Hydropeaking in Himalayan Rivers associated effect on aquatic life, flood management and sediment transport

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India have hydropower capacity of 46,000 MW. Large number of projects are in the category of run of the river schemes with daily pondage. For many decades hydropower in India specially of Himalayan rivers have also functioned as base load power stations like thermal, nuclear and other fossil fuel projects. No peaking or off peaking power of worth was being generated in such hydropower stations except during dry seasons of few months and that also for limited time in a day.

As the requirement of power went on increasing in India and search of sustainable power generation became primary goal, generation of power by renewable energy like power from wind, sun and small hydro became priority. In last few decade growths of renewable power in India has been phenomenal. However, in a day of 24 hours daily generation of renewable power is possible for few hours depending upon the effective wind in a day or sunlight hours in a day and intermittent flow in small stream.

India is aiming to have 40 % of the total installed capacity by the year 2030 based on non-fossil fuel sources. This translates to about 235 GW of renewable energy by the year 2030.

Till now majority of hydropower stations are not involved in system stabilization of power grid by peaking up and down of power generation mainly due to following reasons

1)      Hydropower can pick up and down fast than other power generation mode but it has also its secondary cost and detailing requirement

2)     Sudden rise and fall of water level in downstream due to hydropeaking may cause serious problem in environmental flow and also stranding, drift and movement of spawning ground, taxa, refuge in the sediment of all aquatic life specially fishes.

The 2000MW Lower Subansiri is at present the larges hydropower project under construction in Brahmaputra valley. River Subansiri is one of the large tributary of river Brahmaputra.

From ecological point of view the major issue is to maintain the constant source of water flow for sustainability of dolphin and other aquatic biodiversity downstream, which can be addressed by maintaining minimum average flow discharge to the tune of 240 cumec at least on constant perennial basis. In Lower Subansiri the dam and powerhouse being adjacent to each other the issue is not that critical. Downstream flood management in State of Assam is a critical issue.

More than two decades, NHPC for projects in Himalaya has developed the practice of putting large spillways near the riverbed for regular flushing of reservoirs during monsoon months. This helps to maintain sediment supply downstream and help the fish movement upstream and downstream during monsoon months, after and before.

Operation of this power station requires careful planning for hydropeaking or otherwise. The project is in advance stage of construction. It is right time for NHPC to set up few observation stations downstream of dam and powerhouse. A multidiscipline expert committee should study the ecological change after dam construction.