

Mitsubishi Electric Group

Environmental Vision 2021



Background to Establishing Environmental Vision

~Towards the realization of an environmentally sustainable society~

Common Worldwide Target for Preventing Global Warming

Reduce CO₂ Emissions by Half by 2050



**Reduce by 30%
by 2021**

Challenge of Creating a Recycling-Based Society

**Sustainable Resource Cycle by Reducing,
Reusing and Recycling (3Rs)**



**Practice 3 Rs
Achieve Zero
Emission**

Broadening Scope of Corporate Social Responsibility

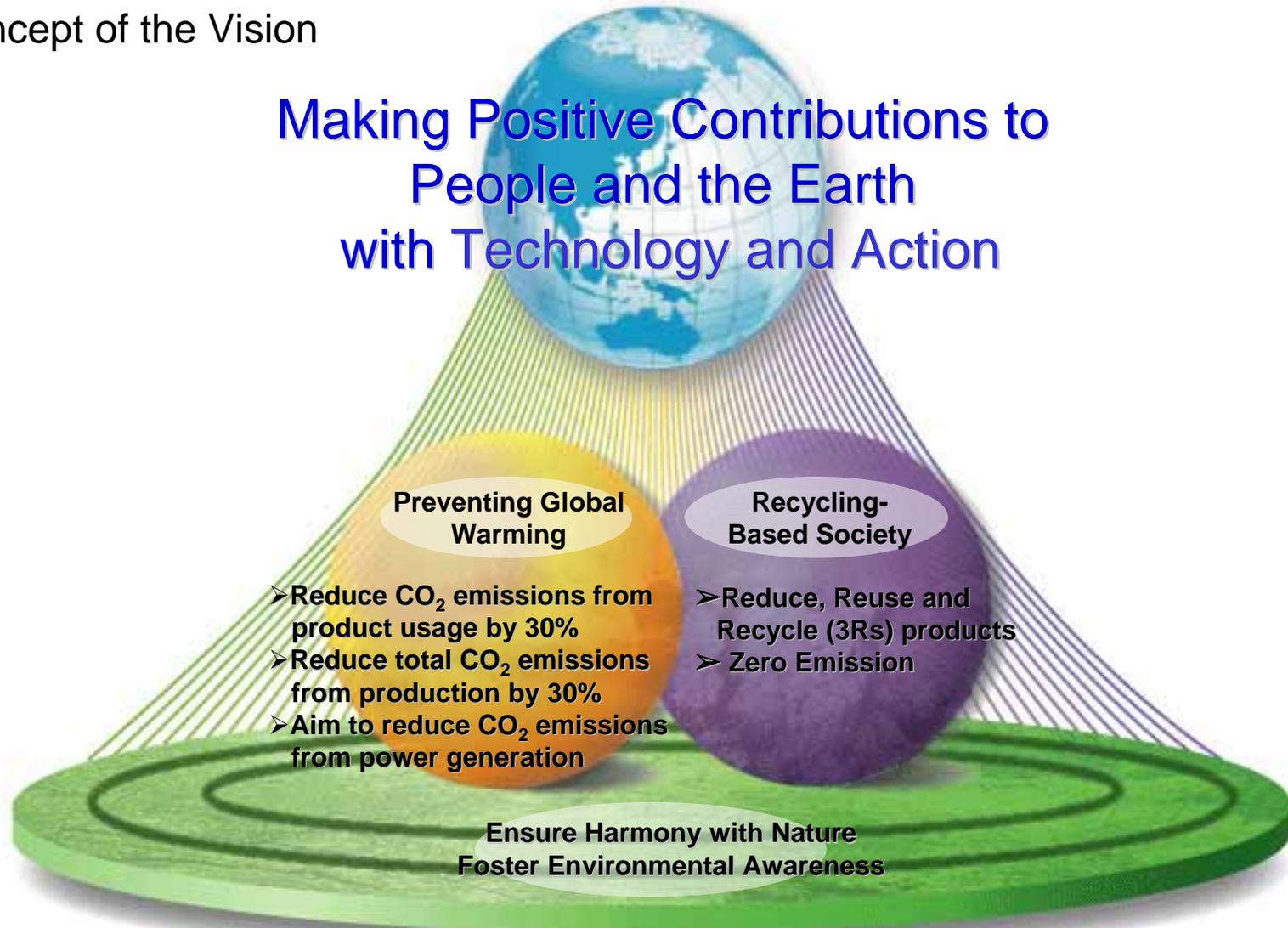
**Developing Personnel Who Feel, Think
and Act for the Environment**



