MITSUBISHI ELECTRIC

ELEVATORS & ESCALATORS

Changes for the Better

Quality in Motion

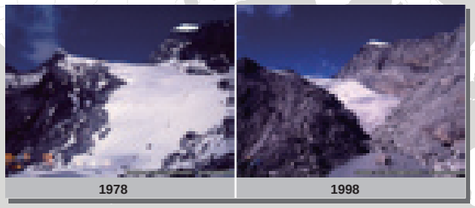
Environmental Issues and Global Approaches

● What is happening to the environment?

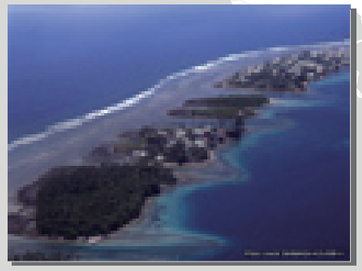
These are only a few examples of observed impacts of climate change around the world. We must proactively work together to stop global warming in order to protect our beautiful Earth for posterity.

Dried-up pond due to lack of rainfall

Agriculture in the Sahel region, without the widespread use of irrigation systems, farm equipment or chemical fertilizers is dependent on rainfall.

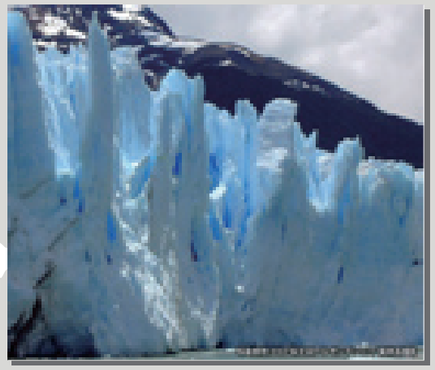


Retreating AX010 Glacier in the Himalayas of East Nepal



Majuro Atoll in the Marshall Islands

Some coral islands are in danger of submersion by rising sea levels due to global warming.



Collapse of Perito Moreno Glacier in the Andes of Argentina

Source: Japan Center for Climate Change Actions http://jccca.org

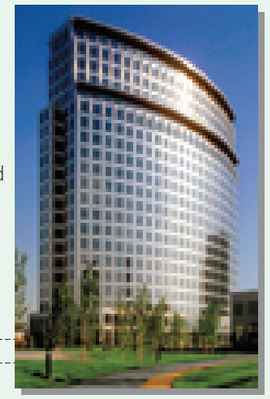
● Assessment

Throughout the world, a variety of assessment systems for green buildings have been established to promote the better environmental performance of buildings.

USA (LEED)

[Certification levels: Certified, Silver, Gold, Platinum]

Leadership in Energy and Environmental Design (LEED) is a rating system developed by the U.S. Green Building Council (USGBC) to evaluate the environmental performance of buildings and sites. It is adopted not only in the U.S., but also used in many other countries for real-estate appraisal.



Plaza Tower
Segerstrom Co.
LEED / Gold

United Kingdom (BREEAM)

[Certification levels: Pass, Good, Very Good, Excellent, Outstanding]

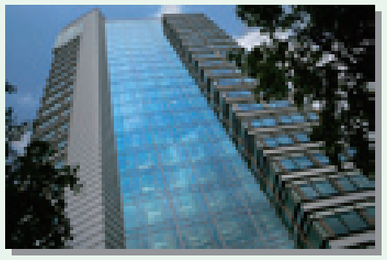
Implemented in 1990 in the UK by the Building Research Establishment, the BRE Environmental Assessment Method (BREEAM) was the world's first environmental assessment system for green buildings.

More London Plot 8
More London Development Ltd.
BREEAM / Excellent

Germany (DGNG and VDI 4707)

[Certification levels: Energy Level G, F, E, D, C, B & A]

VDI 4707 is a guideline established by the German Association of Engineers for evaluating the energy efficiency of installed elevators.

