Nam Ngum 2 Dam Hydropower Info by Hobo Maps - Home Go Back to Hydropower Web Page

Nam Ngum 2 Dam and Reservoir images below:

Nam Ngum 2 Hydroelectric Power Project is located near Ban Huay Bor, 90 kilometers north of Vientiane and 35 kilometers upstream of the Nam Ngum 1 reservoir. The project is owned and managed by Nam Ngum 2 Power Company Limited (NN2PC), a company registered in the Lao PDR that is 75% owned by SouthEast Asia Energy Limited and 25% by EDL-GEN.

Thai construction firm Ch. Karnchang PCL is the largest shareholder in SouthEast Asia Energy Ltd.

The Nam Ngum 2 hydroelectric dam is a concrete-faced rockfill dam 485 meters wide and 181 meters high. The dam features two concrete-lined diversion tunnels and three Francis turbines. The dam structure is built in a steep narrow gorge creating a reservoir with a surface level at 375 meters above sea level.

The installed capacity of the project is 615 megawatts with annual production capacity of 2,220 GWh. Electricity produced from the project is sold to Electricity Generating Authority of Thailand pursuant to a Power Purchase Agreement for a period of 25 years.

Construction of Nam Ngum 2 began in late 2005 and was completed in 2011. Thai-based Ch. Karnchang PCL handled construction of the project.

Nam Ngum 2 dam location satellite image below:

Nam Ngum 2 dam site satellite image below at coordinates 18°45'10.8"N 102°46'37.2"E (18.753, 102.777) :

Contractors Involved:

Toshiba Energy Systems and Solutions was selected as the turbine supplier for the project. The company provided 3 units of Francis turbines, each with 205 MW nameplate capacity.

Mitsui supplied 3 electric generators for the project.

Right Tunneling Public Co. Ltd. handled construction of tunneling for diversion, outlet works and power waterways.

Nam Ngum 2 Hydropower Plant components below:
- **Two diversion tunnels 12 meters in internal diameter located on the left abutment**
- **A gated spillway with chute and flip bucket on the right abutment**
- **A concrete face rockfill dam 182 meters high**
- **A single headrace tunnel with intake facility in left abutment**
- **Powerhouse building with 3 turbine-generator units having a total installed capacity of 615 MW**
- **Main transformers located on the hill side of the powerhouse**
- **A GIS switchgear integrated into the powerhouse**
- **A 230 kV / 500 kV transmission line system 96 km long**

Nam Ngum 2 basics:

1. Reservoir

Reservoir Area	:	5,640 km^2
Yearly averaged discharge capacity	:	6,270 MCM
Full supply level	:	378.75 masl
Maximum flood level	:	375 masl
Reservoir area (full supply level)	:	122 km^2
Storage (full supply level)	:	6,774 MCM
Minimum operating level	:	345 masl
Storage (minimum operating level)	:	3,780 MCM
Active storage	:	2,994 MCM

2. Dam

Type	:	concrete face rockfill
Crest length	:	485 m
Crest level	:	381
masl Height from foundation	:	181 m
Width of concrete face	:	0.30 – 0.90 m

3. Headrace Tunnel

Type	:	concrete-lined divided into 2 tunnels
Diameter	:	11.7 m
Length of the first tunnel	:	1,141 m
Length of the second tunnel	:	1,263 m
Height (above the penstock) masl	:	209.1