**Ensure Harmony
with Nature
Foster
Environmental
Awareness**

Concept of the Vision

Making Positive Contributions to People and the Earth with Technology and Action





**Preventing
Global
Warming**

Initiatives to Prevent Global Warming

Reduce CO₂ Emissions



**CO₂ Emissions from
Product Usage**



30% Reduction

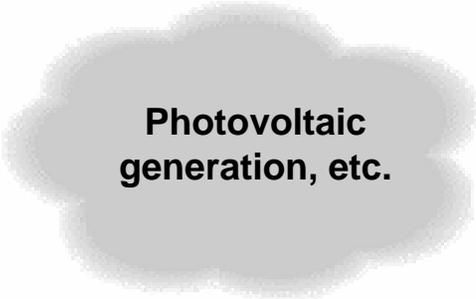


**Total CO₂ Emissions
from Production**



30% Reduction

**Reduce CO₂ from Power
Generation**



**Photovoltaic
generation, etc.**



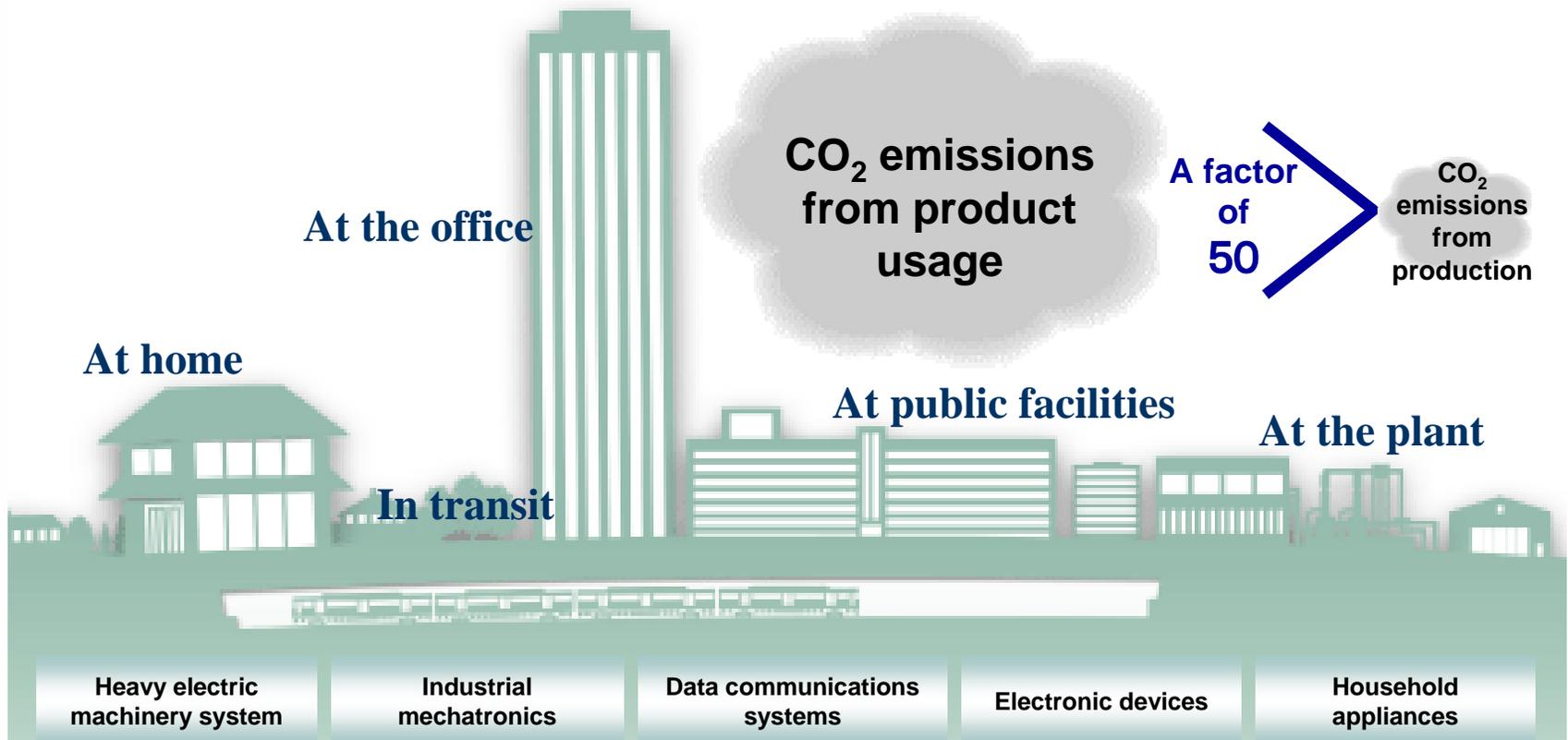
**Improve Generating
Efficiency**



Initiatives to Prevent Global Warming (I)

Aim to Reduce CO₂ Emissions from Product Usage by 30%

A wide variety of energy-saving products





Preventing
Global
Warming

Initiatives to Prevent Global Warming (I)

Reduce CO₂ Emissions from Product Usage by 30%

Products and businesses, and the technologies

At the office

- Further evolution of our distinctive technologies cultivated over many years
- Innovation in our inverter/power semiconductor technologies shared across all businesses
- Development of system solutions

At home

In transit

At public facilities

At the plant

Heavy electric
machinery system

Industrial
mechatronics

Data communications
systems

Electronic devices

Household
appliances

Preventing
Global
Warming

Initiatives to Prevent Global Warming (I)

Reduce CO₂ Emissions from Product Usage by 30%

Recent Examples of Initiatives to Reduce CO₂ During Use

Lighting



Use of high-efficiency light sources (LED)

Improvements in installation of fluorescent lamp inverters

Encouraging the diffusion of lighting control systems

Air conditioning



Raising the efficiency of compressors

Raising efficiency through use of new heat exchangers

Energy loss minimization using sensing technology, inverter technology and air stream control

Motor vehicles



Further advances in power train control

Raising the efficiency of electric power steering

Reducing the size and improving the efficiency of intelligent power units (IPU) for hybrid vehicles

Preventing
Global
Warming

Initiatives to Prevent Global Warming (I)

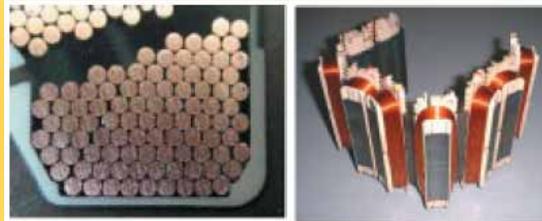
Reduce CO₂ Emissions from Product Usage by 30%

Motor



Elevator

High-density Winding / Joint-lapped Core



**Optimal Excitation Control Inverter /
Gradationally Controlled Voltage Inverter**



Fan for air-conditioning or extraction.



