, supported by Institute Pasteur and local health authorities, is currently investigating the causes of the rash and advising communities on how to minimize their risks. NTPC will provide stocks of anti-histamine creams to local health authorities to treat symptoms where this is desired by villagers. The results of the investigation will be made known through the usual public health channels.
- (iv) *All of the 535 boreholes and pumps planned have been provided to villages along the Xe Bang Fai.* Most of these boreholes provide a reliable source of clean water suitable for domestic use. Some boreholes have naturally occurring high levels of iron, turbidity or salinity due to geological conditions, and others have had occasional mechanical problems. A monitoring system is in place that samples water quality from the pumps and identifies mechanical problems where they exist. In addition, since Downstream Program staff are in most villages at least once a week, these issues are usually picked up quickly through community feedback. Where groundwater quality is an ongoing problem, new boreholes are being constructed, and where pumps malfunction, they are repaired. The Downstream Program team has also been testing sand filters as a way of reducing iron in the groundwater over the last year. The IFI team will continue to monitor this program.

32. *A broader and complementary approach to flood management and socio-economic development is also underway.* The Xe Bang Fai has an annual flood cycle that involves much higher volumes of water than Project releases; the challenge of flood management therefore goes well beyond NT2. In addition, there are broader socio-economic development opportunities created by NT2 – such as more economical irrigation – that need to be pursued. The World Bank is already assisting the Khammouane Province to do this through the Khammouane Development Project, and is also preparing a regional integrated water resource management project (FY2011) that will include support to broader institutional and livelihood approaches to flood management in the Xe Bang Fai.

Watershed

33. *External threats to the Watershed have required strong action from the Government over the last year.* The greatest threats to the Watershed are external ones, such as mining exploration that crossed over the Watershed boundary during the last year, and salvage logging operators that crossed over from the reservoir into the Watershed. Although Government has taken strong action on both of these issues, ensuring that the mining operator left the Watershed and suspending salvage logging, close attention to these issues by the IFIs and other oversight bodies will still be needed.

34. ***There is compelling need to further strengthen the authorizing environment for the Watershed to ensure its long-term protection.*** The POE recommends development of a national law going beyond Decree 39 (which created the WMPA, *inter alia*), and the IFIs are in dialogue with the Government about how best to protect the Watershed in a sustainable fashion. Action is needed to permanently stop mining and logging within the Watershed for the long term to conserve this National Protected Area of global significance, protect the long-term viability of NT2 hydropower, and comply with both national regulations and NT2 Project commitments. The Government is currently rewriting Decree 39 to strengthen and update it, and is involving key stakeholders, including the IFIs, in the discussion.

35. ***While external threats remain, there has been improvement on the management of the Watershed in the last year.*** The WMPA has made progress on the recommendations made by the IFIs during the Watershed and SEMFOP¹ Mid-Term Review, undertaken over the February-June 2009 period. Key examples of recent progress include: (i) recasting the WMPA board; (ii) accessing stronger technical experts from other line agencies to do specific work, such as irrigation and livestock management; (iii) producing an illustrated *Handbook of Regulations and Penalties* related to NT2 Watershed protection; (iv) creating a Priority Patrolling Plan, which will increase spatial and temporal patrolling presence; and (v) drafting a new 5-year Management Plan, including a budget. This Plan draws on the SEMFOP and includes macro-zoning (of total protection zone, controlled used zone, and tourism zones). These extra efforts have been supported by NTPC, with the backing of the POE and IFIs, via a frontloading arrangement that has enabled the WMPA to make additional investments that should pay off over the longer-term.

36. ***Institutional arrangements for the Watershed are still evolving and need continued support to ensure conservation and appropriate livelihood development over the longer term.*** The WMPA's commitment to improving its performance and results is clear, and the IFIs will continue to support the evolution of this potentially important model for protected area management in Lao PDR. Some of the challenges in the coming years will include: (i) strengthening the livelihood development model for small and remote villages with distinct ethnic identities within protected areas – and avoiding any involuntary village consolidation; (ii) developing more efficient and effective operational partnerships for enforcement activities, and (iii) improving monitoring systems, including development of Watershed livelihood indicators.