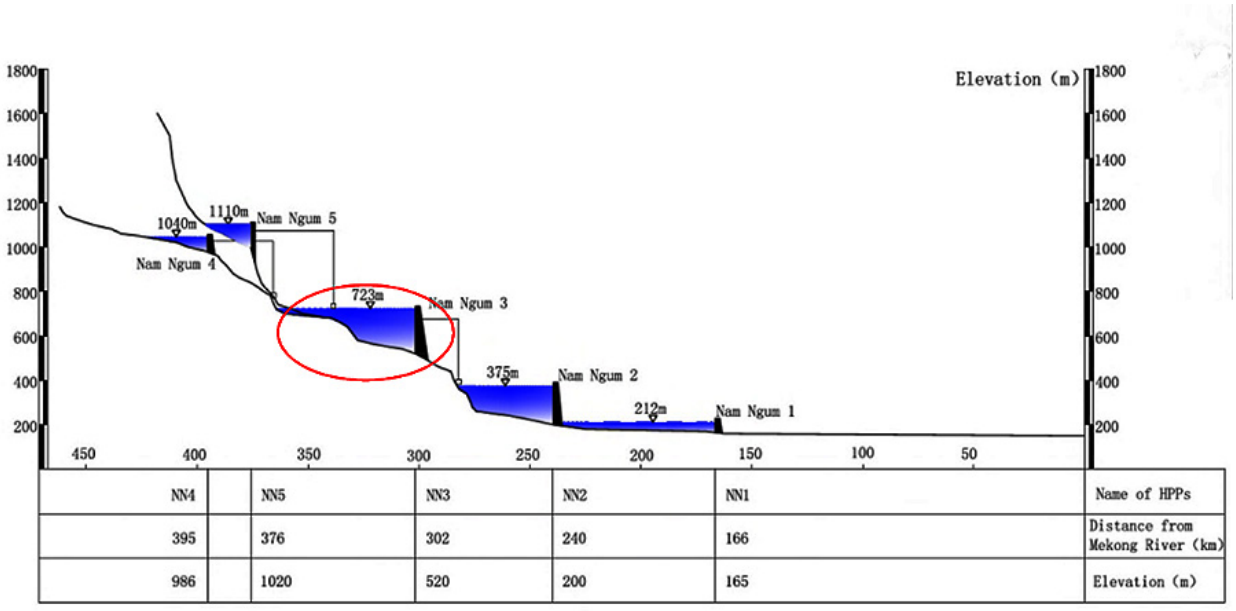
4. Tailrace Canal

Amount	:	3 units
Diameter	:	5.35 m
Length	:	212 m

NAM NGUM 2 HYDROPOWER PLANT

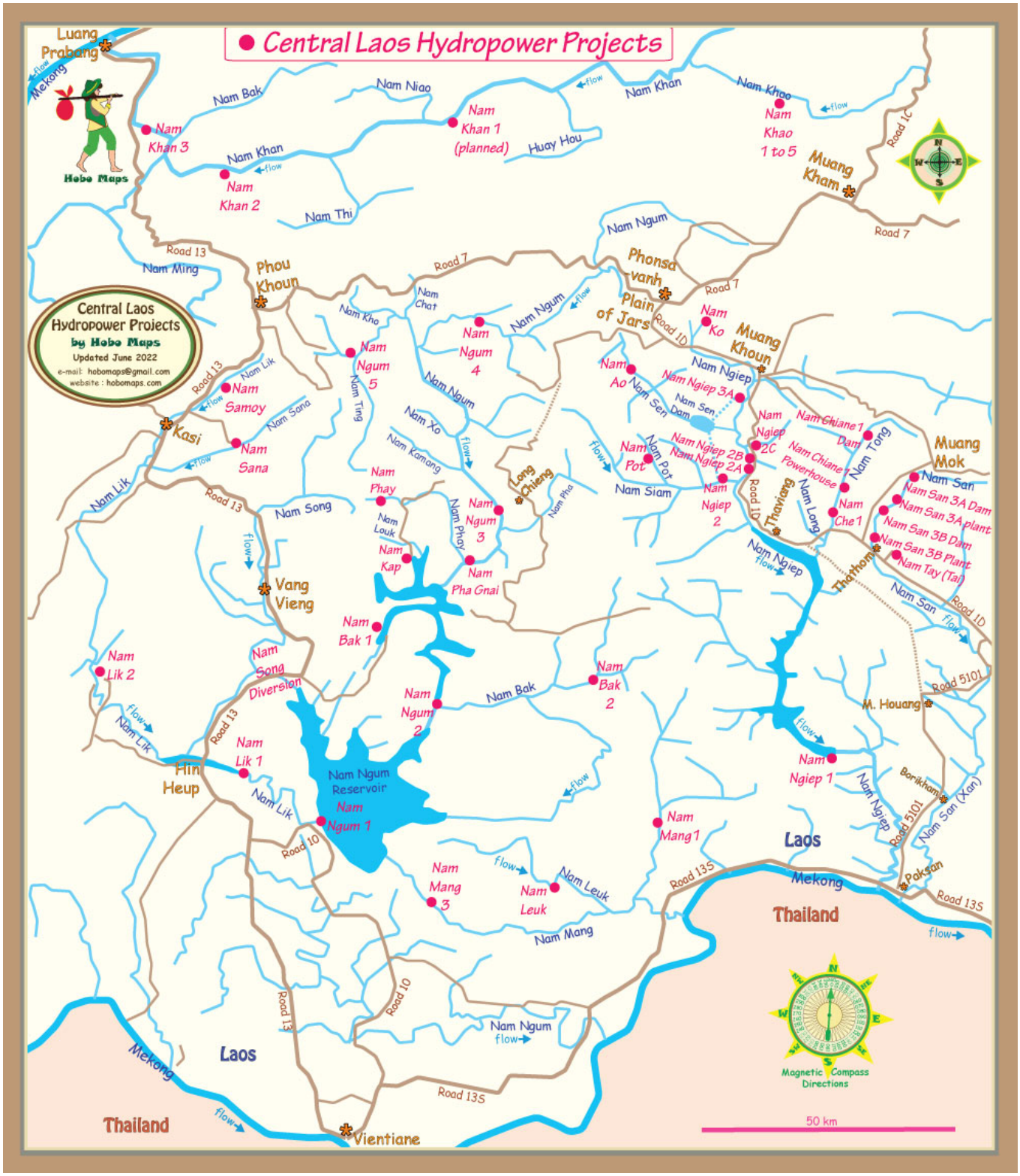
Name of Project	**Nam Ngum 2 Hydropower Project(NN2PC)**
Shareholders	**• SouthEast asia Energy limited (SEAN) 75% (Thailand)** **• EDL-GEN 25%**
Location	River: Nam Ngum, Province: Vientiane
Operation date	Jan 2013
Contractor	CK
Install Capacity	615 MW
Average Annual Energy	2310 GWh/year
Turbines	3 Units x 205 MW (Francis)
Project Type	Reservoir
Type of Dam	Concrete face rock fill dam
Catchment Area	5640 km^2

