Nam Theun 2 Multipurpose Development Project

Overview and Update

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Overview

The Nam Theun 2 multipurpose development project (NT2) is larger and more complex than any other hydropower project in Lao PDR. It is jointly implemented by the Nam Theun 2 Power Company (NTPC) and the Government of Lao PDR and financed by 27 parties, including the World Bank Group (WBG) and the Asian Development Bank. NT2 is expected to generate US $2 billion in revenues over a twenty-year period. This money is already earmarked for the country’s economic development and poverty reduction.

Direct benefits for affected people include

1. Largely-improved living conditions for over 6,000 resettled villagers, including better road access and employment opportunities;
2. A development program for 200 villages in the downstream areas; and
3. The protection of large areas with rich biodiversity.

Revenues

NT2 enables Lao PDR to export 1000 MW of electricity-generating capacity and electrical energy to the Electricity Generating Authority of Thailand. The hydroelectric project also supplies 75 MW of electricity for domestic use in Lao PDR. The project is expected to generate annual revenues for the Government of Lao PDR averaging about US$30 million (nominal) per year during the first ten years while commercial debt service is paid, then rising sharply thereafter to an average of approximately US$110 million (nominal) from 2020 to 2034. If the around US$2 billion in revenues are spent efficiently, and transparently—in accordance with project agreements—NT2 will provide significant support to Lao PDR’s poverty reduction and environmental management efforts.

Project features

The project, which was approved on March 31, 2005 by the International Development Association (IDA) and the Multilateral Investment Guarantee Agency (MIGA), features:

1. A hydropower facility providing 1000 MW of power for export to Thailand and an additional 75 MW for domestic consumption;
2. The management of the project’s environmental and social impacts on the Nakai Plateau and in the downstream areas of the Nam Theun and Xe Bang Fai rivers, as well as the protection and management of the 4000km2 NT2 Watershed (including the Nakai Nam Theun National Protected Area and two corridors linking it to other national protected areas);
3. Assisting the Government with the design and implementation of NT2 revenue and expenditure management arrangements, which focus on strengthening the national public expenditure management systems. This framework helps ensure that NT2 revenues received by the Government are applied effectively—with transparency and accountability—to reduce poverty and improve environmental management; and
4. Monitoring and evaluation arrangements designed to meet sound engineering practices fiduciary responsibilities, as well as ensure full compliance with the project’s social and environmental objectives.

The WBG’s financial support consists of:

1. US$42 million IDA Partial Risk Guarantee;

2. US$20 million IDA grant for the Nam Theun 2 Social and Environment Project (NTSEP) which finances a part of the Government’s equity in the project to be used for management of environmental and social impacts, independent monitoring, and evaluation of the NT2 project; and


The US$1.3 billion* construction is complete, while the social and environmental programs are designed to continue implementation over the medium-term.

*Project cost was originally budgeted at US$1.25 billion with a contingency budget of US$200 million.

Project Developers

NT2 implementation is being undertaken by NTPC and the Government of Lao PDR, NTPC and the Government signed agreements with public and private lenders and guarantors to complete the project financing arrangements for NT2. A total of US$1.45 billion equivalent (excluding bonding facilities) in US dollars and Thai baht has been committed by financing partners to fund the base project cost of US$1.25 billion and US$200 million for contingencies.

The project plays an important role in the broader development of the country by building capacity to manage natural resources and develop infrastructure. It also helps improve transparency and public expenditure management system effectiveness.

The World Bank’s decision to approve the project was preceded by careful consideration of the substantial preparation, which included almost a decade of studying the project and risk evaluation, taking into account valuable lessons learned from past projects, an intense consultation process, and due diligence on environmental and social impacts, and the project’s economic costs. Public and private entities are closely monitoring project implementation through a coordinated program.

NT2 provides impetus for the Government of Lao PDR to continue economic, social and public financial management reforms. At the same time, it furthers cooperation among donors, deepens engagement with private sector and civil society, and strengthens the growing regional electricity market.

Project Description

NT2 has been designed as a build-own-operate-transfer (BOOT) project. It includes the development, construction, and operation of a trans-basin diversion power plant that would use water from the Nam Theun River and release the water into the Xe Bang Fai River (both are tributaries of the Mekong River).
The project site is located in the Khammouane and Bolikhamxay provinces in central Lao PDR (250 kilometers east of Vientiane). It stretches from the Nakai Plateau to the lower Xe Bang Fai River confluence with the Mekong.

The main features of the project include:

- A 39-meter-high gravity dam on the Nam Theun River.
- A 450-square-kilometer reservoir.
- A powerhouse (from which water would flow into the Xe Bang Fai).
- A 130-kilometer-long, double-circuit 500-kV transmission line to the Thai grid.
- A 70-kilometer-long, single-circuit 115-kV transmission line to Lao’s domestic grid.

