

2018

Transport and Environment in Japan



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This document is a tentative translation by the Foundation for Promoting Personal Mobility and Ecological Transportation (Eco-Mo Foundation) of “Transport and Environment in Japan 2018”, published in March 2018 by the Eco-Mo Foundation under the editorial supervision of the Environmental Policy Division, Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT).

Initial translation was performed by a translation company, with necessary revisions made afterwards. Unique terminology and phrases which cannot be understood without knowledge of the societal background and conditions involved in the Japanese transport environment have been replaced with appropriate English expressions without being constrained by the original Japanese expressions. However, no additional explanations or additional text has been inserted, and, wherever possible, the tentative translation is faithful to the original text.

This document is published on the Eco-Mo Foundation website (<http://www.ecomo.or.jp/>) and available for download. We hope that it may serve of assistance with the implementation of transport environment measures in the reader’s own country.

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I. Developments Related to Environmental Issues in 2017

There were a great deal of developments in 2017, both inside Japan and overseas, related to environmental issues. Belows are some of the developments in global warming, automobiles and the environment.

■ Global warming related developments

With regard to the framework for 2020 and beyond, an ad hoc working group was established at COP17, which was held in Durban, South Africa in November and December, 2011, and consensus was reached regarding the formulation by 2015 of a new framework which would apply to all countries.

Each country had to formulate its own voluntary greenhouse gas reduction targets, etc. and submit them to the convention secretariat sufficiently in advance of COP21, held in late 2015. Japan decided on by the Global Warming Prevention Headquarters Japan's Intended Nationally Determined Contribution (greenhouse gas reduction targets, etc. for 2020 and beyond) in July 2015, and submitted it to the UNFCCC secretariat. Under this INDC, Japan's emissions reduction target was defined as a 26.0% reduction in 2030 compared to 2013 (25.4% reduction compared to 2005) (approximately 104.2 million tons of CO₂).

COP21 was held from November 30 to December 13, 2015, in Paris, France. At the conference the "Paris Agreement," a new legal framework for global warming countermeasures was adopted and went into effect on November 4, 2016.

Japan decided to become a signatory to the agreement on November 8, 2016, and presented instruments of acceptance to the Secretary-General of the United Nations on the same day.

On May 13, 2016, the Japanese cabinet approved the Global Warming Countermeasure Plan, aimed at comprehensively and systematically promoting global warming countermeasures.

The plan clarified the measures to be taken by individual entities and by the nation in order to reach the medium-term target of reducing emissions by 2030 by 26% compared to 2013 levels, laid out a roadmap for achieving these reduction targets, and stipulated a long-term target of reducing greenhouse gas emissions by 2050 by 80%.

It includes comprehensive transport sector measures such as automobile and road traffic flow measures, the promotion of public transport usage, and logistics efficiency improvements.

■ Automobile and the environment related developments

According to Japan Automobile Dealers Association and Japan Light Motor Vehicle and Motorcycle Association, light vehicles accounted for more than half of the top 10 vehicle models sold in 2017, and hybrid vehicles or electric vehicles are increasing.

II. Current Status of Major Environmental Problems of the Transport Sector

1 Current status of global environmental problems

Our globe is facing severe environmental problems, such as global warming and the destruction of the ozone layer. For the next generation to receive a planet in which they can live in security, our generation must rapidly implement countermeasures to these problems.

(1) Current status of global warming

The mechanism behind and impact of global warming

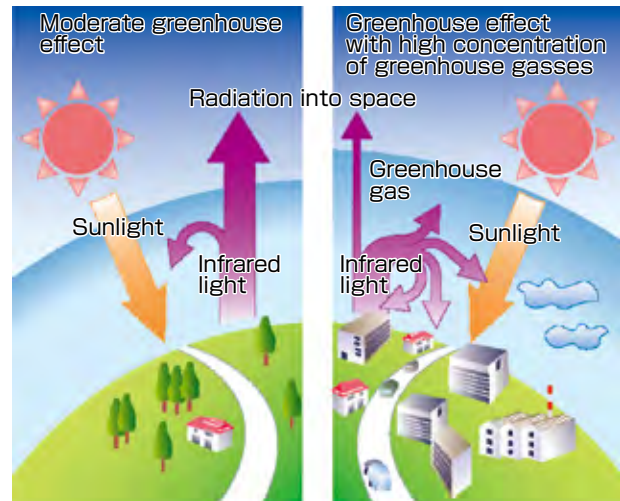
In order to produce energy, we burn fossil fuels such as petroleum, coal, and natural gas, generating gasses such as carbon dioxide (CO₂) and releasing them into the atmosphere.

Atmospheric gasses such as carbon dioxide absorb a great deal of the light from the sun, as well as infrared radiation released from the earth's surface. This results in a warming of the atmosphere. They act like the glass in a greenhouse, raising the earth's temperature. These gasses, which have kept temperatures in the range suited for life on earth, are called greenhouse gasses.

However, factors such as the rise of industry have increased the amount of daily activity, producing a rapid rise in the amount of greenhouse gasses emitted into the atmosphere. This has intensified the greenhouse effect, producing a commensurate increase in climate temperature. This is called global warming. The 5th assessment report of the Intergovernmental Panel on Climate Change (IPCC), published between 2013 and 2014, states that the average global temperature rose 0.85°C between 1880 and 2012, and that the temperatures of every decade of the past 30 years have been warmer than any of the preceding decades since 1850. Furthermore, it states that there is no doubt that the climate system is growing warmer, and that it is highly likely that the main cause of the warming which has occurred since the mid-20th century is human activity.

Without measures to prevent global warming to counter the global growth in fossil fuel consumption, the concentration of greenhouse gasses in the atmosphere will continue to rise, resulting in further global warming. The IPCC report says it is highly likely that the average global temperature at the end of the 21st century will have risen by 0.3 to 4.8°C, and that the average sea level will have risen by 0.26 to 0.82m. Risks resulting from the climate change include droughts, flooding, rainfall changes, food shortages, negative impacts on health, and reductions in biodiversity.

Mechanism of the greenhouse effect



● Forecast of increase in average global surface temperature

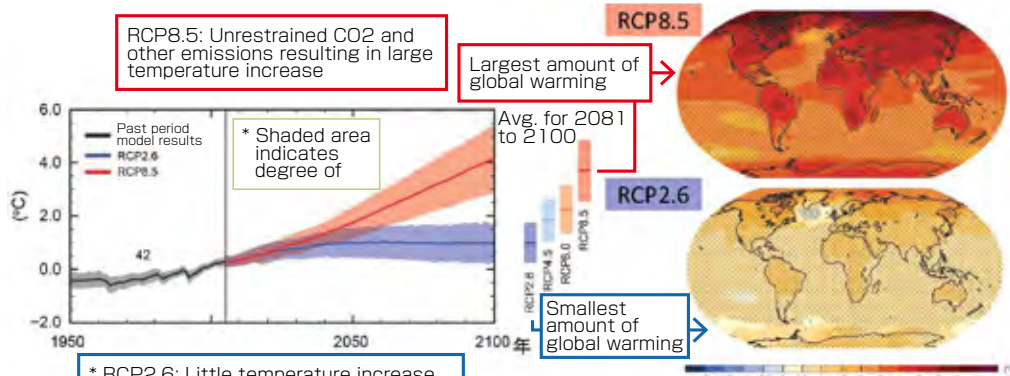


Fig. Change in average global ground temperature between 1986 and 2005 CMIP5 simulated timeline based on multiple models (1950 to 2100) Source: Figure: IPCC AR5 WG I SPM Fig. SPM.7(a)

Fig. Change in average annual ground temperature (Difference versus 1986 to 2005 average) 2081 to 2100 RCP2.6 and RCP8.5 scenario CMIP 5 multiple model average distribution diagram (IPCC AR5 WG I SPM Fig. SPM. P.20, lines 21 to 22) The north pole area will warm faster than the global average, and the average increase in temperature will be greater for land areas than sea areas. (IPCC AR5 WG I SPM Fig. SPM. P.20, lines 21 to 22)

Source: Ministry of Environment (MOE) "Overview of IPCC 5th assessment" (Tentative Translated by Eco-Mo Foundation)

■ Impact of individual greenhouse gasses on global warming

In addition to carbon dioxide, greenhouse gasses which cause global warming include methane, dinitrogen monoxide, and chlorofluorocarbon. According to the IPCC, the greenhouse effects per unit of volume of methane, dinitrogen monoxide, and chlorofluorocarbon, etc., are far stronger than those of carbon dioxide, but the amount of carbon dioxide being emitted is tremendous, so carbon dioxide emissions worldwide since the industrial revolution account for roughly 60% of all greenhouse gas contributions to global warming.

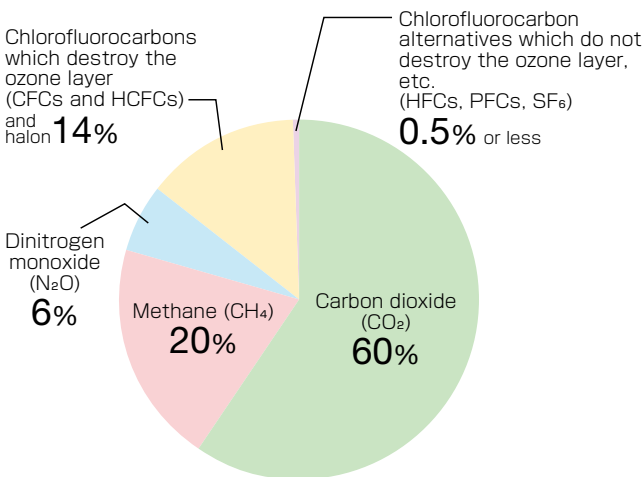
For Japan, in 2015 carbon dioxide accounted for 93% of all greenhouse gas contributions to global warming, an extremely high figure.

● Greenhouse gas and global warming potential (100 year period)(*1)

	Carbon dioxide	Methane	Dinitrogen monoxide	HFC(*2)	PFC(*3)	SF6
Global warming potential (100 year cumulative period)	1	25	298	1,430	9,300	22,800

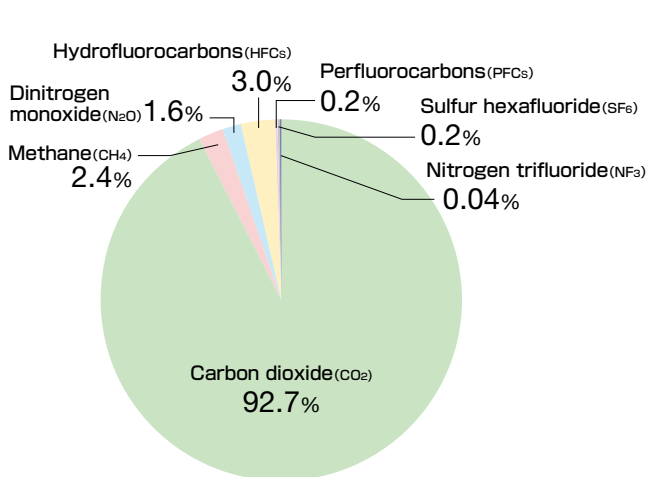
*1: Global warming potential Warming effect of greenhouse gasses over a 100 year period (using carbon dioxide as a baseline with a value of 1)
 *2: HFC Calculated for HFC-134a, a typical HFC used as a coolant
 *3: PFC Calculated for PFC-5-1-14, a typical PFC used in rectifiers
 Source: IPCC (2007)

● Contributions to global warming by greenhouse gasses emitted due to human activity since the industrial revolution



Source: IPCC 4th assessment report 1st working group materials (2007)

● Contributions to global warming by greenhouse gasses emitted by Japan(for 2015)



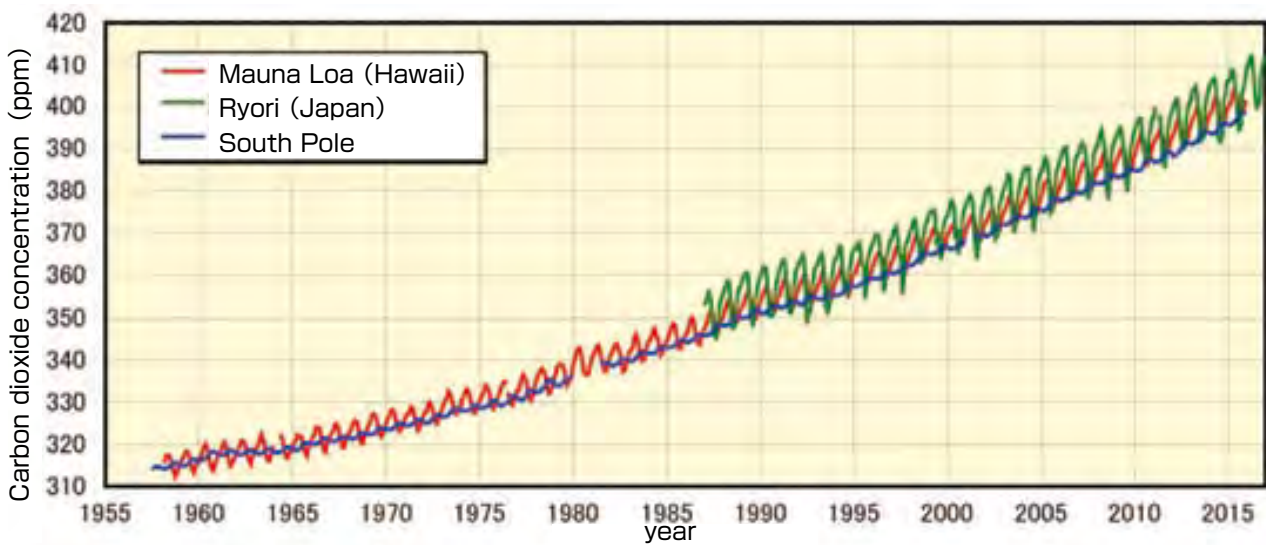
Source: GIO "Greenhouse Gas Inventory"

Trends in concentration of carbon dioxide in the atmosphere

The concentration of carbon dioxide in the atmosphere varies cyclically every year due to factors such as plant photosynthesis. The amount of change also depends on the location, due to differences in local vegetation, etc.