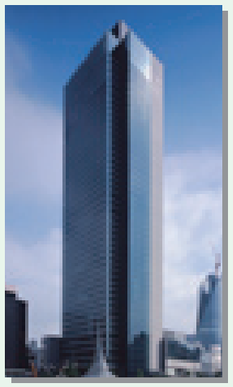


Le Mirage (The Netherlands)
Eurocommerce Holdings B.V.
VDI 4707 / Energy Level A

Japan (CASBEE)

[Certification levels: C, B-, B+, A, S]

CASBEE (Comprehensive Assessment System for Build Environment Efficiency) is an assessment method to measure the environmental performance of buildings. It was established in 2001 by the Japan Green Build Council (JaGBC) and the Japan Sustainable Building Consortium (JSBC) under the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

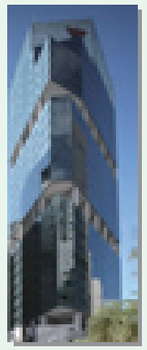


Midland Square
TOWA Real Estate Co., Ltd.
CASBEE / Class S (Excellent)

Singapore (BCA Green Mark)

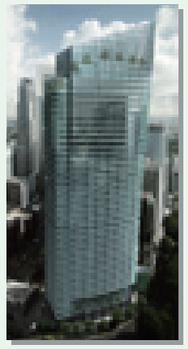
[Certification levels: Certified, Gold, GoldPlus, Platinum]

The BCA Green Mark Scheme was launched by the Building and Construction Authority (BCA). It is intended to promote sustainability in the built environment and raise environmental awareness among developers, architects and builders.



Straits Trading Building
The Straits Trading Company Limited
BCA / Gold

Photo: Courtesy of The Straits Trading Company Limited



Ocean Financial Centre
Ocean Properties Pte Ltd.
BCA / Platinum

Photo: Courtesy of Ocean Properties Pte Ltd.

Building with Mitsubishi Electric's elevators/escalators
Property/Building
Owner
Assessment system / Certified level

(As of March, 2010)

● Laws & Codes

Some countries have established a legal framework to promote energy conservation.

China (Energy Conservation Law)

On April 2008, an amended version of China's Energy Conservation Law came into effect. Based on this law, measures for the Supervision and Administration of Energy-conservation of Special Equipment with High Energy Consumption that are related to elevators and escalators came into effect on September 1, 2009.

Hong Kong (Building Energy Code)

Hong Kong is considering implementation of a mandatory adoption of the building energy code for introduction into the Legislative Council by the end of 2009. The proposed scheme requires buildings to comply with minimum energy efficiency standards in their system design.

The New “Quality in Motion” with an Environmental Perspective—“Evolving Quality”

Comfort
- Smooth riding comfort
- Universal design
- Creating comfortable building environments

Efficiency
- Promoting energy-savings with cutting-edge drive/control technologies
- Improving efficiency of building management and transportation in buildings
- Pursuing space-saving developments

Safety
- Ensuring safety during boarding and exiting and at the time of an emergency
- Developing highly durable and safe service systems
- Offering advanced building security

Ecology
- Saving resources through downsizing and weight reduction
- Using environmentally conscious materials
- Promoting eco-factories

We strive to be green in all of our business activities.

We take every action to reduce environmental burden during each process of our elevators’ and escalators’ lifecycle.

Eco Products

Mitsubishi Electric's advanced technologies bring greater energy savings to products. Our latest group control system enables elevators to use less energy, and improves traffic flow in the building. Moreover, we use materials with reduced environmental impact.

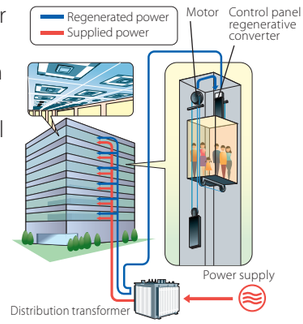
*Actual energy saving rates differ depending on specifications and conditions.
*Applicable features differ depending on elevator models.

Energy Savings

Regenerative Converter

Energy savings 35%

The Regenerative Converter transmits the power regenerated by the traction machine via distribution transformer to the electrical network in the building.

