

II. Activities of Each Department

1. Public Relations Office

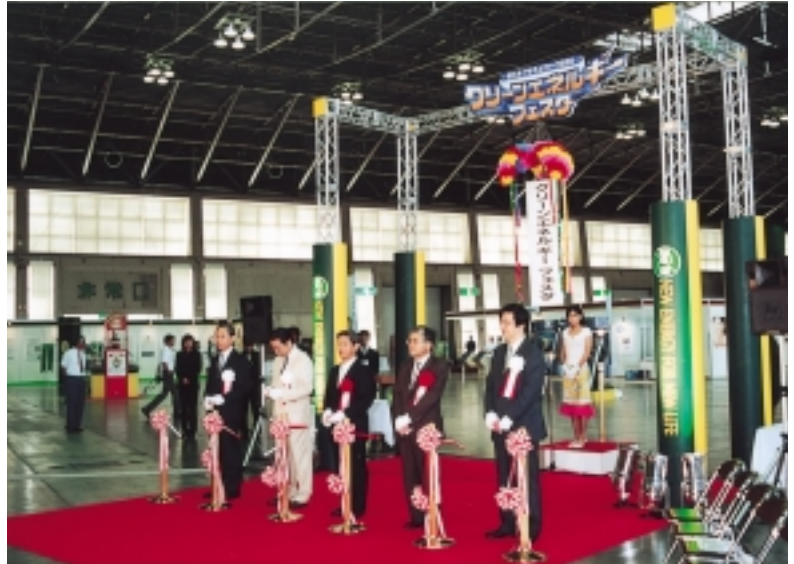
The Public Relations Office handles the following public relations activities, to positively introduce and promote new energy to the general public.

Exhibitions

The exhibitions are intended to show new energy in general, and include display of clean energy vehicles, trial rides in them, and presentations by local governments, universities, enterprises, etc.

Each exhibition is designed to introduce new energy, mainly to people who do not have knowledge on new energy, in a manner that have them learn enjoyably. At the exhibition, we hold a character show as an attraction, a quiz meeting, and a family solar car workshop; a general new energy introduction corner; a clean energy car display and trial ride corner, etc.

In FY 2000, 150 exhibitions were held throughout the country. “Clean Energy Festa” the largest scale exhibition allured 14,000 persons for two days.



Opening ceremony of a Clean Energy Festa

Symposium

Symposiums are held in cooperation with local governments and regional Bureaus of Economy, Trade, and Industry, in respective places in Japan, with professionals of new energy as lecturers. The symposiums are aimed at having participants learn knowledge concerning new energy enjoyably, to contribute to the introduction of new energy.

Information Provision Through Home Page

The new energy home page on the Internet presents information concerning new energy, including various events, such as exhibitions to be held, subsidy programs, award programs, and results of various surveys, to improve knowledge of general people on new energy.

Provision of Various Pamphlets

Various pamphlets are prepared and distributed in the above exhibitions. They are prepared for various targets including children and people who have knowledge on new energy.



A scene of a Clean Energy Festa

The Research and Planning Center is engaged in the following activities to positively promote the development, practical application, introduction and spreading of new energy technologies.

New Energy Industrial Forum and Policy Proposals

The New Energy Industrial Forum, an advisory body of the Chairman of NEF, formulates policy proposals aimed at reflecting views of private sector in the government new/renewable energy technology development programs and introduction schemes.

The forum has eleven committees and a sub-committee, and each of them is consisting of representatives of industries concerned. The committees compile draft of policy proposals based on their survey and research on their own categories.

The Research and Planning Center is in charge of surveys and research of the following committees.

1. Planning Committee
2. Planning Subcommittee
3. Fuel Cell Committee
4. Coal Energy Committee
5. Cogeneration Committee
6. Wind Energy Committee
7. Waste Power Generation Committee
8. Biomass Committee
9. Solar Energy Committee
10. Indigenous Energy Committee

Surveys and Research

Besides the surveys and research concerning the committee activities, NEF collects basic data and information on the technology development and introduction schemes of new/renewable energy.

Marine Resource Utilization System

Research on resource and technology using the low temperature stability peculiar to marine deep water, and investigation for multipurpose industrial use are underway.

International Collaborations

(1) Information Exchange with New Energy Concerned Organizations Overseas

Information is exchanged with foreign governments, organizations, research institutes, and the like, concerning the development and practical application of new energy technologies in foreign countries, and on how the cooperation should be between governments and research institutes.