The concentration of carbon dioxide in the atmosphere remained roughly stable at 280ppm (ppm: parts per million) before the industrial revolution in the latter 18th century, but the rapid increase in manufacturing and production activities following the industrial revolution has been accompanied by an increase in the carbon dioxide concentration. According to World Data Centre for Green house Gases (WDCGG) the carbon dioxide concentration in 2015 was 400.0ppm, significantly higher than the concentration before the industrial revolution.

Change in carbon dioxide concentration at typical global observation points

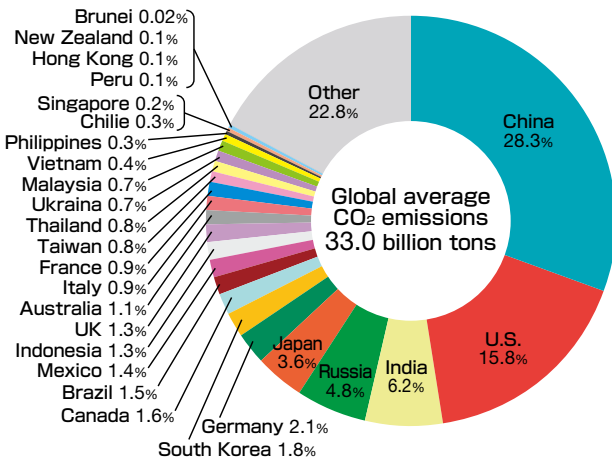


Source: Japan Meteorological Agency (JMA) "Climate Change Monitoring Report 2016" (Tentative Translated by Eco-Mo Foundation)

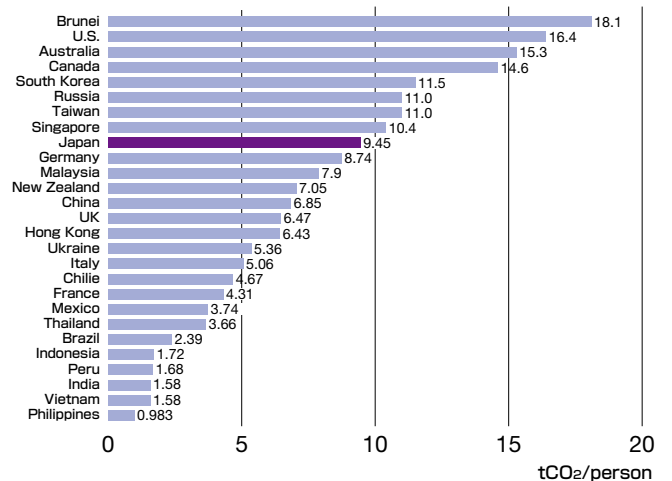
Carbon dioxide emission volume by country

In 2013, Carbon dioxide emission volume by country is as follows: China 28.3%, U.S. 15.8%, India 6.2%, Russia 4.8%, followed by Japan at 3.6%. In terms of per capita emissions by country, Japan is number 9.

Share of carbon dioxide emission volume by country (2014)



Per capita carbon dioxide emission volume by country (2014)



Source: EDMC "Handbook of Energy & Economic Statistics in Japan 2017"

(2) The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and Paris Agreement

■ UNFCCC

UNFCCC was formulated with the objective of stabilizing greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. It was adopted in May 1992, and after being signed by the heads of states at the June 1992 United Nations Conference on Environment and Development (held in Rio de Janeiro), it went into effect in March 1994. As of January 2017 the European Union (EU) and 196 countries, including Japan, are signatories.

■ The Kyoto Protocol

In December 1997 COP3 was held in Kyoto, and the Kyoto Protocol for achieving the convention's objectives was adopted. The Kyoto Protocol specifies the percentage by which average annual greenhouse gas emissions by developed countries are to be reduced compared to a reference year (in principle 1990) during the period from 2008 to 2012 (the first commitment period). Japan was to have reduced emissions by 6%, the U.S. by 7%, and the EU by 8%. No binding targets were set for developing countries. The November 2004 ratification by Russia satisfied the Kyoto Protocol's requirements for coming into force, and the treaty became effective on February 16, 2005. The U.S. did not ratify the Kyoto Protocol. The first commitment period of the Kyoto Protocol, which went into effect in 2008, ended in 2012. While official adoption will first require screening by the U.N, Japan met its greenhouse gas emissions reduction target.

■ Paris Agreement

With regard to the framework for 2020 and beyond, an ad hoc working group was established at COP17, which was held in Durban, South Africa in November and December, 2011, and consensus was reached regarding the formulation by 2015 of a new framework which would apply to all countries.

Each country had to formulate its own voluntary greenhouse gas reduction targets, etc. and submit them to the convention secretariat sufficiently in advance of COP21, held in late 2015. Japan decided on by the Global Warming Prevention Headquarters Japan's INDC (greenhouse gas reduction targets, etc. for 2020 and beyond) in July 2015, and submitted it to the UNFCCC secretariat. Under this INDC, Japan's emissions reduction target was defined as a 26.0% reduction in 2030 compared to 2013 (25.4% reduction compared to 2005) (approximately 104.2 million tons of CO₂).

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The results of the November 2017 COP23 are shown below.

The 23rd session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 23)

The 13th session of the Conference of the Parties Serving as the Meeting of the Parties to the Kyoto Protocol (CMP13)

The 2nd part of the 1st session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA1-2)

November 20, 2017

The 23rd session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 23), the 13th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP13) and the 2nd part of the 1st session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA1-2) took place from November 6 to 17 in Bonn, Germany, chaired by Fiji. Mr. Masaharu Nakagawa, Minister of the Environment, and officials from relevant Ministries participated in the conference. They include the Ministry of Foreign Affairs, the Ministry of Economy, Trade and Industry, the Ministry of the Environment, the Ministry of Finance, the Ministry of Education, Culture, Sports, Science and Technology, Ministry of Agriculture, Forestry and Fisheries and the Ministry of Land, Infrastructure, Transport and Tourism.

1. Overview of the conference

(1) The relevant implementation guidelines of the Paris Agreement

Japan put forward technical proposals on the relevant implementation guidelines of the Paris Agreement (hereinafter referred to as "the guidelines") including on nationally determined contributions (NDCs), transparency framework and market mechanisms. Some developing countries argued that implementation of the Paris Agreement should be differentiated between developed and developing countries and pushed for broadening the scope of the guidelines. Developed countries opposed to these arguments, and Japan emphasized that the guidelines should promote all countries' efforts on climate change and should not be bifurcated.

The outlines/elements of the guidelines were developed at this conference in order to accelerate the technical work towards adoption of the guidelines in 2018. The contents of each outline/element varied depending on the maturity of work under each agenda.

(2) Talanoa Dialogue

The consultations on the design of Facilitative Dialogue in 2018 (hereinafter "Talanoa Dialogue" [note]) were convened by Fiji, the COP Presidency. Japan supported Fiji's effort and contributed to the completion of its design at the COP23, aiming to design it as a forward-looking opportunity for communication or update of NDCs by 2020.

[note]

In Talanoa Dialogue, stocktaking of the collective progress on mitigation effort of Parties will be convened. "Talanoa" is a traditional approach used in Fiji and the Pacific to engage in an inclusive, participatory and transparent dialogue, which will be used for Facilitative Dialogue in 2018 by the COP Presidency's proposal.

(3) Accelerating Global Climate Actions

Minister Nakagawa met with his counterparts including Canada, China, Fiji (COP23 Presidency), the United States and EU and stressed the needs to come together and send a strong message to the international society for combatting global warming.

Throughout the COP23, the Government of Japan set up Japan Pavilion, where it held some events to introduce and discuss the efforts on climate change taken by the Government and various institutions, organizations and researchers. The Japan Pavilion showcased Japan's contributions to climate change measures such as "Japan's Assistance Initiatives to address Climate Change Responding to Needs of the Developing Countries 2017" released on October 30th and the Roadmaps on innovative technologies released from Innovation for Cool Earth Forum (ICEF).

(4) Speech by Minister Nakagawa at the high-level segment

Minister Nakagawa stated that Japan would contribute to progress of the negotiation at the COP23 towards adoption of the relative guidelines of the Paris Agreement at the COP24 and support Fiji's effort in designing of Talanoa Dialogue. He also introduced the Japan's domestic and international actions as well as the assistance for the non-state actors' actions, and expressed intention to invite the 49th plenary session of the IPCC to Japan. Furthermore, Minister Nakagawa referred to the establishment of "Partnership to Strengthen Transparency for Co-Innovation" to enhance transparency of various actors' efforts addressing climate change and the provision of \$500 million to the Capacity-Building Initiative for Transparency (CBIT) as part of the initiative, and promotion of climate actions by the launch of GHG Observing Satellite "IBUKI-2" (GOSAT-2).

(5) Climate Finance

Countries reaffirmed the continued progress of developed country Parties towards reaching the goal of jointly mobilizing USD 100 billion annually by 2020. Regarding the Adaptation Fund, the discussion took place towards the decision on the Adaptation Fund serving the Paris Agreement, subject to and consistent with decisions to be taken at CMA1-3 (December 2018). It was decided that the identification of the information to be provided by Parties in accordance with Article 9, paragraph 5, of the Paris Agreement would be taken over by the SBI (Subsidiary Body for Implementation) from 2018.

(6) Market mechanisms

Japan held "the 5th JCM Partner Countries' Meeting" where representatives of 17 partner countries of the Joint Crediting Mechanism (JCM) gathered to welcome the progress of the JCM and share the view to support further formulation and implementation of JCM projects. Furthermore, Japan held a side event on "Ministerial Declaration on Carbon Markets" at the Japan Pavilion. Among the signatories of the declaration, Honorable Aupito William Sio, Minister for Pacific Peoples from New Zealand and Honorable Stéphane Dion, Ambassador and former Minister of Foreign Affairs from Canada participated in the event. Honorable Masagos Zulkifli, Minister for the Environment and Water Resources from Singapore also attended and expressed to join the declaration.

(7) Others

At the beginning of the conference, some developing countries proposed to address pre-2020 implementation and ambition. Japan promoted its steady implementation including actions towards achieving its GHG reduction target in 2020 and support to developing countries, and emphasized that advancing the practical actions is important. The decision on this matter includes convening stocktakes of all Parties' pre-2020 implementation and ambition in 2018 (COP24) and 2019 (COP25).

The COP/CMP decisions related to the following issues were also adopted: the Warsaw International Mechanism on loss and damage, gender and climate change, the local communities and indigenous peoples platform, and programme budget for the biennium 2018-2019. The decision towards the concrete work on agriculture was first adopted, taking into consideration the safeguarding food security.

(8) Others

The COP 24 will be convened in December 2018 in Katowice, Poland.

