

# Nam Theun 2 Board Update: Project Progress during 2011

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## SCOPE OF THIS UPDATE

### **1. This Update<sup>1</sup> reports on developments in the implementation of the NT2 project during 2011.**

It is based on the findings of ongoing work of the field-based team; a comprehensive assessment of the Downstream Program that took place in February-March 2011; and a Joint Supervision Mission of the International Financial Institutions (IFIs) supporting the Project undertaken in November 2011. It follows the last Update to the World Bank and Asian Development Bank (ADB) Boards in December 2010. The NT2 power station has now been in full commercial operations since April 2010, and this Update takes stock of the current status of implementation, in the context of the Project's development objectives,<sup>2</sup> as well as drawing attention to the challenges ahead.

### **2. The Lao PDR economy continues to grow vigorously at 8 percent this year despite the impact of typhoons and slower growth in the global economy.**

The country's growth estimate was revised slightly downwards to 8 percent from an early estimate of 8.6 percent to account for (i) the adverse impact on agriculture by the typhoons Haima and Nock Ten during the second half of the year as well as the adverse impact of the current flooding in Thailand on Lao PDR's tourism and trade sectors; (ii) an upward revision of 2010 GDP due to a higher than anticipated output of electricity generation from the Nam Theun 2 power plant; and (iii) commencement of operations at the Nam Ngum 2 hydropower plant. The manufacturing sector is projected to grow at 15 percent driven by garment, construction materials, and food and beverage production.

### **3. The 7th National Socio-Economic Development Plan was approved in 2011 by the National Assembly, following the 9th Party Congress in March 2011.**

A new government structure was announced at the same time, including among other details, the creation of a new Ministry of Natural Resources and Environment. Structural reforms have witnessed some progress. The General Tax Law approved in June 2011 introduces a simplified presumptive tax regime, abolishes the minimum turnover tax, establishes a uniform corporate tax rate of 26 percent in line with regional practice and creates a level playing field for foreign and domestic businesses. The continued implementation of Treasury centralization reforms and the Government Financial Information System has improved budget monitoring and controls in FY10/11. The Government has also commenced work to launch an electronic trade portal as part of efforts to improve transparency in the provision of trade related information. In October 2011, the government launched one-stop service for investment registration in order to reduce time and procedures for business registration. Under this new service business licenses procedures are streamlined and simplified.

### **4. 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 and related work. It also reflects on progress towards the Project's social and environmental objectives and pays particular attention to the results of the Mid-Term Review of the Downstream Program mounted by the IFIs in February-March 2011. Finally, the Update looks ahead to key challenges, as well as project supervision and monitoring

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<sup>1</sup> The World Bank and the Asian Development Bank (ADB) have agreed to keep their respective Boards of Executive Directors informed about NT2 implementation through joint reporting. The Project was approved by the Boards of the World Bank and the ADB on March 31 and April 4, 2005, respectively.

<sup>2</sup> 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.

needs, highlighting issues that warrant continued attention during the ongoing commercial operations phase of the Project.

## **PROJECT IMPLEMENTATION PROGRESS**

### **5. The official NT2 inauguration ceremony took place in Khammouane Province, Lao PDR on December 9th, 2010.**

Following many years of consultation, planning, and construction, and about 8 months after the start of commercial operations, the Nam Theun 2 Project was officially inaugurated in December 2010 in Khammouane Province, Lao PDR. Lao PDR's President, H.E. Choummaly Sayasone, together with the Thai Prime Minister, H.E. Abhisit Vejjajiva, as well as the President of the Asian Development Bank, Mr. Haruhiko Kuroda, and the World Bank's Managing Director, Mrs. Sri Mulyani Indrawati, joined representatives of international organizations, private companies and diplomatic missions at the Nam Theun 2 Power Station to participate in the ceremony. The Government of Lao PDR again confirmed the importance of the project to the country's development. President Sayasone expressed his gratitude to the World Bank, Asian Development Bank and other financial institutions and development agencies for their ongoing work on this project and highlighted that the people of Lao PDR take great pride in witnessing the Nam Theun 2 development as one of the most important projects in the country.

## **Operations and Maintenance**

### **6. NT2 is now in its second year of commercial operations.**

NT2 construction was completed in October 2011 with issuance of a Certificate of Completion for the Head Construction Contract (HCC). Residual issues from the construction phase have been brought to closure and the Head Construction Contract (HCC) is now in the Defects Notification (warranty) Period, which expires on 4 April 2012. Various contractual matters between the Head Contractor and the Nam Theun 2 Power Company (NTPC), which are to be expected in a project of this scale, continue to be worked through in a constructive manner as they arise. NT2 revenues (from the sale of up to 1000 MW of electricity to Thailand) are flowing, and slightly exceed planned revenues, and being used for poverty reduction and environmental protection around the country in accordance with the Revenue Management Arrangements. NT2 is also providing up to 80 MW of electricity for domestic use in Lao PDR.

### **7. All six generation turbine units are fully operational.**

The four Francis Units (for export power of power to Thailand) and one Pelton Unit (for domestic power generation) were taken over (by the Operator, from the Head Contractor) before Commercial Operation Date (April 2012) and the second Pelton Unit was taken over on in September 2010. Annual operational targets for supply both to the Electricity Generating Authority of Thailand (EGAT) and Electricité du Laos (EDL) during 2010 were reached and Excess Supply was delivered to EGAT, which provides a cushion against possible shortfalls in generation in the future. Operating and maintenance costs are within budget and the Project generated net operating profits for the year 2010, as expected.

### **8. During 2010 NTPC transferred to Government of Lao PDR over US\$102 million worth of project-related assets.**

These include over 270 km of roads, 29 km of transmission lines (115 kV), community facilities such as schools and health centers, agricultural facilities, and water supply systems. GOL is now responsible for the operation and maintenance of these public assets. A key challenge going forward will be to ensure that adequate budget is allocated towards long-term maintenance so that the full productivity of the

assets can be sustained. Maintaining these assets is expensive, and in the absence of a dedicated budget, little maintenance has been carried out by GOL on project-related roads since handover (which occurred progressively during the October-November 2010 time period). The IFIs have recommended that GOL prepare a long-term strategy and budget for road maintenance, together with the necessary budget allocations, consistent with national road maintenance approaches, to ensure effective and timely maintenance of roads. The World Bank and the Asian Development Bank have indicated their readiness to work together with all concerned parties – including the Ministry of Energy and Mines, the Ministry of Public Works and Transport and NTPC – to identify effective approaches for long term maintenance of the NT2 project-related roads, perhaps as part of a broader approach to the maintenance of large infrastructure investments.