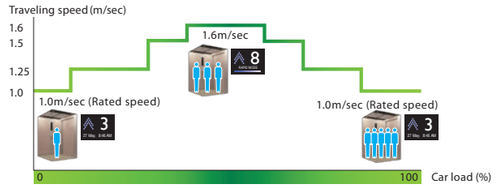


Mitsubishi Electric original

Variable traveling speed elevator system

Traffic improvement without increasing power-supply capacity 15%

This system allows elevators to travel faster than their rated speed depending on the number of passengers in the car, thereby improving transport efficiency.

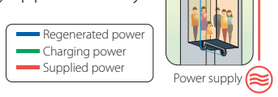


Mitsubishi Electric original

Electricity recycling system for elevators <ELESAVE>

Energy savings 20%

ELESAVE is designed to store electricity generated during regular elevator operations. The electricity stored in nickel-hydrogen rechargeable batteries can be used as an auxiliary power supply for running elevators, providing approximately 20% power savings.



Mitsubishi Electric original

PM motor with joint-lapped stator

Energy savings 20%

With the joint-lapped motor in traction machines, the iron core is split like a hinge, which allows coils to be wound around the core more densely, resulting in greater motor efficiency and compactness.

Permanent magnet (PM) door motor

The direct-drive PM door motor and the VVVF inverter realize efficient door opening and closing.

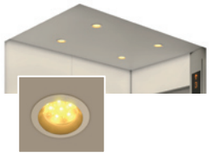
Car light/fan shut off

The car lighting and ventilation fan are automatically turned off if there are no calls for a specific period.

LED lighting

Energy-efficient and long-life LEDs are used for car lighting in elevators and under-handrail lighting on escalators.

Elevators Energy savings 88%
Car lighting



Escalators Energy savings 50%
Under-handrail lighting

Materials

Less oil

The guide shoe and rope require only minimal oil, significantly reducing environmental impact.

Size and weight-saving

The size and weight of doors, cars, car frames, rails and some other components have been reduced based on test analysis of their shock-absorption performance.

Traffic Efficiency

Σ AI group control system

Traffic improvement without increasing power consumption 20%

Effective control of multiple elevators reduces energy consumption.

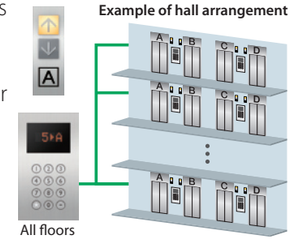
Energy-saving operation Smart control technology

Energy savings 10%

According to each car's location and passenger load, the group control system assigns a call to the elevator that best balances operational efficiency and energy consumption.

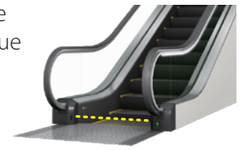
Destination oriented prediction system (DOAS)

When a passenger enters a destination floor at a hall, the hall operating panel indicates which car will serve the floor.