2. Assessment

Japan participated in the COP23 with three main objectives: (i) furthering discussions on the guidelines of the Paris Agreement, (ii) completion of the design of Talanoa Dialogue and (iii) promoting Japan's contribution on climate change. The three objectives were largely achieved in various aspects of the outcomes of the conference. Japan supported Fiji, the COP23 Presidency, on both negotiation and promotion of global climate actions.

It should be noted, however, that some developing countries pushed for reopening the Paris Agreement. They maintained their pre-Paris positions that only developed countries were required to take actions, taking advantage of the ambiguous interpretations of the Paris Agreement, and also argued to treat all agenda equally on the time allocation and the format of outcome of the session. Since there are clear differences between views of developed and developing countries, the challenge will remain in finding a way to develop the guidelines constructively while maintaining the mandate of the Paris Agreement.

(3) Current status of global warming issues in Japan

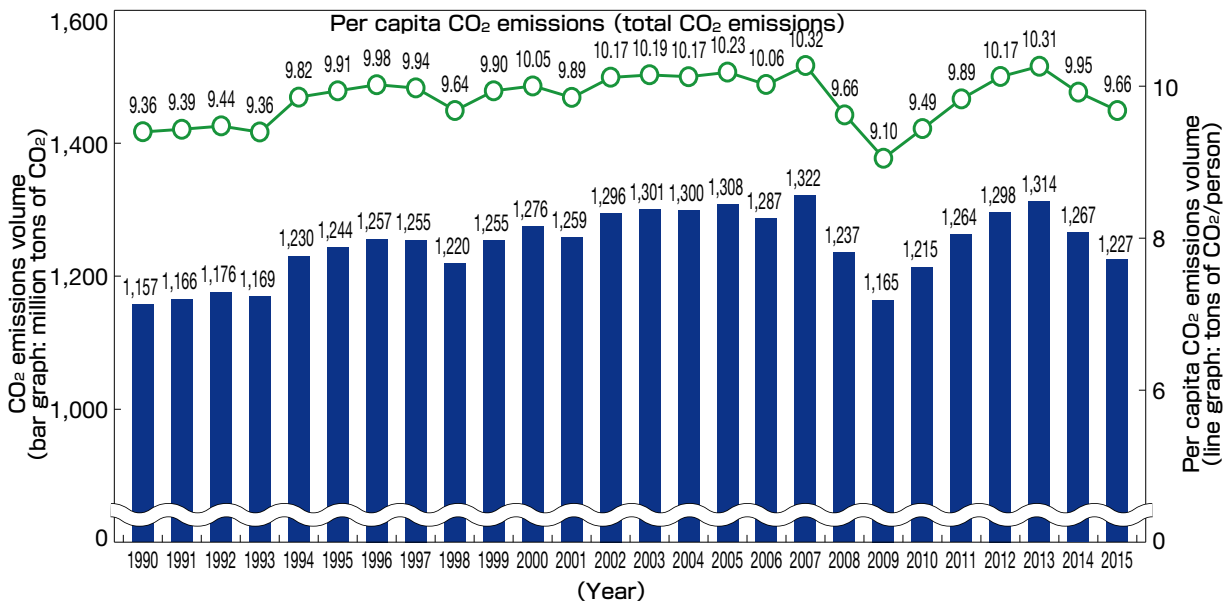
① Current status of carbon dioxide emissions in Japan

Japan is the world's 5th largest producer of carbon dioxide emissions, so it plays an extremely important role in solving the problem of global warming.

■ Trends in carbon dioxide emissions in Japan

In 2015 Japan emitted approximately 1,227 million tons of carbon dioxide, roughly 6.0% more than it did in 1990. The per capita emissions volume in 2015 was approximately 9.66 tons.

● Trends in carbon dioxide emissions in Japan

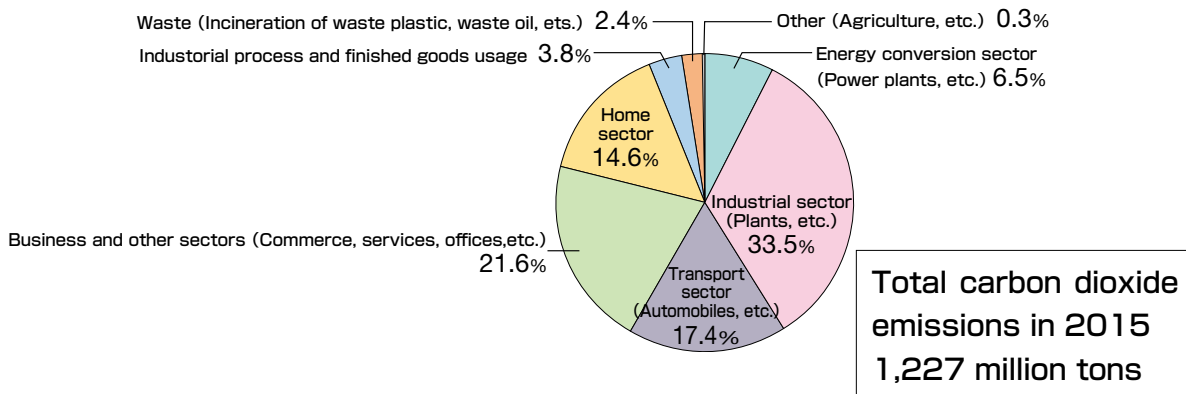


Source: GIO "Greenhouse Gas Inventory"

■ Ratio of carbon dioxide emissions in Japan by sector

The industrial sector accounts for 33.5% of Japan's carbon dioxide emissions, the transport sector for 17.4%, business and other sectors account for 21.6%, and the home sector accounts for 14.6%.

● Amount of carbon dioxide emissions in Japan (by sector) 2015



Source: GIO "Greenhouse Gas Inventory"

② Energy consumption in Japan

The rapid increase in fossil fuel consumption since the industrial revolution is considered to be one of the main causes of global warming. Global warming is inextricably linked to energy consumption.

■ Final energy consumption in Japan

Japan's energy consumption grew faster than its GDP during the period of rapid economic growth which lasted into the 1970s. However, the two times oil crises in the 1970s led to increased efforts to reduce energy consumption by the manufacturing sector, and the development of energy saving products. These efforts made it possible to restrain energy consumption while still achieving economic growth. Throughout the 1990s crude oil prices remained at a low level but energy consumption of the home sector and the business sector increase. The price of crude oil began rising again in the 2000s, and energy consumption peak has been falling since peaking in 2004. In 2010 the economic recovery, together with temperature conditions, produced a major increase in final energy consumption. In 2011 the focus on energy conservation following the Great East Japan Earthquake brought about another decline in final energy consumption. In 2015, the real GDP increased by 1.3% to 2014, however, due to the cool summer and warm winter in the previous year as well progress in energy conservation, the final energy consumption decreased by 1.4%.

Looking at energy consumption trends from 1973 to 2015, energy consumption for the company and business sector grew 1.0-fold (0.8-fold for the industrial sector and 2.4-fold for the business and other sectors), and 1.9-fold for the home sector, 1.7-fold for the transport sector. Since the oil crises, the company and business sector, while experiencing economic growth led primarily by manufacturing, has seen minimal increase in energy consumption thanks to the implementation of energy saving measures. On the other hand, the home sector and the transport sector has seen greatly increase in energy consumption because of the spread of energy equipment and automobile. As a result, while the company and business establishment, the home, and transport sectors accounted, respectively, for 74.7%, 8.9%, and 16.4% of total energy consumption in 1973, in 2015 these ratios had changed to 63.5%, 13.8%, and 22.7% respectively.

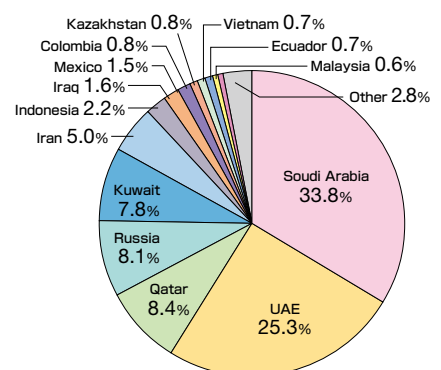
■ Dependence on petroleum for energy consumed in Japan

Japan's supply of petroleum as a primary energy source fell as the result of petroleum replacement policies and energy saving measures implemented in response to the oil crises, but began rising from the late 1980s due to falling crude oil prices. From the mid-1990s onwards the development of alternative energy sources, etc. caused petroleum use to decline.

In 2015 Japan supplied 0.3% of the crude self-sufficiency ratio. Japan's major oil fields are located in Niigata Prefecture, Akita Prefecture, and Hokkaido. Because of this low level of self-sufficiency, in 2015 Japan relied on foreign imports for 99.7% of its crude oil, with over 80% coming from the Middle East. Japan is far more dependent on the Middle East for its oil than other countries — in 2015 the U.S. depended on the Middle East for 20.2% of its crude oil, and European OECD countries depended on the Middle East for 18.9% of their crude oil. In 2015 Saudi Arabia was Japan's largest supplier of crude oil, supplying 33.8%, followed by the UAE (25.3%), Qatar (8.4%), and Russia (8.1%).

(Source: METI "Energy White Paper 2017" (Tentative Translated by Eco-Mo Foundation))

● Crude oil imports by supplying country (2015)



Source: METI "Yearbook of Mineral Resources and Petroleum Products Statistics" (Tentative Translated by Eco-Mo Foundation)

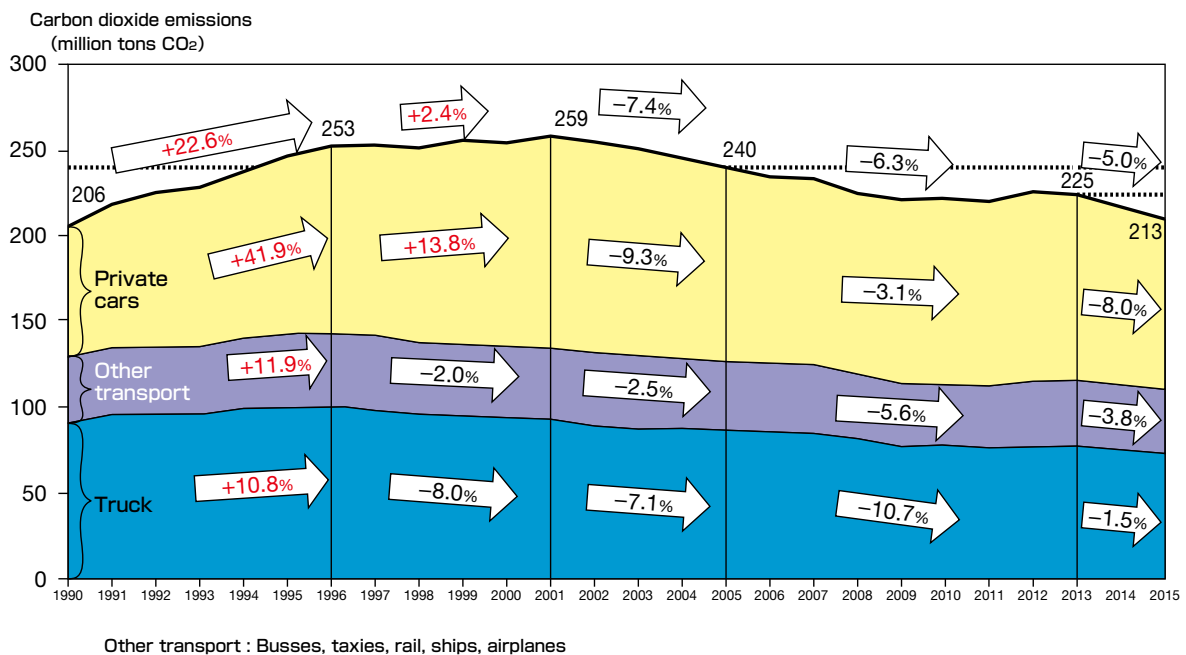
(4) Current status of global warming issues in the transport sector

① Current status of carbon dioxide emissions by the transport sector

■ Trends in carbon dioxide emissions by the transport sector

From 1990 to 1996 the amount of carbon dioxide emitted by the transport sector rose by 22.6%, but the rise in emissions then slowed, and began falling from 2001 onwards. In 2015 the amount of carbon dioxide emissions was approximately 213 million tons, 3.4% more than in 1990.