Traction drive



Industrial equipment



Automotive equipment



Compressor

Preventing
Global
Warming

Initiatives for Preventing Global Warming (I)

Reduce CO₂ Emissions from Product Usage

Power Semiconductors

Improved performance points
Low loss / high speed / compact
high temperature operation




Inverter



Servo amplifier



Solar generator



Automotive



Rail vehicle



Elevator



Refrigerator



Air-conditioner



Heat pump boiler

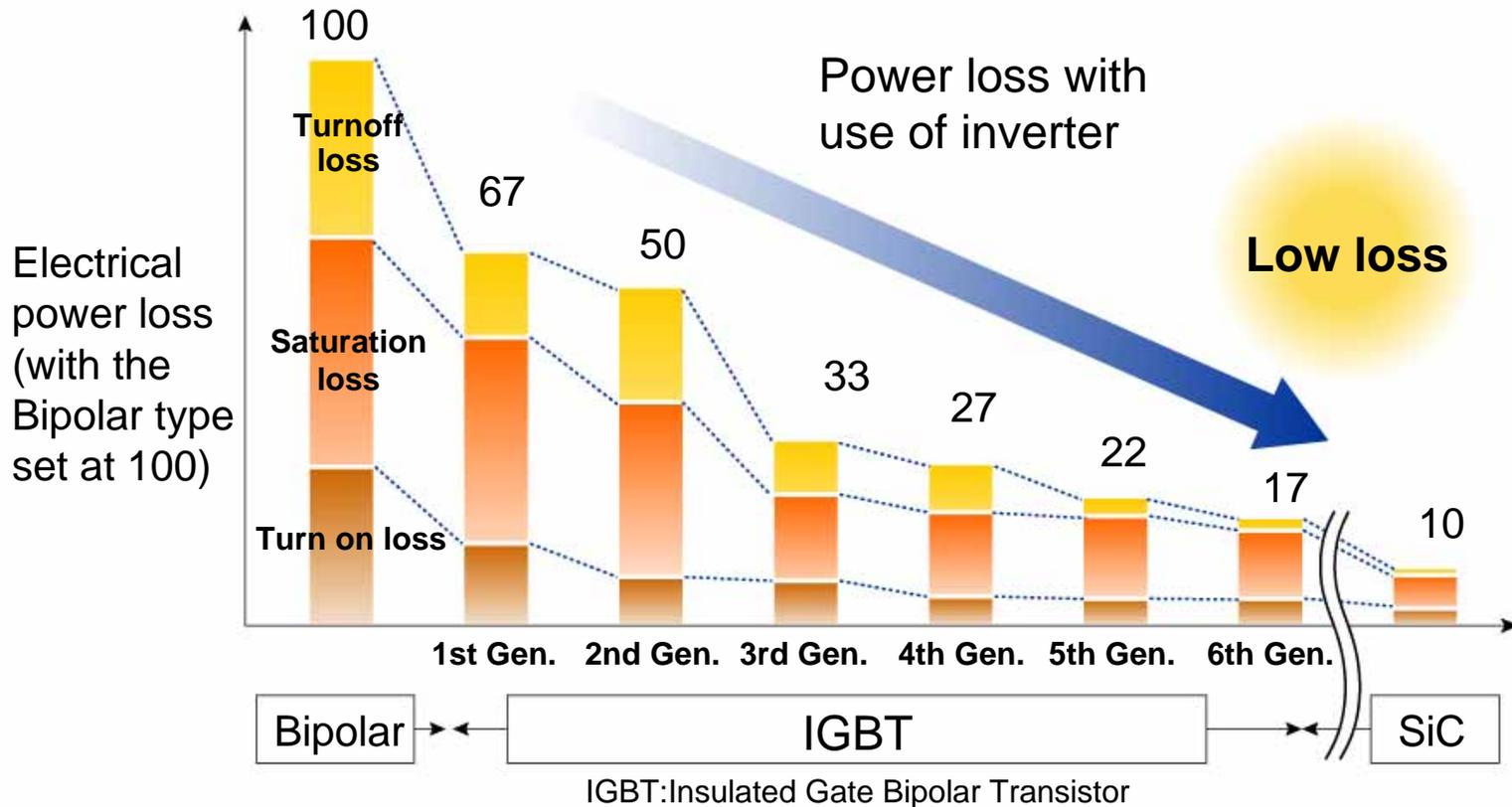
HVIC: high Voltage IC DIP-IPM: Dual-In-Line Package Intelligent Power Module
 IGBT: Insulated Gate Bipolar Transistor ASIPM: Application Specific Intelligent Power Module



Initiatives to Prevent Global Warming (I)