Environmental Management

37. ***As construction activities conclude and remaining issues are addressed, focus will sharpen on future plans, roles and responsibilities.*** At present, several management issues concerning construction-related environmental impacts are still on the radar screen, particularly, waste management and rehabilitation of Project sites. These are being addressed, as described below. At the same time, efforts are under way to make the transition of roles and responsibilities for ongoing efforts from NTPC and the Head Contractor (HC) as implementers to NTPC (as operator) and to relevant Government entities that will be responsible for sustaining particular programs or elements.

¹ Social and Environment Management Framework and First Operational Plan.

38. ***Waste management, particularly the final disposal of used oil and hazardous waste, remains an issue that requires final resolution.*** About 400 drums of used oil and a small amount of used tires, contaminated soil/sand and containers, and used batteries, are stored in a temporary storage area at the Gnommalat landfill. NTPC's Environmental Management Office (EMO) is working closely with the HC and subcontractor to identify proper disposal methods for these wastes. Burning of used oil as an energy source at a steel recycling factory has commenced. A land farm to treat the contaminated soil is now in operation. Also, efforts have been made to improve the effectiveness of the leachate treatment system and structure at Gnommalat to avoid overflow during the rainy season.

39. ***Rehabilitation of borrow pits, spoil disposal, and other Project sites still needs more work as decommissioning progresses.*** A number of large permanent spoil disposal sites (associated with construction of the intake structure, Nakai and regulating dams, some saddle dams, some Project roads, and along the downstream channel) require proper rehabilitation and closure before completing the NTPC taking-over process. Most of these areas are being graded and leveled under close supervision of NTPC's EMO; however, acquiring adequate top soil for final closure and re-vegetation within the next 16 months will be a challenge. Closure of the private borrow pits and spoil disposal sites is also ongoing and the EMO is taking an active role in ensuring that the agreements between the subcontractor and land owners and local communities are followed through a tri-party consultation process. A process is in place to maintain fairness and acceptance among the key parties and to avoid potential conflicts and grievances.

40. ***The Company's Environmental Management and Monitoring Plan (CEMMP), covering the operating phase of the Project, has been drafted.*** This CEMMP is designed to be comprehensive and comply with ISO 14001. It outlines NTPC policy on environmental protection and management, its environmental management system - including the operational process, roles and responsibility of key units - and the staffing of the EMO. It is expected that the draft CEMMP will be sent to the IFIs for comment and to the Government for approval, as required under the CA (Clause 15.14 and Schedule 4, Part 2). The approved CEMMP will be in force from COD to the end of the concession period.

41. ***Government leadership and commitment will be necessary to ensure effective management of solid and liquid wastes generated from domestic and other sources.*** Government actions to address domestic waste management and disposal issues have become more urgent as rapid development of population and businesses in the Nakai and Gnommalat areas has created serious issues related to solid and liquid waste management and disposal. To address short-term needs, NTPC has provided assistance for construction and operation of a lined pit at the Gnommalat land fill, including piloting for various treatment options (e.g., constructed wetland, worm farm, composting, and pig-raising). In other areas, water quality data suggests that there is some contamination of surface and groundwater with human/animal wastes, and this needs heightened attention. The actions thus far of the GOL's Environmental Management Unit (EMU) to address these issues have been limited. NTPC has been providing technical assistance to the EMU through a consulting service contract and EMU staff participated in some of NTPC/EMO's monitoring efforts during construction and site closure. The EMU is now part of the Department of Environmental and Social Impact Analysis of the Water Resources and Environment Administration and efforts are being made to build the technical and management

capacity of the provincial offices in Khammouane and Bolikhamxay to take the lead in monitoring of environmental impacts during operation of NT2.

III. NT2 REVENUE MANAGEMENT ARRANGEMENTS

42. ***The reforms achieved through the Government's Public Financial Management Strengthening Program are strengthening fiduciary capacity and have facilitated NT2 Revenue Management Arrangements (NT2-RMA).*** The implementation of revenue management arrangements have helped Lao to put in place tools for transparent and accountable management of public resources. Implementation of the revenue management arrangements have allowed the Government to implement a budget classification and monitoring system capable of reporting expenditures on budgetary outlays, sector ministries have put in place systems for reporting physical progress of expenditures, and the State Audit Organization is building capacity to conduct performance audits. The government has also implemented a Treasury Single Account.