● Trends in carbon dioxide emissions by the transport sector



Source: MLIT website (Tentative Translated by Eco-Mo Foundation)

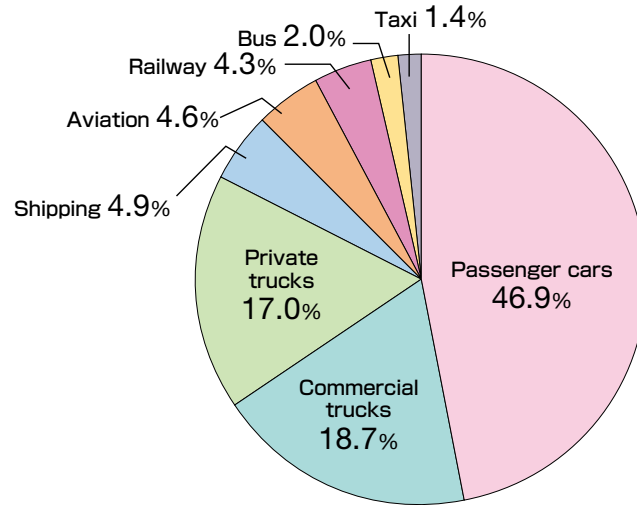
Carbon dioxide emissions from automobiles accounts for 86.1% of total carbon dioxide emissions produced by the transport sector. 46.9% of these carbon dioxide emissions are produced by private cars.

■ Carbon dioxide emission rates by the transport sector

Comparing passenger transport carbon dioxide emission rates (the amount of carbon dioxide emitted in transporting a person for 1km), private cars emit 7.0 times more carbon dioxide than rail transport. Therefore in order to reduce carbon dioxide emissions, the use of public transport, which has smaller carbon dioxide emission rates than private vehicles, need to be promoted.

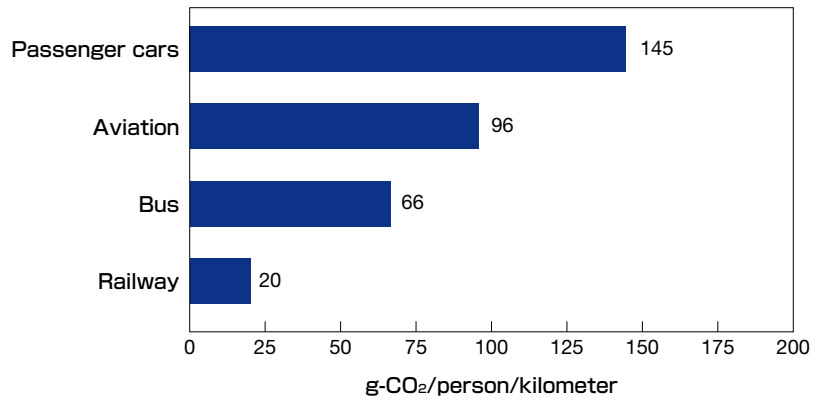
For freight transport carbon dioxide emission rates (the amount of carbon dioxide emitted in transporting one ton of freight for 1km), private trucks emit 52 times more carbon dioxide than trains, 31 times more than ships, and 5 times more than commercial truck. There need to be a modal shift, moving to efficient use of commercial truck, ships, and trains, improving distribution efficiency.

● Amount of carbon dioxide emissions from the transport sector (by means of transport) 2015

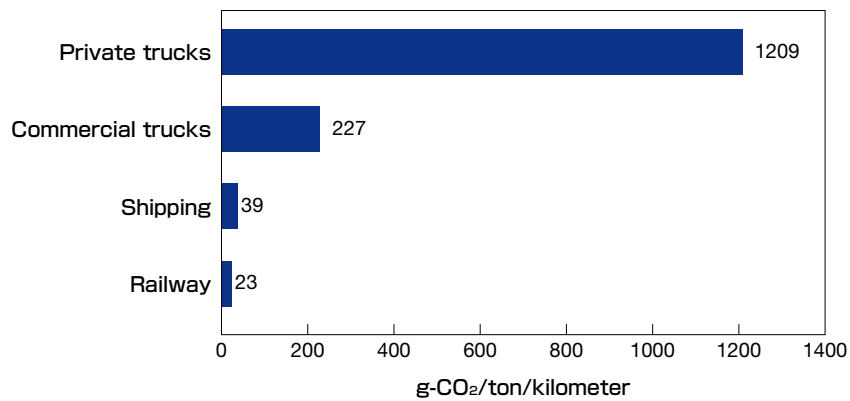


Source: MLIT website (Tentative Translated by Eco-Mo Foundation)

● Carbon dioxide emission rates by passenger transport mode (2015)

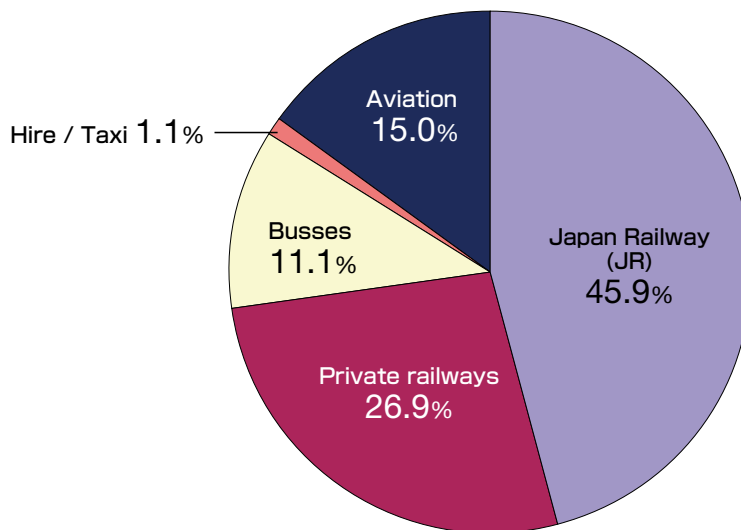


● Carbon dioxide emission rates by freight transport mode (2015)



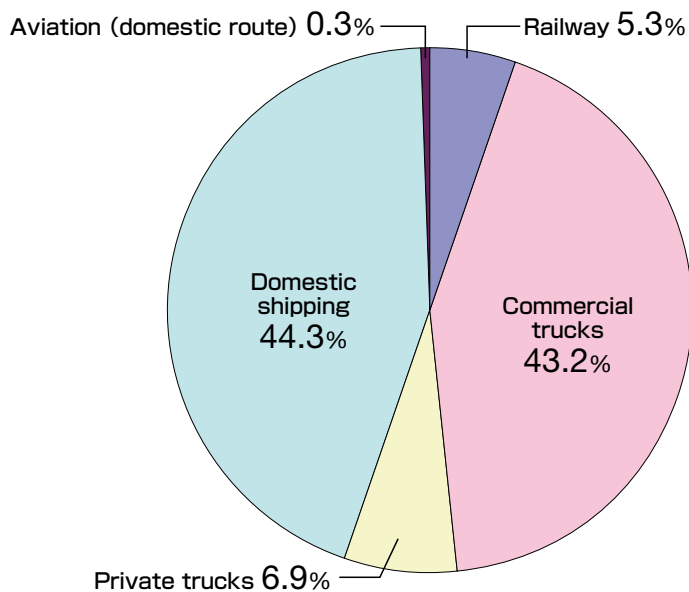
Source: MLIT website (Tentative Translated by Eco-Mo Foundation)

● Modal shares of domestic passenger transport (per person per kilometer), 2015



*1 The air transport volume percentage is the total of both regular and irregular service.
*2 The hire/taxi percentage includes both light motor and truck.

● Modal shares of domestic freight transport (per ton per kilometer), 2015



*1 The air transport percentage is the total of both regular and irregular service, and includes excess luggage and postal mail.
*2 The total of subtotals for individual transport modes and the total for transport modes may not be identical due to rounding.

Source: MLIT "White Paper on Land, Infrastructure, Transport and Tourism in Japan 2016" (Tentative Translated by Eco-Mo Foundation)

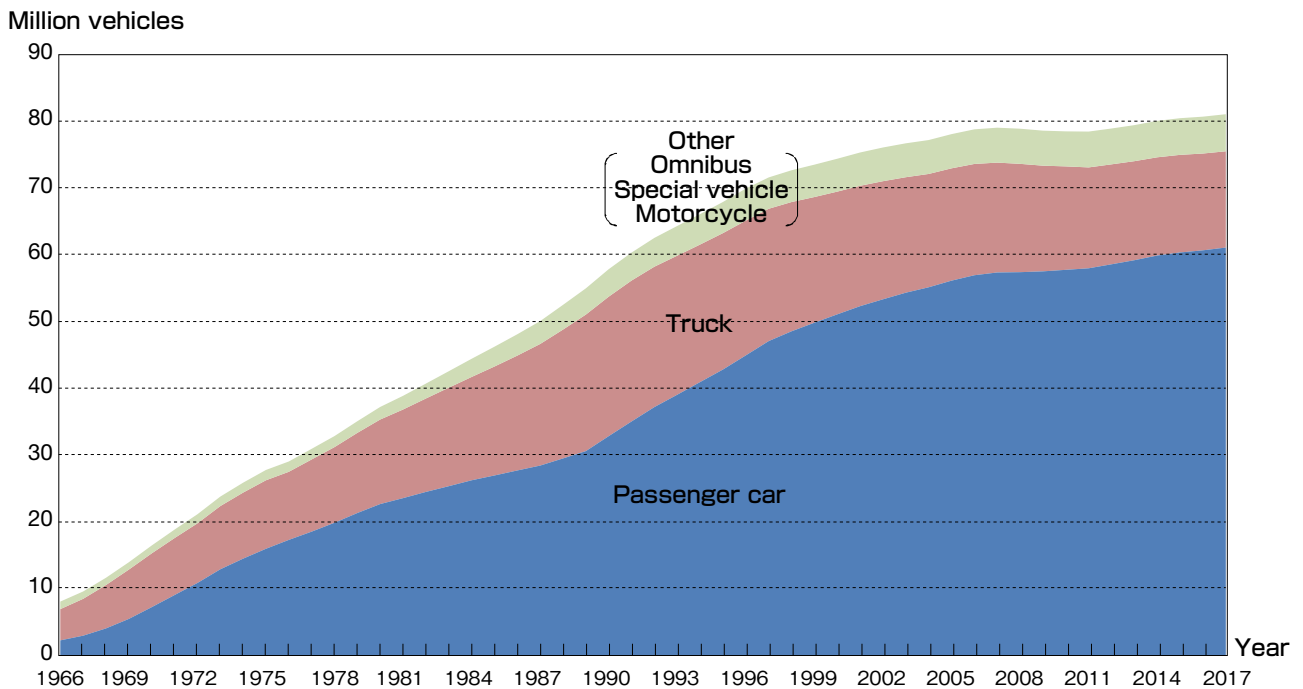
② Energy consumption by the transport sector

Within the transport sector, automobiles account for the largest amount of energy consumption, roughly 87% of the sector's total energy consumption. The majority of this is energy consumption is by cars and trucks. In terms of consumption by oil type, gasoline and diesel oil account for 87% of the transport sector total.

Over the past few years automobile fuel efficiency improvements and increased shift from in-house or private operation to commercial truck operation has brought about a reduction in carbon dioxide emissions by the transport sector. Emissions in 2015 were 213 million tons.

Efforts must continue to be made to achieve further reductions in the amount of energy consumed by automobiles.

● Automobile ownership trends



1: Passenger vehicles include mini-vehicles.

2: Number of vehicles as of the end of March of each year.

