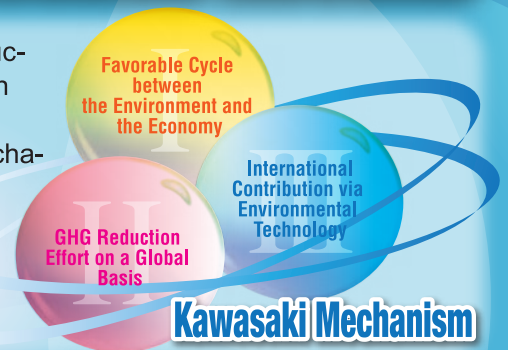


Kawasaki Mechanism

Certification System Certification Results

A strength and characteristic of Kawasaki City is its effort in promoting a reduction in greenhouse gas (GHG) emissions on a global basis by leveraging high quality environmental technologies.

As one of its related initiatives, Kawasaki City has initiated the Kawasaki Mechanism Certification System to mark the contribution to GHG emission reductions outside the city (avoided emissions) made through the use of environmental technologies of enterprises within the City and to facilitate the appropriate evaluation of these enterprises in the market.



Overview of products/technologies and avoided emissions (FY2015)

Toshiba Corporation Komukai Complex C-Band Solid-State MP (Multi-Parameter) Radar

Overview and features of product, technology

- Weather radar that realizes high accuracy observation of rainfall conditions, downsizing and light weight, using multi-parameter observation technologies and solid state transmitter technologies.
- Downsizing transmitter (1/3 size of conventional radar), extended lifetime and reduction of power consumption, utilizing solid state devices (electron tube to semiconductor).
- Base-line for calculating the avoided emissions**
Conventional weather radar which is used electron tube (Klystron)
- Product usable years** 15 years

Avoided emissions

5.59×10² tons
(as CO₂ equivalent)



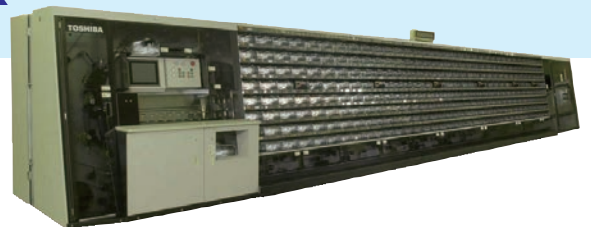
Toshiba Corporation Komukai Complex Letter sorting machine "TT-210"

Overview and features of product, technology

- Equipment to transfer collected mail one by one and sort according to delivery destination, providing greater weight- reduction and power-savings than ever before.
- Human- and eco-friendly product that reduces running costs by reducing power consumption with operability and maintainability upgraded by improving destination reading efficiency.
- Base-line for calculating the avoided emissions**
Letter sorting machine of the former model "TT-200"
- Product usable years** 15 years

Avoided emissions

1.65×10⁴ tons (as CO₂ equivalent)



Overview of products/technologies and avoided emissions (FY2014)

Ajinomoto Co., Inc. L-Lysine (Feed Grade)

Overview and features of product, technology

- L-Lysine is one of the essential amino acids for animals but tends to lack in conventional feeds. Feed-grade amino acid L-Lysine is used to supply the deficit and enables to reduce protein level of the feeds.
- With optimal amino acid balance, lowering total protein in feed contributes to reduce greenhouse gas emissions from livestock wastes.
- Advanced biotechnology was fully utilized to establish efficient manufacturing process of L-Lysine feed grade.



Avoided emissions
2.40×10⁵ tons
(as CO₂ equivalent)

Product usable years:
—

Base-line for calculating the avoided emissions
Nutritionally equivalent feed with soybean meal but without lysine addition

Toshiba Corporation Komukai Complex Solid-State MP Radar

Overview and features of product, technology

- Weather Radar can observe the inside of a cumulonimbus cloud which is the cause of sudden downpours and gusts accurately, and it meets needs such as commercial power source and downsizing for transportation.
- 1/5 size of conventional weather radar and reduction in the power consumed by using Solid-State transmitters, etc. contribute to reduce CO₂ emission.