43. ***Government has received about US\$600,000 as revenues from NT2 in June 2010.*** NT2 commenced operations in April 2010 and these revenues follow the agreed billing cycle. The funds were transferred by NTPC to the Bank of Lao PDR, which in turn deposited the money into the National Treasury Account. Government has made allocations for eligible expenditures across health, education, rural roads, rural electrification and environment.

44. ***With the NT2-RMA now in place, and eligible programs identified, the focus is now on refining reporting modalities and coordination mechanisms.*** Implementation of the programs has already started. The involved agencies are maintaining detailed information on the physical progress of the projects and have been regularly reporting on the projects to the Ministry of Finance (MOF). Looking ahead, as per the NT2 RMA, the MOF will need to report on the application of NT2 revenues in December 2010 (six months after revenues start flowing into the budget system). The reporting format and coverage is under discussion. Furthermore, it will be important to maintain focus on assuring "additionality" particularly in the case of social sectors which have historically experienced fluctuations in recurrent budgets as a percent of the total recurrent budget. At the same time, internal coordination mechanisms between MOF, the Ministry of Planning and Investment (MPI), sector ministries, and the State Audit Office need to be formalized to ensure that all respective agencies remain current on the requirements and commitments within the NT2 RMAs.

45. ***More progress is needed on the medium-term expenditure framework for social sectors as well as on developing performance measurement systems for expenditures.*** Planning for application of NT2 revenue to eligible expenditure programs needs to take place within a framework for medium-term sectoral financing plans. Presently, agencies are preparing multi-year projections for NT2 revenues, which are just one source of financing for such plans. The ADB has mobilized technical assistance in this regard to facilitate collective work by the respective agencies to develop the sectoral financing plans for the benefit of the entire budgeting process, in addition to the narrower focus on NT2 expenditure programs. It is also important to include outcome indicators when preparing the medium-term financing plans, so that MOF and

MPI can have a clearer picture of sectoral plans and corresponding financial implications. Doing so would also strengthen the budget formulation process overall.

IV. MONITORING AND OVERSIGHT ARRANGEMENTS

46. ***The NT2 Project has been overseen by an extensive set of monitoring and oversight bodies during the preparation and construction period.*** The CA and other contractual documents establish mandates and broad timeframes for the POE, the Dam Safety Review Panel (DSRP), the Government Engineer (GOLE), the Lenders' Technical Advisor, and the Independent Monitoring Agency. In addition, the World Bank established the IAG that reports directly to the World Bank President on Project progress. The IFIs also collectively monitor NT2 implementation closely, including a joint World Bank-ADB Project supervision team based in Vientiane.

47. ***Monitoring and oversight arrangements need to evolve along with the Project.*** While these intense monitoring and supervision efforts have certainly helped contribute to successful implementation progress to date, there is broad consensus among involved parties and implementers that this heavy arrangement has imposed avoidable burdens on the developer and the Government. Going forward, as the focus shifts from implementing physical aspects of the Project to supporting a narrower set of highly challenging activities, there is scope for recalibrating the arrangements and lowering the direct and indirect costs of monitoring, while maintaining the needed level of coverage. Such recalibration will include external monitoring agencies, the World Bank and ADB supervision, as well as reporting arrangements, as outlined below.

- (i) ***External oversight recalibration will occur in line with legal agreements.*** The role and intensity of supervision by oversight groups will shift during the operations phase, but the system as a whole will remain substantially intact for a number of years to come. For example, the mandate of the POE extends to at least the end of the Resettlement Implementation Period (in 2014 if all goes according to plan, including the POE's judgment on income targets being met), while the Lenders' Technical Advisor will continue quarterly site visits for another two years, before switching to three and then two visits per year.
- (ii) ***World Bank and ADB Project supervision arrangements have been recalibrated for the commercial operations period.***² Ensuring the overall success of NT2 will require the World Bank and the ADB to continue to remain actively engaged in implementation support and monitoring of the Project, with the focus being primarily on the priority areas outlined in the following section, as well as building Government capacity across each of these areas. In addition to direct NT2 implementation support, the World Bank team is also supporting complementary activities (such as the Environment and Social Project, Khammouane Development Project, the Technical Assistance for Capacity Development in Hydropower and Mining, and the Public

² NTPC has a 25 year concession for commercial operations. However, from the perspective of the World Bank's Development Grant Agreement (DGA), the Project is under supervision until its closing date of end-December 2017.

