

Nam Khan 2 Dam images below:



The Nam Khan 2 Hydropower Plant is a reservoir-style project consisting of 2 turbine units with an installed capacity of 130 MW and average capacity of 65 MW per unit. It may be able to generate 558 GWh of electricity per year

Both the Nam Khan 2 and Nam Khan 3 dams went into operation in 2016 and were built by China's Sinohydro Corporation. The two projects were funded by a Lao investment of US \$350 million and an interest-free loan of \$308.5 million from Exim Bank of China.

Commercial energy generation at Nam Khan 2 commenced December 2015. The dam is on the Khan River and is managed and operated by Electricite du Laos (EDL).

The project includes a 115kV transmission line that links to a substation in Xieng Ngeun district of Luang Prabang Province, supplying electricity to the northern provinces and Vientiane. Nam Khan 2 will also provide power for the construction and operation of the China-Laos railway to be completed in 2021.

The reservoir covers an area of 37.9 km² at full supply level. Less than 1 km wide, it has a length of about 60 km along the river.

The reservoir is planned to also be developed as a tourist attraction to provide a boost for the local economy.

The Nam Khan 2 hydropower plant is 48 km away from the Nam Khan 3 plant in Xieng Ngeun district Luang Prabang province. The dam site is approximately 68 km upstream from and 30 km Southeast of Luang Prabang, near the village of Kengkoung.

Nam Khan 2 location is indicated in red in the satellite image below:



Nam Khan 2 location is shown in the upper left portion of area map below:

will provide a live storage of 635 cubic km for seasonal flow regulation. During the passage of extreme floods, the reservoir may rise to an elevation of 487 masl.

The powerhouse and related structures are located on the right bank at the foot of the dam. The project will be able to produce peak output of 126 MW under a net head of 137 meters. The estimated annual average energy generation is 567 GWh.

The two turbine units will be fed individually by an intake and a penstock. The intake structure is incorporated into the dam and the penstocks (4.1 meter diameter) are placed on the downstream face of the dam. The powerhouse will house two generating units driven by vertical Francis turbines.

A tailrace channel will discharge water directly back to the Nam Khan.

The Full Supply Level of the reservoir at elevation 475 masl will create a reservoir with a surface area of about 38 sq km and storage for 1,366 million cubic meters of water .

The drawdown of the reservoir to the Minimum Operating Level at elevation 455 masl will be 25 meters where the volume of the dead storage is 1,078 million cubic meters.

Generally, the reservoir will be filled up to the Full Supply Level during the wet season, from August to October, and be drawn down to the Minimum Operating Level at the end of the dry season.

The power plant will operate during daytime and stop at night. Such peaking according to the demand for electricity will depend on the size of the inflow each day and the amount of water stored in the reservoir. Typical peaking operation may be for about 10 to 16 hours on a daily basis.

No reregulating pond: In dry periods the power plant will not be able to operate more than part of the day due to technical limitations in the turbines. Peaking will cause daily fluctuations in flow and water levels in the river immediately downstream of the power house outlet. These variations will depend on the power demand each day and on the general flow of the river.

Just downstream of the power house outlet the water level will change quite suddenly after a start or stop in the power station. Further downstream from the power plant changes in the water levels will not be so rapid as tributary streams join the Nam Khan.

TABLE 1
THE PRINCIPAL FEATURES OF NAMKHAN 2 AND 3 HPPS

Description	NK2HPP	NK3HPP	Units
Dam			
Type of the dam	CFRD	RCC	
Height of the dam body	136	61	m
Crest Length	365	156	m
Dam crest elevation	481	353	masl
Data of reservoir storage			
Reservoir capacity	686.2	224	MCM
Reservoir area	30.57	7.07	km ²
Full supply level	477.86	349.06	masl
Dead storage level	465	343	masl
Regulation storage capacity	229.1	48	MCM
Index of engineering benefit			
Annual energy generation	558	240	GWh/y
Installed capacity (2 Units)	130	60	MW
Water discharge turbine	135	176	m ³ /s
Annual utilization hours	4,294	4,000	hour
Spillway gate discharge (Radial Gate)			
Amount of spillway gate	4	3	gate
Maximum discharge	9,974	5,710	m ³ /s
Dimension of spillway (WxH)	13.5 x 21	13.5 x 21	m
Rate head			
Maximum net head	119.18	41.50	m
Minimum net head	104.58	36.50	m
Tailrace flood level	355.58	304.22	masl
Tailrace check flood level	357.30	306.09	masl
Hydrological data			
Catchment area of dam site	5,167	7,049	km ²
Annual average inflow	67	92.1	m ³ /s
Design peak flow (0.1%)	8,640	9,410	m ³ /s

Name of Project **Nam Khan 2**

Location River: Nam Khan, Province: Luangprabang

Operation date 2015

Contractor SinoHydro (China)

Install Capacity 130 MW

Average Annual Energy 558 GWh/year

Turbines • 2 units x 65 MW (Francis)

Project Type Reservoir

Type of Dam Rock fill dam

Catchment Area 5167 km²

Nam Khan 2 Hydropower Project

EDL

NCC

Table 1: The Main Technical Parameters of the Nam Khan 2 HPP

Descriptions	Unit	Nam Khan 2
<u>Hydrology</u>		
Catchment Area	km ²	5,221
Annual average discharge	m ³ /s	64.4
<u>Reservoir</u>		
Full Supply Level (FSL)	m	475
Area at FSL	km ²	37.9
Total storage (below critical operation level)	M m ³	1,366
Total storage (below full supply level)	M m ³	1,078
Active storage	M m ³	635
Flood control storage	M m ³	288
Backwater length	km	60
<u>Dam</u>		
Type		Gravity RCC (Roller Compacted Concrete)
Crest Elevation	msl	488
Height	m	160
Crest length	m	405
Crest wide	M	15
<u>Spillway</u>		
<u>Service Spillway</u>		
Type		Ski-jump with a plunge pool
Discharge capacity at El. 475 and 487	m ³ /s	5,460 and 8,900
Number of bay		2
Bay width		14 m
<u>Emergency spillway</u>		
Type		Dam crater flow section with tapped chute
Discharge capacity at El. 487	m ³ /s	1,400
Number of bay		2

Descriptions	Unit	Nam Khan 2
Bay width		14 m
<u>Turbines</u>		
Type		Francis
Number	ea	2
Rated net head	m	137.5
Total Design discharge	m ³ /s	104
Design capacity (one Unit)	MW	64.4
<u>Power Facility</u>		
Installed capacity (all units)	MW	126.2
Annual Energy	GWhr	567.8

Source: Feasibility Study Report, July 2009.

The powerhouse location and reservoir are shown in image below:

Nam Khan 2 Hydropower Project

