

THESIS

**STUDY FOR THE DEVELOPMENT OF LOW HEAD
HYDROPOWER STATION AT MARALA**

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Submitted by:

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ABSTRACT

The continuously escalating energy prices necessitated a comprehensive re-examination of small hydropower. In evaluating renewable and traditional energy resources for their economic and technical feasibility, small hydropower emerged as advantages among other. The economic situation now favors smaller hydropower projects, so internationally; they are coming to the attention of multilateral donors, as a viable alternative to diesel generators for developing countries, like Pakistan.

This 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 based line information for detailed investigation such as feasibility study. In addition to the technical aspects of the project, this also discusses economic analysis and environmental considerations.

The proposed hydel scheme lies on the right side of Upper Chenab Canal, off taking from Marala Barrage, Sialkot. Using the available discharge data of UCC for post ten years, 10-daily flow duration curve, hydrograph and rating curve are developed which are used to analyze and select suitable pattern for power generation, types of hydro-turbines and number of standardized size of unit.

The proposed layout of the project recommended for further analyses is powerhouse with gated spillway. Brief technical information is presented in capacity of

head regulator, design for headrace and tailrace channel, relieving structure i.e. spillway and pit type turbine.

Estimated total cost of the project is Rs. 284.70 million inclusive of Rs. 72.8 million as foreign exchange compared. To check the profitability of proposed plant, economic analysis of the costs and benefits has been carried out using the discount rate of 12%. The results yielded by economic analysis and comparison with equivalent diesel generation shows the economic viability of the project.

Finally, the study discusses the environmental impacts on the proposed hydropower project. The procedure presented fills a need for an authoritative technique to help in physical, biological and human environmental aspects of planning for potential project. The study shows that the project has very limited environmental impacts with mitigating measures.

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 to the people who are required to make decisions as to the acceptability of projects.