

# Drawing Fully on Sanden's Core Competence to Enter the "EcoCute" Next-Generation, Energy-Saving Hot Water Systems

Sanden entered the next-generation, energy-saving hot water systems, which are nicknamed "EcoCute\* systems," in fiscal 2005 by combining the compressor and heat exchange technologies that it has accumulated in supplying the automotive industry, the heat control technologies that it has accumulated in its living and environment systems business, and the know-how it has accumulated in its year-round, 24 hours a day maintenance services provided for the convenience store industry. In fiscal 2007, we expanded this business to provide products and services nationwide in Japan.

In addition to providing a lineup of EcoCute products that feature a storage tank with a depth of only 43cm, which can be installed even in tight urban spaces, and the capability to provide hot water even when the outside temperature is -20°C, Sanden is working to develop products that are even more environmentally friendly to promote the use of high-efficiency hot water heaters in line with the policy of the Japanese government of promoting energy conservation and preventing global warming.

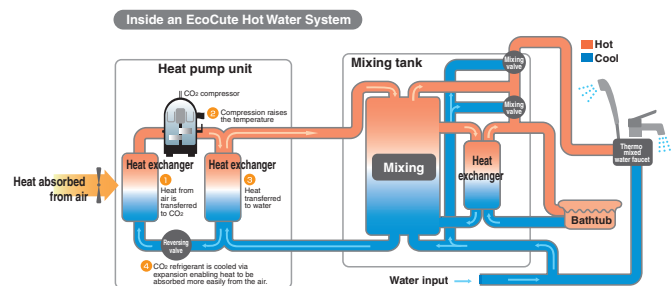
\* "EcoCute" is the nickname given to CO<sub>2</sub> natural refrigerant heat pump hot water supply systems that have been recommended by electric power companies and companies engaged in manufacturing and marketing these units.



Sanden's EcoCute unit with a slim storage tank, which went on the market in October 2006

## Development Aimed at High Efficiency

EcoCute units use the heat pump technology that is widely used in room air conditioners to provide hot water. Heat pumps are based on the principle of using a heat exchange element to transfer heat in the air to a refrigerant. The refrigerant is passed through a compressor to further raise its temperature. Heat in the refrigerant is then transferred to water. (Refer to the diagram on the right.) Most of the electricity required by heat pumps is used to power the compressor. Heat pumps can absorb an amount of thermal energy through their heat exchanger equivalent to more than twice the electricity required by the compressor. Using this technology, EcoCute systems can meet the needs of a typical household with only about one-third the power consumed by conventional systems.



How EcoCute Uses Heat in the Air to Produce Hot Water

Each of the component parts of the EcoCute system, including the compressor and heat exchanger, holds the keys to the efficiency of the system. To pursue even higher levels of efficiency in the EcoCute system, we conduct R&D on each of the component parts and are working to develop systems that can produce hot water with even less inputs of electric power.

## Improvements in Tank Insulation

The EcoCute system is designed to use inexpensive late-night power to produce hot water, then keep it in a storage tank for a long period. For this reason, the insulation of the tank is another key to energy saving.

In the EcoCute unit with a slim tank that we put on the market in 2006, we were ahead of other companies in the industry in using vacuum insulation that we have used in refrigerators and other applications. Even though the tank is relatively thin, its insulation properties are good and it excels in terms of function and performance. Vacuum insulation provides the same level of heat-holding performance as Styrofoam, which has been used thus far, but with only 1/10 of the thickness.



## Reduction in Materials Used

Even if a unit is highly efficient, it would not be an environmentally responsible product if it used large amounts of materials and was bulky and heavy. We at Sanden have designed the EcoCute units with an eye to saving resources of all kinds. For example, we conduct both experiments and simulations, making changes in the thickness of copper pipes, and carry out R&D aimed at reducing the materials used in our EcoCute water heaters.