#### **9. Several extreme rainfall events impacted the project during the 2011 rainy season.**

Rainfall was extremely high during 2011, with accumulated precipitation up until the beginning of October surpassing the total rainfall in any year since local records began in 1995. According to NTPC's hydrological models, rainfall exceeded a 1 in 1000 year event more than once during the rainy season. The heavy precipitation had some impact on operations, including the need to temporarily halt generation to avoid exacerbating the natural flood in the Xe Bang Fai (see below), as well as some damage to project infrastructure from earth slippage and erosion. At the same time, the rainy season has ended with water levels in the reservoir at the Full Supply Level, which helps to secure the generation potential for the remainder of the dry season (i.e. until around May 2012).

#### **10. As a consequence of the severe weather, there was almost no NT2 generation during August 2011, but annual supply targets are still likely to be met.**

As a result of heavy rainfall and rising water levels in the Xe Bang Fai, NTPC stopped power generation from 2 to 17 August 2011 in accordance with the Concession Agreement (CA), which requires NTPC to cease water releases (and therefore power production) once water level in the Xe Bang Fai at Mahaxai reached a pre-defined threshold. The storm events also resulted in ground slippage that severely damaged the foundation of one of the 500 kV transmission towers, which required dismantling of the tower and its replacement with temporary towers. To accommodate this emergency repair, the 500 kV transmission line had to be placed out of service from August 18 to 31. Despite the lack of generation in August, energy generation met the annual target for supply to EGAT since high availability of the Francis Units has resulted in sufficient accumulated generation. There is also "excess" energy from earlier generation that has been "booked" as a reserve which can be applied at a later date in case of shortfall.

#### **11. At the same time, some additional generation was possible for EDL using available excess water.**

The NT2 power purchase agreement provides for an annual average of 95% of energy to be supplied to EGAT and 5% to EDL. Strong economic growth in Lao PDR has led to high demand for additional domestic power, and EDL is interested in purchasing extra power from NT2 should it be available. During the last rainy season EGAT agreed to let EDL generate additional power via the Pelton turbines during periods when water was being spilled over the dam. An additional 75 GWh was generated for the Lao grid during this period.

#### **12. A number of NT2-improved (and now government-owned) roads suffered storm damage.**

Extreme rainfall during 2011 resulted in significant impacts – including landslides, erosion and floods – that affected roads and other project infrastructure. The rainfall quantity and intensity of the extreme events largely exceeded design limits for the roads. Road B3, which runs from the Powerhouse to Oudomsouk, was damaged by impacts including landslide and erosion undercutting; and damage to Road D, which runs from Oudomsouk to Ban Thalang, came as a result of impacts including three areas of major earth slippage. The roads will need to be repaired and reinstated to satisfactory operational condition prior to the onset of the next wet season (circa May 2012).

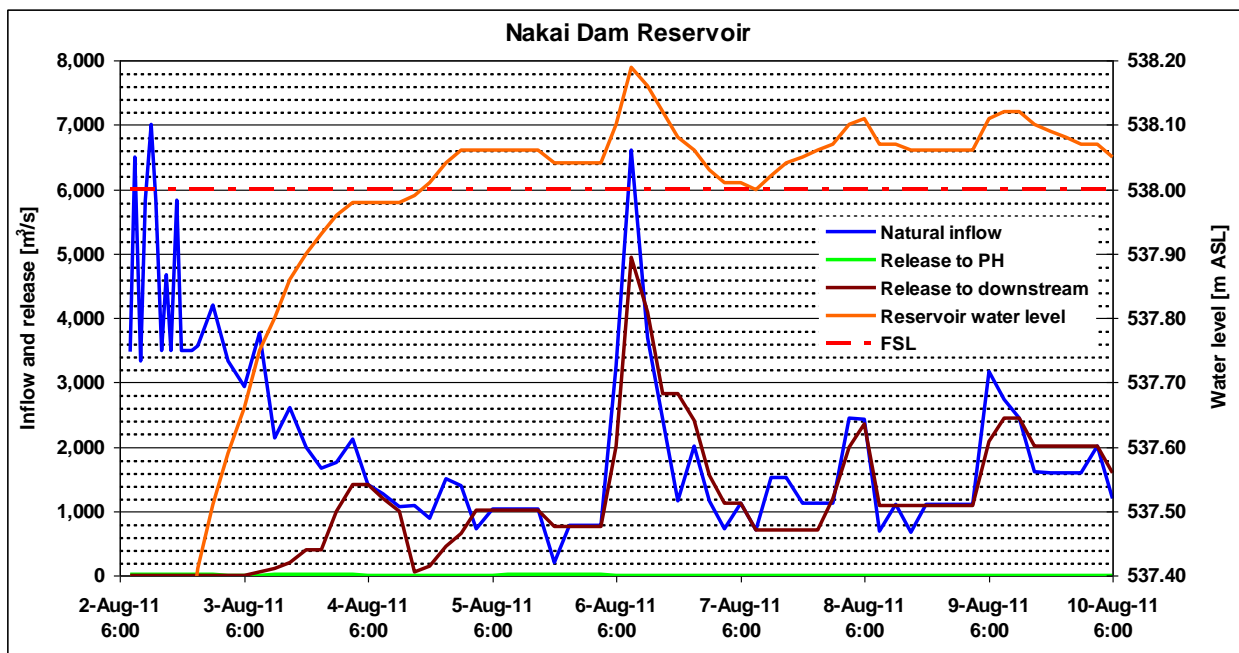
### 13. NTPC and GOL are working out arrangements to repair the roads.

Emergency work to make the roads safe and passable pending repairs was carried out by NTPC at the request of the Government. However, major repairs are still needed to fully reinstate the roads, and GOL and NTPC are currently discussing the best way to achieve this prior to the next wet season. Since all project-improved roads have now been handed over and are under GOL control, maintenance and repair of roads is now the responsibility of GOL, and they are also no longer covered by NTPC insurance policies. The extent to which GOL is fully liable for the repair costs will depend on the extent to which road failures might be due to design faults, poor construction; and/or poor maintenance. While the detailed arrangements are still being worked out, the IFIs agree in principle to the approach outlined thus far, which places priority on achieving the needed repairs and then dealing with sorting out causes, liabilities and cost allocations. WB and ADB are monitoring the situation and urge the parties to agree to a solution as soon as feasible.

### 14. The extreme weather events of the 2011 wet season demonstrated the effectiveness of dam safety and water release protocols.

