

Nam Theun 2 Hydropower Project and Hydropower Development in Laos



Xaypaseuth PHOMSOUPHA

Abstract: Hydropower development and exporting electricity to neighbouring countries is a success story in Laos. Several projects are under construction and some projects are already exporting electricity. The Nam Theun 2 Hydropower Project (1000MW+86MW) started commercial operation on 15 March 2010. This project is exporting electricity to Thailand which is part of the MOU signed between Governments of Thailand and Laos for exporting 7000 MW to Thailand. In almost all projects, the Govt. of Laos is also a share holder.

Key words: Hydropower development, cross border electricity export, Nam Theun 2 Hydropower Project, Laos

Introduction

The Nam Theun 2 Hydropower Project, previously identified as a key component of the economic and social development program of Laos, was nominated to supply generating capacity and electrical energy to the Electricity Generating Authority of Thailand (EGAT) under the 7,000 MW Memorandum of Understanding signed between the governments of Laos and Thailand. The Project's technical feasibility study and environmental and social impacts studies started in the mid-1990s. The Project is located on the Nam Theun River, a tributary of the Mekong. The key features of the Project include:

- a 48m high concrete gravity dam with integrated spillway
- a 450 km² reservoir (at full supply level) on the Nakai Plateau
- a catchment area of 4,013 km²
- an average net head of 348 m
- a tunnel of 3.4 km
- a trans-basin downstream channel of 27 km
- a powerhouse comprising 4 x 250 MW Francis turbines and 2 x 43 MW Pelton turbines
- an average of annual generation of about 6,000 Gwh

- a 78 km long double circuit 115 kV transmission line to Thakhek, capital of Khammouane Province
- a 138 km long double circuit 500 kV transmission line to the Thai border, and
- a 160 km long double circuit kV transmission line from the Thai border to Roi Et (built, funded and owned by EGAT).



Photo 2: View of Powerhouse



Photo 1: Main Dam

About 6,000 people previously living in the inundated area have been resettled in nearby, mostly along the rim of the reservoir. The resettlers have been offered new sustainable livelihoods ranging from fishery in the reservoir, productive forestry, tourism, agriculture and off-farm employment. The project's potential environmental and social impacts have been the subject of study and evaluation by the project sponsors, the government of Laos, domestic and international non-governmental organizations (NGOs), independent consultants, and the World Bank. Environmental and social mitigation measures were developed based upon the results of comprehensive study and dialogue amongst various national and international institutions, in addition to local populations, in order to ensure that the views of



Photo 3: Houses for Resettlers

all stakeholders would be considered, that all appropriate remedial measures would be undertaken, and that the project would comply with the World Bank Guidelines. These studies have been updated (where appropriate) by these independent organizations in order to ensure appropriate compliance with applicable regulations and guidelines.

In 1997, the Government of Laos approached the World Bank for support for the project in the form of providing a political risk guarantee and part of the financing. The financing of the project was subsequently joined by the Asian Development Bank, Agence Française de Développement, and the European Investment Bank. More than 10 private banks also provided loans as debt financing to the project company, Nam Theun 2 Power Company Limited (NTPC).

NTPC was established under Lao laws as a special purpose company. NTPC is owned by EDF International (EDFI) of France (with a 35% shareholding), Electricity Generating Public Company Limited (EGCO) of Thailand (25%), Italian-Thai Development Public Company Limited of Thailand (15%), and Lao Holding State Enterprise (LHSE) of the Lao PDR (25%). NTPC owns and operates the project through the concession period, at the end of which all project assets will be transferred to the Lao state.

The project comprises the design, development, construction, ownership, operation and maintenance of a 1,080 MW (net capacity) trans-basin hydroelectric power project located in Bolikhamxai and Khammouane Provinces in central Laos, and the generation of electricity and sale of 1,000 MW of generating capacity and electrical energy to EGAT and 80 MW of generating capacity and electrical energy to Electricité du Laos (EDL), respectively, under power purchase agreements. The construction of the project started in June 2005.

The Nam Theun 2 Hydropower Project is the third Lao IPP cross-border hydropower project that has taken a decisive step towards completion by beginning commercial export of electricity to Thailand.

On 15 March 2010, the project's four export generation turbines started full service, supplying EGAT with 1,000

MW of electricity at commercial tariff levelized over 25 years of operation that was based upon long run marginal costs in the electric system of Thailand. After 2010 the energy tariff will be escalated by 1.383% per annum. Payment of energy will be made 50% in US dollars and 50% in Thai Baht. Over the 25-year operation period, the Lao government will accrue royalties and taxes estimated at over US\$2 billion. After the concession period, the Nam Theun 2 Hydropower Project will be fully owned by the Lao state.

Related Story

A number of IPP hydropower projects in Laos are currently being constructed and commissioned. Once construction has been completed, these projects will supply the power grids of neighboring countries as well as meeting domestic Lao load demand, under specific power purchase agreements that have been signed on a take-or-pay commitment basis. The status of some of such projects is below:

IPP Hydropower Projects under Commissioning

1. Nam Ngum 2 Hydropower Project (615 MW) achieved its financial closer on 1 July 2006. Electricité du Laos (EDL), holding 25% of total shares, represents the government of Laos in the project. The remainder of the shares are held by US and Thailand-based companies. The project is financed on a limited recourse basis. The project will start supplying electricity to EGAT in early 2011.
2. Nam Lik 1.2 Hydropower Project (100 MW) is a BOOT project with investment by China Water and Energy Corporation (CWE) holding 90% of the shares and EDL holding 10%. All generated energy will be supplied to meet domestic needs. The project is scheduled for commercial operation in June 2010.

