

**THESIS**

**STUDY FOR THE DEVELOPMENT OF DARBAN ZAM  
HYDROPOWER SCHEME IN DISTT. D.I. KHAN**



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**Submitted by**

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## ABSTRACT

Management of Lotic waters into lentic ecosystem has become a necessity to mankind's endeavour to have better quality of life. Since a few decades conversion of natural ecosystem into manmade or engineered ecosystem has increased tremendously as the agrarian and industrialized societies need water for their multifarious activities. It is estimated that about 4000 large reservoirs and about 80000 small reservoirs are serving mankind world wide. Most of the reservoirs are multipurpose and hydropower generation is the most common purpose. Keeping in view the economic situation and energy demand in the area, this study was carried out for the development of hydropower scheme at Daraban Zamdam Site.

Daraban Zam Dam is a proposed 45 m high ECRD dam to create 83.4 MCM storage reservoir. It is located on Kohra river nearly 69 Km south west of Dera Ismail Khan and 13 km north-west of Daraban town. The project is at its design stage by the time.

Main objective of the Project is to make available assured irrigation supplies to the command area and thus enhance the agricultural produce. In addition to this, the dam shall reduce flood damages and provide job opportunities and recreational facility. The feasibility studies for the project were carried out by Associated Consulting Engineers- ACE (Pvt) Ltd., (Lead firm) in association with Development & Management Consultants- DMC, Lahore, and Development Management Consultants - DMC, Peshawar, in 2005.

The project consultants did not consider in the studies the hydropower Aspect of the project because it was not included in the TOR of feasibility study. The available gross head at site is 45m, so by utilizing the available gross head and the design irrigation releases of 21.4 m<sup>3</sup>/s, the energy was estimated which is 8 MW and annual energy output of 70 Gwh respectively. After assessing the power and energy, design of penstock, selection of number of turbines and sizing of powerhouse was carried out. The design of penstock, penstock's diameter, mean flow velocity in penstock, velocity of pressure wave, reflection time of pressure wave and closing time of controlling system was determined.

For this research study Francis turbine was selected. The two numbers of turbines were decided by keeping in view cost of units and flow variations. The sizing of selected Francis turbine was carried out by using computer model TURBNPRO. In sizing of powerhouse, the length of powerhouse was decided to be 40.59 m, spacing between units were kept 11.76 m, repair bay floor and was 198.92 m<sup>2</sup> width of powerhouse was 16.48 m and height of powerhouse crane wall was kept 10 m.