

Location Map of CBK Hydroelectric Power Plants



CBK COMPLEX CAPACITY

COMPONENT	ORIGINAL CAPACITY (MW)	GUARANTEED NET CONTRACTED CAPACITY (MW)	CURRENT NET CONTRACTED CAPACITY (MW)
KPSPP - I	300.00 (2X150.00)	336.00 (2X168.00)	366.00 (2X183.00)
KPSPP - II	-	348.60 (2X174.30)	370.00 (2 x 185.00)
CHEPP	32.00 (4X8.00)	22.60 (2X11.30)	37.00 (2 x 18.50)
BHEPP	17.00 (2X8.00+1.00)	20.80 (2X10.00+0.80)	*22.35 (10.76+10.78+0.81)
TOTAL	349.00	728.00	795.35

*2011 NCC Test



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BOTOCAN Hydroelectric Power Plant





Botocan Hydroelectric Power Plant (BHEPP) is located in Majayjay, Laguna, about 80 kms. southwest from Manila. The first unit was commissioned in 1930 while the other units were commissioned in 1947.

BHEPP

The Dam, located in Brgy. San Roque, Luisiana is of the concrete curved-gravity type, 45.81 meters long and 28.32 meters high from the lowest point of the foundation.

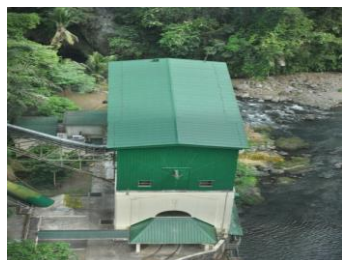
BHEPP was acquired by National Power Corporation (NPC) from the previous owner, Manila Electric Company (Meralco) in January 1979. BHEPP was then equipped with two (2) Francis-type turbine units rated 8MW each at 720 rpm, directly connected to a vertical generator and a 0.96MW auxiliary Pelton-type turbine unit driving a horizontal generator. A run-of-river power plant, BHEPP uses Botocan River as its water source for energy.

On February 7, 2001, CBK Power took over the operation of the CBK Complex including BHEPP. The plant underwent rehabilitation and upgrading program that aimed at the following:

- Extend the useful life of the Botocan Dam and power plant equipment by another 50 years;
- Improve the plant's available capacity, reliability and safety

As a result of the rehabilitation and upgrading program, BHEPP's capacity increased from 17MW to 20.8MW operating at 187.5 m net head.

COMPONENTS of BHEPP



Powerhouse

The **POWERHOUSE** encloses the three generator units as well as its auxiliaries. It is located on the left bank of the river and is in a 150-meter deep gorge. It can be reached via the cable car or a stairway.



Generator Units 1 and 2



Generator Unit 3



Switchyard



Intake



Dam Gates

GENERATOR UNITS 1 & 2

are the main units of BHEPP, each utilizing a Francis-type turbine. Each has a guaranteed output of 10MW at a rated speed of 600 rpm and a power factor of 0.85. It has a rated output voltage of 13.8 kV at 60 Hz.

GENERATOR UNIT 3

utilizes a Pelton-type turbine. It has a rated power output of 960 KW at a rated speed of 720 rpm. Its rated output voltage of 13.8 kV and with a power factor of 0.8.

The **SWITCHYARD** is located on the powerhouse roof. Low voltage lines are carried up the gorge through a series of overhead towers and are connected to the transformer station near the surge tank.

The **INTAKE** provides a means for the closure of power tunnel intake during dewatering of penstock or during emergency operations. It is located on the left bank of the river at a short distance from the dam, and it is equipped with conventional trashracks and a Stoney-type sliding gate. From the intake until the surge tank, the water is conveyed through a 2-m, 2-km long waterway consisting of a concrete-lined, 1,180 m long tunnel of circular section, and a 783 m-long riveted steel type section.

The **DAM GATES** provide a means to control and maintain the level of water in the reservoir. It is equipped with four counterweighted tainter gates, each 3.7 meters high and 7.6 meters long. The gates can be controlled

in either auto/remote mode from the Operator's Station or at local/manual at the Intake Building. In case of absolute power failure, it can be controlled manually by means of hand wheels.

The **OVERFLOW SPILLWAY** is designed in such a way as to permit the free flow of water at the Dam when it reaches 332.50 masl.

A differential 2.25 m-diameter, 63.96 m-high **SURGE TANK** is located at the top of the hill above the powerhouse. The tank is made of steel plates and is supported by six steel legs. The exposed steel penstock 1.8 m in diam. x 179 m long, convey the water from anchor block to the powerhouse through a steep slope inclined at 45deg. to 51deg. supported by concrete anchor blocks and concrete saddles. The surge tank prevents water hammering in the event of sudden closure of the butterfly valve. Likewise, it provides the required amount of water in case of an abrupt increase in load.

The **CABLE CAR** is the primary means of transportation going to the Powerhouse, with 15 minutes as interval time. It has a maximum safe capacity of 25 metric tons. The upper and lower landing elevations are 277.089 masl and 143.94 masl, respectively.

The **STAIRWAY ALONG THE PENSTOCK** is the alternative route from the ground level to the Powerhouse and vice versa. It has 611 steps, consisting of 597 steel ladders and 14 concrete step-ladders.



Overflow Spillway



Surge Tank



Cable Car



Stairway