

# [New Course] Regular Course on Energy Management— Advanced Technologies and Strategies

A new regular course on “Energy Management” was organized this fiscal year in response to recent changes in needs in oil-producing countries, and was held from October 8 to 23, 2013.

## 1. Background

In many oil-producing countries today, domestic oil consumption is increasing rapidly accompanying economic growth and population growth, and is prompting their oil ministries and state-run oil companies to explore measures to control oil consumption and increase energy efficiency as priority issues, and to consider introducing renewable energies in a positive light.

However, there is little economic incentive to promote energy efficiency in oil-producing countries, because a subsidy system is in place that keeps the prices of oil products relatively low, and the economic environment is hardly conducive to the formulation of energy efficiency projects. Furthermore, since the residential, transportation and business sectors account for an especially large percentage of the domestic oil consumption in oil-producing countries, there is a growing need to address energy consumption efficiency on a sector basis.

Amid this situation, JCCP has annually received an increasing number of requests from oil-producing countries for training programs on energy efficiency and renewable energies, with particularly strong expectations for Japan’s advanced environmental and energy technologies and for the formulation of specific projects. As a prime example of this trend, a customized program on energy efficiency was organized and held jointly with the ADNOC Environment Subcommittee last fiscal year.

In addition, a new regular course on energy management was established based on a course on energy conservation that has been offered up to now and placing the focus on introducing energy efficiency technologies and case examples, including renewable

energies, and on building the necessary capacities to formulate new energy efficiency projects in oil-producing countries.

## 2. Basic Design of the New Course

The course that was previously offered on energy conservation aimed to develop skills for the evaluation of new technologies, as well as those for analyzing energy efficiency and new project formulation, through lectures and a workshop. Ultimately, a workshop on developing new energy efficiency projects was implemented, and the course was essentially designed so that participants could take the initiative in developing new projects in their respective countries after completion of the course.

Gauging from the status of previous participants to the course on energy conservation, providing understanding of the following items is considered particularly important from the perspective of building capacities for project formulation among participants from oil-producing countries:

- (1) Changes in the energy market structure brought about by the development of renewable energy sources and other advanced technologies;
- (2) Environmental policies in the energy market and the impacts of environment-conscious actions;
- (3) Development of technologies to increase energy utilization efficiency in the residential, industrial and business sectors; and
- (4) Project formulation through cooperation among all stakeholders, including the government, private companies and local communities.

The new course was therefore designed with the aim of enhancing conceptual, imaginative, and project development capacity related to energy efficiency among participants from oil-producing countries.

More specifically, the course program consisted of a general overview of energy, environment and economics, energy and environmental policies, and strategies of oil companies, followed by an examination of new

technologies (process technologies and energy-saving and environmental devices), policy studies of advanced technologies, and pilot projects based on public-private cooperation. A workshop was then held to provide practical training in the formulation of individual projects and energy and environment scenarios, so that participants could utilize the knowledge they had acquired to develop capacities for taking initiative after returning to their respective countries.

### 3. Participants

From more than 40 applicants from around the world, 17 were ultimately selected following strict screening. They represented various departments, including oil downstream policy departments in oil ministries, planning departments in state-run oil companies, and environment and energy efficiency departments in refineries.

### 4. Course Content

#### (1) Lectures at JCCP

Mr. Yoshikazu Kobayashi from the Institute of Energy Economics, Japan gave a comprehensive lecture on the structure of Japan's oil market while sorting out the main focuses of the energy demand-supply situation in Japan after the accident at Fukushima Nuclear Power Station following the Great East Japan Earthquake and the state of long-term policy examinations.

Tetsuo Arai, JCCP lecturer, introduced a theoretical framework for analysis of environmental measures applied to crude oil production, energy efficiency, climate change and other such issues, and held an interactive class discussion to examine practical policies from the standpoint of state-run oil companies. He also introduced strategic initiatives of oil companies in



*Class discussion on scenario planning*

Japan's energy market, and discussed possibilities for future business expansion by state-run oil companies in oil-producing countries.

Mr. Masakazu Sasaki from Toyo Engineering Corporation lectured on the basics of pinch technology as an important technology for analyzing potential energy conservation and promoting project development, and its application to energy cooperation among a multiple number of plants.

Mr. Motonaga Kume from JGC Corporation gave a lecture that emphasized how the introduction of gasification would enable a broad range of strategic initiatives. For example, in addition to heavy oil treatment in refineries, it would allow flexible responses to changes in the demand structure owing to the development of power generation businesses and the petrochemical industry, as well as promote increased production of crude oil and establishment of measures against climate change through the effective utilization of CO<sub>2</sub>.

The lectures provided a general, theoretical perspective on trends in energy and the environment, and introduced case examples in which new technology-oriented projects have allowed diverse and flexible expansion of businesses. Inspired by these lectures, many participants commented that they had gained ideas for formulating new projects in their countries.