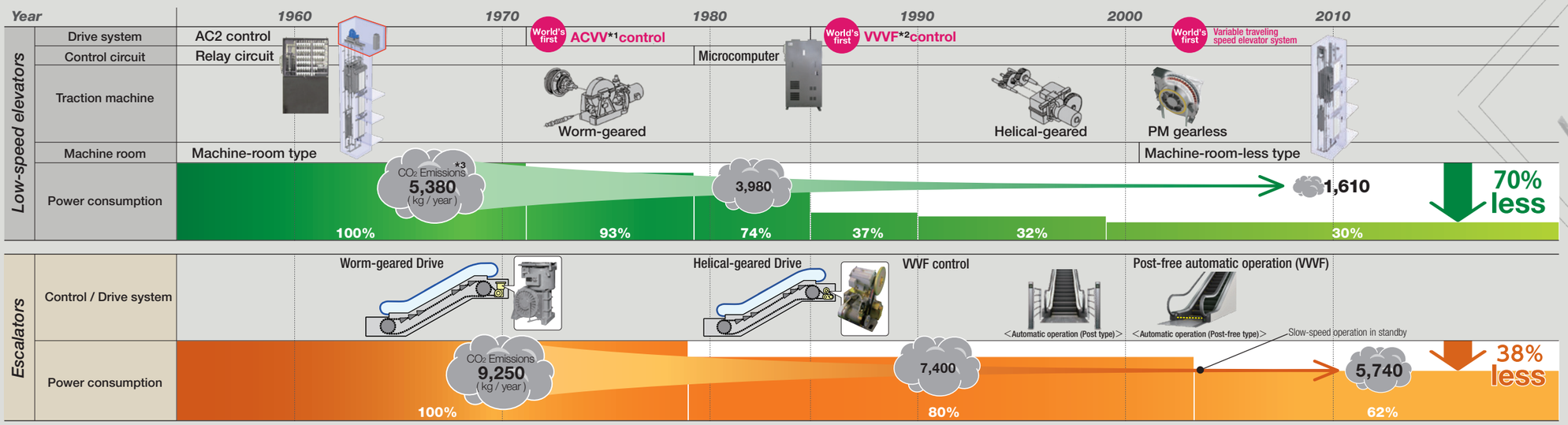
Automatic operation

Our newly-developed, innovative escalator inverter enables a unique way of controlling the escalator speed in Automatic and Variable-Speed Operations.

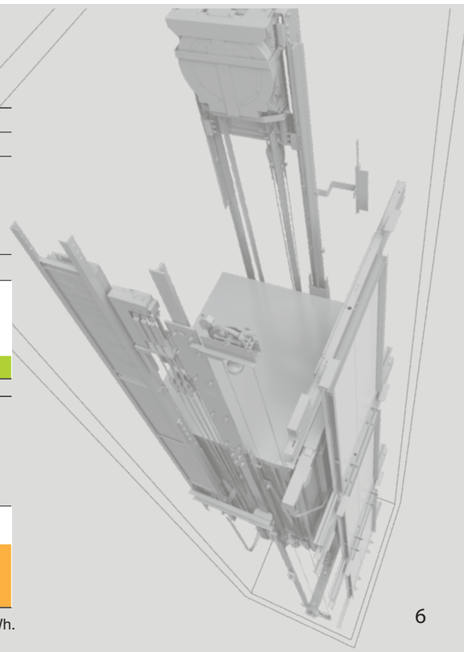


Milestones of Energy-saving Technologies

*1: Alternative current variable voltage *2: Variable voltage, variable frequency
*3: These values are estimated based on the latest CO_2 emissions.



CO_2 emissions: Calculated from the power consumption with coefficient of 0.6 kg/kWh.



Eco Factory

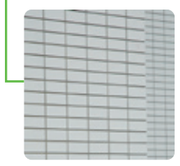
To minimize the negative environmental impact of our business activities, we employ environmentally responsible manufacturing technologies and production processes.

Rooftop garden (5,537 m²) [INAZAWA works]

The garden on the factory building shields from heat and improves air conditioning efficiency.

Elevator testing tower – SOLAÉ – [INAZAWA works]

Ventilation tunnels
Large voids (ventilation tunnels) allow the tower to breathe fresh air through window louvers, ventilating the tower and cooling off the indoor temperature.

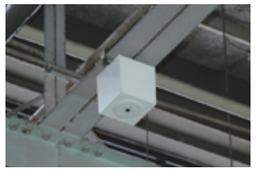


Photocatalytic tiles
Photocatalytic tiles on the outer walls resist and decompose dirt and even bacteria, helping reduce the use of cleaner.

High efficiency ceiling lights

Old lights were replaced by high-frequency inverter lights, as the illuminance sensors help optimize the use of natural light and save 270,000 kWh of electricity per year.

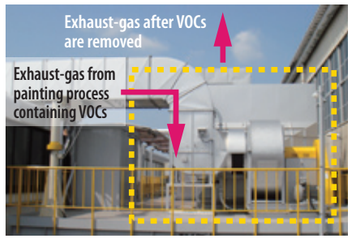
High-frequency inverter lights



Illuminance sensor (MELSAVE)

VOC* removal system

A VOC removal system was installed. It not only eliminates approximately 93% of the VOCs, it also deodorizes the gases emitted. As a result, the deodorizing furnace is no longer required, which ultimately reduces the natural gas consumed by Inazawa Works. * VOC: volatile organic compound

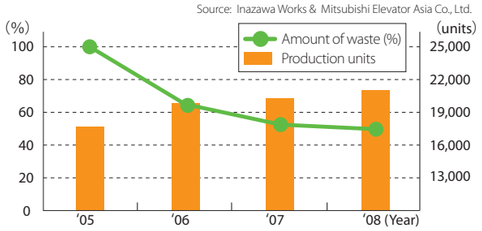


Waste reduction

We have reduced waste in our manufacturing processes to protect the environment.

