

# Bhutan's happiness stems from its hydropower, too

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Only 5% of Bhutan hydropower has been exploited. Credit: Mélanie Guittet

EPFL researchers are supporting this Himalayan country's efforts to expand its hydropower capacity.

At a time when dams in Switzerland are up for sale, another small mountainous country intent on preserving its natural environment is looking to further tap into its hydroelectric potential. Bhutan, which sits

in the Himalayan foothills, wants to expand its production of [hydropower](#), one of the country's only indigenous resources, in part to sell it to neighboring India. Only 5% of this resource has been exploited, meaning there is enormous untapped potential.

Yet Bhutan – a country known for its Gross National Happiness Index, age-old traditions and resistance to globalization – is in no hurry. It wants to be sure it has all the skills and knowledge needed to develop, operate and maintain its new dams without foreign assistance. It has only called on outside experts to help it set up its Hydropower Research and Development Center. EPFL, through its Energy Center and three laboratories and in association with BG Consulting Engineers, responded to Bhutan's request for proposals – and won.

## **A social and economic lever**

Three EPFL labs are involved in the project: the Laboratory of Hydraulic Constructions (LCH), the Laboratory for Hydraulic Machines (LMH) and the Swiss Post Management of Network Industries Chair (MIR). EPFL submitted its roadmap to the procuring agency at the end of 2016. "The Research and Development Center will include nine centers of excellence that cover the entire hydropower production value chain. It will handle all domestic needs, from planning to operations, from training to construction and maintenance, and from safety to cost optimization," said Mélanie Guittet, the project coordinator at EPFL's Energy Center.

The procuring agency was particularly impressed with the LCH's work on modeling hydropower installations. The models are designed to both understand and predict how facilities will interact with water. "The new center will also be equipped with a similar hydraulic laboratory for analyzing existing and future installations," said Guittet. The R&D center will also be given a strategic research mission, with a particular

focus on managing sediment, hydraulic structures and optimization. It will carry out this mission in conjunction with other universities, such as the Royal University of Bhutan, and through international partnerships including with EPFL. The idea behind combining operating and research responsibilities under one roof is to make the center competitive, attractive and profitable and to build its reputation. "It will eventually employ around 100 people and will spur both social and economic growth in the country," added Guittet.

The Bhutanese government aims to install around 11 GW in capacity by 2030, which is nearly eight times the country's current level. For comparison, Swiss hydropower plants represent 16.6 GW of installed capacity. Bhutan's population is only one tenth the size of Switzerland's, and its hydropower potential is estimated to be 30-40 GW.

Provided by Ecole Polytechnique Federale de Lausanne

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