Financial Management Strengthening Program) because of commonality of project activities, objectives, and/or geographical coverage. NT2 Project supervision is carried out by empowered decentralized teams, with the field-based NT2 Team being held accountable for results and performance by the World Bank's Sector Director in Washington DC and the ADB's Director of the Energy and Water Division in Manila. Management also leads an annual IFI high-level supervision mission that conducts a thorough review of progress. The Project Oversight Group, chaired by the Regional Vice President, will continue to oversee the project at the World Bank.

- (iii) ***Reporting arrangements on implementation progress will also be modified.*** Subject to acceptance of these arrangements by the respective Boards, the current practice of preparing semi-annual Update reports on NT2 to the respective Boards of the World Bank and the ADB would be replaced by a note circulated annually on the findings and remedial actions recommended by a high-level IFI annual supervision mission.
- (iv) ***In addition to its formal oversight structures, the NT2 Project continues to attract considerable attention from international non-governmental organizations (NGOs).*** The World Bank and ADB hear regularly from some NGOs that have particular concerns about the Project or its implementation. The supervision team follows up on these concerns as appropriate. The responses of the World Bank and the ADB are made public through websites and, where warranted, these issues will also be covered in the annual note.

48. ***Recalibrated Project oversight and monitoring arrangements will assist in focusing efforts on the key challenges during the operations phase of the Project.*** While reaching COD and entering the operations phase of the NT2 Project are important achievements, many of the key challenges still lie ahead. The following section outlines key areas where the World Bank and ADB are intending to focus their attention in the years to come.

V. LOOKING AHEAD

49. ***Four areas, critical to the achievement of NT2's development objective, require close support and monitoring as NT2 implementation proceeds.*** These areas are: (i) achievement of livelihood objectives for resettlers; (ii) the downstream mitigation and compensation program to benefit villagers in the downstream areas; (iii) successful management of the Watershed by WMPA, including both the conservation of biodiversity and the appropriate socio-economic development of the people living in the Watershed; and (iv) effective implementation of the NT2-RMA. Continued oversight and monitoring by the IFIs, through streamlined support, will also contribute to achievement of NT2's project development objectives.

50. ***Underlying each of these four areas is the ongoing challenge of institutional and human resource development across Government agencies.*** The size and complexity of the Project have meant that multiple ministries and levels of the Government – national, provincial and district – have been involved in implementing the Project to date. While capacity has been stretched, the Government has in general done an admirable job in evolving institutions and helping people develop the skills to meet the new challenges of NT2 – demonstrating that a key

way to develop capacity is to do the job. During the operations phase, the Government, particularly at the local level, is taking on increased responsibility for Project implementation and sustainability of a number of Project investments. Meeting these new challenges, and ensuring sustainability, will require a continued evolution of institutions, skill development, and prioritization of resources during the operations phase.

51. ***It will be important to continue to build on the NT2 experience, tapping relevant lessons to strengthen development of future hydropower projects in Lao PDR.*** NT2 served as a catalyst for a broad range of reforms and is helping to build capacity in sustainable natural resource management and infrastructure development, while also strengthening partnerships among a range of interested stakeholders including IFIs and the private sector. NT2 has also helped to strengthen the investment climate in the country. Through the work on NT2 and the complementary LEnS project, Lao PDR has established a systematic approach to sustainable development of hydropower, encapsulated in the National Policy on Sustainability of Hydropower. The recently-approved IDA Technical Assistance for Capacity Development in Hydropower and Mining Project will address this need by applying the hydropower development lessons learned during the implementation of the NT2 and LEnS projects to further enhance the capacity of key sector decision makers in the country involved in hydropower development.