Project areas

Nakai Plateau

NT2 required the resettlement of around 6,300 people from 15 villages on the Nakai Plateau. Resettling whole communities is a challenging and long-term task. The project’s commitment to these communities extends beyond compensating them for moving. It also entails helping villagers develop better livelihoods and living standards than they had before the project.

The NT2 resettlement program included three broad phases: (1) Consultation and planning; (2) Physical relocation; and (3) Livelihoods development.

Detailed consultations and community outreach helped determine resettlement sites, the design of houses, village layouts, and livelihood opportunities. A comprehensive resettlement package provided to all resettled people included community infrastructure such as roads, schools, and water supply. Household entitlements, such as housing, electricity, agricultural land, and a livelihood support program.

The post relocation livelihood program is based on four pillars: agriculture and livestock, community forestry, reservoir fisheries, and off-farm income. It takes into consideration the natural resources available to re-settlers, their skills, traditions, and previous livelihood patterns. The program aims to help households achieve an acceptable income level through a diverse set of livelihood opportunities. These also helps villagers decide for themselves which combination of livelihood opportunities to pursue over the long term.

Downstream

Nakai Dam Downstream

After the Nakai Dam wall was completed in April 2008, a diversion channel was built to bring water around the dam wall. When the channel was closed, the Nakai Reservoir was allowed to fill. There are no permanent settlements or established villages along the stretch of river downstream of the dam but some
households from 38 nearby villages were thought to use it regularly for fishing. Environmental and socio-economic impacts were expected in this area. The impact of a greatly reduced flow would have a significant effect on river processes. Socio-economic impacts were likely for villages that used the area for fishing. Environmental mitigation was proposed through guaranteed minimum riparian releases, a regular spill flow downstream of the dam wall (2m³/s) and supplemental spillage during the wet season. A compensation framework and program was discussed and agreed with villagers. This has been delivered from 2008 to 2011.

**Xe Bang Fai Downstream**

Since April 2010, the turbines are turning and the Xe Bang Fai River 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. Over 75 villages along the Xe Bang Fai are impacted in some way by the NT2 project. About 84 semi-riparian and hinterland villages, in which some of the households travel to the Xe Bang Fai to catch fish or collect aquatic products, are also impacted. The release of reservoir waters into the Xe Bang Fai modifies its ecosystem, despite first being discharged into a regulating pond and then to the 27 km man-made downstream channel before reaching the Xe Bang Fai River. Possible negative effects of increased water volumes from the reservoir into the Xe Bang Fai include erosion of the riverbanks, causing the loss of riverside gardens and riverside buildings, a decrease in fish catch and related aquatic life, and altered water quality in the river.

For all these reasons, the project created a downstream program – a relatively new approach in hydropower project design. The program includes infrastructure provision, livelihood restoration, a fish catch monitoring program, water quality and socio-economic surveys, and compensation for partially-lost riverbank gardens.

The program’s infrastructure provision includes a variety of subcomponents. Under the water supply, sanitation, and hygiene program— which provides alternate water supply— boreholes with pumps have been constructed and an awareness raising-program on health and sanitation was rolled out. Toilet construction for households and schools have also been provided. All planned boreholes and pumps have been provided to villages along the Xe Bang Fai to provide a reliable source of clean water suitable for domestic use.

At the Government’s request, flood gates along the Xe Bang Fai have been rehabilitated to improve its operation and allow fish migration. To help villages cope with the changing environment, the livelihood development program supported 92 villages in five districts. The program was designed to provide additional and new earning opportunities and enhance current livelihood practices. Shareholder-based microcredit systems have been established in 92 villages to provide capital for different types of income-generating activities. To establish a long-term baseline of fish catch in target areas, a fish catch monitoring program was put in place in 2006. This enables any changes in fish catch over time to be understood and documented.

Water quality is another component that has been regularly assessed since 2005 on the Xe Bang Fai River. In addition, a socio-economic monitoring survey was conducted in 2001 and 2009 to serve as the baseline. This was repeated in 2012.
Watershed

Concern for the protection of the Nam Theun watershed led the NT2 project principals to pay for its current and future management. To do this, the Nam Theun 2 Watershed Management and Protection Authority (WMPA) was formed. NTPC agreed to provide US $1 million per year for the next 31 years to fund its activities. The Nakai Nam Theun National Protected Area (NNT NPA) is the largest of Lao PDR’s 20 national protected areas and is the most important for biodiversity conservation. It is also one of the most important protected inland areas in Asia.

The Social and Environment Management Framework and Operation Plan (SEMFOP) contains details regarding the management of the 4,100km2 NPA. Its aims to ensure the long-term protection of the biodiversity and watershed values of the NNT NPA and, at the same time, safeguard the well-being, traditional livelihoods, and culture of its human inhabitants. To do this, the WMPA works with local communities to implement programs that protect the watershed.

