

THESIS

**STUDY OF HYDROPOWER POTENTIAL AT UPPER REACH
OF LOWER CHENAB CANAL**

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ABSTRACT

It is an admitted fact that energy is the backbone of economy. The ill balance between demand and supply and also the escalating energy prices improvised a comprehensive re-examination of small hydropower. In evaluating renewable and traditional energy resources for their economic and technical feasibility, small hydel emerged as advantageous over others. The projects along canal will be the best alternative of base load plant as hydrological risk is also minimum and can be a best candidate project against thermal projects.

The present study is meant for different alternatives of the project location and powerhouse by considering unique site conditions and challenging technical aspects. This study is aimed to establish some base line information for detailed investigation such as feasibility study. In addition to the technical aspects, this also discusses the economics of the project.

The proposed hydel scheme will lie on the left side of Lower Chenab Canal (LCC), off taking from Khanki Head Works, District Gujranwala. Based on past eleven years of head work's pond & LCC data hydrograph, flow duration and rating curves are established which are used to analyze and select suitable pattern for power generation, types of hydro turbines and number of standardized size of unit.

Power generation under routine operation of head work's pond emphasizes for the improvement so two proposals along with the existing conditions of the system are also considered.

Brief technical information is presented regarding capacity of head regulator, head race and tail race, power house and pit type turbine. Precautionary measures have been taken for lift irrigation.

Estimated cost of the project is Rs. 276.329 million inclusive of Rs. 109.979 million as foreign exchange. To determine the profitability of proposed plant, economic analysis of the costs and benefits for the existing and proposed options has been carried out at 12% discount rate. The sensitivity of the project is also measured. A tentative schedule for project activities has also been worked out.

In the light of both technical and economic aspects the project under existing condition of head works is marginally acceptable. Project under proposal no.2 is much feasible.

The results of the present study are encouraging and intend to attract Government and private organization to exercise their plans. In brief, the study is contribution to the future work on low head hydropower development and hopefully, it would be helpful for the decision-makers.