

Osaka Gas Group Technology Management

The Osaka Gas Group works to develop technologies that are both safe and secure and bring comfort to customers' lifestyles. We also work to develop technologies that make effective use of energy and contribute to preventing global warming, boosting the efficiency of gas cogeneration systems and developing fuel cells.

The Evolution of Residential Gas Appliances

Development of Residential Cogeneration Systems

Following our 2003 launch of ECOWILL, a 1-kilowatt gas cogeneration system, we have been working on the development of polymer electrolyte fuel cells (PEFC) and solid oxide fuel cells (SOFC) to enrich our product lineup of residential cogeneration systems.

As part of the development of residential PEFC cogeneration systems, since April 2005 the Osaka Gas Group has participated in the large-scale demonstration experiments for stationary fuel cells hosted by the New Energy Development Foundation. In the three years up to the end of the fiscal year ended March 2008, we installed a total of 224 units, and continue to collect data on usage patterns. Durability was a major issue in the commercialization of these products. In March 2008, we reached our first commercialization target of 40,000 hours of operation. Going forward, we will accelerate our efforts

to reduce the cost and improve reliability, aiming to bring the product to market in the fiscal year ending March 2010.

The power generation efficiency of the household SOFC cogeneration system is as high as 45% (LHV standard) and is expected to provide significant energy savings for customers who require only a small amount of heat from the system. Starting from the fiscal year ended March 2008, we participated in the New Energy Development Foundation's Experimental Study on Solid Oxide Fuel Cells, and initiated a 20-unit demonstration test in residential homes. In future, we will proceed with efforts to improve durability and cut costs, aiming for market introduction at an early date.

Technologies for Creating Comfortable Living Spaces

Since our 1982 launch of KAWACK, we have achieved substantial penetration of the bathroom heating and drying equipment market with this product. In 2004, in response to the recent heightened demand for health and beauty products, we launched the new MIST KAWACK, which incorporates a mist generator. Enabling people to enjoy a sauna in the comfort of their home, the product has been well received in the market. In September 2007, we launched sales of the Splash and Micromist Sauna bathroom heater and dryer with a newly added Soft Mode function ideal for stretching in the bath.



Osaka Gas is developing a residential polymer electrolyte fuel cell (PEFC) cogeneration system for commercialization in fiscal 2009



The MIST KAWACK makes it easy to enjoy a sauna experience in the home

Sophisticated Technologies for Energy Solutions

In our commercial and industrial gas equipment businesses, we are strengthening our ability to offer customers solutions tailored to their needs, such as greater efficiency and functionality in their gas cogeneration systems or gas heat pump (GHP) air conditioners and sophisticated commercial-use gas kitchen equipment.

High-efficiency Commercial and Industrial Cogeneration

As the demand for economically efficient and eco-friendly cogeneration systems steadily rises, we are responding to these needs by developing our technology to improve electrical efficiency and overall energy efficiency. In September 2007, we began development of a high-efficiency gas engine cogeneration system that realizes generation efficiency of 41.7% (LHV standard), the highest in the world. A Miller cycle gas engine with 1MW generation capacity, it achieves its high efficiency through long-stroke and other technologies. Sales began in October of that year.

Upgrading Gas Air Conditioning Systems

The commercial air conditioning market has in recent years been calling for eco-friendly equipment that offers high energy efficiency and low CO₂ emissions, as well as the requisite low running costs. Launched in April 2006, the commercial-use

GHP High Power EXCEL functions simultaneously as a high-efficiency conventional air conditioning system and a high-efficiency electric power generation unit with approximately 4kW of output. This high efficiency enables users to further conserve energy and limit CO₂ output.

Going forward, by expanding into the market comprising office buildings and commercial facilities, where cogeneration has not been widely utilized due to limited demand for supply of hot water, we are working to promote greater adoption of GHPs that offer combined air conditioning and electric power generation.

Technologies That Underpin the Benefits of Gas (Stable Supply, Safety, and Peace of Mind)

Evolution of Safety Technologies

To ensure the safe supply of gas to customers, we carry out routine patrols of all gas transmission pipelines and supply facilities as well as taking such preventative measures as regularly replacement of old pipelines.

Furthermore, taking into account the experience of the Great Hanshin-Awaji (Kobe) Earthquake, we are promoting efficient and effective maintenance activities. In the fiscal year ended March 2008, with the aim of further enhancing safety, we developed and installed a new seismometric cut-off device able to respond to an extended period of ground motion of



The High Power EXCEL commercial-use gas heat pump functions simultaneously as an air conditioner and electric power generator

the type anticipated in the event of seismic vibrations off the Kii Peninsula and the southern coast of the Chubu region. Osaka Gas remains fully committed to the research and development of technologies that support the stable supply of gas.

Sophisticated Safety Functions and Enhanced Ease-of-Use in Gas Appliances

Osaka Gas strives to make gas appliances even safer for our customers to use. Since March 2008 the burners on all gas stove models sold by Osaka Gas are equipped with Si safety sensors to prevent accidents like overheating of deep-frying oil and gas leaks due to the gas supply being left on after the flame has been extinguished, as well as an auto-off function to prevent flames being accidentally left burning.

Moreover, along with the recent aging of society, there is an increasing demand for products created with Universal Design principles. In the area of cooking appliances, this means devices that are easy for anyone to use and can accommodate a broad range of values, lifestyles, and physical abilities. In October 2007, we launched the Udea Universal Design built-in gas stove, which aims for ease of use for all people. Going forward, we will work to improve the safety of our customers' homes and the usability of our gas appliances.



The easy-to-use Udea stove is based on the principles of Universal Design

Technologies to Develop New Business

Developing a hydrogen supply station for automobiles

Fuel cell vehicles (FCV) boast high energy-efficiency and zero-emissions of CO₂ as they run. There are great expectations for FCV as environmentally friendly vehicles that will be used for generations to come. Drawing on our catalytic technologies accumulated over the years, Osaka Gas is working to develop technology for hydrogen stations that will supply hydrogen fuel to FCVs. We joined the Japan Hydrogen & Fuel Cell Demonstration Project (JHFC) in the fiscal year ended March 2007, and in August 2007 built and began testing Japan's first natural gas reforming hydrogen station for commercial use near the Osaka Prefectural Government building.

Linking Technologies With Early Commercial Returns—Thorough Technology Management

We have invested our resources strategically in technology development, deeming it to be the most effective method of differentiating ourselves in the market to bolster our technological competitiveness. Amid constantly shifting customer needs in an intensely competitive business environment, we are rigorously implementing technology management that can translate development into early outcomes in terms of commercial application, thus boosting our competitiveness.



Japan's first urban hydrogen supply station (Osaka City)