

Press Release

Study recommends differential pricing for pumped-hydro energy storage in India to boost RE

For Immediate Release

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A differential pricing mechanism that calculates different pumping and generation prices for pumped-hydro energy storage (PHES) should be employed for its growth in India, recommends a recent study by the Center for Study of Science, Technology and Policy (CSTEP).

On 29 November 2021, the Ministry of New and Renewable Energy (MNRE) announced that the country's total installed renewable energy (RE) capacity (including hydro) had crossed 150 gigawatts (GW), while also setting a new target of reaching 175 GW capacity of RE by 2022.

The role of hydropower in achieving India's renewable energy aspirations will be critical. Power minister R K Singh reiterated this last month when he said that though the country is set to exceed its target of 500 GW RE capacity by 2030, it needs hydro-power as a balancing source for grid stability since the supply of wind and solar power is intermittent.

In this context, the CSTEP study seeks to analyse why the growth of PHES— the oldest and most mature large-scale storage technology— has been sluggish in India, and arrives at measures to boost it.

Making a comment on the existing pricing mechanism, the study says that the current mechanism considers PHES only as a generator, while PHES acts both as a generator (generating mode) and a consumer (pumping mode). This leads to poor cost recovery without any profit being generated from operations. Employing a differential pricing mechanism can help recover pumping costs fully, offset low recoveries, and eventually generate profits, says the study.

Further, emphasising the need to recognise the multifunctional role of PHES, the study recommends developing pricing mechanisms in accordance with the specific services being offered by the PHES plant to the grid, and illustrates it with case studies. Such services include peak-load shaving—where PHES manages the peak load of the grid effectively by storing energy in the off-peak hours and supplying it when the demand is high—; and RE smoothing—where PHES helps smooth out the variability by storing energy in the form of hydro potential (which can then be used when the grid needs it).

Adopting the recommended measures on pricing mechanism can make PHES commercially viable, leading to its higher uptake in India, finds the study.

As India moves towards large-scale integration of intermittent RE sources into the grid, the many services offered by PHES can help stabilise this integration, while also managing sudden changes in load, thereby resolving grid-balancing issues and supporting efficient grid operation.

The full study report is available [here](#). For quotes from researchers and details of the study, please mail us at cpe@cstep.in

About CSTEP:

Headquartered in Bengaluru, the Center for Study of Science, Technology and Policy (CSTEP) is one of India's leading think tanks with a mission to enrich policymaking with innovative approaches using science and technology for a sustainable, secure, and inclusive society. CSTEP's areas of focus are Climate, Environment and Sustainability, Energy and Power, AI and Digital Labs, Materials and Strategic Studies, and Computational Tools.