Amount of waste in manufacturing processes

Source: Inazawa Works & Mitsubishi Elevator Asia Co., Ltd.



ISO 14001 certification

Mitsubishi Electric's products, comprising the world's leading elevator and escalator technologies, are now manufactured in nine countries and regions, and sold in 88 countries. Since the achievement of ISO 14001 certification at the Inazawa Works, other overseas manufacturing plants and affiliated companies in Japan have also been certified.

Logistics

Reduction in wood consumption for packing (3Rs – reduce, reuse, recycle)

By reusing wood from crates, Mitsubishi Electric reduced wood consumption by 240 m³ per year.

Returned wood

Sorted

The packaging for small parts of escalator trusses was changed from wooden crates to cardboard boxes, which reduced wood consumption by 69 m³ per year.

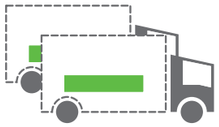
Before: 0.078 m³/box

After: 0.037 m³/box

Increasing load capacity to reduce the number of trucks used

We formulated guidelines on how to stack multiple containers or crates depending on their shape to improve load capacity. These efforts reduced the number of trucks used, and CO_2 emissions accordingly.

Fewer trucks



Before: single-stack

After: triple-stack

Local procurement and production

Purchasing materials and manufacturing products as close as possible to our customers, we promote local procurement and production in order to use minimum resources and energy in transportation.

Installation / Maintenance

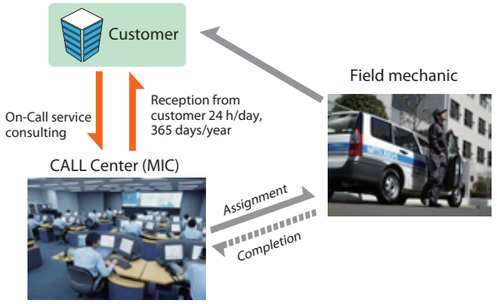
Development of installation engineering

In order to reduce the time and energy required for installation, installation equipment was made smaller and lighter. Mitsubishi Electric developed its installation method and equipment to have less impact on the environment.

【WOS method】
(Without-scaffolding installation method)
An elevator is installed by using the elevator's car platform, instead of scaffolding. It can eliminate the time for installation and removal of scaffolding.

High-performance maintenance service

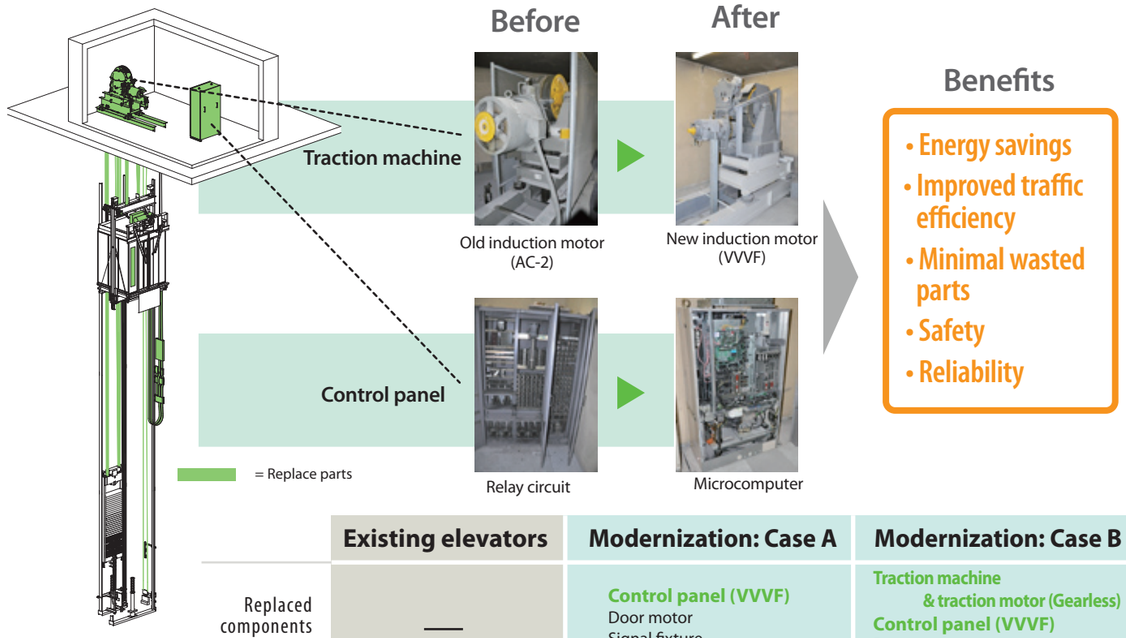
Monitoring each elevator's condition at the central control center, we provide efficient and reliable service without wasting energy.