Three major rainfall events occurred in the Project catchment area during the 2011 rainy season. Two of these were successfully absorbed or mitigated by the reservoir, but the third one (October 1, 2011) triggered activation of the Emergency Contingency Plan (ECP), with the need for rapid release of water in the Nam Theun downstream of the Nakai Dam as the reservoir reached its full capacity. Despite these being extreme events, flows were within design limits and releases were carried out in accordance with operating procedures and in compliance with the CA. As it is indicated on the chart below, during one incident of the extreme weather event (August 2, 2011), the reservoir absorbed the flood event entirely while during the second weather event (August 6, 2011) project water releases mitigated the extreme fluctuations of the incoming flow and therefore reduced, rather than exacerbated the impacts of the natural flood. While the water release from Nakai Dam caused no loss of life or injury, it did impact on property in downstream of Nakai Dam villages. Since the followed operating protocols were in compliance with the CA and did not exacerbate the natural flood, the project is not liable to pay compensation, although discussions with government about how to help affected villagers is continuing.

NT2 Reservoir: Nakai Dam Water Release Management August 2011 (Chart prepared by NTPC)



### **15. The ECP event in October 2011 provided the first practical experience with activating the Emergency Contingency Plan for the Nakai Dam.**

While the technical aspects of water release management worked well, Government, NTPC and the IFIs believe that communications protocols require further work in order to ensure that all stakeholders are fully informed. The IFIs have suggested to Government and NTPC that they agree on such a communications protocol prior to the next rainy season.

### **16. Visits of the Environmental and Social Panel of Experts (POE) continue.**

The POE undertook its 17<sup>th</sup> visit in November 2010. The Panel's report recognized continued progress in implementing the Project. The Panel also noted a number of concerns in its report, particularly around the need to strengthen protection of the Watershed from external pressures. A follow-up visit in February 2011 (visit #18A) focused on the conservation of the Watershed areas and the POE made a number of recommendations aimed at strengthening the Watershed Management and Protection Authority (WMPA) and suggested ways to support the implementation of Prime Ministerial Decree #471 on the Management and Protection of Nakai Nam Theun National Protected Area and Nam Theun 2 Watershed Area. This new Decree updates and augments the previous Decree #39, which established the protected area, *inter alia*. A complementary visit (#18B) was undertaken in June 2011. The POE's report makes a number of recommendations aimed at continuous strengthening of the sustainability of the Nakai Plateau program, including for the Village Forestry Association (VFA). Beyond that, the POE encouraged the Government, NTPC and the IFIs to work together to realize the broader (beyond NT2) potential of the Xe Bang Fai river basin, and ensure the sustainability of the downstream program as it is handed over from NTPC to government during 2012. The POE reports are available on the Government and NTPC websites.<sup>3</sup>

### **17. The International Advisory Group (IAG) undertook its tenth and final visit in April 2011.**

World Bank management and the IAG agreed that since the project was moving into a new phase the tenth IAG mission would be its last. The social and environmental monitoring role of the IAG would be continued by the Panel of Experts, while oversight of the Revenue Management Arrangements would be continued by the relevant member of the IAG as an individual consultant to the World Bank. During the preparations for the final IAG mission, the Project asked for feedback concerning the governance and institutional arrangements for NT2, sustainability, and potential lessons for hydropower elsewhere. The IAG 10th Report addresses each of these issues. The IAG finds that the institutional arrangements for the NT2 project are broadly sound, and have provided for effective coordination across different ministries, and between national and local governments. More specifically, the IAG report suggests that some of the project specific structures, such as the Resettlement Management Unit, will need to be maintained in the medium-term, and offers important lessons for how the Government of Lao PDR might manage similar projects in the future. The IAG report addresses a number of areas where it suggests that lessons from NT2 might be applied to national approaches, or where it identifies the difficulties of making progress on NT2 in the absence of broader national progress (such as in community forestry models or protected area management). The IAG also makes recommendations about improving the prioritization and management of hydropower projects more broadly. The IAG's reports are available on their website.<sup>4</sup>

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<sup>3</sup> The Government's website is: [www.poweringprogress.org](http://www.poweringprogress.org). NTPC's website is: [www.namtheun2.com](http://www.namtheun2.com).

<sup>4</sup> The IAG's website is: [www.nt2-iag.org](http://www.nt2-iag.org).

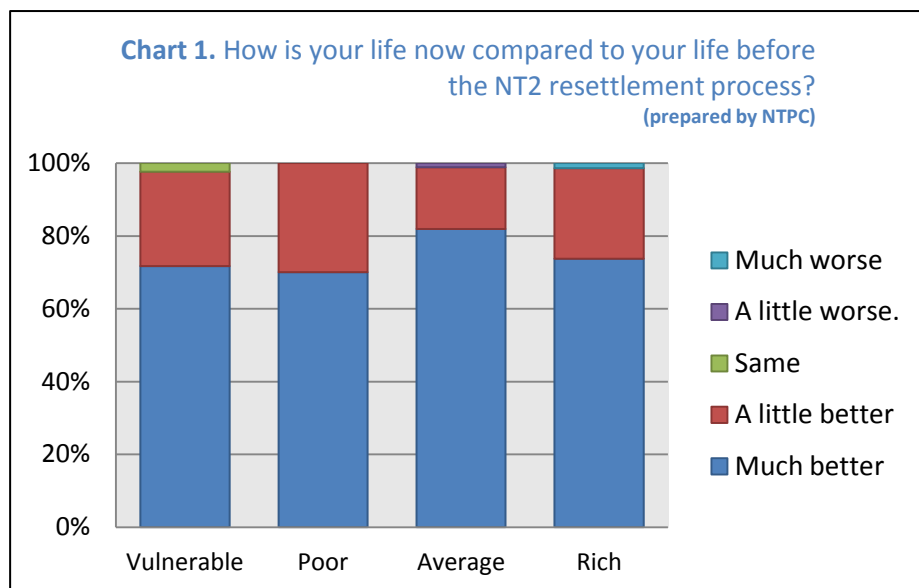
## Environmental and Social Aspects

### Nakai Plateau

#### 18. Environmental and social objectives remain important, and will continue to be key focus during the operations phase

Many villages and households have already reached or surpassed the project's income targets, but progress is uneven. The resettlement program continues to register positive progress on post-resettlement livelihood restoration and movement towards income targets set in the CA, and efforts remain focused on making new livelihoods sustainable. An extensive livelihood monitoring program is in place, and available socioeconomic data shows that resettler income is clearly above the baseline income levels (see a fuller discussion of these issues in the "Nam Theun 2 Resettlement: Taking Stock at the Halfway Point 2010", a publication available on the World Bank website<sup>5</sup>). While full analysis of recently-collected survey information is expected to be available later in 2012, initial results indicate that specific quantifiable income targets for households have already been met for almost all people (of the roughly 6,300 resettled people on the Nakai Plateau). The data also shows that very high

proportions of resettled people still consider themselves better off following resettlement (see Chart 1). However, there is considerable variation in incomes across villages, households, and time. NTPC intends to undertake further work to better understand why that is the case. The livelihood improvement targets (representing a significant increase over baseline income levels)



in the Concession Agreement (CA) are due to be measured in 2013 in order to judge whether the contractual Resettlement Implementation Period can come to an end. The POE's opinion will be an integral part of that decision.