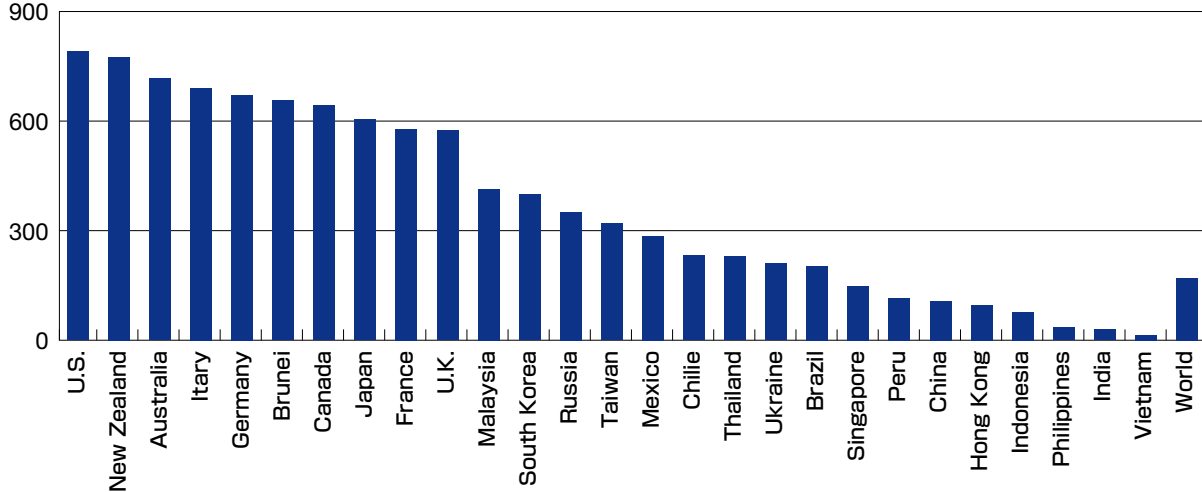
Source: Automobile Inspection & Registration Information Association website (Tentative Translated by Eco-Mo Foundation)

Automobile ownership rates around the World

In terms of automobile ownership per thousand people, the U.S. has the world's highest automobiles ownership rate, at 790 automobiles per thousand people. Automobile ownership rates are low for developing countries. In recent years developing countries such as China and India have experienced dramatic upswells in automobile ownership led by their rapid economic growth. The number of cars owned per thousand people grew by 3.0% globally in 2014, but in China it grew by 14.7%, and in India by 15.7%. Automobiles ownership in these countries, with their enormous populations, is predicted to have some impact on global warming, and is an area where attention is being increasingly focused.

● Automobile ownership rates in individual countries 2014

(automobiles ownership per 1,000 persons)



Source: EDMC "Handbook of Energy & Economic Statistics in Japan 2017"

2 Current status of automobile gas emissions

Road traffic related environmental problems involving the transport sector include atmospheric pollution produced by suspended particulate matter (SPM) and nitrogen oxides (NO_x) such as nitrogen dioxide (NO₂) emitted from automobiles. NO_x is not only a cause of acid rain and photochemical smog, but also has negative health effects (on respiratory organs). SPM is also said to harm respiratory organs by adhering to the lungs and bronchi.

In recent years all air pollution monitoring stations have met 2015 air quality standards achievement rates for NO₂, with 100% achievement rates for ten consecutive years since 2006. Automobile exhaust gas monitoring stations have seen a slight decline in target achievement, at 99.8% compared to 2014. For automobile exhaust gas monitoring stations in areas implementing Automobile NO_x/PM Act measures the achievement rate was 99.5%.

For SPMs, nationwide air quality standards achievement rates were 99.6% for air pollution monitoring stations and 99.7% for automobile exhaust gas monitoring stations. These have remained almost the same level, for both types of stations, in comparison to 2014 (air pollution monitoring station: 99.7%, automobile exhaust gas monitoring station: 100%). SPM 2015 air quality standards achievement rates for areas implementing Automobile NO_x/PM Act measures were 100% for both air pollution monitoring stations and 99.5% for automobile exhaust gas monitoring stations, have remained almost the same level.

※ 1 Air pollution monitoring station:

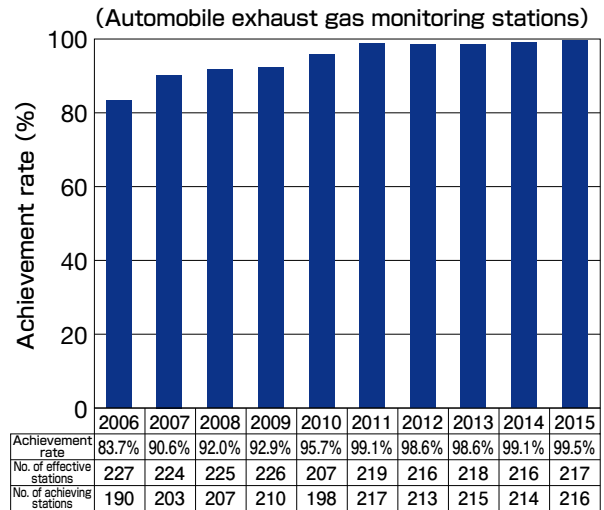
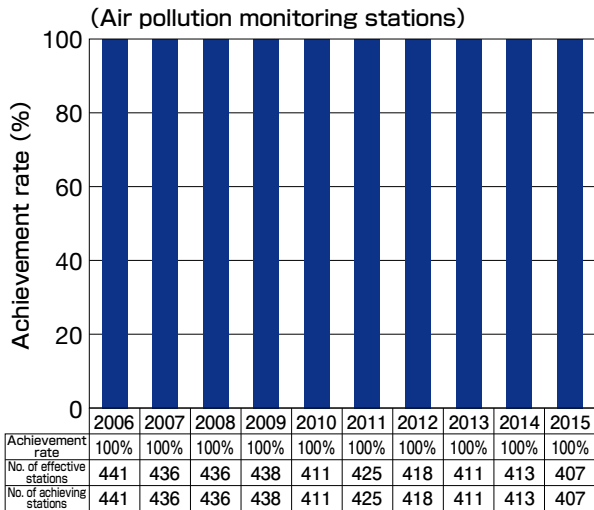
Monitoring stations performing regular monitoring of general atmospheric pollution conditions.
(Nationwide: 1,471 stations)

※ 2 Automobile exhaust gas monitoring station:

Monitoring stations performing regular monitoring of atmospheric pollution conditions near intersections, roads, and road edges in which emissions from automobiles are believed to be sources of air pollution.
(Nationwide: 413 stations)

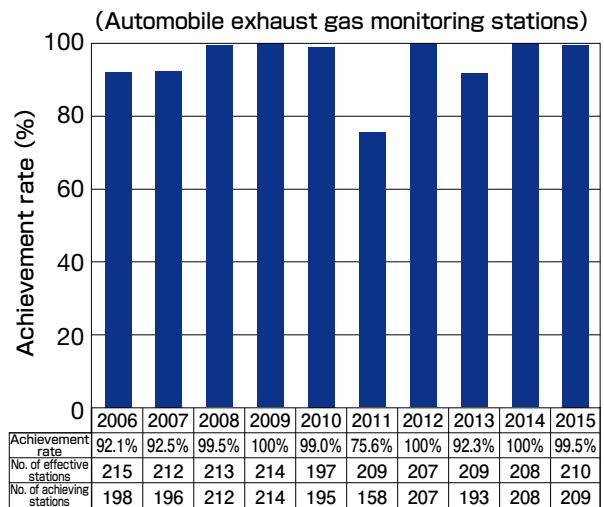
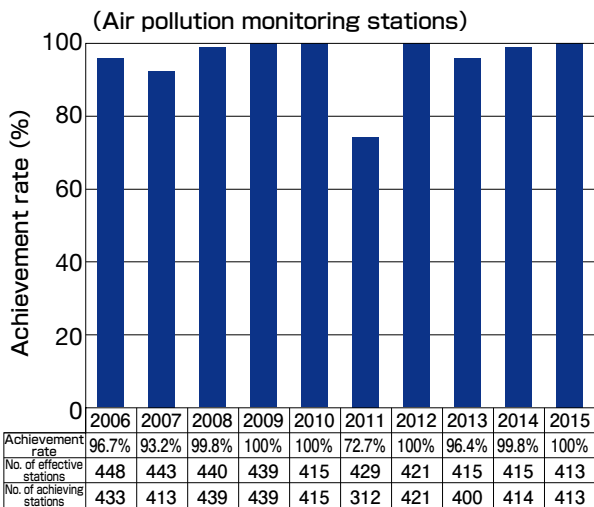
II. Current Status of Major Environmental Problems of the Transport Sector

- NO₂ air quality standards achievement rates in regions implementing Automobile NO_x/PM Act measures (2006 to 2015)



Source: MOE website (Tentative Translated by Eco-Mo Foundation)

- SPM air quality standards achievement rates in regions implementing Automobile NO_x/PM Act measures (2006 to 2015)



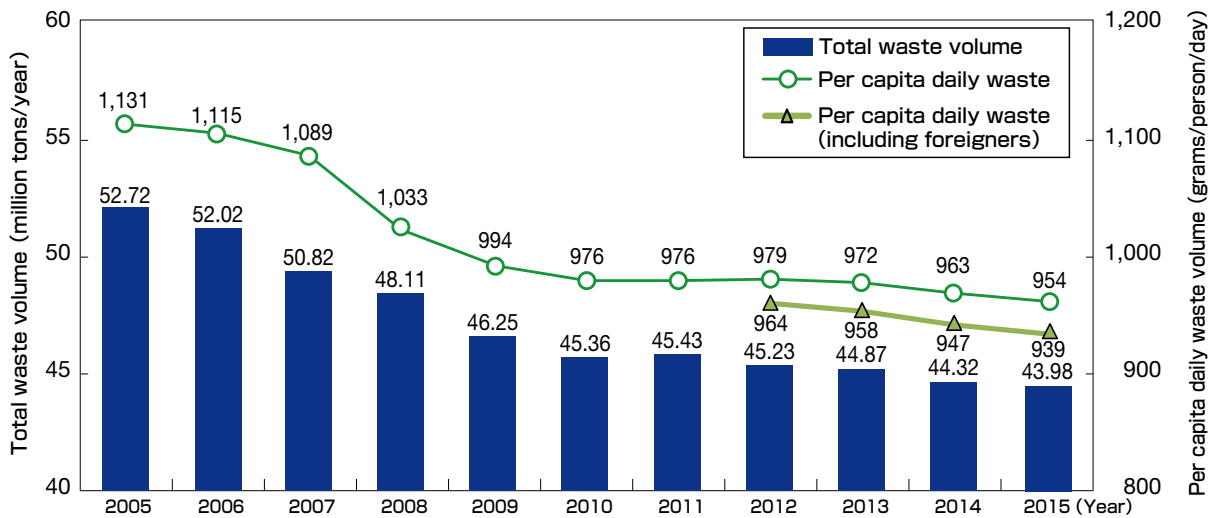
Source: MOE website (Tentative Translated by Eco-Mo Foundation)

3 Current status of waste and recycling

① Trends in general waste volume

Total waste volume and per capita daily waste volume fell slightly after the second oil crisis in 1979, but began rising rapidly from roughly 1985. From 1990 they leveled off or increased slightly, but began falling from 2001. In 2015 the total amount of waste was 43.98 million tons. The total amount of recycled waste in 2015 was 9.00 million tons. The ratio of total waste which was recycled has grown tremendously, from 5.3% in 1990 to 20.4% in 2015.

● Total waste volume and per capita daily waste volume

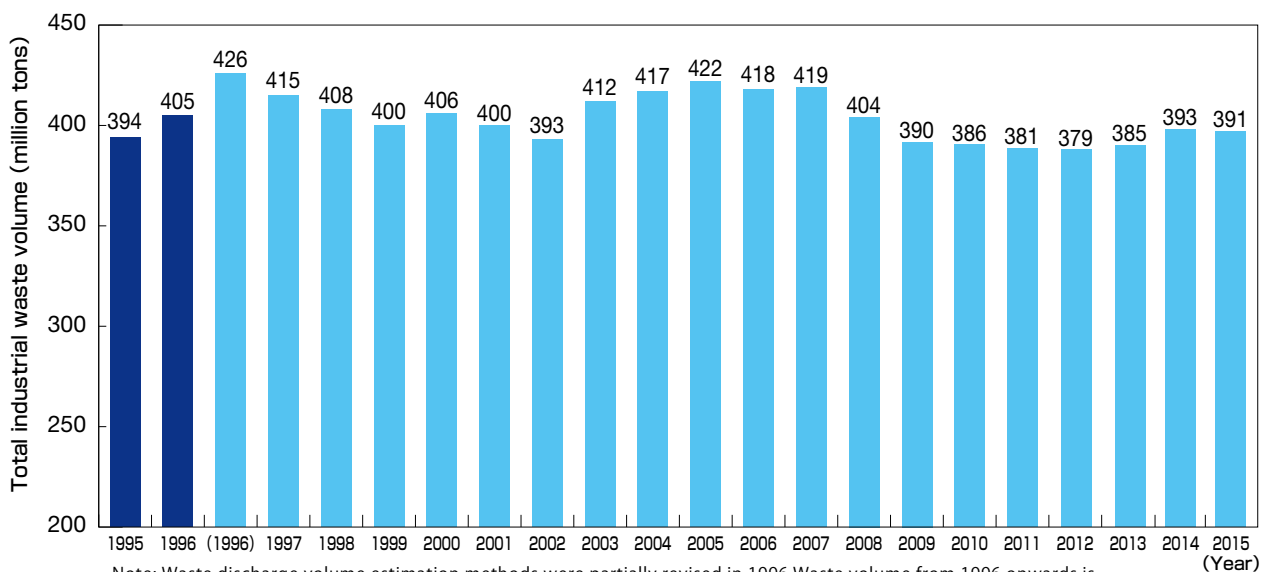


Source: MOE website (Tentative Translated by Eco-Mo Foundation)

② Trends in industrial waste volume

The amount of industrial waste produced has stayed roughly at the same level since the 1990s at approximately 400 million tons.