Avoided emissions
7.71×10² tons
(as CO₂ equivalent)

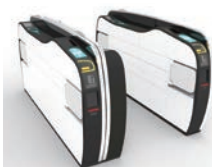
Product usable years:
15 years

Base-line for calculating the avoided emissions
Conventional weather radar which is used electron tube (Klystron)

Toshiba Corporation Komukai Complex EG-7000 Automatic Ticket Gate for Shinkansen

Overview and features of product, technology

- Automatic ticket gate for Shinkansen can handle both smart cards and magnetic tickets such as fare ticket, limited express ticket, seat reservation ticket at one time. Passenger who had smart card for Shinkansen can pass the gate without using magnetic ticket.
- Decreased machine weight by approximately 12% and reduced power consumption by approximately 30% when idle compared to the former model.



Avoided emissions
1.93×10² tons
(as CO₂ equivalent)

Product usable years:
7 years

Base-line for calculating the avoided emissions
Former model of automatic Ticket Gate for Shinkansen

MITSUBISHI KAKOKI KAISHA, LTD. HyGeia Series Small-Scale On-Site Hydrogen Generator

Overview and features of product, technology

- New model high-performance, compact, on-site hydrogen production unit that produces high-purity hydrogen (more than 99.999 vol%) to be used as a feedstock for city gas (natural gas), LPG, etc.
- Offers world's foremost reforming efficiency, more than 20% reduction in amount of feedstock used, and more compact size (requires half footprint for the installation) to contribute to CO₂ reduction.



Avoided emissions
1.40×10² tons
(as CO₂ equivalent)

Product usable years:
10 years

Base-line for calculating the avoided emissions
Previous model on-site hydrogen production unit

Overview of products/technologies and avoided emissions (FY2014)

Asahi Kasei Chemicals Corporation / Kawasaki Works ASACLEAN™ Purging Compound for plastic molding machines

Overview and features of product, technology

- ASACLEAN is the purging material that shows excellent effects on cleaning plastic molding machines, such as quick resin/color change and removal of carbonized resins.
- It can reduce amount of waste and defect ratio, such as raw materials loss while changing materials/color with highly cleaning performance.



Avoided emissions

1.13×10³ tons
(as CO₂ equivalent)

Product usable years:

—

Base-line for calculating the avoided emissions

Cleaning Plastic molding machines with processing materials

Takasago, Ltd

Regenerative system power source (charging and discharging functional evaluation equipment)

Overview and features of product, technology

- Device for testing electric power trains for EVs and hybrid vehicles at actual current using high-speed, bidirectional power supply.
- Whereas power consumption was given off as heat when evaluating with large capacity batteries and inverters, this device regenerates electric power so it can be reused to contribute to CO₂ reduction.



Avoided emissions

1.82×10³ tons
(as CO₂ equivalent)

Product usable years:

5 years

Base-line for calculating the avoided emissions

Evaluation device with charge/discharge function, but no regeneration function

Toshiba Corporation Komukai Complex Phased Array Meteorological Radar System

Overview and features of product, technology

- Toshiba has developed the first Phased Array Weather Radar in Japan, which performs high speed and high accuracy observation to recognize local torrential downpours "guerrilla rainstorm" and tornado.
- Observation time of Phased Array Weather Radar is reduced to 1/20, compared to conventional weather radars with parabolic antenna. So observation performance of Phased Array Weather Radar is equivalent to 20 conventional weather radars with parabolic antenna, and then contributes to reduce CO₂ emission.



Avoided emissions

6.18×10³ tons
(as CO₂ equivalent)

Product usable years:

15 years

Base-line for calculating the avoided emissions

Solid-state MP radar which is the conventional weather radar

Toshiba Corporation Hamakawasaki Operations 145 kV Gas Insulated Switchgear (GIS) G3A-b

Overview and features of product, technology

- Switchgear which is installed in substation that is realized lightweight and compactification.
- Reduction of amount of used material for manufacturing GIS and SF₆ gas volume to be sealed and recovered when testing, in addition to that making a contribution to CO₂ reduction because of cutting down the amount of current loss by changing materials.



