

THESIS
ANALYSIS OF AN OPTION
FOR
POWER PLANT LAYOUT OF BASHA DAM

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ABSTRACT

Pakistan has been gifted a potential of at least 35,000 MW of hydel power on the main rivers and another approximately 10,000 MW on the side valleys. In addition, there is 550 MW of low-head potential in the plains on existing canals and barrages. It is a pity that Pakistan's power shortages are being met from thermal power rather than cheaper hydel alternative, which is not only environment friendly but its eternally available and renewable source of energy is a bounty of nature in contrast to environmentally hazardous, non-renewable and costly imported sources of energy for thermal power.

Pakistan is passing through a critical phase of water shortage as well as energy and tariff crises. The only solution is the construction of multipurpose mega hydro projects like Kalabagh, Basha and recently identified Akhori Dam. Such development will also support the industrial and agricultural growth and ultimately the national economy.

Planners started the feasibility studies of different mega projects since 1953. Kalabagh Dam has been ready for implementation but due to differences among the provinces, this project has yet to see the day light.

Meanwhile all the potential sites on river Indus have been identified and ranked. Basha Dam site is the best ranked, project of 5.7 MAF live storage capacity with a power potential of 3,360 MW. The proposed Basha reservoir would help in reducing irrigation shortfall and replace storage loss in existing reservoirs. It will also facilitate additional regulation on Indus river including flood control and water management.

The project is located on Indus river, about 310 km upstream of Tarbela Dam and about 40 km downstream of Chillas Town on Karakorum Highway (KK). The feasibility report of Basha was completed by Montreal Engineering Company of Canada in 1984. Later a Panel of Expert (POE) reviewed the MONENCO Report in 1988 and commented each component in detail. The POE concluded that different layout alternatives in combination of different types of Dams be studied for further comparison and reach the best layout of the project.

Complete layout process of such a mega project is a coordinated contribution of several professionals in various disciplines of Civil Engineering along with Hydro-mechanical and Electrical Experts. Therefore this thesis study was limited to analyze an option for Power Plant layout of Basha Dam.

Results of the study indicates that construction of an underground power complex on right abutment of axis C-2, seems to be technically feasible and viable. The analysis further indicates that the proposed layout offers an economical alternative as compared to the existing proposal by MONENCO. The overall cost saving is more than 29% of all the civil works of power complex and spillway.

The shorter length of the Tunnels and associated works reduce the quantum of underground excavations significantly and will also reduce construction time. Similarly hydraulic performance of the proposed layout will be improved due to reduction in total length of the power tunnels/tailrace tunnels and less number of bends.

The results of this study should be taken as an effort to provide a basis for further exploration of best location of the proposed dam site subjected to detailed investigation.