#### (2) Site Visits

At JX Nippon Oil and Energy Corporation, a lecture was given on the company's initiatives for energy efficiency in the residential and industrial sectors, with a focus on the fuel cell business and the achievement of energy efficiency in the "SOENE (energy-creating) House." The initiatives particularly garnered the participants' strong interest as the oil company's approach to the final consumption sectors, and as its efforts toward increasing energy efficiency and introducing renewable energies in the residential sector. In fact, some of the participants expressed their wish to promote the initiatives as a pilot project in their countries.

At Kashima Oil Co., Ltd., specific case studies were introduced, such as of the cooperative relationship between the company's refinery complex and neighboring companies, and of the company's initiatives for promoting energy conservation. Particularly in regard to the framework of cooperation for improved efficiency, which goes beyond the conventional bounds

of the company to include neighboring companies, many participants said they wish to consider adopting the framework in their countries.

Solar Frontier K.K. gave an overall introduction to the CIS thin-film solar cell technology and photovoltaic power generation businesses in Japan and abroad. The company's operations also strongly interested the participants, as many state-run oil companies in oil-producing countries are planning to introduce renewable energies.

At Nissan Motor Co., Ltd., a presentation was given of the company's initiatives related to electric vehicles, fuel cell vehicles and technical development, and its environmental measures as an automobile manufacturer. Following the presentation, the participants had the rare opportunity to experience a test ride on a test course.

At Kitakyushu Smart Community, an overview was given of the project that is being implemented in the community to promote the introduction of renewable energies and increased energy efficiency in cooperation among Kitakyushu City, private companies and local residents. Also in Kitakyushu, the participants visited the Next Generation Energy Park, where they received an introduction to an energy project that aims to promote the introduction of renewable energies and the innovative utilization of waste.

At Mitsubishi Heavy Industries' Nagasaki Shipyard, the focus of training was placed on energy-saving boiler and turbine technologies and wind-power generating technologies, and on the potentials of project development based on the introduction of the latest high-performance technologies. The participants also learned about quality management and production processes in the manufacture of large-sized equipment.



*At the Kitakyushu Citizens' Solar Power Station*

At the National Institute of Advanced Industrial Science and Technology (AIST), a lecture was given on examples of leading-edge technical development in the environment and energy-saving fields in the institute, including the Fukushima Renewable Energy Project, methane hydrate initiatives, heavy oil reforming technologies, and other examples of research that will have an impact on future energy markets.



*At Mitsubishi Heavy Industries, Ltd.*



*At Nissan Motor Co., Ltd.*

### (3) Workshops

In order for the participants to utilize the knowledge on advanced technology projects they gain from the lectures and site visits in the course and apply it to their duties in their countries, they need to acquire experience in thinking and acting on their own initiative. Thus, the following capacity-building workshops were organized as part of the course.

- (1) Development of environment and energy projects  
(lecturer: Mr. Tetsuo Aarii, JCCP)
- (2) Planning environment and energy scenarios  
(lecturer: Mr. Masahiro Kakuwa, Showa Shell Sekiyu K.K.)

The project development workshop prepared participants to initiate specific projects in their own countries, by providing an exercise in linking new energy efficiency technologies and advanced case examples to project formulation. Particular emphasis was placed on realizing such projects by identifying obstacles and issues and discussing them among the entire class.

The participants created project proposals that respond to needs in each oil-producing country, including needs for cogeneration, regional energy cooperation, solar power, wind power and biofuels.

As a culmination of the training the participants received in Japan, the workshop on scenario planning provided an opportunity to personally reflect back on the technical knowledge and case examples they had acquired, and to define and deepen their awareness of issues with the aim of applying that knowledge within the economic environment in their respective countries. In effect, it motivated the participants to put the fruits of their training in Japan to full use in their countries.

## 5. Summary

As part of the renewal of training programs, JCCP has placed high priority on developing participants'



*At the National Institute of Advanced Industrial Science and Technology (AIST)*

capacities to proactively formulate new projects in their countries. Not only are the participants expected to make full use of what they learned in Japan after their return to their countries, but they are also expected to use that knowledge to build human networks and develop new businesses between participants from around the world and Japanese companies.

The development of new technologies is advancing particularly in the environment and energy sectors, and the situation in Japan is also changing from year to year. Thus, the training for new projects in this course also aimed to develop a broad perspective, creativity and imagination through an examination of the status of technical development and advanced projects. It also placed emphasis on helping participants build their own framework for gaining a broad understanding of the changes in the energy market and the direction of technical developments related to the environment.

The program schedule consisted of visits to Kitakyushu and Nagasaki within a short period of time, but the participants indicated they had spent a fulfilling time in Japan. JCCP hopes the project plan they created in the workshop will come to realization in their countries in the future.

*<by Tetsuo Aarii, Training Dept.>*