(2) Invitation program of Asian New Energy Specialists

Under this annual program, NEF has invited energy concerned government officials and researchers from Asian countries to show new and renewable energy facilities in Japan for two weeks. The program aims to contribute to Asian countries for their further new/renewable energy introduction and utilization. Since the beginning of this program in 1989, some 53 specialists of ten countries have been invited to Japan. In FY 2000, nine spe-

cialists in total came from India, Indonesia, Malaysia, Nepal, Taiwan and Vietnam and visited a wind farm, biogas facilities, and small hydro power facility in Japan

(3) Overseas Seminars

NEF conducts an annual overseas new energy seminar for energy concerned people working at government offices, institutes, electric companies, and universities in Asian countries. The first seminar was conducted in 1998 in Hanoi, Vietnam. Then, it was held in Bangkok, Thailand, and Kuala Lumpur, Malaysia. In FY 2000, the seminar on “New and Renewable Energy Development and Utilization for Global Environment Protection” was conducted in Manila, the Philippine in October with about 150 participants.

Provision of Information

Various information concerning the development and use of new energy in Japan and foreign countries is collected and compiled as “NEF News,” to present information to member companies, and government offices concerned.

New Energy Award

NEF has commended excellent and innovative system and application of new and renewable energy since 1996. In FY 2000, Minister of Economy, Trade and Industry Prize was granted to a system and an application, Director-General of the Agency of Natural Resources and Energy Prize was granted to three applications, and Chairman of New Energy Foundation Prize was granted to nine systems and applications. Panels featured the prize winning systems/applications are presented at new energy exhibitions.



Overseas seminar in Malaysia



New Energy Award ceremony

Secretariat of FCCJ

Besides the surveys and research on fuel cell, NEF performs a role of the secretariat of Fuel Cell Commercialization Conference in Japan (FCCJ). FCCJ aims at early commercialization of fuel cell in Japan and was established with 127 member companies in March 2001.

The Development Promotion Center performs the following activities to positively promote the development, introduction, and spreading of technologies concerning solar energy and indigenous dispersed energy.

Project to Promote the Introduction of New Energy

1. Subsidy Program for Residential Photovoltaic Power Generation Systems

For three years, from FY 1994 to FY 1996, the “Residential Photovoltaic Power Generation System Monitor Project” was carried out, to promote the installation of photovoltaic power generation systems into private homes, expected to grow most in demand, in order to create initial demand, and the efforts contributed to a significant price reduction of the systems.

However, to make the photovoltaic power generation market viable early, intensive support is necessary. This leads to the large-scale introduction of photovoltaic power generation systems and the prices can be further reduced as a result of mass production.



An example of PV system installation under NEF's Subsidy Program for Residential Photovoltaic Power Generation System

Under subsidization by the national government, people who install a residential photovoltaic power generation system (a photovoltaic power generation system with less than 10 kW capacity, suitable for installation on the roof or the like of a private home and interconnected with a low voltage distribution line, with reverse power flow allowed), and people who purchase a ready-built house having a residential photovoltaic power generation system, are subsidized to cover part of the cost necessary for the system installation, subject to the condition that they offer data concerning the system operation, etc.

Furthermore, after installation, the data concerning system operation and the like are periodically collected and analyzed, to be reflected into various measures taken for full-fledged spreading in the future. Furthermore, explanation meetings and seminars to promote the spreading of residential photovoltaic power generation systems are held, and public relations activities are performed through mass media.

2. Support Program for Regional Activities Concerning New Energy

The program aims to realize accelerated promotion of new energy introduction throughout Japan with positive efforts performed by private organizations such as NPO who can take regionally adapted effective measures at the grassroots level. Subsidies from the national govern-



PV system installed housings for sale

ment are used to partially cover the installation cost of photovoltaic power generation and the costs required to hold symposiums and lecture meetings.

3. Interest Subsidization Program

The program aims that businesses engaged in the thermal utilization of indigenous energy and power generation using geothermal and other renewable energy to be financed at low interest by financial institutions. NEF subsidizes financial institutions in interest, under subsidization by the national government.