Reduce CO₂ Emissions from Product Usage by 30%

Electrical power loss of power semiconductors in inverters

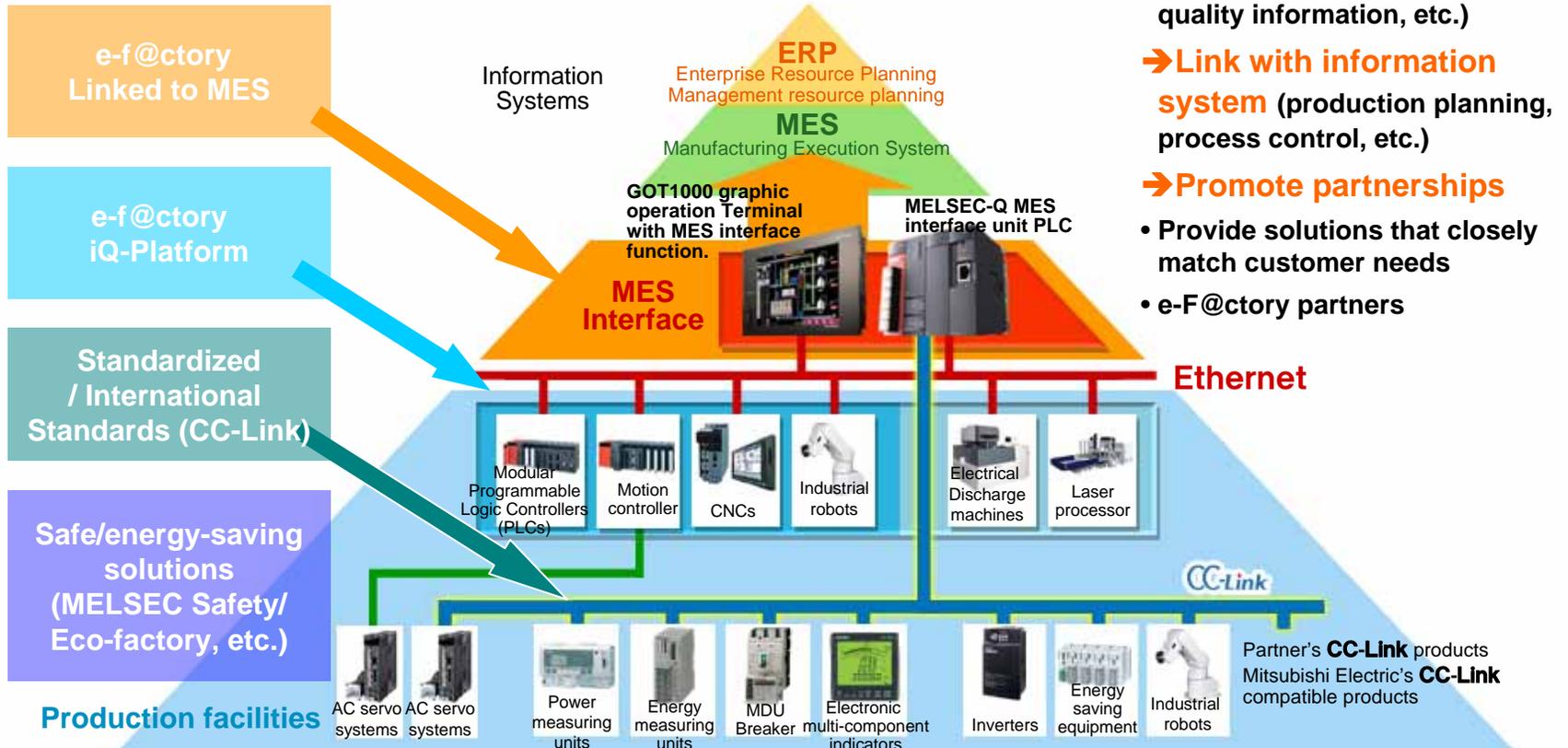


Preventing
Global
Warming

Initiatives to Prevent Global Warming (I)

