

Integrated energy projects —fuel cells, natural gas, and more

With the ongoing deregulation of the energy sector, the divisions between oil, electricity, and gas businesses are becoming less clearly defined. Cosmo Oil is expanding into energy business besides petroleum to foster more effective use of energy sources that are less harmful to the environment—such as distributed power generation, fuel cells, hydrogen fueling stations, and liquefied natural gas (LNG).

Distributed power generation

The supply of electricity from power plants involves huge energy losses during power transmission. With distributed power generation, electricity is generated close to where it is needed for residential or business use, with significantly lower transmission losses, and heat from the generation process can be used effectively. Combined, these features help to significantly boost energy efficiency.

Cosmo Oil has developed a cogeneration system for power generation and the effective use of excess heat. The system has been installed in hotels, hospitals and other facilities. We have also been developing a kerosene-powered air-conditioner that runs on a heat pump*1. As the fuel source for those units and distributed power generation, we have the potential to build an efficient business model using our existing distribution network. New contracts in fiscal 2002 for this combined heat and electricity supply business amounted to 8,284 kW, with a total amount supplied of 11,872 kW.

Independent power production*2

In the Kasumi area of Yokkaichi City in Mie Prefecture, we completed construction of an electrical power plant with a maximum output of 200,000 kW, which started operating in July 2003. We sell the electricity wholesale to Chubu Electric Power Co. We have designed the plant to run on oil residue (asphalt fractions) as fuel, supplied from the Yokkaichi Oil Refinery by pipeline. The plant naturally has environmental equipment installed, including denitrification and desulfurization equipment and electrostatic precipitators, and consideration of the natural environment was also incorporated in the overall design, with features such as green spaces, a

conservation pond, and protection of endangered plant species and rare birds.



Yokkaichi Kasumi power plant

Hydrogen production and fuel cells

Because fuel cells use hydrogen as their source of energy, they are attracting much interest as the next generation of distributed power systems that emit only small amounts of pollutants. Under contract from New Energy and Industrial Technology Development Organization (NEDO) and the Petroleum Energy Center, we are developing a stationary fuel cell system that uses hydrogen produced from petroleum-based fuels such as LPG and kerosene. In fiscal 2002, as a part of efforts to develop technologies to produce hydrogen from kerosene using the ATR*3 method, we constructed a hydrogen production unit that uses a reforming catalyst developed by Cosmo Oil.

We participated in “Hydrogen/Fuel Cell Demonstration Project” (funded by the Ministry of Economy, Trade and Industry) and in March 2003 opened a hydrogen refueling station in Yokohama for fuel cell vehicles, which includes a garage for work on those vehicles. Besides providing hydrogen fuel, Cosmo Oil will continue working to collect a variety of data and promote wider use of fuel cell vehicles.

*1. Kerosene heat pump air-conditioning unit

Heat pumps collect heat from a cool zone and move it to a warmer zone. In a kerosene-powered heat pump/air-conditioner, kerosene is used to run a compressor, and the heat transfer medium goes through a cycle of vaporization and condensation, providing both cooling and heat.

*2. Independent power production

In 1995, Japan’s Electric Utilities Industry Law was partially amended to allow companies other than electric utilities to operate as independent power producers, and make it possible for them to sell electricity wholesale to the utilities.

*3. Auto Thermal Reforming

To produce hydrogen, oxygen is mixed with raw materials (hydrocarbons and steam), oxidizing a portion of the raw materials and providing the heat for hydrogen generation.

Stationary fuel cell system