#### 19. A safeguard compliant package of both permanent and interim compensation and support was provided to all resettler households several years ago.

Thus, all resettlement households have received compensation that goes beyond what they lost due to the project. However, the Board Update in July noted some ongoing items of compensation and entitlement, which were addressed promptly. In addition to the standard compensation package for all resettlers, the CA provided additional compensation for those who had lost fruit trees and paddy fields. Compensation for these items was completed in early November 2010, except for outstanding cases where there is a dispute over the amount or when there has been a change of domestic circumstances, such as death, divorce or people moving out of the area. A process is underway to resolve these cases. A figure of 555 buffaloes that died due to project-related impact was finally agreed between the Nakai

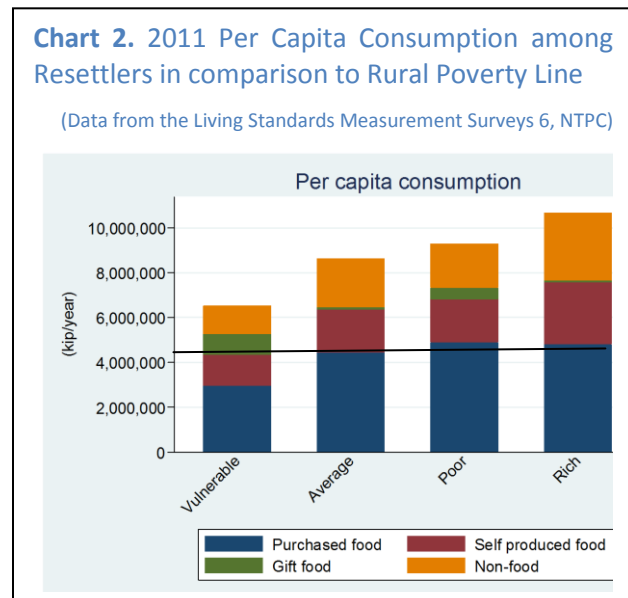
<sup>5</sup> The publication can be found on the World Bank's website at [www.worldbank.org/laont2](http://www.worldbank.org/laont2)



District, NTPC and the Resettlement Committee. NTPC transferred funds to the Resettlement Management Unit and district authorities have been visiting eligible households to discuss individual payments.

**20. Solid progress has been made on developing livelihoods to meet project income target and problems are being addressed when they are encountered. This requires close attention for a number of years to come.**

Recent socioeconomic monitoring survey results suggest that all but two households in the survey sample are now above the rural poverty line in Lao PDR, which is the relevant NT2 income target. This suggests strong progress towards meeting the NT2 socioeconomic targets, which are due to be measured in 2013, five years after relocation. Chart 2 below shows the average per capita consumption is well above the rural poverty line for all wealth groups, as well as a move from self-produced to purchased food due to more diverse sources of income. Although consumption and income levels indicate positive trends of resettlers living, it is important for the Project and Government agencies to stay focused on building support mechanisms for the most vulnerable households and enhance the sustainable management of current and future sources of incomes. While the Project's legal commitments are focused on income targets, there is increasing recognition that selected households will always find it difficult to remain above poverty lines for a variety of reasons largely beyond their or the project's control, such as single elderly households and people with disabilities. NTPC, government, the IFIs and the POE will continue to discuss the appropriate long-term and sustainable solutions to this challenge, while building on traditional family and community safety nets, as well as avoiding encouraging project dependency among those who can reasonably take care of their own livelihoods. While the focus on sustainable livelihoods is the core part of the resettlement program, important progress is also being made in improving access to services on the Nakai Plateau. Table 1 compares access to education among resettler villages and national average of villages in comparable villages.



**Table 1. 2011 Access to Education among Resettlers in comparison to National Averages for Rural Villages with Road Access**  
(Data from the Living Standards Measurement Surveys 6, NTPC)

	Nakai Resettlers (2011)	National average: Rural villages with road access (2006)
Early childhood education attendance	38%	2.4%
Primary age attendance	91%	80%
Lower secondary age attendance	74%	29%

**21. Fisheries continue to contribute strongly to resettler livelihoods and remain one of the most important sources of income for people.**

Reservoir fisheries catches indicates stabilization at lower levels after an initial windfall period, although still considerably above levels caught in rivers prior to the project. Daily fish catch monitoring is undertaken, and fish species remain reasonably diverse, although some have experienced reductions.

The priority now is to strengthen the enforcement of fisheries regulation on the reservoir, a task that involves both affected communities and local government. Institutional capacity building for local authorities will be critical to ensuring better protection of the fishery resources. Fisheries co-management is underway and Village Fisheries Groups (VFGs) have agreed on boundaries that divide fisheries management responsibilities between villages (accomplished through the PLUP process). Continued efforts are needed to keep fish stocks robust, preserve fish habitats, and ensure that sufficient institutional capacity exists to undertake monitoring and enforcement efforts. Furthermore, efforts should continue to strengthen fisheries co-management institutions, particularly with regards to building capacities of the VFGs, the Reservoir Fisheries Association and the Reservoir Management Secretariat (RMS).

## **22. The emphasis on livelihood development continues with other livelihood pillars contributing to resettler income as well.**

Non-timber forest products as well as livestock remain important to many households. There appears to be a welcome trend towards more sustainable raising methods (cut-and-carry fodder versus free-roaming grazing, mineral inputs and vaccination) for large livestock, and this is important since the numbers are near the carrying capacity for the Plateau. Finally, agriculture remains one of the key elements for many resettler livelihoods. Irrigation infrastructure in all villages, as well as construction of complementary gully dams to improve the water table next to the reservoir drawdown zone have now been completed. Water User Groups have been established and trained in all the villages. Rice yields are coming in well above pre-resettlement average production levels.

## **23. Significant progress has been made on Participatory Land Use Planning (PLUP) and land allocation, but refinements continue.**

All villages have now completed the PLUP process, which clarifies village boundaries, land zoning and land use rights, all of which are important to livelihoods sustainability and resource protection/enforcement. Village boundaries have been finalized and additional areas of agricultural land identified in consultation with communities and district authorities. Next steps in the process will include final boundary demarcation and allocation and titling of land to entitled households throughout the Plateau. Resettlers have already accessed the additional agricultural land (beyond the 0.66 ha), and there has been a substantial increase in clearance and cultivation activities (with early reports of a good harvest). Additional information will need to be gathered to enable monitoring on how much additional land is being cultivated and by how many households as well as the level of productivity of that extra land.

