

Osaka Gas Group Technology Management

1. Advances in Residential Gas Appliances

In our residential gas appliance business, we address day-to-day challenges of product development leveraging the advantages of gas based on the theme of providing safe, secure, and comfortable living environments for our customers.

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 PEFC cogeneration systems for household use, we have participated in the large-scale demonstration experiments for stationary fuel cells hosted by the New Energy Development Foundation since fiscal 2006. Over that time, we have commenced operation of systems in 63 actual households. We are planning to accelerate our product development in this field by further refining our natural gas reforming technology, one of our areas of specialty. This technology enables us to produce hydrogen from natural gas for use as fuel in fuel cells.

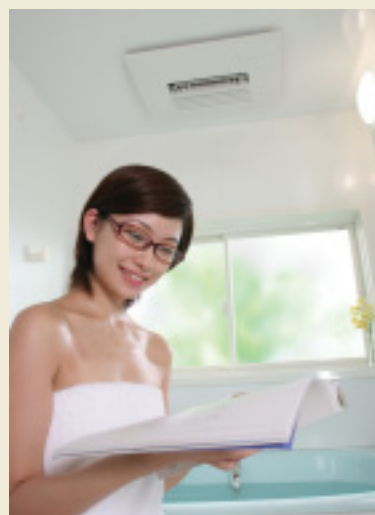
The household SOFC cogeneration system realizes power generation efficiency as high as 45% (LHV standard) and is expected to provide significant energy savings for customers who require only a small amount of heat from the system. In November 2005, we commenced the first on-site tests of this system in Japan, starting up operation in our experimental house NEXT 21. We are proceeding with the development process, aiming for an early launch.

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. To promote use of this technology by even more customers, we expanded our lineup in April 2006, adding MIST PLUS, a mist generator that can be easily attached to an existing KAWACK model. For the ultimate in comfort, we also launched Micromist Sauna, a mist generator that emits nano-water



PEFC cogeneration system for household use



MIST KAWACK offers an authentic mist sauna in the comfort of your own home.

droplets less than one micron in diameter. The finer mist allows people to easily enjoy reading a magazine or watching television while in the sauna. We will continue to develop products on a timely basis, taking advantage of our close communications with customers to discern their needs.

2. 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 performance in their gas cogeneration systems or gas heat pump air conditioners.

Launch of High-efficiency Cogeneration Systems

As the demand for economically efficient and eco-friendly cogeneration systems steadily rises, we are developing our technology to improve electricity generation efficiency and overall energy efficiency. Other actions include extending our product lineup to offer a range of electricity generation capacities. In April 2005, we successfully developed a highly efficient gas cogeneration system that achieved 41.5% (LHV standard) power generation efficiency, the world's highest in the 300-kilowatt generation capacity class. We also enhanced the efficiency of long-stroke Miller-cycle gas engines—which have longer piston strokes than traditional Miller-cycle gas engines—by improving combustion efficiency and reducing heat loss.



Long-stroke Miller-cycle engines

Upgrading Gas Air Conditioning Systems

To expand the market for gas cogeneration systems, we are endeavoring to bolster the competitiveness of our micro-cogeneration systems in the under-50-kilowatt class. By using combustion technologies cultivated in our development of larger engines and improving the conversion efficiency of electric power generators and inverters, we developed a 25-kilowatt-class micro-cogeneration system with 33% (LHV standard) power generation efficiency, the world's highest in its class. With this product, we intend to expand the market among small-scale businesses, such as restaurants and public bathhouses.

3. 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 stations as well as taking such preventative measures as regular replacement of old pipeline. In the past, it was difficult to determine the extent of deterioration in buried polyethylene-lined steel pipe/galvanized steel joint combination pipe material without excavation. However, we were recently successful in developing a technology that allows us to do this. Utilizing this technology, we can more easily analyze deterioration in pipelines and conduct effective maintenance. We continue to search for technologies that support our efforts to maintain an uninterrupted supply of gas to the market.

Sophisticated Safety Functions in Gas Equipment

We have equipped all the burners of our Class-S series of gas stoves with sensors to prevent overheating of deep-frying oil. For the frequently used front burners, we have also added sensors to detect when there is no pan. With these functions, customers can feel more confident than ever before in using these glass-top built-in gas stoves, which feature heat-resistant ceramic glass. To further improve safety, a cut-off timer, which automatically turns off the gas if users forget to, has also been built into all the burners.

In view of the phasing in of obligations to install residential fire warning systems in accordance with recent revisions of the Fire Defense Law, we launched the fire warning system KEMU PIKO in April 2006. We are promoting the greater use of such systems to offer customers increased safety and peace of mind in their homes. To do so, we leverage the sales network used to promote the use of PIKO PIKO, a gas alarm system that senses gas concentration in the room caused by gas leaks and incomplete combustion. In addition, we are drawing on our know-how in managing the effective period of use for such systems.

4. Technologies to Develop New Business

From Carbon Materials to Photon and Electronic Materials

Since the days of producing gas from coal, we have actively expanded our business with a focus on carbon material technologies and in other areas of activated carbon, electrode materials, and fine materials.

In our photon and electronic materials business, we have focused our attention on the fluorene contained in coal tar and developed an industrial method for producing dozens of fluorene conductors and marketing them as materials. The high refraction rates and heat resistance properties of fluorene conductors are highly valued in the market, with sales expanding mainly to manufacturers of lenses for mobile phones incorporating cameras and liquid-crystal-related materials. In the fiscal year under review, sales of photon and electronic materials amounted to about ¥3.8 billion yen, rising 40% from the previous fiscal year.

5. Linking Technologies With 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 and bolstering our technological competitiveness. The need for technology management that can produce early outcomes from technology development programs to use in business is rising amid the constant change in demand among customers and the dramatic changes in business climate. We intend to implement thorough technology management to satisfy the demands of the market.



Class-S Premier offers the convenience of an advanced glass-top stove.



KEMU PIKO, a fire warning system for residential use



Fluorene conductors are used in lenses for mobile phones incorporating cameras.