Amount of loan per project

(1) Thermal utilization Project

- 500 million yen or less
 - Geothermal heat
 - Waste heat
 - Thermal energy conversion

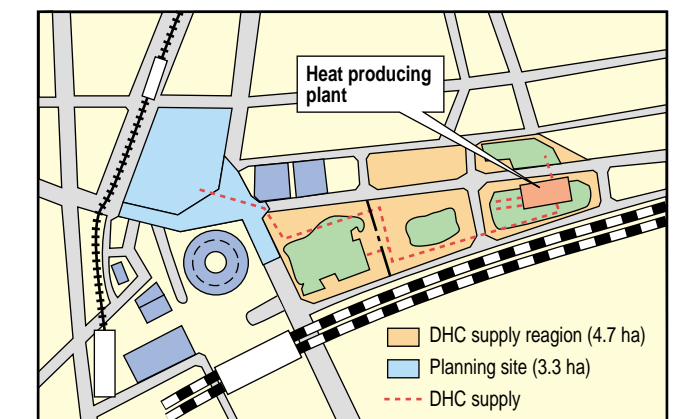


An installed example of wind power generation equipment (400 kW) under the interest subsidization program

- 300 million yen or less
 - Heat of waste power generation
- (2) Power generation projects
 - 400 million yen or less
 - Wind power generation
 - Power generation using waste heat
 - Waste power generation
 - Photovoltaic power generation
 - 300 million yen or less
 - Geothermal power generation



District heat and cool supply system using waste heat from buildings



Heat supply region

4. Hydroelectric Power Development Center

Hydraulic energy is largest in reserved capacity among domestic energy resources, and it accounts for the greater part of domestic primary energy. Furthermore, hydroelectric power generation equipment accounts for 20.7% of the total installed power generation capacity in Japan, playing a very important role. Hydroelectric power generation is clean energy that less influences the global environment, and it has high supply stability as renewable domestic energy. Especially also to prevent global warming, the development of hydroelectric power generation must be promoted. The installed capacity of conventional hydroelectric power generation in Japan is 21,390MW (as of March 2001), and according to the long-term energy supply-demand outlook of the Advisory Committee for Energy (July 2001), the target of the installed capacity of general hydroelectric power is set at about 20,690MW by FY 2010. To meet the target of the national Government, the Hydroelectric Power Development Center conducts the following activities to support measures taken to energetically promote the development of hydroelectric power generation.

Surveys Concerning the Development and Use of Hydroelectric Power

To effectively promote the development of hydroelectric power generation, the Center carried out a “Survey to Formulate the Hydroelectric Power Development Site Plan (Fifth Hydroelectric Power Generation Potential Survey),” being commissioned by the national Government, and presented the entire picture of undeveloped potential water resources. The survey found undeveloped



Excavation and covering integrated TBM

2,800 sites and their average capacity is about 4,600 kW per site, which are small-to-medium-scale. Few sites are economically attractive. To promote development of these small-to-medium-scale sites, the “Basic Survey for Small-to-Medium-Scale Hydroelectric Power Development Promotion and Guidance Activities” is being conducted (1) to examine development promotion measures, (2) to investigate and examine approaches to improve the accuracy of individual construction plan for power generation site, (3) to examine the potential hydropower resources of unused water head, and their development plans and (4) to collect technology information concerning hydroelectric power development.

Promotion of Technological Development

Since the planned sites for hydroelectric power development are of small scale and are located in remote mountainous areas, construction costs become higher than the past. As such, it is important to develop technologies to reduce construction costs, and to decrease impacts on nature.

For this reason, since FY 1981, under cooperation among industries, government, and academic circles, efforts are made to develop less costly technologies for hydroelectric power equipment, turbines, generators, and civil engineering construction machines, and also to develop technologies to simplify and standardize plants, under “Study on the Design for Standardization of Small-to-Medium-Scale Hydroelectric Power Model Plants.” Further, to introduce the results of technological development into development sites, to increase spreading of applications, the New Technology Development Committee was established, to select demonstration sites and to design demonstration plants.



Relief weir made of rubber-coated fabric at the Kurotani Power Plant

The results of technological development are widely used for hydroelectric power development in connection with the subsidiary measures of the national Government. Up to FY 1999, they had been introduced into newly constructed power plants and redeveloped power plants having total power of about 5,000 MW.

Engineering Guidance

For hydroelectric power generation in the future, small-to-medium-scale sites must be developed, as many as possible, systematically, and the preparedness for this is insufficient. As such, in response to requests of public utilities, the Center extends guidance and engineering cooperation in the formulating of particular development plans, and in investigation, design, and construction at hydroelectric power sites. Especially for public utilities and the like that plan to develop such sites in the coming few fiscal years, and that are not sufficiently prepared in view of engineering and management, guidance activities are conducted, under government subsidies (subsidy rate 50%).

International Cooperation

The Center participates in the “Implementation Agreement on Hydropower Technologies and Programs” of IEA to collect information concerning hydroelectric power development. Also, it conducts surveys on poten-



Dispersed small scale hydroelectric power plant (Indonesia)



Iwate Prefecture Matsukawa Power Plant (4,600 kW)

tial hydropower resources and demonstration tests and surveys on dispersed small scale hydroelectric power respectively in southeast Asian countries.