Reduce CO₂ Emissions from Product Usage by 30%

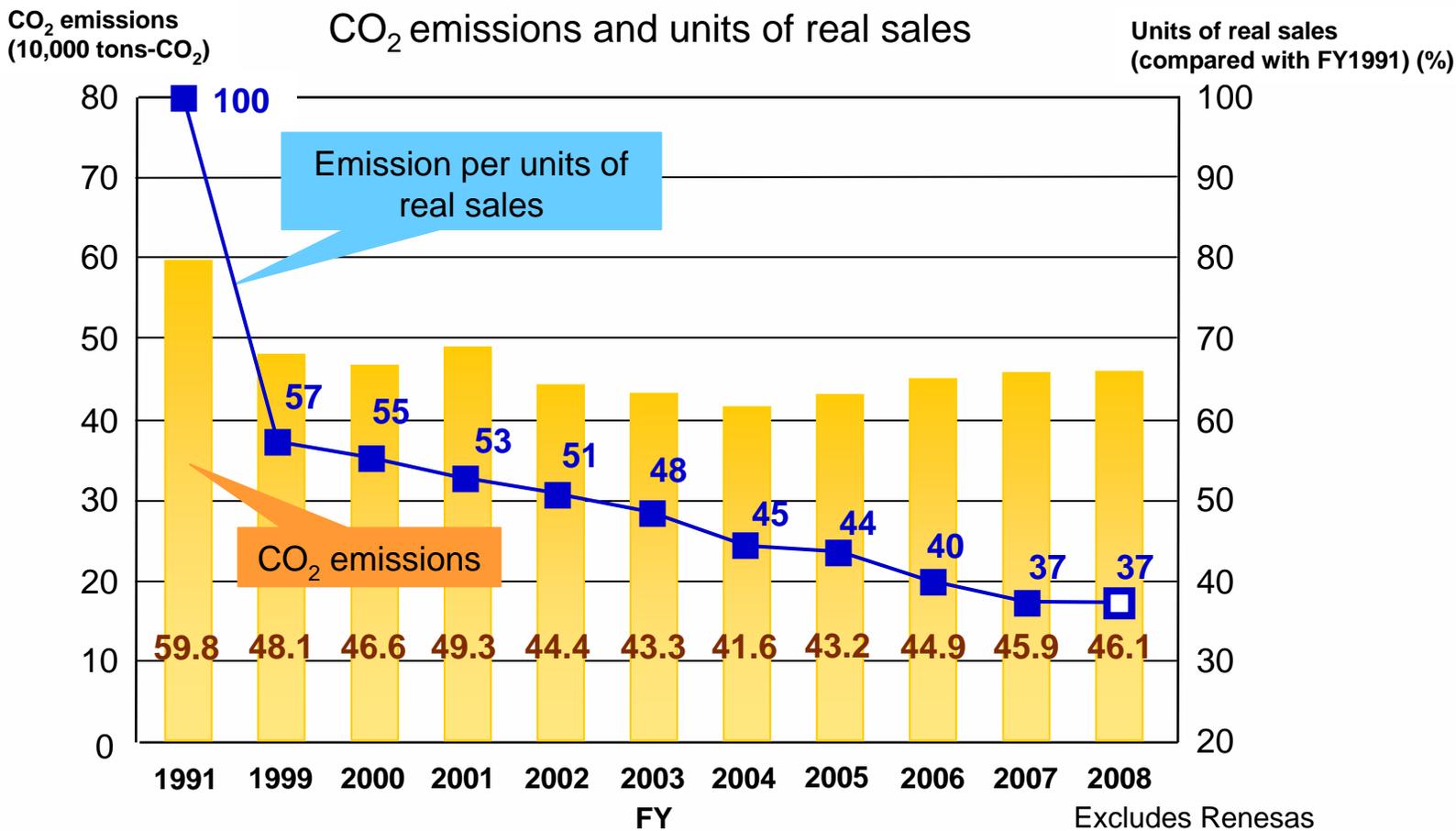
e-F@ctory Solution





Initiatives to Prevent Global Warming(II)

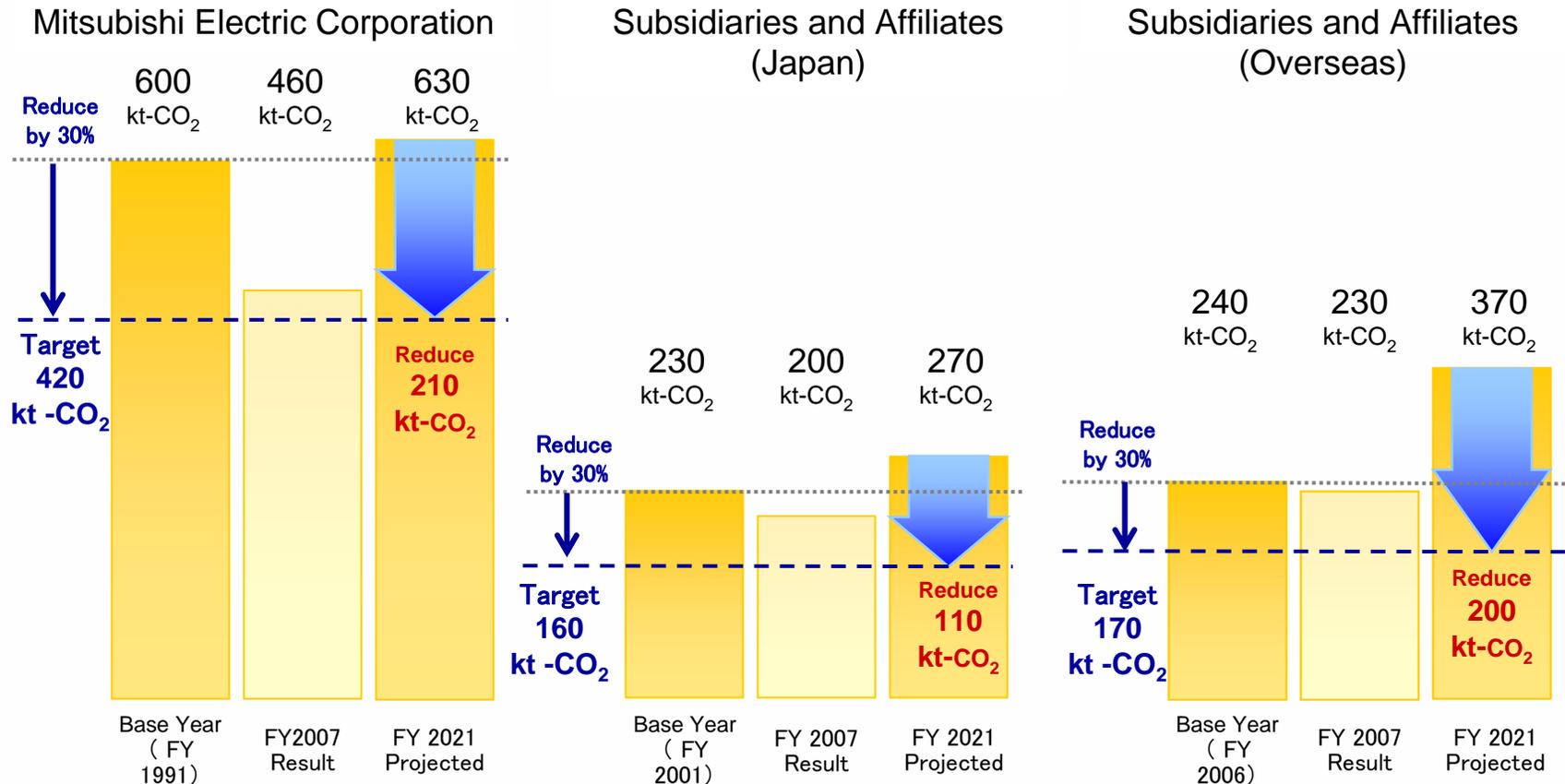
Targets for Voluntary CO₂ Emissions Activities