● Industrial waste volume



Note: Waste discharge volume estimation methods were partially revised in 1996. Waste volume from 1996 onwards is calculated based on the same conditions as the waste reduction target volume (established in September 28 2009).
 *:Government set value based on The Dioxin Countermeasures Basic Policy (Ministerial Meeting on Dioxin Policy decision).

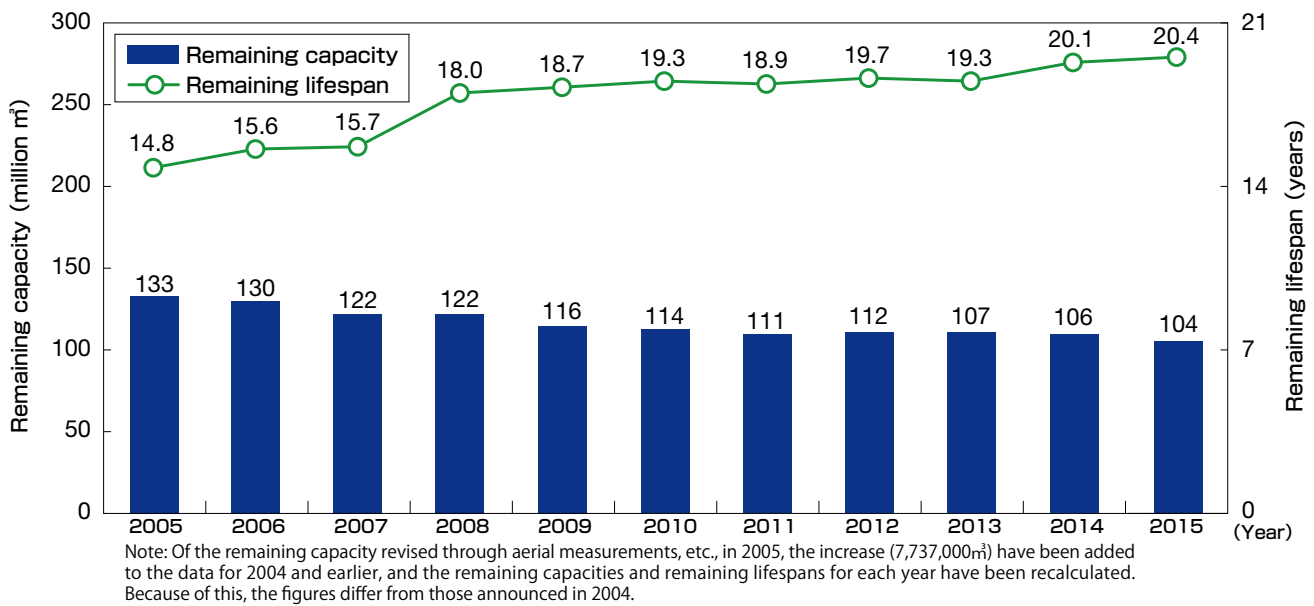
Source: MOE website (Tentative Translated by Eco-Mo Foundation)

③ Remaining lifespans and remaining capacities of general and industrial waste final disposal sites

As of the end of 2015 there were 1,677 general waste final disposal sites in Japan with a remaining capacity of 104.04 million m³. The average remaining lifespan was 20.4 years. The remaining capacity is shrinking, and the remaining lifespan is decreasing.

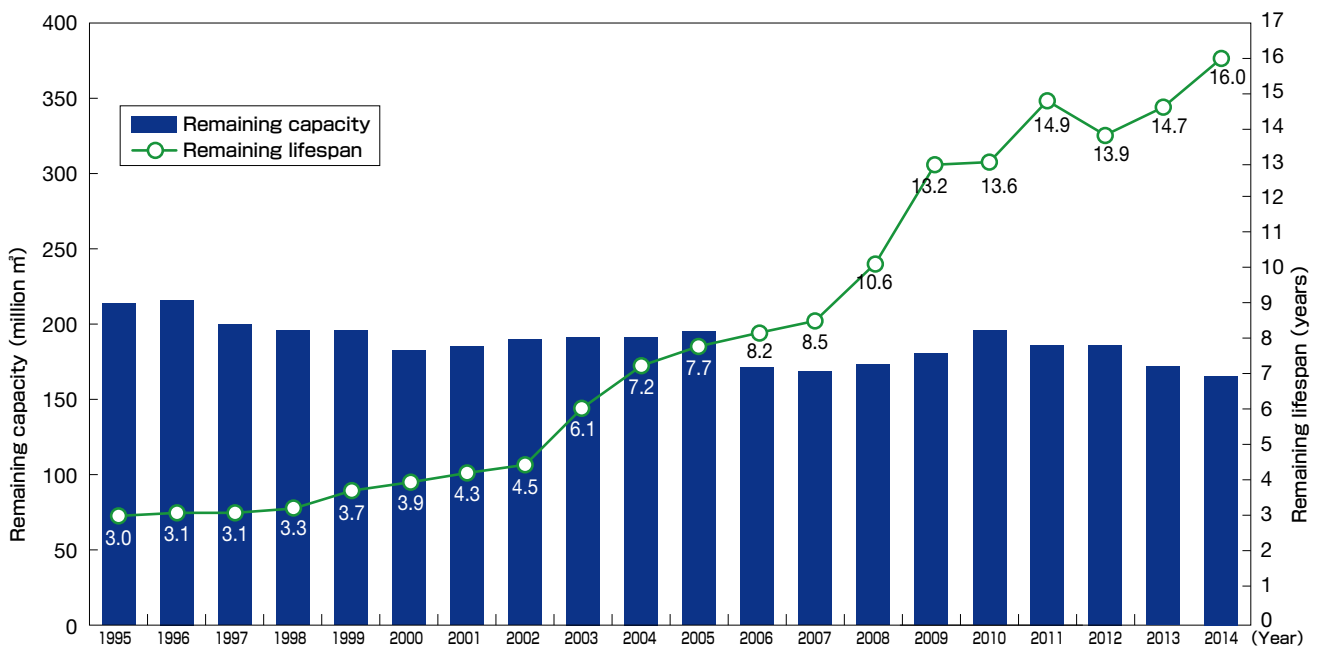
The remaining capacity of industrial waste final disposal sites as of the end of 2014 was 166.04 million m³, 5.76 million m³ less than the previous year. The average nationwide remaining lifespan is 16.0 years. Slight improvements are being made, but the remaining lifespan in the Tokyo area is 5.4 years, and remaining capacities are particularly low for major metropolitan areas.

● Remaining lifespans and remaining capacities of final disposal sites (general waste)



Source: MOE website (Tentative Translated by Eco-Mo Foundation)

● Remaining lifespans and remaining capacities of final disposal sites (industrial waste)

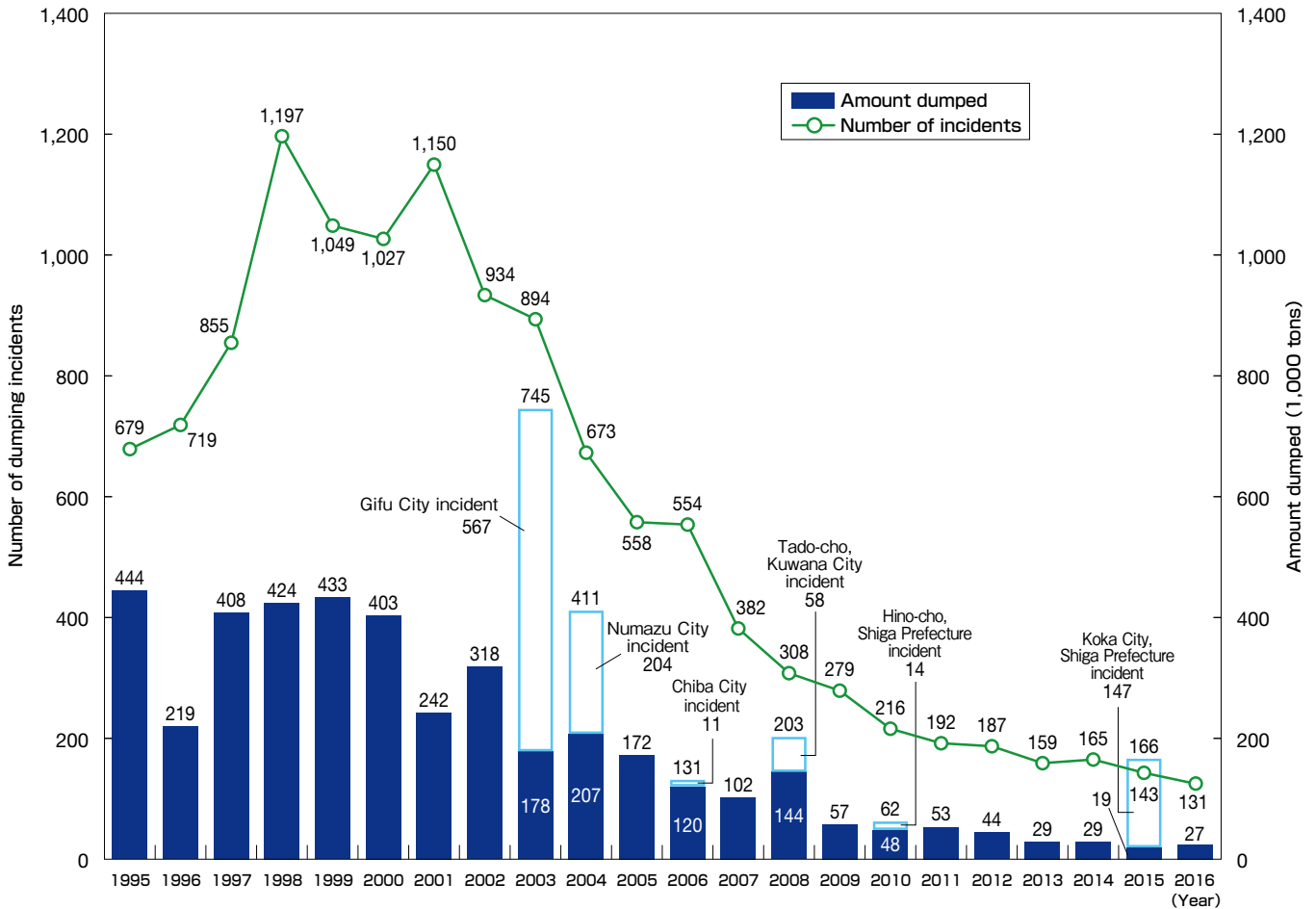


Source: MOE website (Tentative Translated by Eco-Mo Foundation)

④ Trends in number of incidents of illegal dumping, etc., and amount dumped

131 incidents of illegal dumping of industrial waste, a total of 27,000 tons of waste, were discovered in 2016, along with 132 incidents of improper disposal (75,000 tons). Newly discovered cases of illegal dumping decreased considerably and steady results are being observed. Regarding improper disposal, new incidents were discovered in 2016; thus, elimination thereof has not yet been achieved.