Interest Subsidy for Small-to-Medium-Scale Hydroelectric Power Generation Projects

With a view to decreasing the initial cost of hydroelectric power generation for further promotion of their development, the Center subsidizes the construction of hydroelectric power plants, as to bank interest charges.

Higher Engineering Competency

To improve the practical skills of engineers engaged in the development of small-to-medium-scale hydroelectric power, basic training courses and practical training courses are continually provided. Documents on engineering are prepared and distributed.

Policy Proposals

This Center is in charge of the following activities of the Hydroelectric Power Committee, New Energy Industrial Forum: surveys concerning the development of small-to-medium-scale hydroelectric power and promotion of its introduction; and compilation of draft proposals for energy policy of the national government.

5. Geothermal Energy Development Center

Japan, as part of a major volcanic zone in the world, has many volcanoes, and beneath them is an enormous reserve of geothermal energy. This reserve of geothermal resource is different from region to region, and if regionally adequate development and use of geothermal energy are realized, sustainable and stable energy is expected to be obtained.

At present, geothermal energy is used not only for steam power generation but also for air-conditioning, hot water supply, thawing, horticulture, breeding, etc. As well as geothermal power generation, if the direct use of brine is expanded in response to the regional demand for heat and power, it is expected that these efforts will contribute to improving the living standard and welfare of regional inhabitants, and to leveraging local industries. This will also be useful for global environmental protection. The Geothermal Energy Development Center performs the following activities to promote the development and use of environment-friendly geothermal energy.

Surveys on Promoting Development

Various surveys are conducted to identify reserves of the geothermal resource, and to decrease the development risk of the geothermal resource, to promote the develop-



Kokonoe-cho, Oita Prefecture (Cultivation of orchids by use of geothermal heat)

ment of geothermal energy. These surveys include the terrestrial surveys, well surveys, environmental impact surveys and data processing respectively conducted in cooperation with the “Geothermal Energy Development Promotion Survey” conducted by the national Government (NEDO).

Surveys on Environmental Protection

Since the geothermal resource is located near natural parks and hot springs resorts, it is necessary to predict and assess the influence on scenery and hot springs, and the influence of diffused hydrogen sulfide. For this purpose, the Center conducts site surveys of development areas, and research to demonstrate environmental protection technologies.

Surveys Concerning Effective Use

For effective use of the geothermal resource, it is necessary to consider regional characteristics and resource attributes, when formulating development plans, and constructing and managing systems. As such, conceptual designs of various supply and use systems, evaluation of economics, demonstration investigations, and the like are performed under commissions of the national government, and local governments. Furthermore, power generation and brine use systems, using hot springs steam and low-temperature hot water, are being studied, and advice is given as required.

Cooperation in Surveys and Research, Guidance on Development and Technology Assistance

Upon request, the Center cooperates in surveys and research concerning geothermal energy development in both Japan and foreign countries, and extends technical guidance for formulating development plans, designing, construction work, etc.

Training Courses

To help improve and nurture the skills of people engaged in the development and use of geothermal energy, lecture meetings and training courses are provided.

Information Provision

To deepen people’s understanding of development and use of the geothermal resource, and to promote the energy further, a bulletin “Geothermal Energy” is issued, and lecture meetings and various information on geothermal energy applications are provided.

Policy Proposals

The Center is in charge of the following activities of the Geothermal Energy Committee, New Energy Industrial Forum: surveys on development of geothermal energy and promotion of its introduction; and compilation of policy proposals to the national government.

Management of Liaison Meeting To Promote Geothermal Energy Development

To smoothly promote geothermal energy development and use, liaison meetings are held with the governmental offices and enterprises concerned.



Sumikawa Geothermal Power Plant (capacity 50 MW), Tohoku Electric Power Co., Inc.

The electric power demand in Japan is increasing year after year, though not as much as in the past, and it tends to be concentrated in a specific season and in a specific time zone. For stable supply of electric power, it is essential to develop power in anticipation of peak demand, but during off-peak hours, such as on holidays and at night, the developed power must be partially suspended, to lower the annual load factor, affecting economics in view of electric charges. If the electricity which is generated during off-peak hours can be stored and used during peak hours, then the annual load factor of electric power equipment will be enhanced. And the sharply increasing peak demand can be covered without affecting economics.

For load-leveling, pumped storage power generation has been used. If a novel power system having a similar energy storage function can be practically applied, stable supply of electric power can be more ensured.

