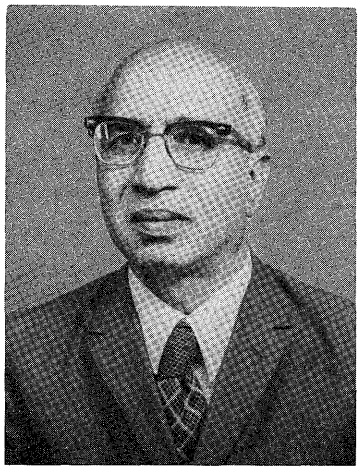
POWER DEVELOPMENT IN INDIA AND THE ROLE OF LOW HEAD/SMALL SCALE HYDRO



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I am happy to learn from M/S. Fuji Electric Company in Japan that the Fuji Electric Review is bringing out a special paper on Hydro Electric Power Plant Development with special reference to the development of generating plant for extreme low head hydel schemes. They have requested me to contribute an article indicating the current status of power development in India, particularly hydro power development, and the role of low head/small hydel plants in the energy scene of the country. Taking this opportunity, I am glad to indicate below the current status of developments in India, and the role of low head/small hydel plants in the energy scene of the country.

1 Development of renewable sources of energy, particularly hydro power has been assuming increasing importance all over the world on account of rising costs of fuel, its non-polluting renewable nature and also diminishing generation cost of energy, of hydro plant with the capital cost being written down from year to year as compared with the steeply rising fuel cost for thermal power generation. India also has been laying special emphasis on rapid development of its hydro electric resources.

2 The energy crisis in the world has attracted increasing attention to the development and role of low head/small hydro resources also. The power potential of such hydro schemes in India has not so far been fully assessed. Rough estimates indicate that these resources can contribute about 7 to 8 per cent of the total hydro energy potential of over 300 Twh.

3. Development of small hydro sites are generally of two kinds. One the medium and high head variety in the hilly terrain, which are generally remote from populated areas and the electricity net work. The second type of development consists of low head developments at the foot of dams, diversion weires across rivers, and the drops along the irrigation canals. India being one of the few developing countries with a vast net work of irrigation dams and canals, offers attractive possibilities for the low head type of development. Development of a number of designs such as bulb, tubular and straight flow type of turbines has taken place in the past, for use at such sites, in view of increasing importance being now attached to such a hydro power sites.

One of the major disadvantages of such low head/small scale developments is the high initial cost. It is necessary that the cost of such installations should be brought down as much as possible by standardizations of unit sizes and speeds, and manufacture of package type of designs which can

be installed in a short period.

An important consideration in the development of low head/small scale hydro sites in India is that the flow in the canals and rivers are seasonal in as much as the rain fall pattern in the country is not well distributed during the entire year and is concentrated generally in the monsoon months. This would result in power supply from such installations being intermittent. It is therefore necessary that the small scale hydro sites should be interconnected with the grid, where storage type of hydro electric power plants and other forms of generation are already available to even out the variations in the generation at small hydro plant sites. Such interconnection would substantially increase the total quantum of energy that could be harnessed thereby reducing the cost of continuous power supply. Another great advantage of small scale hydro developments is that the needs of the rural areas for agricultural and domestic requirements can be met from such small localised generation, thereby reducing the transmission and distribution losses encountered in delivering the energy to the rural areas, from remote centralized stations. Decentralised small scale generation will also help in developing local talents and providing increased employment opportunities to the local population.

4 The demand for energy in India is growing fast. It has been assessed that the energy requirements and the peak demand by the end of the year 1983–84 would be of the order of 168 billion KWHrs and 30,372 MW. Long term forecasts indicate that the energy requirements during the year 2,000–2,001 on a high and low scenaio basis would be about 593 billion KWh and 492 billion KWh.

Corresponding peak demands are anticipated to be of the order of 107,000 and 900,000 MW. It would be necessary to harness all forms of energy, including that from low head/small hydro developments to meet this rapidly growing requirement. The country has already launch a number of low head hydro developments to harness the drops along the major irrigation canals and river systems, using the bulb type of units. There are two stations already in operation, one on the Kosi river in Bihar and the second on the Gandak river in which is an India aided project located in Nepal. Two more stations one along the Western Yamuna Cancal in Haryana with an installed capacity of 8 x 8 MW and the other along the Cauvery river at four weir sites below Mettur Dam with an installed capacity of 8 x 15 MW. Fuji Electric Company has made a significant contribution to low head power development in the country and will be supplying the 16 sets required for the Western Yamuna Canal and Lower Mettur schemes. It is expected that in the years to come the development of low head/small scale hydro sites in the country will pick up tempo and play an important role in contributing to the energy requirements of the rapidly developing Indian economy.

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