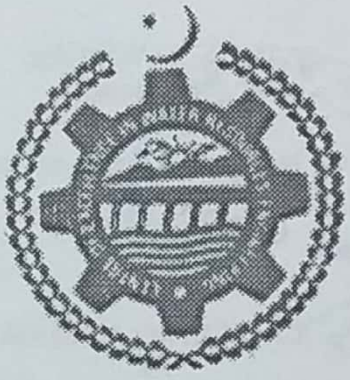
THESIS

SOCIO-ECONOMIC FEASIBILITY OF LOW HEAD HYDROPOWER PROJECT AT LOWER BARI DOAB CANAL



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ABSTRACT

Pakistan being a very rich country in natural resources has large potential of hydropower on its main rivers and canals. For sustainable development of the country the hydropower needs to be explored in such a way that negative impacts of water resources development on environment are minimized. The generation of thermal electricity has increased in the past few years as a result of agreement between Federal government and independent private producers (IPP). The private sector has set up several thermal projects in different parts of the country which have more generation cost as well as more adverse impacts on environment. Therefore it is need of the time to develop the renewable resources of the country that should be environmental friendly. Under limited financial resources, small head hydropower projects can be proposed along the canal falls of vast irrigation network in Pakistan.

The present study is meant for different alternatives of the project location and selection of the best option by conducting economic analysis and considering socio-economic and environmental aspects.

The proposed hydropower project lies in Okara District on Lower Bari Doab Canal, off taking from Balloki barrage on River Ravi. The discharge data of the proposed site was analysed for past 10 years (1990-2000). The techniques of flow duration curve, hydrograph and rating curve were applied to work out the reliable discharge value available most of the time throughout the year. On the basis of the results, the number and size of turbine units were decided. Different alternatives were discussed out of which three alternatives were selected for performing economical analysis.

Economical analysis was performed using the avoided cost concept of an equivalent thermal substitute.

The proposed layout of the project was recommended for powerhouse at left side of the existing fall structure at RD227+454 of Lower Bari Doab Canal. This project is proposed in bye pass arrangement by using combined head of canal falls at RD 196+954 and 227+454 which is 3.2 m. The head available at fall RD196+954 is proposed to shift to fall at RD 227+454 by raising the banks of existing canal.

Estimated total project cost is 298.14 million Rupees. To check the profitability of proposed plant, economic analysis of the costs and benefits has been carried out using 12 percent discount rate. Sensitivity analysis was carried out to check the viability of the project under worst conditions of 10 percent less benefits, 20 percent cost over run and then by combined effect of 10 percent less benefits and 20 percent cost overrun. Load forecasting was also done for Okara Tehsil by the technique of trending analysis.

Finally, the socio-economic aspects were examined for the proposed hydropower. The proposed project will have some beneficial impacts on the society during and after the construction of the project. During construction, the constructional staff will buy their daily use goods from local market, which will improve the economy of the local people. Also local people will have opportunity of getting jobs during and after the construction of the project.