These programs include:

1. Forest and land use planning
2. Allocation and management at the village and NPA levels
3. Biodiversity related research work
4. Monitoring and protection
5. Village livelihood and social development activities.

One of the more vulnerable groups in the NT2 project area, are located in the NNT NPA. These people - hunter-gatherers – are the Vietic minorities. Some of these people live in small groups of foraging nomads while others practice slash and burn agriculture and move every two to three years. Others are a combination of both. There are approximately 6,000 people living within NPA.

Protection and conservation programs were designed with the help of international organizations such as the Wildlife Conservation Society. Other successful elements of the program include wildlife rescue (during reservoir creation and inundation), elephant management, creation of artificial wetlands, patrolling and enforcement and increasing public awareness of conservation and protection.

The wildlife rescue program was completed in February 2009 but the monitoring of released wildlife continues in the watershed area. Significant numbers of rare and recently discovered species endemic to the area – like the Large Antlered Muntjac - were captured and released into appropriate areas, as well as numerous other species.

Significant challenges remain to efforts to safeguard the area’s biodiversity. These include poaching of wildlife and the allure of exploiting the watershed’s timber and potential mineral resources. These threats have the potential to create social and environmental impacts on both the downstream and watershed areas. Protecting the area will require long-term commitment from communities and partners on a broad scale.

Monitoring and Evaluation

NT2 has a robust, multi-layer monitoring and evaluation framework consisting of the following:
• **Supervision of physical implementation** of the hydropower project by professional engineering firms under contract to the NTPC and the Government.

• **Lenders’ Engineer** to monitor progress in project construction and implementation of environmental and social management plans through review of monthly and half-yearly progress reports. These are submitted by implementing agencies and through quarterly site visits.

• **Dam Safety Review Panel** to advice on technical construction, operations, and dam safety issues.

• **Independent Monitoring Agencies** reporting to Government implementing agencies to monitor progress on resettlement, environmental impact mitigation, and watershed management issues.

• **Panel of Environmental and Social Experts** POE reporting to the Government to advise on environmental and social issues. The POE visits Laos once or twice per year (or more often, upon the Government’s request).

• **International Advisory Group (IAG)** advised the World Bank’s President on project implementation, covering revenue management arrangements as well as environmental and social aspects. In April 2011 IAG, undertook its tenth and final visit to NT2. World Bank management and the IAG agreed that, since the project is moving into a new phase, the tenth mission would be its last. The social and environmental monitoring role of the IAG would be continued by the POE.

• **Regular supervision by staff of the World Bank, other international financial institutions, and bilateral agencies** in the form of site visits and management and technical missions.

**Reporting Arrangements**

The World Bank and the Asian Development Bank release project reports to inform their respective Boards and the public on the status of project implementation on an Annual basis. In addition to that, NTPC also releases reports updating information on project implementation and responding to issues raised through supervision missions and reports. Reports are available at the NTPC website for more information.

Other monitoring agencies are expected to make, on average, one visit per year and to issue reports following each visit. The findings and recommendations of the various panels of advisors are taken into account for implementation and adaptive management purposes by the implementing agencies and for supervision by the international financial institutions. In addition, updates on past findings and recommendations are likely to find a place in subsequent panel reports.

**Related Projects**

Complementary projects are being designed to support NT2 and prevent it from being an isolated, stand-alone “enclave” project by extending some of the standards and programs established for it beyond the project area.
These programs include:

The Lao Environment and Social Project (LEnS) which helped the Government, on a national level, strengthen the management of environmental and social issues associated with the sustainable use of natural resources in Lao. In particular, the project is (1) Assisting the Government strengthen institutions and instruments for assessment; (2) Monitoring and compliance for environmental and social sustainability; (3) Broadening the constituency for environmental change; (4) Invest in on the ground environmental improvement activities with emphasis on sustainable biodiversity and community environmental management and livelihoods enhancements; and (4) Operationalize the Environmental Protection Fund to allocate revenues for priority environmental protection activities.

The Khammouane Development Project (and its additional financing grant, which became effective in 2012) aims to enhance the planning process and public financial management associated with the decentralized delivery of services and infrastructure. This includes irrigation development in Khammouane Province and offering broader development opportunities for villages and communities living in the NT2 project area. It helps them in gaining access to and participation in growth opportunities resulting from the East West Corridor and trade integration.

The Rural Electrification Project helped expand access to electricity in rural areas through off-grid renewable resources and grid connections. It further strengthened Electricite de Lao, a key counterpart for the NT2 Multipurpose project.

The Hydro Mining Technical Assistance Project aimed at increasing human resources capacity and improving the performance of the Government oversight institutions for the hydropower and mining sector.

For more information

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