Nam Ngum Dams cascade elevations shown below (Nam Ngum 2 is below the one circled in red Nam Ngum 3):

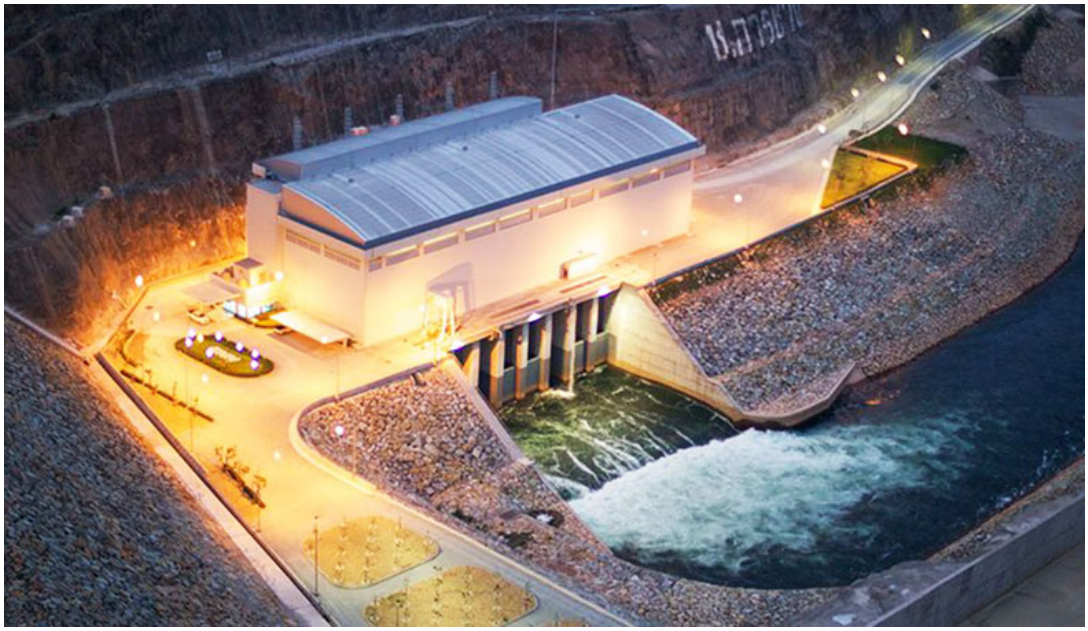


NN4	NN5	NN3	NN2	NN1	Name of HPPs
395	376	302	240	166	Distance from Mekong River (km)
986	1020	520	200	165	Elevation (m)