IPP Hydropower Projects under Construction

1. Xe Kaman 3 Hydropower Project (250 MW), developed by a Vietnamese consortium, will be the first Lao IPP project to supply electricity to the state power authority in neighboring Vietnam, Electricity of Vietnam (EVN). Financial closer was achieved in April 2006. The project is currently under construction and aiming to supply electricity by 2012.
2. Xe Kaman 1 Hydropower Project (322 MW) is also developed by a Vietnamese consortium. There is one percent golden share held by EDL. The project expects to achieve power-on date in 2014, and will operate on a production sharing basis. Around 13% of total generation will be made available to the Lao government in lieu of resource usage levies and corporate income tax.
3. Nam Ngum 5 Hydropower Project (120 MW) is a joint investment by Sinohydro Corporation from China having a 95% shareholding and EDL holding 5% of

total shares. The project will start supplying the EDL grid by 2011.

4. Theun-Hinboun Expansion (220 + 60 MW) is jointly invested by EDL holding 60% of shares and each of GMS of Thailand and the Statkraft of Scandinavia holding 20%. The project will supply 60 MW and 220 MW of new power to EDL and EGAT, respectively, in 2012.
5. Nam Nhone Hydropower Project (2.5 MW) is the first Small Power Plant (SPP) project in Laos, being jointly developed by private investors from Laos and Hong Kong. The project will begin to supply the EDL grid in Bokeo Province in northern Laos in 2011.
6. Tat Salene Hydropower Project (3.2 MW) is wholly invested by a Thai company. All electricity will be supplied to remote communities of Savannakhet Province in central Laos. Project construction started in early 2010 and will take 2.5 years to complete.

More than 20 hydropower projects are now under technical feasibility studies that were nominated to supply electricity in accordance with government-to-government Memoranda of Understanding with the governments of neighboring countries. Over the past 20 years the development of IPP projects in Laos has been up and down due to effect of the economic recession in the late 1990s and subsequent cycles that resulted in static demand for electricity in the country as well as in the region on the one hand and the hike in fuel price and rocketing costs of construction materials and equipment on the other. Consequently, several IPP projects in Laos were delayed or suspended during the period of economic crisis. Recently when the demand for electricity started picking up again, the IPP development in Laos was back on track.

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Xaypaseuth Phomsoupha, following his earlier background training in economics, graduated with a Master's Degree in Development Studies with minor business laws, at the Australian National University in Canberra. Mr. Xaypaseuth has been working within the Lao public sector in a number of different government ministries since 1985. He was first involved in the power sector as senior project analyst in 1991. Subsequently, he was appointed as Chief Secretary of the Lao National Committee for Energy (LNCE) in late 1999. Since 2005, he has held position of Chairman of ad hoc Coordinating Committee for Development of Electric Power (CDEP) that is in charge of negotiation on power sale with counterparties in neighboring countries. Currently, he is Director General of Department of Energy Promotion and Development since 2007.

Mr. Phomsoupha is directly responsible for drafting and negotiating legal documents for non-recourse financing in the Lao power sector. Presently, he is the lead negotiator heading up the government negotiation team to negotiate the concession agreements and other relevant agreements to which the government of Laos is party. He has also been involved in negotiation on power purchase agreements and credit facilities agreements of IPP projects to supply electricity to the domestic grid, as well as to Thailand, Cambodia and Vietnam.

Corresponding address: xaypaseuth@laopdr.com

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CALENDAR IRRIGATION

2nd week of July 2010, National Seminar on Challenges in Irrigation Development and Management. Organiser: Dept. of Irrigation (DOI), Location: Kathmandu, Nepal. Contact: Mr. Rama Nand Prasad Yadav, email: yadav_rama_nand@hotmail.com

10-16 October 2010, 6th Asian Regional Conference, Theme: Improvement of Irrigation and Drainage efficiency under the small land holding condition.

Location: Yogyakarta, Indonesia, Contact: Fax : +62 81 726-1956, E-mail: secretariat@icid2010.org, Website : www.icid2010.org

15-23 October 2011, 21st International Congress on Irrigation and Drainage, Location: Tehran, Iran, E-mail: irncid@gmail.com, icid2011@gmail.com, Website : <http://www.icid2011.org>

CALENDAR ENVIRONMENT

13-15 November 2010, Seminar on The First International Seminar on Water, Energy and Environment 'ISWEE01' Location: Oran, Algeria, E-mail: iswee_10@yahoo.com, website: <http://iswee01.webnode.fr/invitation/>

September – December 2010, The Process of Social Impact Assessment, Online Training Course,

International Centre for Hydropower, Trondheim, Norway; More Info: www.ich.no

13-15 Dec.2010: International Conference on Environment 2010; Location: Penang, Malaysia; Contact The Secretariat CENV 2010; Website: <http://chemical.eng.usm.my/ICENV2010/index.php>