● Number of incidents of illegal dumping of industrial waste and amount dumped



Note)

- The number of incidents of illegal dumping and the amount of illegally dumped waste were calculated based on incidents of illegal dumping of 10t or more of industrial waste per incident identified by the governments of prefectures and designated cities (as well as all incidents of illegal dumping of special controlled industrial waste).
- With regards to the white areas of the bar graph, the incidents discovered in Gifu City in 2003 and in Numazu City in 2004 took place over multiple preceding years, resulting in the discoveries of major volumes of illegally dumped waste in the respective years. The white area of the bar graph corresponding to the 2006 Chiba City incident indicates an incident which was discovered in 1998 but was reported in 2006. The white area of the bar graph corresponding to the 2008 Tado-cho, Kuwana City incident indicates an incident which was discovered in 2006 but was reported in 2008. The white area of the bar graph corresponding to the 2010 Hino-cho, Shiga Prefecture incident indicates an incident which was discovered in 2009 but was reported in 2010.
- As for 2015, incidents of Koka city, shiga Prefecture and Ube City, Yamaguchi Prefecture, and Kuji City, Iwate Prefecture are reported as major incident.
- The sulfate aid pitch were not included in this study and are covered separately.
- Ferrosilt dumping incidents were not included in this study. 720,000 tons of Ferrosilt were sold and used as backfilling material since August 2001, but it was later discovered that the manufacturer and seller of Ferrosilt had mixed in toxic waste liquid making this an illegal industrial waste dumping incident. Illegal dumping was confirmed in 45 locations in 4 prefectures, and Ferrosilt removal has been completed in all of these locations (as of March 27, 2015).

* Amounts are rounded, so totals may not match.

Source: MOE website (Tentative Translated by Eco-Mo Foundation)

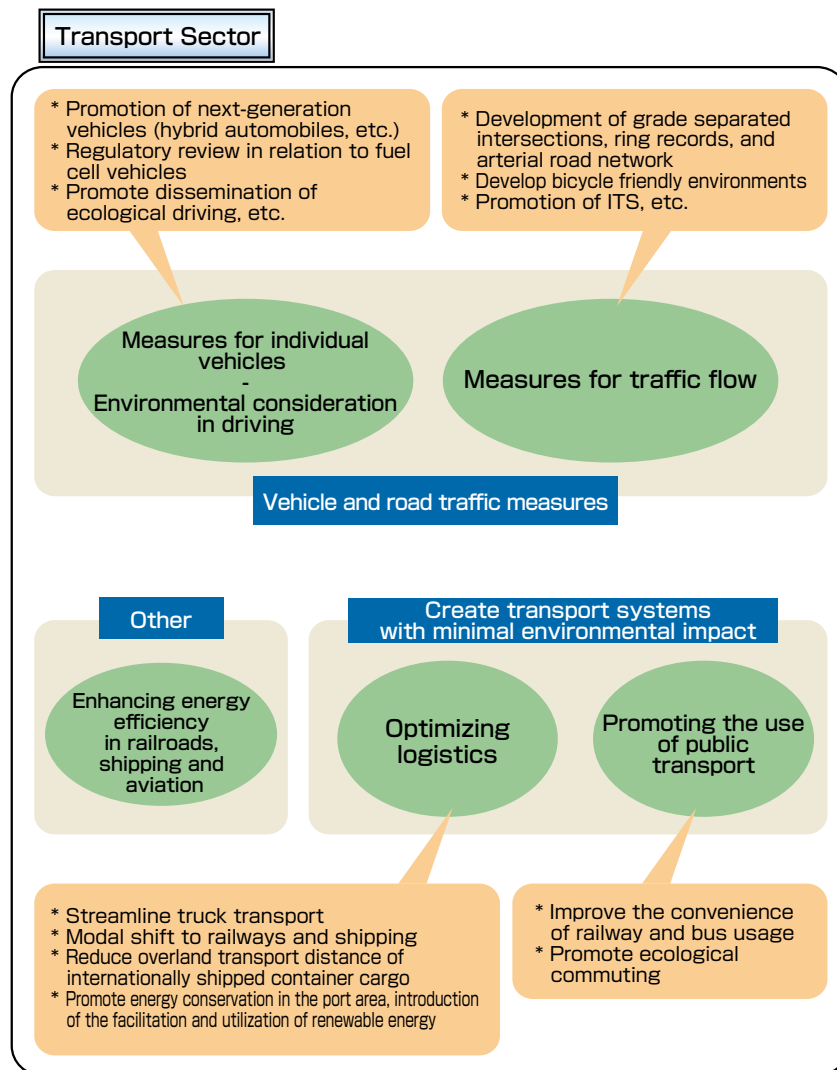
III. Measures in Response to Major Environmental Problems of the Transport Sector

1 Promotion of global warming countermeasures

(1) Transport sector countermeasures

The amount of carbon dioxide emitted by the transport sector in 2015 was 3.4% greater than the amount emitted in 1990, but emissions volume has been decreasing since 2001. In order to ensure that this decrease continues steadily, the MLIT is promoting comprehensive measures such as automobile and road traffic measures, logistics efficiency improvements, and promoting the use of public transport.

● Global warming countermeasures of MLIT



Source: MLIT "White Paper on Land, Infrastructure, Transport and Tourism in Japan 2015" (Tentative Translated by Eco-Mo Foundation)

① Promotion of individual automobile measures

The automobile sector accounts for a large share of the energy consumed by the transport sector, so individual automobile measures have been implemented, including further improving fuel efficiency through the world's leading fuel efficiency technologies and measures to promote the use of automobiles with superior fuel efficiency and the use of clean energy vehicles.

■ Fuel efficiency improvements through Top Runner Standards

○ The Energy Saving Act and fuel efficiency standards (Top Runner Standards)

Improving automobile fuel efficiency is extremely important to reduce automobile CO₂ emissions and promote global warming countermeasures. In order to promote the improvement of automobile fuel efficiency, fuel efficiency standards (Top Runner Standards*) have been established based on the Act on the Rational Use of Energy (Energy Saving Act).

As a result, automobile manufacturing industry members (automobile manufacturers and importers) are required to improve fuel efficiency performance such that the average fuel efficiency of vehicles sold (determined by taking the weighted harmonic average of automobile fuel efficiency values) does not fall below standards set for each company based on their vehicle sales composition. Furthermore, it requires that they post fuel efficiency related information so that automobile users can select automobiles with superior fuel efficiency, and the fuel efficiency values are listed in the product catalogs of individual automobiles.

* Top Runner Standards: Standards based on the currently commercially available automobiles with the highest fuel efficiencies, taking into consideration future technological advances

○ Fuel efficiency standards

In March 1999 fuel efficiency standards for 2010 were formulated for passenger and small cargo vehicles, based on the Top Runner Standards concept.

In March 2006 the world's first heavy duty vehicle (truck, bus, etc.) fuel efficiency standards were formulated, with a target year of 2015.

In July 2007 new fuel efficiency standards were formulated for passenger vehicles. These new standards aimed for a 23.5% improvement in fuel efficiency (versus 2004) for passenger vehicles by 2015.

In March 2013 new fuel efficiency standards were created for passenger vehicles, aimed at 2020, requiring fuel efficiency to be improved by 24.1% versus actual 2009 figures, assuming a shipped vehicle composition equivalent to that of 2009. Furthermore, in July 2015 fuel efficiency standards for 2022 were formulated for small cargo vehicles, based on the assumption of equivalent shipment volume as in 2012, requiring them to be 26.1% more fuel efficient than vehicles sold in 2012 (based on actual 2012 vehicle fuel efficiency).

○ New fuel efficiency test method

In conjunction with the new 2015 fuel efficiency standards, the method for testing fuel efficiency was revised to more closely approximate actual driving conditions. In the past, 10-15 mode driving was used to test fuel efficiency, but this was changed to JC08 mode driving.

Under JC08 mode, driving is performed using a greater number of speed changes to reflect actual driving conditions. It also includes measurement methods under which vehicles are started with cold engines, in addition to starting with warmed up engines.

III. Measures in Response to Major Environmental Problems of the Transport Sector

The World Light Vehicle Test Procedure (WLPT) was established at the UNECE World Forum for Harmonization of Vehicle Regulations (WP29), held in March 2014. In October 2016 Japan added WLTP to JC08 Mode as a method of testing exhaust gas emissions and fuel efficiency for passenger vehicles.

● Passenger vehicles

[Gasoline passenger vehicles, diesel passenger vehicles, and LP gas passenger vehicles (with occupancies less than 10 people or total vehicle weight of 3.5ton or less) and minibus (passenger vehicles with occupancies of 11 or more and total vehicle weight of 3.5t or less)] Target year: 2020
Measurement method: JC08 mode

Category (Total vehicle weight (kg))	~740	741 ~855	856 ~970	971 ~1080	1081 ~1195	1196 ~1310	1311 ~1420	1421 ~1530	1531 ~1650	1651 ~1760	1761 ~1870	1871 ~1990	1991 ~2100	2101 ~2270	2271~
Fuel efficiency standard (km/L)	24.6	24.5	23.7	23.4	21.8	20.3	19.0	17.6	16.5	15.4	14.4	13.5	12.7	11.9	10.6

Source: MLIT (Tentative Translated by Eco-Mo Foundation)

● Trucks/Freight vehicles

[Gasoline cargo vehicles and diesel cargo vehicles (total vehicle weight of 3.5t or less)] Target year: 2022 Measurement method: JC08 mode

Category (Total vehicle weight (kg))	~740	741 ~855	856 ~970	971 ~1080	1081 ~1195	1196 ~1310	1311 ~1420	1421 ~1530	1531 ~1650	1651 ~1760	1761 ~1870	1871 ~1990	1991 ~2100	2101~	
Structure A Fuel efficiency standard (km/L)		28.1	25.0	22.7	20.8	18.5	16.9								
Structure B Fuel efficiency standard (km/L)	MT	21.0	20.4	19.9	19.4	16.7	15.1	13.9	12.9	12.1	11.5	11			
	AT	20.4	19.8	19.2	18.7	16.3	14.7	13.5	12.5	11.7	11.1	10.6	10.2		
Diesel structure B Fuel efficiency standard (km/L)	MT										16.8	15.9	15.2	14.6	
	AT										14	13.7	13.5	13.3	13

(Note)

Structure A: Vehicles with structures matching ①, ②, or ③ below.

① Maximum carrying capacity by total vehicle weight is 0.3 or less.

② The same cab contains both passenger boarding and article loading appurtenances, and the cab is separated from the outside of the vehicle by a fixed roof, window glass, or other partition.

③ There is an engine in front of the driving cabin.

Structure B: Vehicles to which none of the above apply.

[Trucks, etc. (freight vehicles with total vehicle weights exceeding 3.5t)] Target year: 2015 Measurement method: Heavy duty vehicle mode

Category (total vehicle weight (t))	3.5~7.5				7.5~8	8~10	10~12	12~14	14~16	16~20	20~
(Maximum carrying capacity t)	~1.5	1.5~2	2~3	3~							
Fuel efficiency standard (km/L)	10.83	10.35	9.51	8.12	7.24	6.52	6.00	5.69	4.97	4.15	4.04

Source: MLIT (Tentative Translated by Eco-Mo Foundation)

■ Measures for developing and promoting energy-saving vehicles and low-emission vehicles

The increasingly severe global warming situation, together with the rise of CO₂ emissions, air pollution, and crude oil prices resulting from the rapid increase in energy consumption by developing countries, has led to greater usage of energy-saving and low-emission vehicles such as compressed natural gas (CNG) vehicles, hybrid vehicles, and electric vehicles. Vehicles with functions such as automatically stopping idling engines when stopped, or which promote eco-friendly driving awareness by indicating with signal lamps when drivers are performing high fuel efficiency driving, are also becoming more popular.

Research is also taking place for new energy-saving vehicles, aimed at the commercialization of hybrid busses with inductive charging capabilities. These vehicles can be rapidly charged using electrical induction from electricity supply embedded in the pavement, without the need for electrical charging cords. The government, academia, and manufacturers are working together on verification testing for electrical full flat-floored busses, with testing being performed in Fujisawa City, Kanagawa Prefecture in August 2011.

From the perspective of improved automobile safety and harmonization of international standards, testing methods for the UN's Global Technical Regulations on Hydrogen and Fuel Cell Vehicles and Regulations on CNG/LNG Vehicles were introduced into domestic standards, the mandatory installation of vehicle stability control devices was expanded, standards were tightened for collision avoidance systems, and mandatory installation of these systems was also expanded.

In order to accomplish this, the "Announcement that Prescribes Details of Safety Regulations for Road Vehicles (MLIT Announcement No.619 of 2002)" was revised, issued, and enacted.

The "Global Technical Regulations on Hydrogen and Fuel Cell Vehicles" were established in June 2013 based on a proposal made by Japan. They have great potential for contributing to the adoption of fuel cell vehicles outlined in the "Regulatory Reform Implementation Plan" (approved by the Cabinet in June 2013).

On November 18, 2014, based on the Road Transport Vehicle Act, type designation of fuel cell vehicles was implemented for the first time.