Nam Ngum 2 is located just upstream of the Nam Ngum Reservoir as shown in mid section of map below:

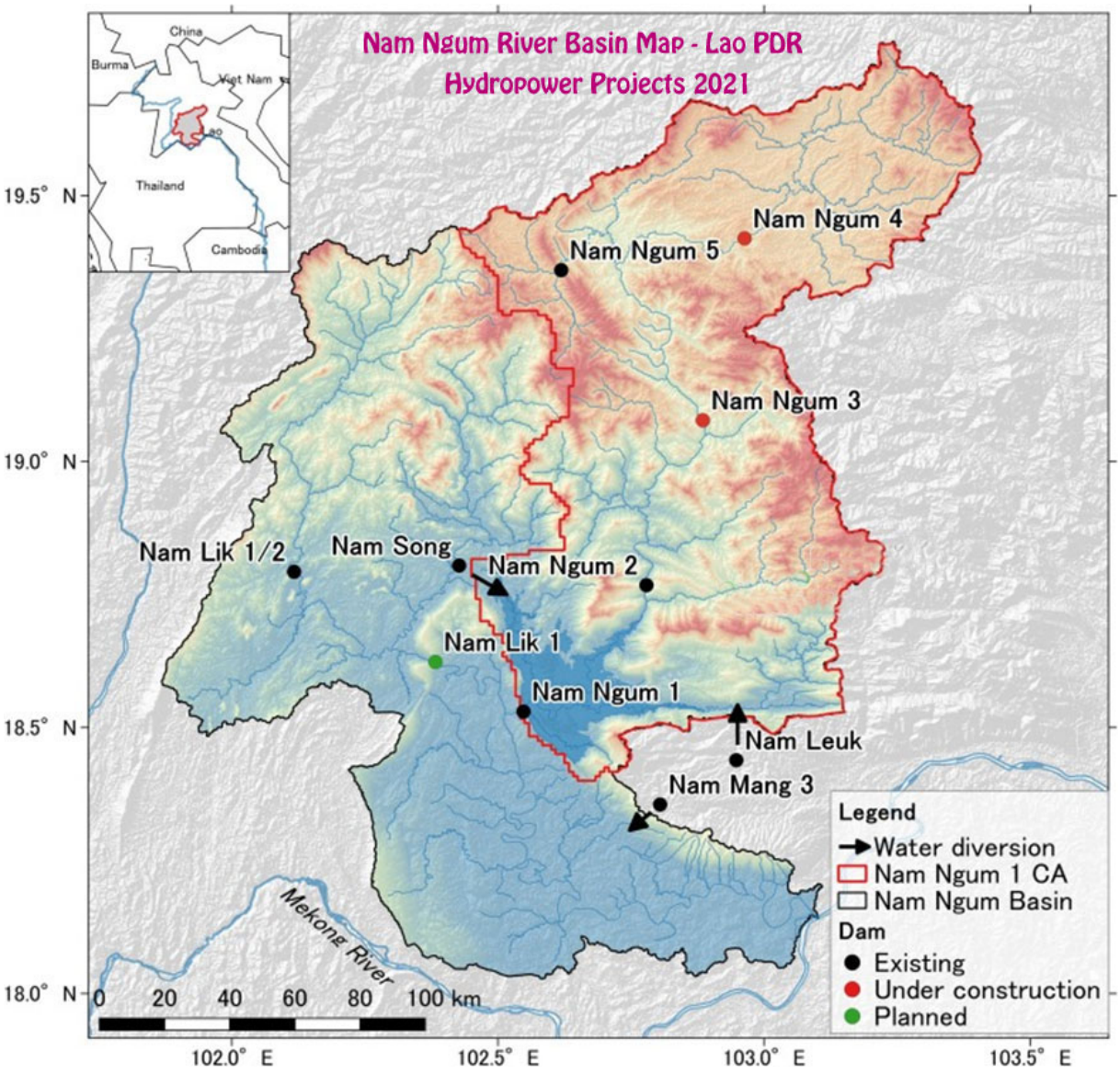


More images of Nam Ngum 2 project below:

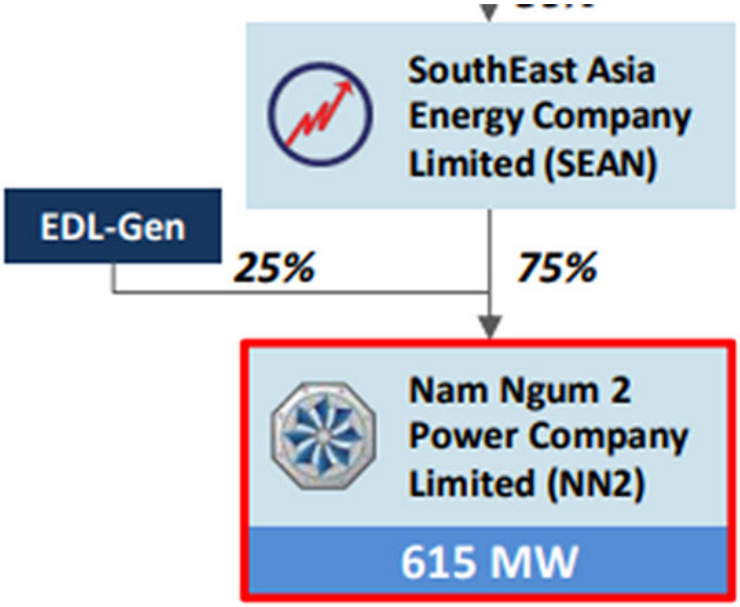


Nam Ngum 2 layout image below during construction:

Nam Ngum Basin map below:



Info below is from draft prospectus with most info dated as of 2019:



Summary of important technical information of NN2HPP is as follows:

1. Reservoir

Reservoir Area	: 5,640 km2
Yearly averaged discharge capacity	: 6,270 MCM
Full supply level	: 378.75 masl
Maximum flood level	: 375 masl
Reservoir area (full supply level)	: 122 km2
Storage (full supply level)	: 6,774 MCM
Minimum operating level	: 345 masl
Storage (minimum operating level)	: 3,780 MCM
Active storage	: 2,994 MCM

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3. Headrace Tunnel

Type	: Concrete-lined divided into three tunnels
Diameter	: 11.7 m
Length of the first tunnel	: 1,141 m
Length of the second tunnel	: 1,263 m
Height (above the penstock)	: 209.1 masl

4. Tailrace Canal

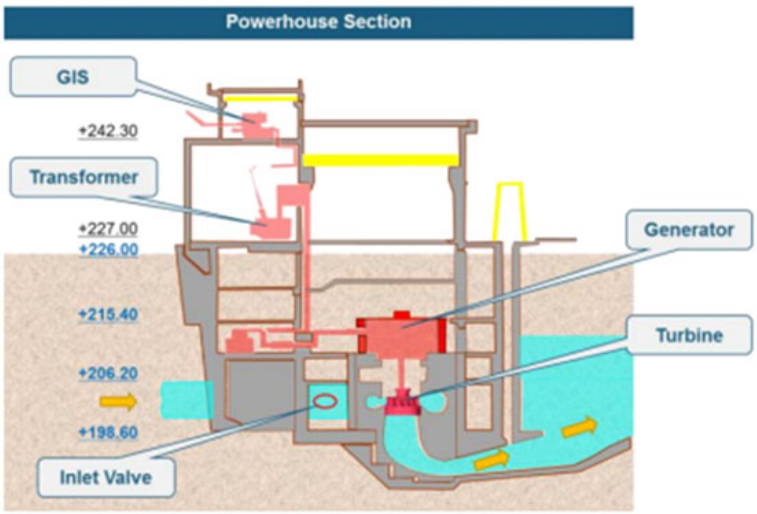
Amount	: 3 units
Diameter	: 5.35 m
Length	: 212 m

Summary of project information of NN2HPP is as follows:

Initial Operation Date (IOD)	: 26 March 2011
Commercial Operation Date (COD)	: 1 January 2013
Project Cost	: ~USD 1 billion
Concession Period	: 25 years from COD
Capacity	: 615 MW (3 turbines*205 MW)
Spillway Capacity (PMF)	: 8,263 m^3/s
PWW Length	: 600 m.
Diameter	: 10.7 m.