Avoided emissions

6.92×10² tons
(as CO₂ equivalent)

Product usable years:

20 years

Base-line for calculating the avoided emissions

145 kV Gas Insulated Switchgear which is the predecessor of the product

TonenGeneral Sekiyu K.K. / TonenGeneral Research Center, located in Kawasaki Refinery Genuine continuously variable transmission (CVT) fluid with advanced fuel economy performance

Overview and features of product, technology

- Developed as a genuine CVT fluid with advanced fuel economy performance.
- Differentiated to offer new additional functionality of better fuel economy to lubricants.
- Designed to contribute to CO₂ reduction through achieving better fuel economy performance by reducing churning loss of the oil in CVT unit as well as torque transmission loss through the oil.



Avoided emissions

5.08×10⁴ tons
(as CO₂ equivalent)

Product usable years:

—

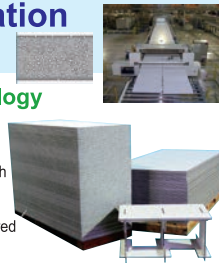
Base-line for calculating the avoided emissions

The previous genuine CVT fluid

JFE Plastic Resource Corporation NF Board (New Frontier & Friendly)

Overview and features of product, technology

- Plastic board consisting of lightweight from layer (core layer) and high rigidity surface layer (skin layer). Core layer is made of used plastic discarded by city residents and skin layer is made of virgin plastic as a principal raw material, it is a sandwich structure product.
- This plastic board can be used as concrete mold form substitute for veneer board and dramatically improves reuse number of times compared with conventional board, in consequence contribute to CO₂ reduction. It is also utilized widely as well material using its special quality.



Avoided emissions

3.13×10² tons
(as CO₂ equivalent)

Product usable years:

—

Base-line for calculating the avoided emissions

Veneer concrete forms

The Tokyo Electric Power Company, Incorporated / Kawasaki Thermal Power Station 1,500°C Class Combined Cycle (MACC-More Advanced Combined Cycle) Power Generation System

Overview and features of product, technology

- Double electric power generation system that combines both a gas turbine that uses combustion gas superheated to 1,500°C and a steam turbine.
- Thermal efficiency is approx. 59% (low calorific value standard); fuel consumption and CO₂ emissions reduced compared to conventional steam-power generation systems.



Avoided emissions

1.70×10⁶ tons
(as CO₂ equivalent)

Product usable years:

Energy supply 1 year

Base-line for calculating the avoided emissions

Electric power supply generated by an LNG thermal power station of the same scale

Toshiba Corporation Komukai Complex EY-5000 Ticket Issuing Machine

Overview and features of product, technology

- Enable efficient ticket handling operation by installing three functions into one product.
 - Ticket inspecting
 - Fare adjusting
 - Ticket issuing
- Decreased machine size and reduced power consumption by integrating former models into one.



Avoided emissions

5.23×10³ tons
(as CO₂ equivalent)

Product usable years:

7 years

Base-line for calculating the avoided emissions

Total emission of former models with same functions

TonenGeneral Sekiyu K.K. / TonenGeneral Research Center, located in Kawasaki Refinery Genuine engine oil with advanced fuel economy performance

Overview and features of product, technology

- Developed as a genuine engine oil with advanced fuel economy performance.
- Differentiated to offer new additional functionality of better fuel economy to lubricants.
- Designed to contribute to CO₂ reduction through achieving better fuel economy performance by reducing frictions on sliding surfaces as well as churning loss of the oil.



Avoided emissions

2.99×10⁵ tons
(as CO₂ equivalent)

Product usable years:

—

Base-line for calculating the avoided emissions

The previous genuine engine oil

Fuji Electric Co., Ltd / Kawasaki Plant

Turbine generator / geothermal turbine with the largest capacity as single cylinder

Overview and features of product, technology

- World's largest 140 MW single device capacity geothermal turbine generator
- Development and manufacture of World's largest 140 MW single device capacity geothermal turbine generator (New Zealand); reduces amount of materials to be procured and reduces amount of energy using in manufacturing and powering equipment to contribute to CO₂ reduction.



Avoided emissions

6.18×10² tons
(as CO₂ equivalent)

Calculated using 2010 delivery results

Product usable years:

30 years

Base-line for calculating the avoided emissions

Several small capacity (50 MW) geothermal turbine generators

Contact

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