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<tr>
<th>Country/Province</th>
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<tr>
<td>China</td>
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<td>Shanghai</td>
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<td>New publication, effective Mar. 2010</td>
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<td>This catalogue is made of recycled paper.</td>
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**INTERNATIONAL NETWORK**

Elevators & Escalators

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**Contents printed using soy ink.**

This catalogue is made of recycled paper.

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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.

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.

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.

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 Building Council (JaBGC) and the Japan Sustainable Building Consortium (JSBC) under the Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

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.

Singapore (BCA Green Mark)
(Certification levels: Certified, Gold, Gold Plus, 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.

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.

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.
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
Modernization
Eco Factory
Installation/Maintenance
Logistics
**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.

**Energy Savings**

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

**Electricity recycling system for elevators <ELESAVE>**

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.

**PM motor with joint-lapped stator**

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.

**Milestones of Energy-saving Technologies**

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<tbody>
<tr>
<td>Drive system</td>
<td>AC2 control</td>
<td>Relay circuit</td>
<td>ACV*¹ control</td>
<td>VVVF*² control</td>
<td>MITSUBISHI OWNED TECHNOLOGY</td>
<td>MITSUBISHI OWNED TECHNOLOGY</td>
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<tr>
<td>Traction machine</td>
<td>Worm gear</td>
<td>Worm gear</td>
<td>Worm gear</td>
<td>Helical gear</td>
<td>PM gearless</td>
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<td>Machine-room-less type</td>
<td>Machine-room-less type</td>
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<td>Power consumption</td>
<td>5,480 Rpm</td>
<td>3,380</td>
<td>1,610</td>
<td>1,610</td>
<td>70% less</td>
<td>70% less</td>
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*1: Alternative current, variable voltage
*2: Variable voltage, variable frequency
*3: The values are estimated based on the latest CO2 emissions.

**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.

**Traffic Efficiency**

* AI group control system
  - 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 elevator inverter enables a unique variable-speed operation, significantly reducing environmental impact.

**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.

**CO2 Emissions**

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<tr>
<td>Elevators</td>
<td>5,740</td>
<td>6,130</td>
<td>6,430</td>
<td>6,800</td>
<td>7,400</td>
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<tr>
<td>Power consumption</td>
<td>100%</td>
<td>80%</td>
<td>37%</td>
<td>32%</td>
<td>30%</td>
<td>70% less</td>
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<tbody>
<tr>
<td>Power consumption</td>
<td>9,250</td>
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<td>9,400</td>
<td>9,400</td>
<td>9,400</td>
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<tr>
<td>CO2 emissions</td>
<td>5,380</td>
<td>5,740</td>
<td>6,130</td>
<td>6,430</td>
<td>6,800</td>
<td>7,400</td>
</tr>
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*CO2 emissions: Calculated from the power consumption with coefficient of 0.8 kW/ton CO2.
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.

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.

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.

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.

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.

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 CO₂ emissions accordingly.

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.

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

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.

Benefits
- Energy savings
- Improved traffic efficiency
- Minimal wasted parts
- Safety
- Reliability

Existing elevators | Modernization: Case A | Modernization: Case B
--- | --- | ---
Replaced components | Control panel (VVVF) | Traction machine & traction motor (Gearless)
Energy-saving | 100% | 62%
Reuse rate | 100% | 88%

Environmental Vision 2021
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 CO₂ Emissions from Product Usage by 30%
Prevent global warming by delivering energy-saving products

Initiatives to Prevent Global Warming
Aim to Reduce Total CO₂ 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 CO₂ 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

Groupwide Plan to Reduce CO₂ from Production

Zero Emissions: Measures to Reduce the Direct Landfill of Waste to Zero
Restricting generation of waste and promoting the efficient reuse and re-resourceing of waste

Recycling
- Conventional Method
- Hyper Cycle Technology
- Closed Loop Recycling
- No waste is generated due to recycling programs.

Proper Disposal
- Disposal
- Waste tracking
- Zero Emissions

Product
- Product
- Material
- Recycling

Reuse
- Reuse
- Repair
- Refurbish

Recycling
- Recycling
- Material
- Recycling

Environmental Vision 2021

Cut amount of raw materials used by 30%
Reduce generation of waste and promote the efficient re-use and re-resourceing of waste

Plastics recovered from home appliances are recycled in home appliances

Resource Cycle
-消耗
-回收
-再生
-下降

Program Society
-消耗
-资源
-社会