



## ECONOMY AND ENVIRONMENT PROGRAM FOR SOUTHEAST ASIA

### POLICY BRIEF

#### SURROGATE PRICING FOR WATER: THE CASE FOR MICRO HYDRO-ELECTRICITY COOPERATIVES IN NORTHERN THAILAND

Thailand, like many other countries, is finding the development of renewable sources of energy a complex challenge. However, a recent study has shown that good economic management combined with targeted incentives could allow micro-hydro schemes to make a viable contribution to the nation's sustainable development.

The study, carried out with support from EEPSEA, looked at pricing and policy in two small dam projects in the Doi Saket District of Chiangmai. As in many of Thailand's 70-plus micro-hydro schemes, electricity delivery problems have led to local demand for connections to the national energy grid - placing the future of micro-hydro in some doubt. The researchers analyzed whether the pricing structures used by the projects' managers could be modified to improve the efficiency of water use and power supply. They also investigated the feasibility of different project development options.

The study's main conclusion was that with adequate backing, micro-hydro projects could continue to exist alongside the developing grid system. Moreover, they found that such a joint system could supply many other benefits to the communities served, including a vital contribution to forest preservation.

The study was conducted by Sitanon Jesdapipat, of the Thailand Environment Institute and Siriporn Kiratikarnkul, of Maejo University, Chiangmai. It was motivated in part by Thailand's search for sustainable forms of power - with over 85% of its power coming from abroad, the country is committed to reducing its dependence on energy imports.

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The researchers visited the Mae-to-luang and the Pang-bong micro-hydro projects which together serve 252 low-income households. The sites are two of seven mini-hydro electricity co-operatives (MHEC) in the area, where small scale hydro project development started over 15 years ago at the initiative of the King of Thailand.

In both Mae-to-luang and Pang-bong, water supply has become erratic because of deforestation. This, in turn, has jeopardized electricity supply. Of the two sites, Mae-to-luang is in better shape financially. But the researchers report that if the situation continues, rising operation and maintenance costs could make both systems less attractive than the connections provided by the Provincial Electricity Authority (PEA). Already 80% of co-op members in Mae-to-luang have said that they would switch to the PEA supply given the choice.

Jesdapipat and Kiratikarnkul first set out to find out if the MHECs could change their electricity charges to improve the efficiency of water use - thereby improving the viability of the projects. To do this they attempted to calculate the full cost of both water supply and electricity generation so that the MHEC's could properly reflect them in their pricing regimes - directly linking water and electricity costs in a so-called surrogate pricing system. This entailed an investigation of such issues as the economics of construction and labor, the environmental cost of dam construction and, most problematical, the cost and benefits of forest protection. This later issue was felt to be key since it is the intact forest system which is the source of the micro-hydro schemes' water.

The researchers then went on to investigate how the micro-hydro schemes should be managed in the future. They did this by comparing the costs and benefits of the different options available to the two MHECs. The Pang-bong project proved to be unviable whatever management scenario was used. However, at Mae-ton-luang the best option proved to be upgrading the scheme so that it could sell electricity to the PEA.

In order to get a clearer picture of the benefits that micro-hydro schemes bring to communities, the researchers interviewed villagers in a number of sites in the Doi Saket District where micro-hydro projects had already been phased out. Over half of those questioned felt that water supply has decreased as a result of deforestation. While not conclusive, this seems to support the hypothesis that micro-hydro schemes - which need intact water catchment areas - make people more aware of the importance of forest conservation.

In light of these findings, Jesdapipat and Kiratikarnkul recommend that Thailand's electricity pricing scheme should change to be more supportive of electricity produced by renewable resources, especially ones that bring other benefits over and above energy production. In the case of micro-hydro, they argue, benefits such as forest conservation make the project more attractive than conventional electricity production.



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Jesdapipat's and Kiratikarnkul's ideas have recently attracted interest from the National Energy Promotion Office which is now carrying out a feasibility study on them. Depending on the results, the office may provide financing for upgrading a series of mini-hydro projects to make them commercially viable. Discussions are also underway with UNDP and the World Bank for use of the Global Environment Fund to support such an endeavor.

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The full text of this study is available as an EEPSEA Research Report:  
*Surrogate Pricing for Water: The Case of Micro Hydro-Electricity Cooperatives in Northern Thailand* - Sitanon Jesdapipat and Siriporn Kiratikarnkul

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