52. ***Ensuring the success of the NT2 Project requires continued vigilance.*** NT2 implementation to date has proceeded satisfactorily, but the ultimate success of the Project will only be known when the full set of environmental and social programs are implemented and the results measured. The Banks need to stay fully engaged in the coming years, particularly in the high-risk areas of conservation, livelihoods, downstream impacts and revenue management, and continue the emphasis on capacity building. In the post-COD environment, some changes in the supervision arrangements for the Project are appropriate and could lead to more efficiency of resource usage. Nevertheless, Management remains committed to providing the resources necessary to support effective supervision efforts in the years to come.

UPDATE FROM ADB ON THE THEUN-HINBOUN PROJECT**Background**

1. A public-private partnership, the Theun-Hinboun Power Company (THPC) Limited, was formed in 1993 to plan, finance, construct, own, and operate the Theun-Hinboun Hydropower Project (the Project) downstream of Nam Theun 2. It started operations on schedule in March 1998. The project is a trans-basin hydropower scheme diverting the Nam Theun by means of a dam consisting of a combination of radial gates, flap gate, and a weir. The flow is diverted through an underground tunnel to a 210 MW surface powerhouse and is discharged to the Nam Hai, a tributary of the Nam Hinboun. An 86 kilometer transmission line to the Lao-Thai border at Thakhek allows the export of power to the Electricity Generating Authority of Thailand (EGAT).

2. The Asian Development Bank (ADB) approved a loan of US\$60 million from the Asian Development Fund for the Lao People's Democratic Republic (Lao PDR) to implement the first joint-venture hydropower project with foreign investors. Electricité du Laos (EdL), the state-owned power utility, contributed 60 percent of the share capital, and two foreign investors, GMS Lao Company Limited (formerly named MDX Lao Company Limited) and Nordic Hydropower AB, 20 percent each. Assisting the transition to a market economy by supporting such private sector participation, ADB acted as the lead coordination agency for Government's negotiations with the foreign investors and provided legal and financial advice in the form of a technical assistance grant. As a result of significant cost savings in main civil works, mechanical works, and electrical equipment, the project was completed at a cost of US\$240 million, 11 percent below the appraisal estimate of US\$270 million.

3. THPC and EGAT signed a power purchase agreement (PPA) in 1996 for a guaranteed off take of 95 percent of THPC's power generation, which has ranged between 1,358 and 1,535 gigawatt-hours (GWh) per annum in the last five years; sales to EGAT have been about 97 percent of declared availability. It was expected that the existing power plant will generate on average 275 GWh per annum less after Nam Theun 2 started full impoundment of its reservoir in June 2008. In 2009, THPC generated 1,456 GWh, which is about 99.36% of the average generation in the last five years. This however, includes approximately 200 GWh resulting from water share agreement between NTPC and THPC for releases of water from the NT2 reservoir before its COD. The PPA between THPC and EGAT is based on the take-or-pay principle, has a term of 25 years from the start of commercial operation, and contains an option for renegotiating the tariff after 10 years. The tariff in the first year of operation was US\$0.0484 per kilowatt-hour, and increased by a fixed rate of 1 percent per annum after 1999. The payment is determined half in US dollars and half in Baht at a fixed exchange rate of US\$1.00 = B25.35. THPC later refinanced its commercial loans aligning the currency profiles of the debt payments with those of the revenues.

4. The power plant has achieved its intended purpose. It has been one of the largest foreign exchange sources in the Lao PDR up to recently. THPC's sales revenues increased from US\$42 million in 1998 to a high of US\$72.35 million in 2008. With the impoundment of Nam Theun 2

upstream, the revenues of the present facilities are expected to be maintained at about US\$56.00 million in the future until the Theun Hinboun expansion project (THXP) has been completed in 2012 (see paragraph 7). THPC's financial performance is very good. THPC has a healthy profit and maintains a comfortable debt-servicing capacity. The power plant generated a cumulative net income of US\$193.58 million from 2004 to 2009. THPC's dividend payments in the same period amounted to US\$165.85 million, of which US\$99.51 million went to EdL. In addition THPC paid about US\$3.38 million in royalties to the Government in 2009. In 2004 THPC started paying taxes. The profit tax payment for 2008 was about US\$5.79 million and about US\$5.13 million for 2009. Revenue sharing arrangements among the shareholders of THPC is as per the joint venture agreement, i.e., 60 percent for EdL on behalf of the Government and the remaining 40 percent equally shared between the Thai and Norwegian investors.

