Early Warning System

ADB-59266-001

Research and Demonstration on Mechanisms for Realizing the Ecological Product Value and Key Technologies for Green Transformation of Small Hydropower

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Quick Facts

Countries	China
Specific Location	Chenzhou (Hunan) and Lishui (Zhejiang)
Financial Institutions	Asian Development Bank (ADB)
Status	Approved
Bank Risk Rating	U
Voting Date	2025-11-12
Borrower	Government of China
Sectors	Energy, Hydropower, Technical Cooperation
Investment Type(s)	Advisory Services
Investment Amount (USD)	$ 0.30 million

Project Description

As stated by the ADB, the TA will support International Center on Small Hydro Power (ICSHP) to realize ecosystem product valuation and advance key technologies for the green transformation of SHP (small hydropower) in the context of climate change adaptation and mitigation. The TA will identify pathways to evaluate ecosystem product from SHP. It will develop a region-specific valuation index system for ecosystem product value, clarify ways to implement the system, and propose mechanisms and policy recommendations for the ecosystem product value of SHP at both national and regional levels in People's Republic of China (PRC). The TA is expected to yield several positive impacts, including: (i) promoting low-carbon energy transition; (ii) advancing technological innovation and industrial upgrading; (iii) fostering sustainable development of regional economy; and (iv) enhancing social and environmental benefits.

The PRC is endowed with significant potential regarding the ecosystem product value of SHP. As of the end of 2024, the PRC has around 41,000 small hydropower (SHP) stations with over 80 GW capacity, aiding energy conservation and emission reduction. Developing ecosystem valuation mechanisms and untapped hydropower is crucial for sustainable growth. The International Energy Agency emphasizes that tapping these potentials enhances efficiency and sustainability, strengthening the water-energy nexus and supporting a resilient energy transition.

Research on quantifying ecosystem services in SHP is in its early stages, with limited domestic and international efforts. Lishui City of Zhejiang Province is pioneering the integration of ecosystem product value into hydropower. Similarly, Chenzhou City in Hunan Province is demonstrating low-carbon pipeline residue power generation for advancing key technologies for the green transformation of SHP. Globally, countries are identifying hidden and untapped hydropower potentials at existing infrastructures to enhance SHP development.

By accurately calculating the contributions from ecosystem products, services, and cultural benefits, the project will enhance public understanding of the value ecosystems can provide particularly hydropower projects, highlighting their substantial public value. Additionally, maximizing the value of SHP and optimizing existing management practices will enable the scientific assessment and effective development of hidden and untapped hydropower potentials within the existing water infrastructures.

The project aims to address several key challenges related to the realization of ecosystem product value and the technological transformation required for the green transition of SHP in the context of climate change adaptation and mitigation. The project will promote integrated use of renewable energy, optimize energy allocation, stimulate technological innovation and industrial upgrading, and support regional sustainable economic development. It is expected to play a critical role in driving the low-carbon energy transition, strengthening renewable energy development, improving ecosystem carbon sink capacity, and enhancing urban and rural climate adaptation strategies.

The project introduces the following innovative elements: (i) mechanism innovation: the project seeks to develop a comprehensive value realization mechanism for SHP ecosystem products that covers the entire spectrum from accounting to trading and compensation; (ii) technological innovation: the project will establish reliable methodologies for identifying and evaluating the hidden and untapped hydropower potentials of the existing infrastructures; (iii) demonstration innovation: key technology research and demonstration activities will be carried out in regions such as Chenzhou (Hunan) and Lishui (Zhejiang); and (iv) outcome innovation: the project will emphasize knowledge sharing and capacity building, crystallizing project outcomes into public knowledge products such as technical standards (guidelines).

Gender gaps remain a challenge in the SHP sector, particularly in technical, engineering, and leadership roles, as well as in access to benefits and participation in decision-making. This TA will integrate gender-responsive approaches to ensure inclusive participation in ecosystem valuation processes, technology development, and policy formulation.

Investment Description

- Asian Development Bank (ADB)

Contact Information

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Bank Documents

- Technical Assistance Report