THESIS

OPTIMAL SIZING OF DASU HYDROPOWER PLANT BY USING HPC SOFTWARE

By

Muhammad Ghafoor
(2002-PG-HPE-47)

For the Degree of

MASTER OF SCIENCE

IN

HYDROPOWER ENGINEERING

CENTRE OF EXCELLENCE IN WATER RESOURCES ENGINEERING
University of Engineering and Technology, Lahore, Pakistan.

2004

ABSTRACT

The surface water resources should be developed and utilized in a sustainable way and conjunctively. Many sites for hydropower are available in Pakistan but a few of them have been exploited so far. Dasu hydropower plant is a runoff river hydropotential project on the Indus river approximately 2 km upstream of village Dasu. This purposeful study engulfed the optimal sizing of Dasu hydropower plant by using HPC (Hydropower costing) software. In this context, over the conservative layout of dam axis, the flow rate was made variable with the uniform increment of discharge and simultaneously costs and benefits in the sense of power and energy were computed at each consecutive flow. This functionary worth was computed by application of a computer software HPC (Hydropower costing) with specially designed spreadsheet model. Marginal cost analysis of the project was carried-out with specially developed spread sheet. The data was collected from WAPDA and a visit of the site.

The net present values (NPVs) for peaking and runoff river options were computerized by taking IDC on base cost and transmission line cost with interest rates of 5%, 8%, 10%, 12% and 15%. Ten percent IDC was found optimal in both peaking and runoff river options resulting in net prevent value of $ 3113 million on design discharge of 2900 cumecs.