## **24. Securing the natural resource base remains important to support achievement of sustainable households.**

There is ongoing pressure, particularly on resettler forestry resources. External investors are expressing interest in buying resettlement land in the Village Forestry Association (VFA) area or on reservoir islands. A 10-year prohibition on such land sales is largely addressing this risk, but the issue remains both a community challenge and an enforcement challenge. Continued vigilance will be needed on this matter, and GOL's leadership in refusing such requests (in order to preserve resettler rights and resources) is applauded by the IFIs. Also, continued GOL support for local enforcement efforts is needed to reduce opportunities for resettlers to engage in small-scale cutting and trading of hardwood timber (either from the Watershed or VFA areas), which is tempting because it is lucrative and there is strong outside demand. A concept on communal land titling has been recently agreed by the provincial government and fully supported by NTPC as a next step and a means to secure collective right to land use and enable resettled villages in Nakai to protect their natural resources.

**25. Work on improving functions of Village Forestry Association (VFA) continues and strengthening its capacity remains a priority so it can continue to contribute sustainably to resettler incomes.**

The Village Forestry Association paid dividends of approximately US\$200,000 (roughly equivalent to US\$150 USD per household in 2010. A further dividend payment for 2011 in the amount of US\$200,000 is being held in VFA accounts and will be made as soon as the VFA has clarified its legal status (see below). Payment in 2011 will be made on a per shareholder basis (all resettlers, including children, are stakeholders); therefore, this year payments at the household level are expected to vary depending on the number of household members. Beyond this, the VFA is poised to finalize its new legal status as a limited liability company owned by the resettlers, and needs to ensure that a planned five-year extension of its contract with a timber processing company results in a fair deal for resettlers. At the same time, VFA faces continued pressures which include threats to its resources such as illegal timber harvesting on its land (which reduces the timber it can harvest for sale to generate dividend income for the benefit of resettlers). Effectively protecting the forest resources and strengthening the capacity of the VFA remain key priorities for the project as VFA dividends are an important long-term income stream for all resettlers, particularly for the vulnerable ones with limited labor opportunities. Significant progress has been made following the recommendation of POE to stop and remove all non-VFA sawmill operations on the Nakai Plateau. The last remaining non-VFA sawmill on the Plateau is expected to be closed in the next several months.

**26. Water quality monitoring on the reservoir and across downstream areas is functioning well, allowing a quick response to any emerging issues if they arise.**

Water is sampled by NTPC regularly at multiple locations and certain water quality monitoring data is now publicly available on NTPC's website. All parameters of reservoir water quality are closely monitored and thus far remain within applicable standards. Levels of dissolved oxygen (DO) in the reservoir continue to vary by area and season. Anoxia (lack of DO) is present in the area of the reservoir near the Ban Thalung bridge in the dry season but has not resulted in impacts to fish. In general, the reservoir remains a good environment for fish. Water released from the powerhouse travels across various aerating structures and the aeration weir in the Downstream Channel, which help keep the water oxygenated. Even after large releases following extreme rainfall events, when reservoir turnover may bring water low in DO to the surface, the water downstream was not found to be anoxic.

**27. NTPC's Aquatic Environment Laboratory is measuring Greenhouse Gas (GHG) emissions from the Nakai Reservoir.**

Measurements include methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and carbon dioxide (CO<sub>2</sub>) emissions from the reservoir. Emissions (which escape by bubbling out or via diffusive flux from the reservoir as well as from the drawdown area and degassing and diffusion downstream) originate from organic matter contained in soils and/or from biomass. The vast majority of methane emissions are found to be generated from decomposing organic matter already in the soil, with fresh biomass contributing relatively little to the overall release. The vegetation in place at the time of impoundment appears to have only a very small additional impact on GHG emissions. Removal of vegetation from the reservoir before impoundment appears therefore to be of little importance on GHG emissions; however, it may have an impact on water quality. Similarly, although there was concern about the GHG impact by cyclical flooding and exposure of the drawdown zone, this also appears to have little impact on GHG emissions. Research is ongoing and more detailed findings will be available in the future. As part of similar work on another reservoir in Lao PDR, the data suggests that the Nam Ngum reservoir, some 40 years old, now acts a carbon sink, as it absorbs more carbon than it emits.

## Downstream Areas

### **28. A Downstream Program is in place to address NT2 impacts in the Nam Theun and the Xe Bang Fai river systems.**

The NT2 “Downstream Areas” designation covers three zones: (i) downstream of the power station, including around 150 villages along the Xe Bang Fai River and in its hinterland which are impacted by increased water flows; (ii) downstream of the Nakai Dam, including 38 villages along the Nam Theun River, which are impacted by reduced flows; and (iii) upstream of the reservoir, including 31 villages in the Watershed area (discussed in the Watershed section of this Update) which are impacted by backwater from the reservoir. Implementation of the Down Stream Program (DSP), according to a mutually agreed plan, is the joint responsibility of the Government and NTPC. The CA provides for the DSP to operate to continue for five years after Commercial Operations Date (April 2010), which would be April 2015. However, NTPC’s contractual obligation is limited to US\$16 million, plus specific monitoring programs. IFI grant and loan agreements (concluded between the GOL and IFIs) require the government to continue implementing key DSP programs in the event that the US\$16 million runs out prior to program completion.

### **29. Nam Theun downstream impacts, underway since the closure of the diversion tunnel in 2008, have been addressed.**

NT2’s site selection meant that there were no villages immediately downstream of the dam. The combination of a steep river bed with numerous rapids, reasonable water quality, and the riparian flow released at the dam, and natural tributaries joining the Nam Theun, all reduced negative impacts on downstream communities. Project monitoring to date suggests that impacts have been very limited on villages downstream of the dam wall, and implementation of the compensation program is now complete.

### **30. Xe Bang Fai Downstream impacts are in line with or less than levels anticipated.**

The onset of commercial operations brings with it significant new flows of water into the Xe Bang Fai River, and close monitoring is in place. Downstream impacts have so far been in line with or less than those anticipated. However, it is likely that impacts will continue to evolve over the medium-term and need to be closely monitored.