Initiatives to Prevent Global Warming (II)

Aim to Reduce Total CO₂ Emissions from Production by 30%



*Calculated on the presumption of 3% growth in Japan and 5% growth overseas.

Preventing
Global
Warming

Initiatives to Prevent Global Warming (II)

Reduce Total CO₂ Emissions from Production by 30%

High-Efficiency Equipment

Invest in Energy Efficiency at
a Targeted Rate of 0.1% of
Production Value



EX Series: Super Energy Efficient Transformers

Energy Loss Minimization (EM Activities)

Set energy efficiency targets
and carry out activities



Managing energy use



Screenshot from energy
management software

Photovoltaic Power Generation

Install photovoltaic power
system at model factories and
expand to all Group
companies



Solar power system installed at Nagoya Works

Preventing
Global
Warming

Initiatives to Prevent Global Warming (III)

Aim to Reduce CO₂ Emissions from Power Generation

Photovoltaic System



CO₂ emissions
reduced to zero
with use of
photovoltaics



Promote installations
and increase module
efficiency

(NEDO's* target value 25% for PV2030)

* The New Energy and Industrial Technology
Development Organization

Results of raising the conversion efficiency of solar cell modules

Use of polycrystalline solar cells has resulted in conversion efficiency of 18%, the highest rate¹⁾ in the world. ²⁾

1) Based on Mitsubishi survey conducted in May 2007.
2) Result of assessment conducted at the National Institute of Advanced Industrial Science and Technology, the official certification body for conversion efficiency.

185W, the highest figure³⁾ ever achieved in the industry, for output per solar cell module.

3) Based on Mitsubishi survey conducted in May 2007. Maximum nominal output per solar cell module polycrystalline silicon type for home use in Japan (mass produced items).

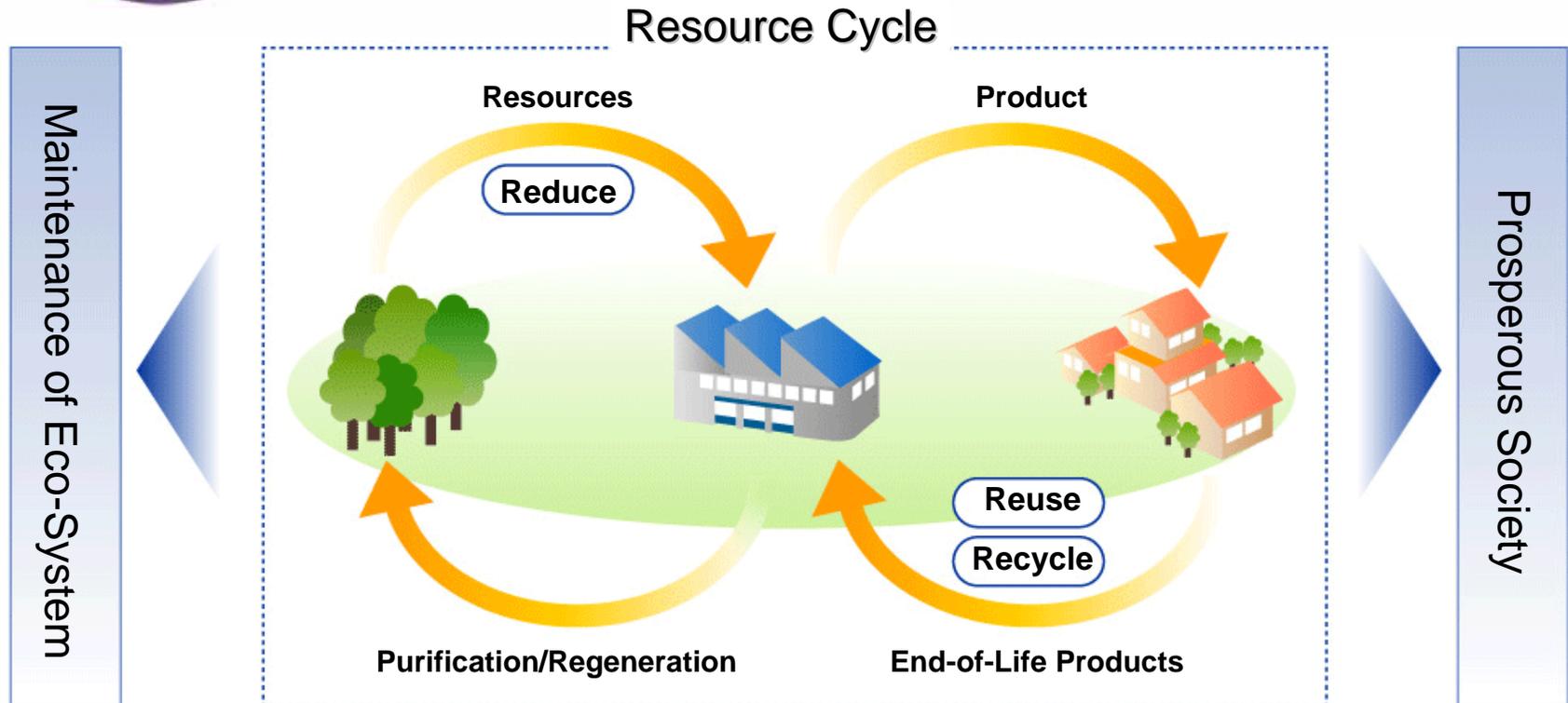
Achieved world's highest ⁴⁾ power conversion efficiency of 97.5%⁵⁾ for power conditioners.