5. The feasibility study included an environmental impact assessment that was completed in May 1993, but due to the lack of baseline data on environmental and social impacts, the extent of these impacts was not properly understood; this resulted in some design weaknesses. The Project was funded and constructed before ADB had fully developed its policies on environmental and social issues, and the lack of baseline information was dealt with by postponing the study of impacts to the post-construction period. Physical relocation of persons was not anticipated, as the communities living in the project area mostly consisted of shifting cultivators. Therefore, the Project did not have a resettlement plan to systematically address income restoration and other social impacts. However, the environment impact assessment (EIA) did propose several community programs in the project area. During implementation and initial operation, it became apparent that the environmental and social impacts were more extensive than anticipated and various parties, including international NGOs, raised their concerns, such as: (i) the number of villages affected by the project increased from 21 to 57; (ii) loss of dry season riverbank gardens, which are an important source of food and income; (iii) loss of access to traditional fishing and fish breeding areas, which are an important protein source for villagers; (iv) erosion along sections of the Nam Hinboun, which caused loss of land and access to clean water supplies; and (v) loss of income by villagers due to delays by the company in taking action to solve the problems caused by the Project.

Agreed Action Plan to Mitigate the Social and Environmental Impact

6. To remedy the environmental and social problems, a 10-year mitigation and compensation program (MCP) was agreed upon in June 2000, and a new Environmental Management Division (EMD) was formed within THPC in 2001 to implement it. The MCP was comprehensive and ambitious, and tried to adopt best practices in terms of participation. The EMD addressed the issues raised in the MCP, which noted that approximately 3,000 families in 57 villages had been impacted by the Project. One of the first actions by EMD was the development of a management strategy in the form of a logical framework (Logframe) to implement activities to mitigate identified project impacts. A significant number of Logframe activities were initiated and show relatively good progress. THPC reported quarterly on the implementation of the Logframe on the following activities. The Logframe has now been merged with the THXP (see explanation below). The following activities were considered most critical for the Logframe:

- ***Community assessment and organization.*** Village development committees (VDCs) have been established and trained in 51 villages. To date all villages have been visited and VDCs and/or village working groups have been established to follow through with

the assessment work. Further training, leadership support and support for women's involvement will be carried out under the THXP. New VDCs have been established in villages that are impacted by Project construction activities from the THXP and new VDCs are being established in host village communities in 2009-2010.

- ***Social mitigation implementation.*** Savings and credit programmes have been established in 62 villages, and 48 livestock groups were established as of mid-2007. A number of these programs are being modified and improved under the THXP. These include the training and supervision of the Lao Women's Union in taking over the day-to-day running of the savings groups and the promotion of local banks in the area to provide loans to small enterprises and farmers.
- ***Water supply.*** More than 130 dug and more than 60 tube wells were completed, as well as four gravity fed systems, several water pumps for domestic use and gardens, and culverts by mid-2008. Under the THXP, all host and resettler households will have private taps and metres for clean drinking water in addition to piped communal water. The same system is being introduced to downstream and head-pond villages in phases with the aim of providing safe drinking water to all affected communities. THPC health and community development staff are working to establish water-user groups in all communities and will monitor performance.
- ***Health and sanitation.*** Village health volunteers were trained, and basic medicine kits, mosquito nets, and revolving medicine funds were provided in all villages by the original Project. Health Programs have been reviewed by a health expert as part of the Public Health Action Plan for the THXP. Under the THXP, one health centre has been fully refurbished and another completed, while two others are being completed with accommodation for health staff as of mid-2010. Training and supervision of district health staff is ongoing to assist them in achieving government health targets, such as vaccination coverage, diagnosis of common health problems and preventative medicine.
- ***Wild fishpond building.*** Six large wild fishponds with good fish yield following the wet season were built at the Hinboun area. Additional efforts have been made to expand these activities in the Nam Kading area. Under the THXP this program now covers all resettlement villages and has been expanded considerably for downstream areas. There is presently production of fishlings and frogs for distribution to communities.
- ***Savings and credit funds.*** As noted above, these were operating in 62 villages by mid-2007. This program has provided funds for various agricultural and income-generation activities as well as forming part of a compensation program and supporting dry-season irrigation.
- ***Gardens.*** House gardens were established in 54 villages with participatory land use planning, terracing where appropriate, and planting of fruit trees and vegetables. Support for these programs will continue under the THXP.
- ***Other activities.*** Other livelihood enhancement activities carried out in several villages include frog rearing, family fish ponds and training for livestock management. Some essential supplies have been provided to several schools. THPC runs a school and a health center adjacent to the power plants that are open to the public in the area.