Modernization

Proposing the most suitable solution

Modernization allows an elevator to be refurbished by replacing some of its components so that usable components can be retained.



	Existing elevators	Modernization: Case A	Modernization: Case B
Replaced components	—	Control panel (VVVF) Door motor Signal fixture	Traction machine & traction motor (Gearless) Control panel (VVVF) Door motor Signal fixture
Energy-saving	100%	62% (38% cut)	54% (46% cut)
Reuse rate	100%	88%	71%

Environmental Vision 2021

ENVIRONMENTAL VISION 2021 TECHNOLOGY & ACTION

Environmental Vision 2021 is the long-term environmental management vision of the Mitsubishi Electric Group. It establishes a framework for realizing a sustainable planet, and defines long-term initiatives to prevent global warming and to create a recycling-based society.

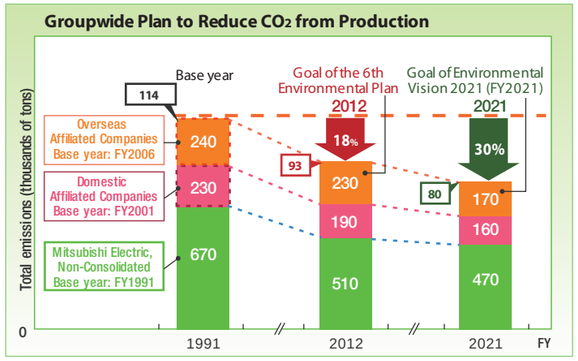
Aim to Reduce CO_2 Emissions from Product Usage by 30%

Prevent global warming by delivering energy-saving products

Initiatives to Prevent Global Warming

Aim to Reduce Total CO_2 Emissions from Production by 30%

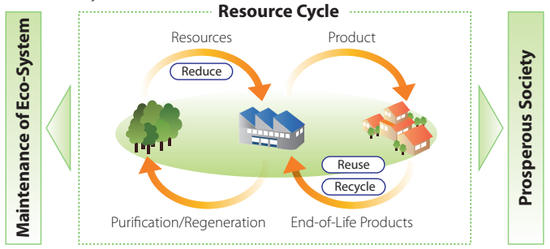
Raising the efficiency and performance of air conditioning, lighting and other utility equipment, as well as improving production lines reduces the amount of CO_2 emitted during production and helps prevent global warming.



Initiatives to Achieve a Recycling-based Society

The 3Rs: Reduce, Reuse and Recycle Products Utilizing 'Design for Environment' and 'Life Cycle Assessment' Technologies

Produce products that incorporate the 3Rs throughout their lifecycles



Zero Emissions: Measures to Reduce the Direct Landfill of Waste to Zero

Restricting generation of waste and promoting the efficient reuse and re-resourcing of waste

Reduce
Cut amount of raw materials used by 30% by setting the goal of size and weight reduction for each product, and by not using more materials than necessary

Reuse
Introduce product lease/rental program and expand maintenance services

Recycle
Expand closed-loop recycling program for plastics and work toward recycling 100% of waste plastic from appliances