### **31. A joint World Bank and Asian Development Bank Mid-Term Review (MTR) of the Nam Theun 2 Downstream Program (DSP) took place in February 2011.**

The MTR focused on the areas downstream of the powerhouse (largely the Xe Bang Fai), and aimed to take stock of impacts, assess the ongoing relevance of the downstream program, and identify mitigation, compensation and livelihood restoration activities involve people living along the XBF mainstream, from just upstream of the junction of the Nam Gnom (approximately 11 km upstream of the confluence with the Downstream Channel) down to the Mekong River. It includes villages not located along the XBF mainstream but who rely on the Xe Bang Fai for fish or aquatic products. The MTR was undertaken in early 2011 for two main reasons: (i) Significant impacts from the project on the XBF area only started with the onset of commercial operations in March 2010, providing a first opportunity to review the DSP while taking actual impacts into account; and (ii) NTPC indicated to Government and the IFIs that their US\$16m budget is expected to be fully utilized by late 2011 or early 2012. The IFIs therefore need to agree with Government and NTPC about how their mutual obligations should be best addressed and coordinated in the future.

### **32. The midterm review found that, one year after commercial operations began, NT2 impacts are broadly in line with what was expected.**

In some specific areas, such as water quality, the impacts are clearly less than some of the scenarios considered. However, it is too soon to assess the full extent of NT2 impacts, and it is expected that

impacts will continue to evolve – and ecosystems and people to respond – for several more years. MTR specific findings on impacts are described below:

- An extensive water quality monitoring program that is in place indicates that, in general, **water quality** has been better than anticipated. Two key factors affect the water quality released from the Downstream Channel into the XBF: water quality in the reservoir at the point of extraction to the powerhouse; and the effectiveness of the aeration structures in the Downstream Channel. Water quality data indicates that, at the intake point on the Nakai reservoir, water quality has been better than anticipated for a new reservoir, while downstream aeration structures improve measurably water quality. Monitoring results indicate that water quality in the Xe Bang Fai downstream of the Downstream Channel meets national water quality standards, as well as recognized criteria for supporting aquatic life. However, it is important to recognize that the broader characteristics of the water in the XBF has been impacted by the project, most obviously in volume and flow rates, but also in temperature and color. Villagers, for example, consistently report that the appearance of the water has changed, mainly during the dry season when the proportion of reservoir water is high.
- As previously reported, a small percentage of people directly exposed to contact with Xe Bang Fai water developed a **skin rash**, which, while not a health risk, causes discomfort. Incidence became known and peaked in mid May 2010. In collaboration with provincial health authorities, NTPC responded quickly which resulted in a swift decline. Only a few new cases were reported in 2011. The rash has been under investigation by NTPC, local health authorities, as well as by international experts, and investigations continue. Some cases have been discovered upstream of the Xe Bang Fai in the areas where the problem is clearly unrelated to NT2 operations.
- **Riverbank garden** impacts have been consistent with predictions, with some additional impacts in tributaries due to backwater effects. The compensation process for 3,180 eligible households is complete, and the project is now working through the grievances that have been filed (related to inclusion in the program, amounts of compensation etc.). The extent of reduced use of the riverbank gardens varies between households. It was also observed that some riverbank gardens have been re-established at a higher level.
- Impacts on **fish-catch** have varied along the river. Emergent losses after the first year of operation of average household fish catch in the XBF mainstream were broadly within the anticipated maximum impact range stated in the SDP. Mainstream catches have been down along the Xe Bang Fai with a stronger decrease near the Downstream Channel confluence, and there are still no fish kills reported. Monitoring suggests that the reduced fish catch is due to a combination of fish being harder to catch in larger amounts of rapidly flowing water, as well as reduced fishing effort.
- All **boreholes** planned for riparian villages have been provided. A monitoring and maintenance process is in place to deal with mechanical or water quality problems as they arise. To address groundwater quality problems, sand filters are being put in place where required as a way of reducing naturally-occurring high levels of iron, and replacement boreholes are drilled for solving turbidity or salinity issues.

### 33. The MTR concluded that the strategy of supporting broader livelihood programs that benefit entire communities continues to make sense.

The design of the NT2 downstream program was debated extensively during the project preparation process, as well as when the DSP implementation plan was developed, approved, and disclosed. Global experience shows that hydropower development can have significant impact on downstream communities, and that designing effective mitigation and compensation approaches can be challenging for several reasons:

- **Uncertainty:** While high quality and comprehensive environmental and social impact assessments are important, the exact range and extent of impacts can only be known after the fact;
- **Timeframes:** Impacts will change and evolve over time as ecosystems and people react to changing circumstances;
- **Attribution:** While some impacts will be direct and clear, it may be the case that hydropower operations have only an incremental impact on an already changing environmental and social system;
- **Household vs. Communal impacts:** Some impacts are directly on household assets, while others are on communal assets – which present substantial practical challenges to effectively and fairly measure impacts, and agree with communities on different approaches to mitigation and compensation;
- **Cumulative impacts:** While each specific impact may be important, it is also important to recognize that the combination of different impacts may have a cumulative effect on ecosystems or livelihoods.

The DSP therefore identified some specific and measureable household level impacts (such as on riverbank gardens) and provided for direct compensation for them, but the majority of the program was designed to encourage sustainable livelihood development in downstream villages through village funds, agricultural extension, community development processes and so forth. Such a design enables the DSP to deal with varying timeframes of downstream impacts; avoids the need for lengthy and costly debates about who is losing what, over what period, and who should be responsible; avoids intra-community conflict over differential compensation; and addresses cumulative impacts.

#### **34. It is therefore important that the DSP move into a new phase.**

The downstream program needs to evolve from a NTPC-managed one that emphasized mitigating short-term project impacts to a set of mainstreamed government livelihood programs for all residents in these areas that primarily focus on sustainable local socioeconomic development. Furthermore, NTPC's US\$16m budget for the DSP will be fully utilized by approximately early 2012, and responsibility for the program will shift to the Government. This will require that relevant government agencies have sufficient capacities to take over responsibilities from NTPC and that they are provided with sufficient resources. The MTR mission discussed and agreed with relevant local authorities and NTPC on a detailed strategy to help ensure an effective transition, with NTPC, Government and the IFIs all contributing to the handover process.

#### **35. In line with the Concession Agreement and the Financing Agreements with the IFIs, responsibility for managing ongoing livelihood programs downstream of Xe Bang Fai will need to transition from NTPC to Government. NTPC, Government and the IFIs have all begun to contribute to a handover process.**

Following the MTR, broad agreement was reached on the following: (a) **NTPC** would ensure that all direct mitigation and compensation are completed prior to the end of 2011 and would provide additional funding (going beyond its legal obligation of US\$16m) to: (i) ensure that all villages impacted by NT2, as identified in the latest Annual Implementation Plan, are covered by the DSP; and (ii) extend the timeframe of their team in downstream areas to enable an effective handover process to Government; (b) **GOL** would: (i) take over direct management responsibilities for mainstreamed livelihood programs in the NT2 downstream areas; and (ii) continue a specific NT2-related monitoring, grievance management and coordination capacity through the Resettlement Management Unit until the end of the downstream program period in 2015; and (c) the **IFIs** would support Government in ensuring the appropriate institutional arrangements, capacities, and resources are in place for Government to

effectively take over programs and assets associated with the DSP, and to ensure continued improvements in livelihood opportunities for communities around the Xe Bang Fai.

