



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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CALIRAYA Hydroelectric Power Plant



CALIRAYA HYDROELECTRIC POWER PLANT

The Caliraya Hydroelectric Power Plant (CHEPP)

is situated in Lumban, Laguna, approximately 60 aerial km from Manila. The plant was commissioned after World War II and shares the upstream Caliraya Reservoir with the Kalayaan Pumped Storage Power Plants I & II.



CHEPP

Under the Build-Rehabilitate-Operate-Transfer (BROT) Agreement between CBK Power Company Limited and the National power Corporation, CHEPP underwent rehabilitation and upgrading program.

COMPONENTS of CHEPP

The INTAKE STRUCTURE

is located on the left bank of the reservoir at El.272.5 m. From the intake until the surge tank; water is conveyed through a circular, reinforced concrete, 2.5 m-diameter conduit.



Intake Structure

The **SURGE TANK** is of the Johnson differential type, 6.1m-diameter and raises 32.9-m above the foundation. There is a 2.3 m-diameter maintenance butterfly valve immediately downstream of the surge tank.



Surge Tank

A 741 m x 2.0 to 2.3 m diameter **PENSTOCK** conveys the water to the powerhouse. The penstock is supported on concrete saddles and anchor blocks. A manifold diverts water into two branches and feeds each of the units. A butterfly valve is installed upstream of each unit which serves as main water inlet valve operated by hydraulic systems.



Penstock



Powerhouse



Generators



Switchyard



Caliraya Reservoir

West Talaongan, Lumot-Mahipon, Inao-awan, Sisilmin, Bukal, Cansuso, and Paowin in Cavinti.

The **CALIRAYA-LUMOT WATERSHED** was set aside as permanent forest reserve on June 26, 1969 by then president Ferdinand E. Marcos through Proclamation No. 573.

The POWERHOUSE

contains two Francis vertical turbines and synchronous generator with a total guaranteed capacity of 22.6 MW. The generators are connected to the main and transfer buses in the substation through SF6 gas-type circuit breakers rated 1,250A. Two transformers 13,800/480V feed the plant auxiliaries.

There are two feeders connecting Kalayaan and Botocan 115 KV line, each one equipped with a de-ton grid circuit breaker. These feeders supply power through two 3-phase power transformers each rated at 22,000 kVA, 13.2 KV / 115KV

The **CALIRAYA RESERVOIR** is located approximately 60 aerial km east-southeast of Manila. It serves as the reservoir for the Kalayaan and Caliraya Power Plants. It was formed by blocking the Caliraya River with a dam. It has a total catchment of 129 sq km including the 37 sq km catchment of Lumot Reservoir. The minimum and maximum normal operating water levels of the Caliraya Reservoir are at 286 and 288 masl and its total storage capacity is approximately about 80 million cubic meters.

Surrounding Caliraya Lake are 12 barangays in three towns; Cavinti, Lumban and Kalayaan. In these areas are Barangays San Antonio and San Juan in Kalayaan; Lewin and Caliraya in Lumban; East

The sale and settlement in these areas were withdrawn, subject to private rights. The private jurisdiction, control and regulation over the reservation is vested upon NPC through its Watershed Management Department.

The **CALIRAYA DAM** is a rolled-earth dam with crest elevation at 292 masl and has a base width of 161.7 m and a top width of 10 m. The base of the dam at the foundation elevation is at approximately 270 masl and was constructed on a foundation of alternate layers of basalt rock and soft materials. the total length considering the west and east dike is 1,156 m. The upstream face is protected with slabs of cement while downstream face is covered with grass.



Caliraya-Lumot Watershed



Caliraya Dam

The LUMOT-CALIRAYA TUNNEL

is situated in the municipality of Cavinti. It connects the Lumot Reservoir with the Caliraya Reservoir through the 2.2 Km long, 2m diameter concrete conduit. A maintenance valve is provided approximately 146 m downstream of the intake portal.



Lumot-Caliraya Tunnel Valve House

The NEW CALIRAYA SPILLWAY

was designed and constructed as it is of the open gated type with its ogee crest elevation 284.46 m. It was designed for a maximum discharge of more than 500 cu.m. per second. The new spillway is consist of a forebay, the ogee, chuteway with appropriate training walls, a

flip bucket as energy dissipater and a plunge pool. Two radial gates, measuring 8.76 m x 9 m wide, are supported by the central pier and abutment piers, which in turn support the spillway bridge.



New Caliraya Spillway