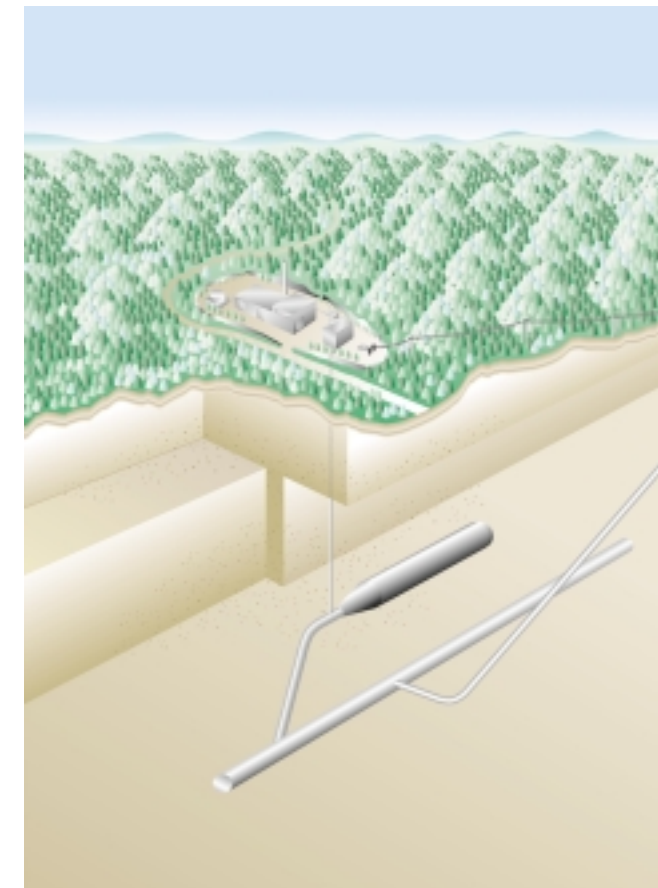
The Energy Storage Engineering Development Center performs the following activities for surveys and research concerning such novel load-leveling power systems.

Surveys and Research on Compressed Air Energy Storage Gas Turbine (CAES-G/T) Power Generation Technology

CAES-G/T (Compressed Air Energy Storage Gas Turbine) power generation is a kind of thermal power generation. In this technology, the electric power generated during off-peak hours, such as at night and on holidays, is used to make compressed air, and the compressed air is stored in a storage facility which is formed in an underground bed rock or the like, and it is taken out during the peak hours of daytime and used to burn a fuel for gas turbine power generation.

In the world, there are two examples of this technology: the Huntorf Power Plant (power 290,000 kW, 1978) in Germany, and the Mackintosh Power Plant (power 110,000 kW, 1991) in the U.S. As such, it can be said that CAES-G/T has reached the level of practical application technologically. However, these examples have a feature that the compressed air storage facility is constructed in a rock salt layer, excellent in airtightness and construction convenience. On the other hand, as to CAES-G/T power generation being practically applied in Japan, since no such rock salt layers exist, the compressed air storage facility must be constructed in ordinary bedrock, and this poses a large technical problem. Further, even though it can be presumed that the impact on the environment, and the particular constitution and design of the power generation apparatus, can be met with existing techniques, there are also considered to be remaining unknown problems, since Japan has not yet had experience with this power generation system.

Therefore, a 2 MW power pilot plant was constructed, in the remains of a coal mine in Kamisunagawa-cho, Sorachi-gun, Hokkaido, and research is being conducted, in a 12-year plan starting from FY 1990, to comprehensively evaluate the plant performance through construction and operation of the plant.



Conceptual view of the pilot plant

Basic parameters of the pilot plant

Rated capacity:	2 MW
Power generation duration:	4 hours
Compressed air charge time:	10 hours
Storage method:	Transformation
Airtight means:	Rubber lining
Stored air pressure:	4–8MPa
Stored air temperature:	50°C or lower
Stored air quantity:	Approx. 1,600 m ³

Technology Study on Underground Pumped Hydroelectric Storage Power Generation

Underground pumped hydroelectric storage power generation is a pumped storage load-leveling power system using an underground cavern as the lower regulating reservoir. And this includes fresh water type power generation using an artificial or natural lake, as the upper regulating reservoir, and seawater type power generation using the ocean, as the upper regulating reservoir. Compared with conventional pumped storage power generation, the topographic requirements, and the environmental load involved in construction, are small. As such, it is expected as a novel load-leveling power system that can solve both the environmental problem and the economy problem.

Therefore, to clarify the development problems confronting the realization of underground pumped hydroelectric storage power generation, and also to examine methods to solve them and to evaluate feasibility, research is being conducted, in a five-year plan starting from FY 1997.