Further Developments

7. THPC finalized a Technical Feasibility Study for the THXP in mid-2007. The Company signed the PPA with EGAT and a Concession Agreement with the Government in December 2007 and August 2008 respectively. Financial Close was achieved on October 8, 2008. The THXP consists of building a dam on the Nam Gnouang, a tributary of the Nam Theun upstream of the Theun Hinboun weir and power intake. The dam will create a reservoir of approximately 105 square kilometers that will regulate the river flows into the Theun Hinboun head pond and increase power output in the dry season. The THXP also includes increasing the installed capacity at the existing power plant from 220 MW to 440 MW for export to Thailand exclusively, and a hydropower plant of 60 MW at the new dam to sell electricity to EdL. The additional energy generated by the expansion project to more than double its present annual generation, when completed in 2012, will offset the reduced generation resulting from the reduced water releases from the NT2 reservoir starting in June 2008. Main civil works and electromechanical works contracts have been awarded and works are ongoing.

8. An expatriate Social and Environmental Division (SED) Manager is responsible for the execution of the Environmental and Social Plans of the new THXP, and has integrated the work of the former EMD with the proposed THXP mitigation plans as of mid-2007. A Draft Final Environmental Impact Assessment and Environmental Management and Monitoring Plan and a Resettlement Action Plan were approved by the Water Resources and Environment Agency on June 18, 2008. Consultations have been carried out on village, district, provincial and national levels. The final Public Information Meeting was held on November 29, 2007 in Vientiane. There is now a SED established with five units: Administration, Resettlement, Social Development, Downstream and Environment. Full implementation mode for this division was reached by mid-2008, ahead of construction, and more than 140 staff have been recruited. In addition, there are more than 20 government staff from various agencies working full-time on the project and an equal number providing regular support for implementation programs. VDCs have been established in all villages and new administration will be established in consolidated host-resettler villages and consolidated relocation sites in the downstream.

9. Regarding the THXP resettlement program, three sites have been identified and demonstration farms have been established, and village and housing designed in accordance with cultural practices has been completed in consultation with affected people. More than 70 formal and informal consultations have been carried out with the about 780 households to be resettled and three host communities. The first group consisting of 143 households from the proposed Nam Gnouang reservoir area resettled in February-April 2009 to Ban Nong Xong. This included vulnerable ethnic groups first so as to allow them longer time to adjust at the new site. An international ethnic minority specialist conducts regular visits of this group and THXP has one person dedicated to vulnerable issues. The second group consisting of 273 households from five villages is in the process of being resettled to two sites south of Laksao, Ban Soppouan and Phonthong. Sites were prepared in 2009 and relocation commenced in March 2010. The final group of resettlers from five villages will be relocated in early 2011 ahead of reservoir filling, completing the physical relocation of the project.

10. Five villages from the downstream areas on the banks of the Nam Hai and Nam Hinboun will relocate in 2010 to the Phou Mak Neng location. A further nine villages will be relocated to

three sites in 2011. All new sites are above 10-year flood events that include additional water from the THXP generation. Completion will be by May 2011 well ahead of any additional THXP impacts in this area. Residual impacts from the existing project will be incorporated into the livelihood restoration strategy with income targets to improve the standard of living in the downstream and through backward relocation if required. ADB has agreed with THPC that it will conduct regular safeguard missions for the duration of the construction activities, and has so far conducted due-diligence missions in December 2008, July 2009 and April 2010.