4) As of October 4th, 2007. Mass produced power conditioners for domestic household solar generator systems.

5) Rated loading efficiency stipulated in JIS C8961. Values measured by Mitsubishi Electric for PV-PN40G (Value for Mitsubishi Electric's former product, PV-PN33G was 95.5%)



Initiatives to Achieve a Recycling-Based Society





Initiatives to Achieve a Recycling-Based Society (I)

Reduce, Reuse and Recycle Products (3Rs) Utilizing DfE and LCA Technologies

Reduce

- Set size and weight for each product
- Efficient use of low materials



Reduce Resources Used by 30%

Reuse

- Introduce product lease/rental program
- Expand maintenance services

Recycle

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

Conventional Method

Disposal

Downgraded Use

General Plastic Goods/Fuel

Manual Dismantling

Only possible to reuse plastic parts that are easy to manually dismantle and sort



Hyper Cycle Technology



All plastics are pulverized together

Closed-loop Recycling
Different types of plastics are pulverized and automatically sorted



Cleaning & Sorting



Reuse

Plastics recovered from home appliances are reused in home appliances

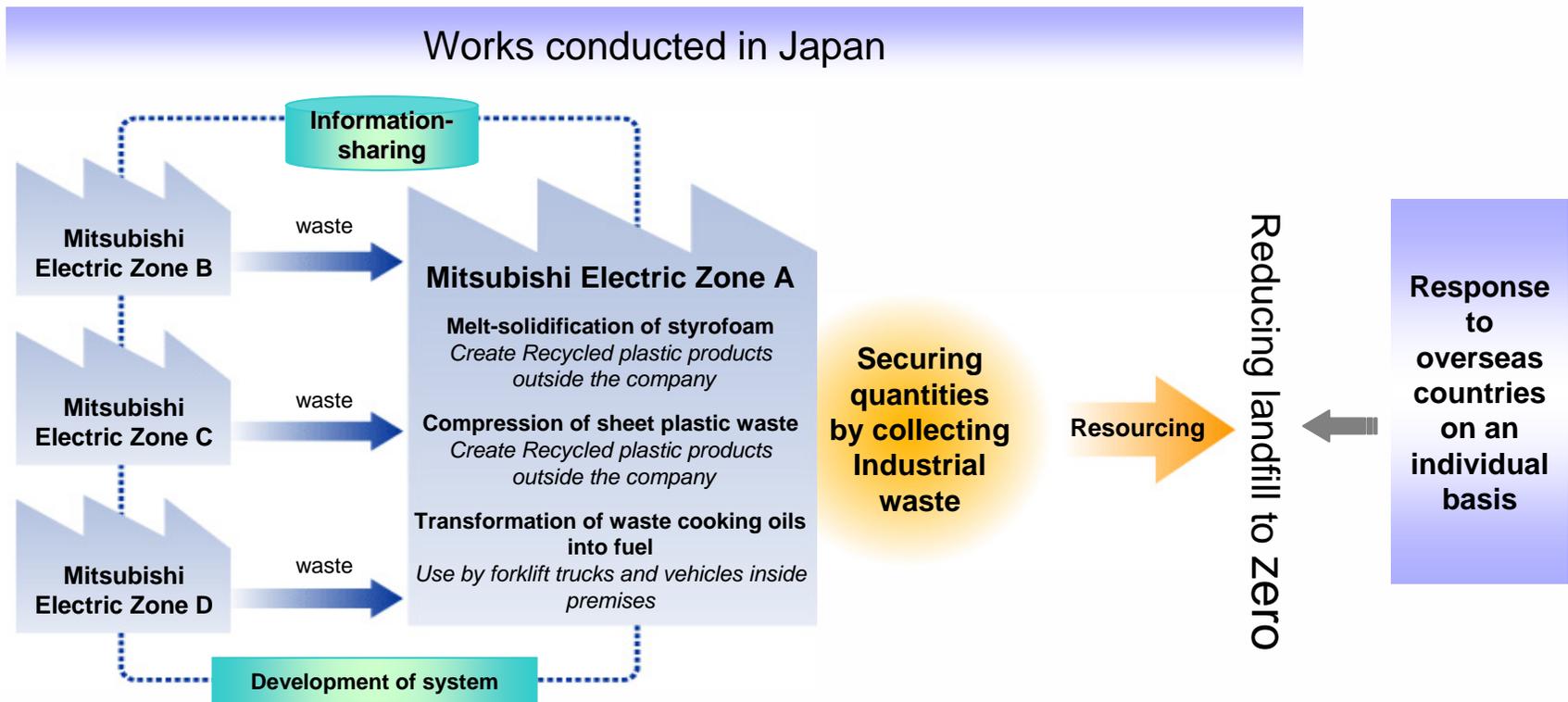
Recycling-
Based
Society

Initiatives to Achieve a Recycling-Based Society (II)

