

Hydroelectric Power Development Center

Among domestic energy sources, the largest reserves are from hydropower, and these reserves provide the highest proportion of domestic primary energy. They account for 17% of the total generating capacity of electric power supply facilities, and thus have a fairly important role in energy supply. Hydroelectric power generation is a clean form of energy with only a small impact on the global environment, and its supply is a highly stable form of domestic renewable energy. It is necessary to promote its development particularly from the standpoint of the prevention of global warming.

In order to support measures to stimulate the development of hydroelectric power generation, the Hydroelectric Power Development Center is implementing the following projects.

Organization of the Hydropower Committee and the Formulation of Policy Proposals

The Hydropower Committee of the New Energy Industrial Forum is responsible for the following activities.

The Committee has been carrying out research and studies on various measures concerning the promotion of the development and introduction of small and medium-sized hydropower plants.

Survey on the Development and Utilization of Hydropower

In order to effectively advance the development of hydroelectric power, the center has carried out a "Survey for the Planning of Hydropower Development Sites (the fifth Survey for hydropower generation)" commissioned by the national government, which presents the whole picture of undeveloped potential water power capacity in Japan. As of March 2006, the potential water power capacity is distributed over more than 2,700 undeveloped sites. Their average output is around 4,500 kW, which represents a suitable site for a small to medium-sized plant. However, the number of remaining economically efficient sites is decreasing. In order to promote the development of these small and medium-sized power plant sites, the following work is being carried out within the framework of the "Basic Research for Small and Medium-Sized Hydropower Development Promotion Guidance Projects:" (1) a study on development promotion measures, (2) research on improving the accuracy of individual generation plans, (3) research for the development and promotion of the Hydrovalley project, (4) a study of the unutilized drop potential for water power and of generation plans in which these drops or heads are utilized, and (5) the compilation of technical information regarding hydropower development.



A Hydrovalley project has been planned and constructed for the intake weir (with effective use of the existing sand control dam) of the Seiwa power plant (output: 190 kW) in Yamato-cho (Kumamoto prefecture) and the power plant (upper right).

Promotion of Technological Development

The development of hydroelectric power generation plants will become more difficult in future since their construction costs are high and there are major environmental impacts due to the construction of the dams and other structures required. However, hydropower is a valuable resource that is available domestically, and there are many sites whose development would not have a significant environmental impact. Vigorous development of these sites is therefore desirable.

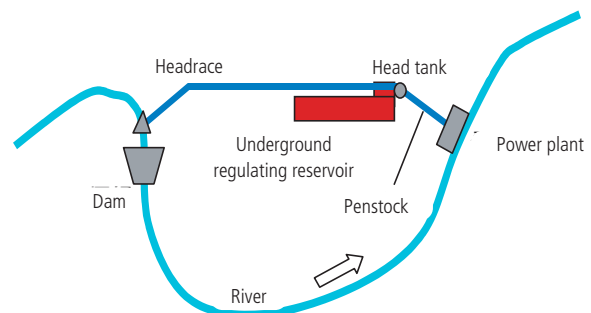
The center is carrying out a "Technological Development Survey for the Effective Use of Hydropower Resources" as a form of development for the promotion of hydroelectric power generation and to provide information on hydropower technologies.

Within this survey, a "Technological Development Survey for the Effective Use of Small-Scale Hydropower Resources" is being conducted to improve the economic efficiency of small-scale hydropower, which has been neglected so far due to its low power output, as well as a "Technological Development Survey to Strengthen Run-of-river Power Plants using Regulating Reservoirs" to raise the capacity for electricity generation by adjusting the river water flow using underground regulating reservoirs constructed within run-of-river power plants.

Since these technologies can make use of the existing facilities, such as water intake systems, they have the advantage of having an extremely low impact on the natural environment compared with new developments.



Small-scale hydroelectric power generation plant using a sand control dam



Basic conceptual diagram of an underground regulating reservoir

Technical Guidance

Hydroelectric power generation in future must be developed using as many small and medium-sized sites as possible according to plans. However, the current administrative system is not necessarily sufficient to achieve this.

Therefore, according to requests from institutions such as municipal electric enterprises, technical guidance and support is provided concerning the formulation of concrete development plans, the conduct of surveys, design, construction, and so on. For institutions such as municipal electric enterprises who are considering development in the near future and who do not have sufficient technology and well-developed management systems, guidance is provided based on government subsidies (subsidy rate 50%).



Miyakashiwadai power plant (output: 2,700 kW) in Iwate prefecture

Interest Subsidies for Small and Medium-Sized Hydroelectric Power Generation Plants

From the standpoint of achieving a reduction in the initial power generation costs and promoting the development of hydroelectric power generation, an interest subsidy program is administered by the NEF for the construction of hydroelectric power generation plants.

Technical Training Workshops

In order to improve the technical level of the engineers involved with the development of the small and medium-sized hydropower plants, a practical workshop is organized in which examples of cases of hydropower development and new maintenance management technologies are introduced as well as a basic workshop for preparatory work, in addition to the distribution of technical handbooks to these engineers for reference purposes.

Hydropower Consultation Work

The Hydroelectric Power Development Center has conducted surveys for the planning of hydropower development sites and this work is commissioned by the national government. Utilizing these achievements and know-how, support is now being provided to local governments, private enterprises, associations, etc. on request through investigation of the potential for hydropower generation and by preparing plans for the optimal size of hydropower plants according to the actual demand, and so on.

Various application documents are also prepared at the request of local

governments, private enterprises, associations, etc. that have a hydropower development plan. The Hydroelectric Power Development Center can therefore assist hydropower developers in outsourcing this work.

International Cooperation

The NEF participates in the "Implementation Agreement for Concerning Hydropower Technologies and Programmes" of the International Energy Agency (IEA). In order to overcome issues that hydropower development is facing, such as environmental problems, regulatory issues, economic efficiency issues, and technological issues and also to contribute to the global promotion of hydropower development, NEF is compiling the technologies that have been accumulated in particular among the IEA member states and is implementing technological cooperation in particular fields.

On the other hand, in order to contribute to the promotion of unutilized hydropower resources development in other areas, including Japan, demonstration projects of distributed small-scale hydropower sites in Southeast Asian countries have been conducted with the aim of establishing the technology for such distributed small-scale hydropower generation, which is easy to plan, design, install and operate. Education and training is also being provided for hydropower engineers through cooperation in surveys of potential hydropower capacity. In addition, the NEF is involved in the accumulation, dissemination and promotion of knowledge and know-how for the promotion of the Clean Development Mechanism (CDM) under the Kyoto Protocol by utilizing hydropower generation in order to prevent global warming.

Furthermore, utilizing the experience and know-how from past surveys, consultations centered on surveys concerning overseas hydropower development and feasibility studies are being conducted.



IEA implementation agreement on the hydropower Annex-VIII Report "Outstanding hydropower case examples (environmental mitigation measures and benefits)"



Demonstration project on the NamMong Power Plant (output: 70 kW) in Laos