Lugu Pahar Pumped Storage Project, (6 x 250 MW)

Project Description

The proposed Lugu Pahar Pumped Storage Project is located near Lugu village in Gumia tehsil, Bokaro district, Jharkhand, India. Lugu Pahar falls in toposheet no. 73E/9 and the project area is bounded by Lat. N 23^{o} 45' to 23^{o} 50' and Long. E 85^{o} 40' to 85^{o} 45'. It is situated at 15 km away from sub-district headquarter Gumia and 70km away from district headquarter Bokaro. Gumia is nearest town to Lugu Pahar. The Nearest Airport is Ranchi which is about 90 km (approx) from the project site

The project will be a Close Loop type Pumped Storage Scheme. It will comprise two reservoirs: one at lower elevation and other one at upper elevation. The difference of water levels of the reservoirs will represent the effective "head" of the Project. The water conductor system will connect the two reservoir through an underground power house. During peak hours power will be generated by releasing the water of upper reservoir through water conductor, turbines and generator installed at power house to Lower Reservoir. During off peak hours the excess power from thermal stations and other sources will be utilized to pump the water from Lower Reservoir to Upper reservoir through power house where generators and turbines will then act as motors and pumps respectively. The same cycle of operation will be repeated during peak and lean period.

The details of the project components are as follows:

- A 104.5m high and 660m long rockfill upper dam with central impervious clay core across Kairo Jharna Nala to provide a live storage of 10.8 MCM with Full Reservoir Level at 640.00 m and Minimum Draw Down Level at 630.00 m.
- A 31.5 m high and about 1078 m long Rockfill lower dam with central impervious clay core across river Bokaro to provide a live storage of 11.5 MCM with Full Reservoir Level at 269 m and Minimum Draw down Level at 262 m.
- An underground power house with six number Francis type reversible pump turbine of capacity 253/285 MW.
- An underground Transformer cavern with six numbers Power Transformer of capacity 336 MVA.
- One 400 kV Gas insulated Switchgear.
- 2 Nos, 740m long each and 8m diameter Head Race tunnel.
- 2 Nos, 900m long each and 8m diameter Tail Race tunnel.

Installed Capacity and Power Generation

The details are summarized below:

Installed Capacity (MW)	1500
No of units	6
Unit Size (MW)	250
Head (min) (m)	353
Head (max) (m)	370

Hours of Peaking Operation	6
Annual Energy Generation (MWh)	3195000 (Considering 10 days shutdown in a year)
Annual Pumping Energy (MWh)	3904913
Cycle Efficiency (%)	81.82

Project Cost

A summary of the cost estimate, including direct and indirect charges for the Civil & Electro-mechanical works at August, 2017 Price Level has been worked out for three options as given below:

Item	**Estimated Cost (Rs. Lacs)**		
	Option 1: 6 Fixed speed	**Option 2: 2 Variable speed + 4 Fixed speed**	**Option 3: 3 Variable speed + 3 Fixed speed**
Civil Works	199772.61	200019.38	200147.33
Electro-mechanical Works	216600.00	223795.00	230200.00
Total	**416372.61**	**423814.38**	**430347.33**