**36. To date good progress is being made on DSP implementation and towards the handover of the program from NTPC to the Khammoune Provincial Government.**

The NTPC Board approved an additional budget for the DSP to enable the extension of key parts of the NTPC DSP until the end of 2012, including complete coverage of all agreed villages and an orderly handover process to Government. National government created an NT2 Handover Committee to guide the process, while local government has developed a detailed plan and clarified implementation arrangements to guide their own role. Furthermore, the IFIs are working to extend current projects (for the World Bank, the Khammouane Development Project, and for the ADB, the Smallholder Development Project) that help to strengthen capacity at the provincial and district levels as part of broader programs.

## **Watershed and the Environment**

**37. Government is making progress in strengthening the authorizing environment for the NT2 Watershed and Nakai-Nam Theun National Protected Area.**

The last Board Update noted the need to strengthen the authorizing environment for the protection of the NT2 Watershed. Since then Government has passed Prime Minister's Decree 471 that strengthens the authorizing environment for the Watershed Management Protection Authority (WMPA), clarifies its boundaries, and more closely aligns it with the administrative systems of government in Lao PDR. The WMPA is also currently finalizing the second Social and Environmental Management Framework and Operational Plan (SEMFOP II), which once approved by its Board, provides a five-year planning framework for the authority. SEMFOP II incorporates updated thinking about prioritizing enforcement efforts around particularly sensitive areas of biodiversity, and also incorporates the Watershed Access Restriction Framework that was a requirement of the Concession Agreement. A final draft of the SEMFOP II was shared with the POE, NTPC, and the IFIs for comments in late 2011, and should be approved by the WMPA Board in early 2012.

**38. Securing the Watershed is a long-term challenge.**

While there is some important progress being made by the Government and WMPA, the watershed will remain under long-term pressure – including poaching of high-value hardwoods and wildlife – because of its valuable biodiversity. At the moment pressure is primarily from those living outside of the watershed, both from across the border, as well as within Lao PDR. The WMPA has implemented its new priority patrolling plan, and have established four ranger posts in remote parts of the Watershed recognized to have high level of threat and high biodiversity, plus three river-based checkpoints to control access. Ranger posts are staffed by WMPA and other government agencies responsible for enforcement, and staff undertake patrols on an ongoing basis towards deterrence of poachers. However, the WMPA still needs to improve its approach to data collection and reporting to help them better assess the effectiveness of their patrol and access control efforts. Finally, government has also made progress in shutting down several non-VFA sawmills operating on the plateau, which can provide a convenient market for local loggers.

**39. Balancing the conservation and socio-economic development needs in the Watershed will remain a key long-term challenge for the NT2.**

Over 6,000 people continue to live in the NT2 Watershed, and the objectives of the SEMFOP include not only conservation but also improved livelihoods for those living within the watershed. Positive progress has been made, especially in the education and health sectors, with support from WMPA. For example, secondary schools have been holding classes for three years now, and substantial improvements have been seen at local health facilities in the Watershed area. New livelihood development methods are

being reviewed based on experiences from other projects (i.e. the Poverty Reduction Fund) and will be introduced during the implementation of SEMFOP II.

#### **40. NTPC's environmental programs in the watershed are being handed over to government.**

The fourth and final wildlife monitoring survey, conducted over the past 2 years, has been completed. The wetlands that were developed above the full supply level of the reservoir have developed well, and the salt licks built by NTPC, now maintained by WMPA, are being used by elephants and other wildlife. However, the survey also found that, despite good potential, there are no large water birds or migratory birds using the Special Conservation Areas (SCAs), which is likely due to disturbance from humans in the area. Finally, the Human-elephant conflict (HEC) mitigation program has been handed over to the District Agriculture and Forestry Office (DAFO) and is functioning very well. A Wildlife Adaptive Management Committee meets regularly to discuss issues and make recommendations on how to overcome implementation issues.

## **NT2 Revenue Management Arrangements**

#### **41. 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 PDR to put in place tools for transparent and accountable management of public resources. Implementation of the revenue management arrangements have allowed the Government to develop 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. In April 2011 the State Audit Organization also published in the local press the summary of findings from the audit of the budget execution reports for FY2008/09 – for the first time in recent history. The government has also implemented a Treasury Single Account framework managed by the recently established National Treasury.

#### **42. 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 information on the physical progress of the projects and have been reporting on the projects to the Ministry of Finance (MOF). The Ministry of Finance provided the financial flows statement for FY2009/10 in February 2011 and is now developing the NT2 financed project performance report. 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 Organization need to be strengthened to ensure that all respective agencies remain current on the requirements and commitments within the NT2 RMAs.

#### **43. NTPC have been paying Resource Usage Charges (royalties) and Dividends to Government since the onset of commercial operations.**

The GOL financial year runs from 1<sup>st</sup> October to 30<sup>th</sup> September, and during the first partial year of operations NTPC paid US\$5.4m to government in royalties. During FY11, the first full financial year of operation, NTPC paid around US\$19m in royalties and dividends, and is projected to pay around US\$27m during the current financial year. This does not include the one-off GOL contingent equity release, which will result in an additional US\$14m of Government Revenues during this financial year.



The funds are transferred by NTPC to the Bank of Lao PDR, which in turn deposited the money into the National Treasury designated Account. Government has made allocations for eligible expenditures across health, education, rural roads, rural electrification and environment.

**44. More progress is needed on improving budgeting for social sectors. The focus thus far has been mostly on identifying projects within health and education sectors that are eligible for NT2 revenues.**

Looking ahead there is need to consider more measures aimed at improving general budgeting for social sectors including: (i) developing appropriate budgetary norms for health and education sectors collaboratively with sector ministries and counterpart provincial departments; (ii) progressively implementing full functional classification for social sectors; (iii) integrating the recurrent and investment budgets, including the personnel budgets; and (iv) developing appropriate monitoring and evaluation tools to ensure the objectives and outcomes can be evaluated. These measures will ensure that progressively the focus for NT2 revenue management arrangements would transition from specific projects considering results at the sector level within the country systems perspectives.