NN2HPP is a storage dam, which impounds water in a reservoir for power generation. The dam was constructed with the water storage level higher than the powerhouse to establish different levels of water to generate high pressure when water is released. The volume of water released from the reservoir down through tunnels towards the powerhouse is controlled to be at the desired quantity. The immense pressure of water in the tunnels drives the turbine to spin at high velocity. The spinning turbine then drives the generator, connected to the turbine through shaft, to spin and produce electricity.

The powerhouse of NN2HPP comprises three vertical Francis Turbines, a reaction turbine type suitable for hydropower plants with moderate water level such as NN2HPP. The generators comprise three synchronous generators with a capacity of 205 MW each, thereby bringing the total capacity to 615 MW.



NN2HPP relies solely on the water in the Nam Ngum River, which originates from the Xiangkhouang Plateau, with a total length of approximately 354 kilometers. NN2HPP's reservoir covers approximately 107 square kilometers, with the full water capacity of 4,886 million cubic meters at full supply level of 375 meters above Mean Sea Level ("masl").

The PPA determines the Annual Supply Target of 2,310 GWh (million units) to be purchased by EGAT, which is divided into:

(a) Primary Energy ("PE"): 2,218 GWh per year, with the production capacity not exceeding 16 hours per day, the payments for which will be made partially in Thai Baht and partially in USD according to the tariff designated in the PPA.

(b) Secondary Energy ("SE"): 92 GWh per year. This refers to the electrical energy generated only during August, September and October each year, all payments for which will be made in Thai Baht.

(c) Excess Energy ("EE") is the excess electricity generated when NN2PC's water volume exceeds the forecasted amount, thereby, in such month, generating electricity in excess of the target designated in (a) and (b) as declared to EGAT in advance. The excess electricity will be considered the Excess Energy. All payments for which will be made in Thai Baht.

The Company may choose to accumulate such Excess Energy in the Reserve Account, which may be utilized in the future in any year in which it cannot generate and sell electricity to EGAT to meet the target as specified in the PPA. The Excess Energy accumulated in the Reserve Account in form of electricity credit can be retained for up to 10 years and will be settled three times in 2022, 2032, and at the end of the CA.

Despite the fact that the water supply has no cost for power generation as it is derived from natural sources, hydropower generation is subject to some limitations due to the uncertain and unpredictable volume of water from time to time depending on weather conditions and seasons. According to the feasibility study of Nam Ngum 2 Hydroelectric Power Project, which takes into account the 50-year rainfall database (during 1954 - 2003), the amount of storm water in the Nam Ngum River is sufficient to feed the dam and for storage for power generation to meet the supply target under the Power Purchase Agreement with EGAT in the respective years.

The water volume in NN2HPP from 2016 to 2018 was as follows:

	2016		2017		2018	
	Height* (masl)	Water Volume (cubic meters)	Height* (masl)	Water Volume (cubic meters)	Height* (masl)	Water Volume (cubic meters)
January	369.4	4,309.8	370.9	4,454.8	364.3	3,818.5
February	370.1	4,376.9	368.7	4,234.3	364.2	3,808.2
March	366.1	3,987.5	361.7	3,576.2	359.9	3,418.7
April	360.3	3,452.0	356.4	3,124.2	354.5	2,965.1
May	354.7	2,918.0	351.1	2,703.1	349.8	2,609.5
June	349.9	2,610.3	345.5	2,301.0	352.7	2,828.2
July	351.8	2,753.0	356.1	3,093.6	372.2	4,591.2
August	361.6	3,586.2	362.7	3,668.4	375.3	4,919.1
September	366.9	4,057.5	363.0	3,695.6	372.6	4,635.9
October	367.5	4,118.6	363.1	3,703.9	370.9	4,459.9
November	369.4	4,310.8	363.2	3,709.4	370.4	4,406.2
December	371.1	4,481.3	364.1	3,794.2	368.4	4,209.7

* Height as at the end of each month

NAM NGUM 2 POWER

Nam Ngum 2 project site offices image below:

Nam Ngum 2 Vientiane corporate offices image below: