

# In Quest of Sustainable Lifestyle

## – Matsushita Electric Industrial Co. –

### Aiming to Realize “Factor 5” for Whole House

By *Sugano Nobukazu*

#### Great Energy Saving on Home Appliances

Since the oil crises of the 1970s, considerable improvements and refinements have been made in home electric appliances to save energy in Japan. Moreover, under a revised energy conservation law enforced in April 1999, the “Top Runner Program” was introduced to improve the energy efficiency of energy-consuming products – electric appliances such as air conditioners, television sets, refrigerators and fluorescent lights, and automobiles. Manufacturers of these products were obliged to set energy performance standards at levels higher than the highest efficiency level attained by those on the market. A penalty was to be imposed on manufacturers that continue to sell goods failing to meet the standards.

The energy efficiency of electric appliances improved further as a result of the introduction of the Top Runner Program. Energy saving for refrigerators, for instance, improved more than 50% in the last 10 years thanks to the introduction of inverter technology, higher efficiency of motors and the development of high-performance heat insulators, among others. Energy saving for air conditioning also was enhanced by about 40% during the same period.

Standby electricity consumption that is said to account for about 10% of power used up at each home has sharply dropped due to the development of such materials as a microchip for the source of electricity. For example, a cellular phone charger now needs only 0.01 watt compared with a few watts in the past.

#### Why Home Greenhouse Gas Emissions Rose

According to government data, the volume of greenhouse gas emissions by Japanese households during fiscal 2005

marked a 37% increase from 1990 despite the remarkable upturn in the energy efficiency of each appliance and growing home awareness of energy conservation.

One of the causes was an increase of about 20% in the number of households from 1990, even though population growth has ceased in Japan. According to the results of household account books on the environment kept by employees of the Matsushita group (Panasonic group), per capita greenhouse gas released by households of one person was about double that of a family of four. It is anticipated that a rise in the number of households will result in an upsurge in greenhouse gas emissions and that this tendency is likely to grow stronger as Japanese society ages and the birthrate declines in the future. In addition, the use of larger refrigerators and television sets, an increase in the number of air conditioning units and the emergence of new digital household electrical goods such as personal computers and DVD players are cited as other factors behind the escalation of greenhouse gas emissions.

#### “Factor 2.8” Achieved in 2006

To overcome these problems and realize a sustainable society, it is not only necessary for us to be thrifty and enduring, but also rather important to achieve both of improving the “quality of life” and of reducing an “environmental impact.”

In addition to pursuing progress in energy efficiency for every product to be offered to consumers, the Matsushita group has introduced an indicator measuring “environmental efficiency” at Japanese homes. In calculating the indicator, the “quality of life” is measured in terms of the number of appliance functions used at every home, and the “envi-

ronmental impact” in terms of the average annual volume of greenhouse gas emissions from all its products during their life cycles. Using the “quality of life” as the numerator and the “environmental impact” as the denominator, the Matsushita group calculates the magnification ratio of environmental efficiency – named “Factor X” – to demonstrate sustainability of a house in its entirety. In one simulation, for instance, a family of four residing in an average detached house of Japan was adopted as a model family and its livelihood was compared between 1990 and 2006. The group learned that the number of family appliances increased from 76 to 85 and that of their functions grew 1.55 times, from 97 to 150. However, it also found that the volume of family greenhouse gas emissions was almost halved, to 0.54 times, attaining “Factor 2.8” (numerator 1.55 divided by denominator 0.54).

#### Matsushita Challenging “Factor 5”

With an eye on forming a sustainable society, the Matsushita group is taking on the challenge of realizing “Factor 5” in a house as a whole in 2010. Since the group presumes that the number of appliance functions will be doubled from 1990, showing improvement in the “quality of life,” the amount of greenhouse gas emissions must be held down to 0.4 times. Matsushita has actually constructed an “Eco & Ud HOUSE” as a model case to embody its assumption. The following is how the group is grappling with matters such as energy saving in the HOUSE.

#### (1) Further Energy Saving on Every Appliance

Energy saving far more than offsetting an increase in the amount of energy consumed by large flat-panel TVs, represented by plasma and liquid crystal dis-

play (LCD) TVs, is beginning to be realized as a result of that on display devices and advances in large-scale integration (LSI) control system. Also, a light-emitting diode (LED) counted on for illumination is showing remarkable improvements in its luminescent efficiency and is expected to attain better performance than a fluorescent lamp in the near future. As such, it will hopefully be able to further upgrade the energy efficiency of every single appliance in the wake of progress in semiconductor and precision-processing technologies. As a result, it is anticipated to achieve energy saving amounting to 40% by the weighted average.

## (2) Energy Saving by High-Performance Insulators

The efficiency of air conditioners can be sharply improved by raising the performance of home heat insulators. For home heat insulation, the Matsushita group capitalizes on a vacuum heat insulator that has been developed for application to refrigerators not using chlorofluorocarbons (CFCs) as a coolant, achieving great energy efficiency. The insulator enables the energy utilization efficiency of air conditioners to almost double as it improves the performance of home heat insulation.

## (3) Energy Saving by Networking Technology

There is a system called a home energy management system (HEMS) that brings a multiple number of appliances together for connection with a network to carry out rationalized operational control and attain further energy saving as a whole than the simple combined total of saving realized by every appliance. More energy saving of about 10% will be possible through the use of an automatic power-off system activated when the user is away as well as remote control by a cellular phone and the optimum operation of energy devices by learning control. The HEMS, together with a system of distributed power generation described below, is becoming the core technology of demand-side management that is expected to make immense development in the future.



### “Quality of Life”



Base year: 1990

2010



### “Environmental Impact”

● Reducing CO<sub>2</sub> emissions to 40%

## (4) Energy Saving by Distributed Power Generation

Besides improving the energy efficiency of appliances by reducing energy consumption, it is important to step up the establishment of distributed power generation and cogeneration systems that will create necessary energy at home. A representative example is a fuel cell cogeneration system which is beginning to go into practical use as a device capable of generating electricity and supplying clean hot water. Together with solar power, this completely new system using hydrogen extracted from city gas for chemical reaction with oxygen in the air is expected to become indispensable to the energy infrastructure of our lives.

## Toward Sustainable Society

In addition to the technological approaches described above, it is conceivable that reductions in the “environmental impact” will move forward with

multifaceted ways, including revolutions in consumer lifestyles and social systems. For that purpose, we must pursue changes in our social systems such as achieving far greater efficiency in goods and people’s transportations by deploying information and communication technologies. On the other hand, we think there is great significance in carrying out activities aimed at enhancing market interest in environmentally conscious products and their technologies by simply displaying the “environmental performance” of products.

The Matsushita group is seeking a global excellence as an environmentally advanced corporation, pushing forward environmental considerations through our business operations and activities as a corporate citizen of our employees and local residents.

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