**45. The Public Expenditure Review (PER) and Public Expenditure and Financial Accountability (PEFA) assessment were concluded in 2011 in close collaboration with authorities.**

The PER and PEFA analyzed reform performance and provided input into the government mid-term review of the Public Finance Management Strengthening Program, under which the NT2 RMA's are being implemented. The PER reviewed the Government's implementation of the NT2 Revenue Management Arrangements and concluded that the Government has put in the core systems for managing and reporting on NT2 revenues. However, there is need to further: (i) strengthen interagency coordination and collaboration on revenue allocations and reporting; (ii) develop results framework to measure impact of programs; and (iii) improve budgeting for the social sectors so that over the medium term the focus on NT2 RMA can shift from being project specific to become more sectoral.

## **MONITORING AND OVERSIGHT ARRANGEMENTS**

**46. Monitoring and oversight arrangements are evolving to meet changing needs of the Project**

The NT2 monitoring and oversight arrangements remain robust. Now that the project is in the operations phase, the focus is on a somewhat narrower set of issues and activities, but ones that remain highly challenging. The external oversight system as a whole remains largely intact; however, over time, some recalibration of roles and intensity/frequency of activities is occurring (in line with legal agreements). For example, the Lenders' Technical Advisor (LTA), which made quarterly visits up until one year after COD, now visits three times per year, and the frequency of visits will gradually reduce to annual. The Panel of Experts (POE) will continue their regular schedule of visits, and continue to make key contributions to the social and environmental aspects of the project.

**47. The IAG has now concluded its work, but a new arrangement covering the Revenue Management Arrangements is being put in place.**

The IAG was established in 1997, reporting to the World Bank President. Since its establishment, the IAG has visited NT2 site regularly, and has advised the Bank on project progress as well as suggested lessons that the Bank can learn about its approach to hydropower. It was created to support the preparation phase into early implementation. Having fulfilled its mandate, the IAG completed its final visit in 2011. The one area that the IAG supervision has covered that other oversight bodies have not is the Revenue Management Arrangements, and the Bank has decided to continue to use the IAG's public financial management expert in his advisory role to the World Bank specifically on the Revenue Management Arrangements.

**48. The World Bank and ADB continue to remain actively engaged in implementation support and monitoring of project progress during the project's operating phase.**

The World Bank and ADB, along with other international financial institutions supporting the NT2 project, are closely tracking project implementation, as well as helping to build capacity and address challenges as they arise. Monitoring of implementation progress is ongoing and joint annual IFI supervision missions are undertaken, complemented by more frequent technical visits by the field-based teams. In addition to direct project implementation support, the World Bank and ADB teams are also supporting a variety of complementary activities that strengthen government capacity at both the sectoral and local levels.

**49. In addition to its formal oversight structures, the NT2 Project continues to attract attention from international non-governmental organizations.**

The World Bank and ADB continue to receive feedback from some NGOs that have particular interest in the Project and its implementation. The supervision team follows up on any concerns raised as appropriate. The communication of the World Bank and the ADB is made public through websites and regular meetings, where participants are welcome to exchange opinions on any project implementation matters.

## **LOOKING AHEAD**

**50. NT2 implementation to date has proceeded well, but the ultimate success of the Project will only be known in the longer term.**

2011, the period reported on in this Update, is the first full year of commercial operations of the NT2 project. As power is sold to Thailand and to the local grid, revenues flow to government, and are spent on priority poverty reduction and environmental programs, the national benefits of the NT2 project are increasingly clear. In addition to these national benefits, this Update notes that almost all resettlers are currently significantly better off than they were before the project, and that a downstream program is in place to address downstream impacts – demonstrating some of the local benefits of the NT2 project to date. However, it is important to remember that key social and environmental commitments are not yet over, including the measurement of socioeconomic targets in 2013/14 and the completion of the downstream program in 2015. The World Bank and ADB remain committed to working closely with the Government, NTPC and local communities over the coming years to ensure that project obligations are met and that both national and local benefits from the project are realized.

**51. The focus of the World Bank and ADB project implementation support efforts in the coming years will continue to be on some of the key medium-term social and environmental challenges.**

These areas include: (i) sustainable achievement of livelihood objectives for resettlers, and early preparation for handover of the livelihoods support program to local government; (ii) effective transition of the downstream program to Government management during 2012; (iii) increasingly effective management of the NT2 Watershed by the WMPA, including both the conservation of biodiversity and the appropriate socio-economic development of the people living in the Watershed; and (iv) ensuring effective implementation of the NT2 revenue management arrangements.

**52. Continued successful implementation of the NT2 project requires ongoing attention and monitoring.**

Although implementation to date has been performing satisfactorily, the ultimate success of the Project will only be apparent when the full set of environmental and social programs has been implemented and the results measured. The World Bank and ADB will continue to provide regular public reports on

the implementation of the project, and to work closely with NTPC and Government to achieve all project objectives.

## ANNEX 1: 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 Project. Electricité du Laos (EdL), the state-owned power utility, contributed 60 percent of the share capital, and two foreign investors, GMS 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. The PPA 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. In 2011, THPC generated 1,140 GWh, lower than past averages due to outages caused by high floods in 2011. For 2011, the payment is determined half in US dollars and half in Baht at a fixed exchange rate of US\$1.00 = B25.35. This structure will change after the COD of the Expansion Project with the tariff listed in US\$ and Thai Baht, and thus payment will be made without issues of then exchange rate.
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. The power plant generated a cumulative net income of US\$160.12 million from 2005 to 2009. THPC's dividend payments in the same period amounted to US\$133.93 million, of which US\$80.36 million went to EdL. In addition THPC paid about US\$3.52 million in royalties to the Government in 2010. In 2004 THPC started paying taxes. The profit tax payment for 2009 was about US\$4.08 million and about US\$1.90 million for 2010. 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 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: (i) Community assessment and organization; (ii) Social mitigation implementation; (iii) Water supply; (iv) Health and sanitation; (v) Wild fishpond building; (vi) Savings and credit funds; (vii) Gardens; and (viii) Other activities.

7. THPC finalized a Technical Feasibility Study for the Theun-Hinboun Expansion Project (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. The reservoir was impounded in July 2011, and power plant is expected to be commissioned by September 2012.

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 18 June 2008. Consultations have been carried out on village, district, provincial and national levels. The final Public Information Meeting was held on 29 November 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 150 staff have been recruited. In addition, there are more than 40 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, four sites have been fully established by July 2011 and all villagers had been relocated to the sites by July 2011. More than 70 formal and informal consultations have been carried out with the about 780 households to be resettled and three host communities.

10. 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. The next Mission will take place in the first half of 2012.