Zero Emissions

Reducing the Direct Landfill of Waste to Zero

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



**Living In
Harmony
with Nature**

Ensure Harmony with Nature and Foster Environmental Awareness

Mitsubishi Electric Outdoor Classroom and Leadership Training

**Education for children and leadership training for 1000 people
in the promotion of nature observation and conservation**



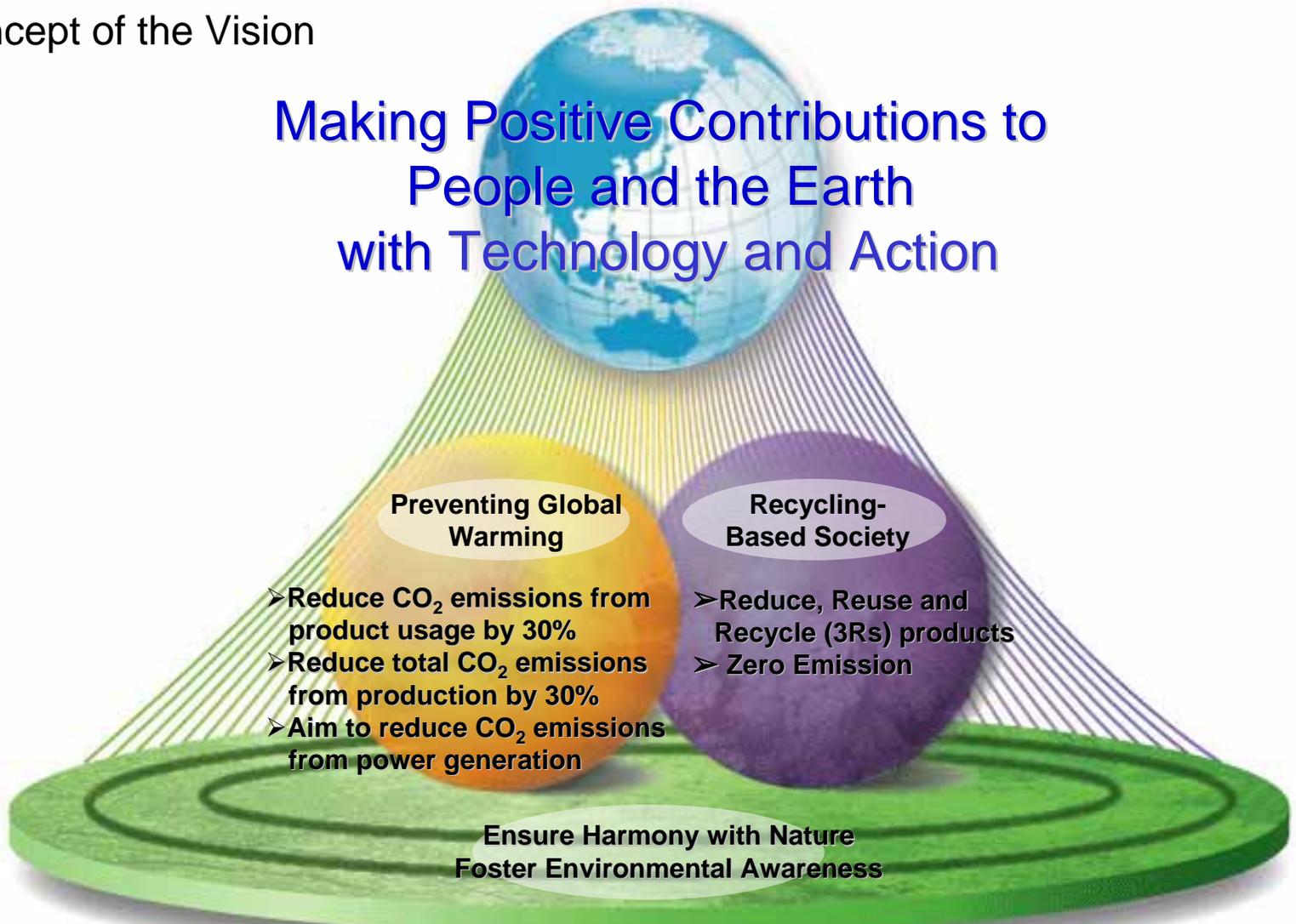
Forest Nurturing Activity

**Reforestation helps to prevent
global warming, protects
against natural disasters, and
contributes to the
preservation of biodiversity**

Woodland Preservation Activities

**With a scale of 1,000,000 people
including local residents,
employees, families, people
from all over the world band
together for this nature
conservation activity**

Concept of the Vision



Making Positive Contributions to People and the Earth with Technology and Action

Preventing Global Warming

- Reduce CO₂ emissions from product usage by 30%
- Reduce total CO₂ emissions from production by 30%
- Aim to reduce CO₂ emissions from power generation

Recycling-Based Society

- Reduce, Reuse and Recycle (3Rs) products
- Zero Emission

Ensure Harmony with Nature
Foster Environmental Awareness