

*1 Kerosene heat-pump air-conditioning unit

Heat pumps are systems that collect heat from low-temperature materials and move it to high-temperature items. In a kerosene heat pump air conditioning unit, kerosene is used to run a compressor; the heat transfer medium is repeatedly vaporized and liquefied, providing both cooling and heat.

*2 ATR (Auto Thermal Reforming)

In the manufacture of hydrogen, oxygen is mixed with the raw materials (hydrocarbon and steam) oxidizing a portion of the raw material and providing the heat for hydrogen generation.

*3 Independent Power Production (IPP) Business

In 1995, the Electric Utilities Industry Law was revised to allow corporations with electrical generation capabilities to sell electrical power to utilities; in 2000, further revisions allowed for the direct sale of electricity to major users. By using reserve electrical generating equipment and our own fuel, relatively inexpensive electricity can be supplied.

Development of Multi-energy Projects: Fuel Cells, Natural Gas, etc.

With the ongoing deregulation of the energy sector, the barriers between energy areas such as oil, electricity, and gas are diminishing. We are actively involved in multi-energy projects including the development of fuel cells and the LNG (liquefied natural gas) business other than oil-related businesses to enable more effective use of energy that is less harmful to the environment.

Distributed power business

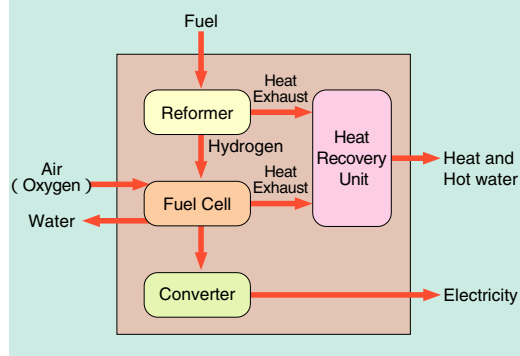
The supply of electric power from power plants brings with it major waste through energy lost during power transmission. With distributed power generation, electricity is generated directly where it is needed with no power transmission loss and waste heat can be used in a more effective form, thereby significantly reducing energy consumption.

Cosmo Oil has developed a cogeneration system for power generation and the effective use of waste heat, and the system is in use in hotels, hospitals, etc. We have also been developing for some time a kerosene heat pump air-conditioning unit*1. We can increase efficiency through our existing supply network by using this fuel supply in a distributed power system.

Fuel cells are seen as the next-generation energy source, because the exhaust they produce contains very few pollutants. We are focused on the development of a home-use fuel cell system using liquid fuels such as gasoline and diesel fuel, commissioned by the New Energy and Industrial Technology Development Organization (NEDO) and the Petroleum Energy Center (PEC). In FY 2001, a demonstration unit that represents the middle stage of our research, a butane-fueled fuel cell, successfully completed a 1,000-hour trial run. We are also working to develop hydrogen production technology using a new technology called ATR (Auto Thermal Reforming)*2.

Demonstration testing of a micro gas turbine fueled by kerosene that is intended for stores is now being conducted.

Fuel Cell System



Independent Power Production (IPP) Business*3

We are proceeding with the construction of a power-generating station with a capacity of 200 thousand kW on land adjoining the Yokkaichi Oil Refinery. Operation will start in FY 2003 and the generated power will be supplied to Chubu Electric Power Co., Inc. The power station will use oil residue (asphalt fraction) as fuel which is to be pumped through the pipeline from the Yokkaichi Oil Refinery.



Power station under construction in Yokkaichi

Liquefied Natural Gas (LNG) Business

Cosmo Oil took part in establishing LNG Chubu Corporation, a liquefied natural gas sales company set up by Chubu Electric Power Co., Inc. and other companies, and began to supply LNG to gas companies at the end of 2001. In addition, we formed