- They add requirements concerning the concentration of hydrogen leaked into the vehicle interior following fuel cell vehicle related collision testing, as well as requirements concerning the securing of gas containers to the vehicle, bringing the regulations into agreement with the Global Technical Regulations.
- They change the method used for testing the strength of the mount of gas containers to compressed natural gas vehicles from vibration testing to acceleration testing, bringing them into agreement with the Regulations on CNG/LNG Vehicles.
- They expand requirements for vehicle stability control device and collision avoidance braking system related vehicle stability control devices, making them mandatory for all busses, trucks, and trailers. They also strengthen collision avoidance braking system control related performance requirements, and make them mandatory for all busses and medium- and large-sized trucks.

● Inductive charging hybrid bus



● Large electrical full flat-floored bus



②Promotion of environmentally friendly automobile usage

“Eco-driving” has been positioned as an environmentally friendly automobile usage promotion measure. The Eco-Drive Promotion Liaison Committee (National Police Agency (NPA), METI, MLIT, and MOE) formulated the Eco-Driving Dissemination and Promotion Action Plan, and the Committee and related organizations are actively promoting these efforts.

In 2006 the committee proposed the “10 Tips for Eco-driving”, which outlined specific eco-driving efforts. These recommendations were revised in 2012.

●10 Tips for Eco-driving

地球と走ろう
環境にやさしいエコドライブで

1 Accelerate gently.
発進するときは、穏やかにアクセルを踏んで発進しましょう（最初の5秒で、時速20km程度が目安です）。日々の運転において、やさしい発進を心がけるだけで、10%程度燃費が改善します。集らず、穏やかな発進は、安全運転にもつながります。

2 Maintain a steady speed and keep your distance.
走行中は、一定の速度で走るとを心がけましょう。車間距離が短くなると、ムダな加速・減速の機会が多くなり、市街地では2%程度、郊外では6%程度も燃費が悪化します。交通状況に応じて速度変化の少ない運転を心がけましょう。

3 Slow down by releasing the accelerator.
信号が変わるなど停止することがわかったら、早めにアクセルから足を離しましょう。そうするとエンジンブレーキが作動し、2%程度燃費が改善します。また、減速するときや坂道を下るときにもエンジンブレーキを活用しましょう。

4 Make appropriate use of your air conditioner.
車のエアコン（A/C）は車内を冷却・除湿する機能です。暑いのみ必要なときは、エアコンスイッチをOFFにしましょう。また、冷却が必要なときは、車内を冷やしすぎないようにしましょう。たとえば、車内の温度設定を外気と同じ25℃に設定した場合、エアコンスイッチをONにしたままだと12%程度燃費が悪化します。

5 Don't warm up or idle your engine.
待ち合わせや荷物の積み下ろしなどによる駐車の際は、アイドリングはやめましょう^{※1}。10分間のアイドリング（エアコンOFFの場合）で、130cc程度の燃料を消費します。また、現在の乗用車では基本的に暖機運転は不要です^{※2}。エンジンをかけたらずらすぐに出発しましょう。

6 Plan your itinerary to avoid congested routes.
出かける前に、渋滞・交通規制などの道路交通情報や、地図・カーナビなどを使用して、行き先やルートをおらかじめ確認し、刻々に余裕をもって出発しましょう。さらに、出発後も道路交通情報をチェックして渋滞を避ければ燃費と時間の節約になります。たとえば、1時間のドライブで渋滞に迷い、10分間余計に走行すると17%程度燃料消費量が増加します。

7 Check your tire pressure regularly.
タイヤの空気圧チェックを習慣づけましょう。タイヤの空気圧が適正値より不足すると、市街地で2%程度、郊外で4%程度燃費が悪化します（適正値より50kPa（0.5kg/cm²）不足した場合）。また、エンジンオイル・オイルフィルター・エアクリーナエレメントなどの定期的な交換によっても燃費が改善します。

8 Reduce your load.
運ぶ必要のない荷物は車からおろしましょう。車の燃費は、荷物の重さに大きく影響されます。たとえば、100kgの荷物を載せて走ると、3%程度も燃費が悪化します。また、車の燃費は、空気抵抗にも敏感です。スキーキャリアなどの外装品は、使用しないときには外しましょう。

9 Respect parking rules and regulations.
迷惑駐車はやめましょう。交差点付近などの交通の妨げになる場所での駐車は、渋滞をもたらします。迷惑駐車は、他の車の燃費を悪化させるばかりか、交通事故の原因にもなります。迷惑駐車のない道路では、平均速度が向上し、燃費の悪化を防ぎます。

10 Check the readings on your fuel efficiency-monitoring equipment.
自分の車の燃費を把握することを習慣にしましょう。日々の燃費を把握すると、自分のエコドライブ効果が実感できます。車に装備されている燃費計・エコドライブナビゲーション・インターネットでの燃費情報などのエコドライブ支援機能を使うと便利です。

エコドライブ普及推進委員会
環境省・国土交通省・警察庁
交通エコロジー・モビリティ財団

エコドライブ普及連絡会策定
(警務庁、経済産業省、国土交通省、環境省)

※1 交差点からエンジンを守る手動アイドリングストップは、以下の点で安全性に問題があるため注意しましょう。（自動アイドリングストップ機能搭載車は別項のページを参照）
・手動アイドリングストップ中に急発進・ブレーキを踏むとブレーキの効きが悪くなります。
・燃料は4%前後燃費が向上しますが、またバッテリーなど交換寿命の低下によりエンジンが可燃性燃料を供給しにくい場合が稀にあります。
・エアリフなどの安全装置や方向指示器などが作動しないため、先頭車や後部での手動アイドリングストップは避けましょう。
※2 2017年度以降の乗用車などは燃費は状況を除き、よりながら燃費改善プログラムで対応しています。

データ出典：（一財）国土交通省・国土交通省・環境省

Definition of the levels and the status of initiatives regarding autonomous driving

In recent years, owing to technological innovation, initiatives toward autonomous driving are making headway and attention is being focused on the trends.

In “Public Private ITS Initiative/Roadmaps 2017,” the Japanese government adopted the definition of SAE International’s J3016 (September, 2016) as the definition for the levels of autonomous driving.

● Summary of the definition of autonomous driving (J3016)

Level	Summary	Surveillance for safe driving and main respondent
Driver carries out all or part of the driving task		
SAE Level 0 No automatic driving	· The driver carries out all of the driving task	Driver
SAE Level 1 Driver assistance	· The system carries out the driving subtask of either front/back or left/right vehicle control	Driver
SAE Level 2 Partial automatic driving	· The system carries out the driving subtask of both front/back and left/right vehicle control	Driver
Autonomous driving system carries out all of the driving task		
SAE Level 3 Conditional automatic driving	· The system carries out all driving tasks (within designated domain) · If continuous operation is difficult, the driver is expected to respond appropriately to the system’s requests for intervention	System (Driver, when continuous operation is difficult)
SAE Level 4 Advanced automatic driving	· The system carries out all driving tasks (within the designated domain) · If continuous operation is difficult, the user is not expected to respond.	System
SAE Level 5 Complete automatic driving	· The system carries out all driving tasks (not limited to the designated domain) · If continuous operation is difficult, the user is not expected to respond.	System

Source: Home page of Prime Minister of Japan and His Cabinet
(Tentative Translated by Eco-Mo Foundation)

MLIT has started an autonomous driving service at semi-mountainous areas with Roadside station (michi-no-eki) as the base. In semi-mountainous areas with a super-aging population, a goal has been set of introducing autonomous driving services focusing on regional hubs such as Roadside station, and an experiment is being carried out to verify the feasibility of securing the flow of both people and goods.

This experiment includes motor-driven carts running on a designated route by sensing the magnetic force from the underground electromagnetic induction line, and motor-driven carts identifying the vehicle position based on GPS and running on a designated route.

● Example of a bus-type vehicle



Eco-tires

In the past “high fuel efficient tires” publicized by tire manufacturers were tested by themselves using their own internal testing standards. This created a demand for a unified evaluation method and selectable indices which would be used to compare products. In December 2009 the JIS tire rolling resistance testing method was established.

Based on this standard, The Japan Automobile Tyre Manufacturers Association formulated “High fuel efficient tire promotion related labeling guidelines (labeling system)” in order to promote the use of these. This guideline went into effect in January 2010.

The labeling system applies to passenger vehicle summer tires sold as replacement tires by tire retailers, etc. Tires within the following range are considered high fuel efficient tires.

Tire grading system

Unit (N/kN)		Unit (%)	
Rolling resistance coefficient	Grade	Wet grip performance (G)	Grade
RRC ≤ 6.5	AAA	155 ≤ G	a
6.6 ≤ RRC ≤ 7.7	AA	140 ≤ G ≤ 154	b
7.8 ≤ RRC ≤ 9.0	A	125 ≤ G ≤ 139	c
9.1 ≤ RRC ≤ 10.5	B	110 ≤ G ≤ 124	d
10.6 ≤ RRC ≤ 12.0	C		

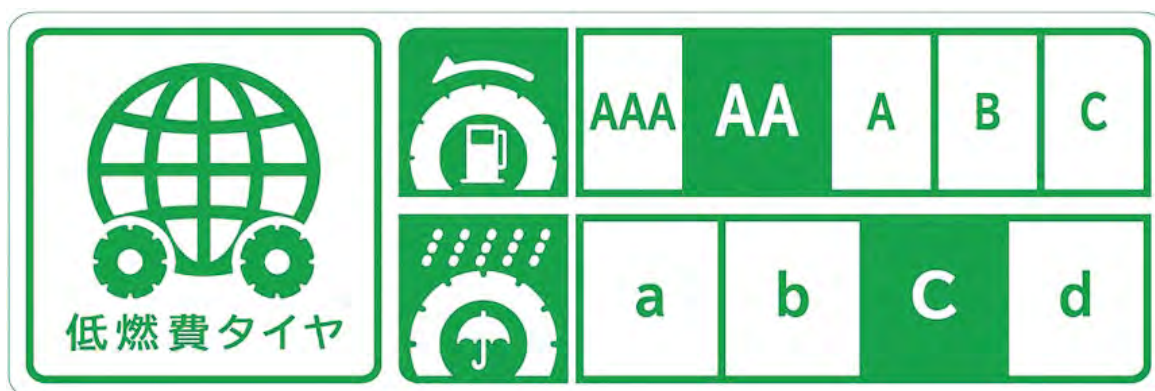
High fuel efficient tire performance requirements

Rolling resistance coefficient : 9.0 or less (Grade AAA to A)

Wet grip performance: 110 or greater (Grade a to d)

● Example of Eco-tires Labeling

In the example below, the rolling resistance grade is AA and the wet grip performance grade is c, so the tire meets high fuel efficient tire standards.



(Eco-tires)

③ Promotion of traffic flow measures

Smother traffic flow increases driving speeds, which in turn produces greater effective fuel efficiency and reduces carbon dioxide emissions from vehicles. MLIT is implementing various traffic flow measures.

Specifically, these include the enhancement of arterial road networks, such as ring roads, which are effective at reducing the amount of traffic influx into central urban areas by providing alternate traffic routes, the creation of multilevel intersections, the promotion of projects for continuous grade separation, etc., in order to eliminate unopened railroad crossings, and other initiatives for reducing traffic congestion in urban areas. They also include the use of big data collected using ITS technology, the optimization of existing networks, and other efforts for promoting smart use of roads in order to provide smooth, safe transport services. Furthermore, they are also maintaining and improving bicycle traffic spaces through the reallocation of road space, etc. In order to reduce the carbon footprint of road facilities, LED road lighting is being installed.

■ Use of ETC2.0 service

Speed, usage route, usage time, and other data collected from ETC2.0, for which full-fledged vehicle-mounted device sales began in August 2015, and various other forms of detailed Big Data are being used in measures for smart usage of roads, such as smart pricing to reduce traffic jams and accidents, and high-productivity smart logistics management.

■ Guideline for the creation of safe and comfortable bicycle use environments

Bicycles play important roles as commonplace means of transport used in everyday life, and means of leisure transport in activities such as cycling. Bicycle usage needs are rising, backed by rising interest in healthy living and environmental conservation. However, although the number of traffic fatalities has decreased by 40% over the past ten years, the number of accidents between bicycles and pedestrians has remained constant, and there are calls for the creation of safer, more comfortable bicycle usage environments.

Because of this, the Ministry of Land, Infrastructure, Transport and Tourism, in conjunction with the National Police Agency, has held meetings of an exploratory committee of experts to consider how to create bicycle network plans and promote the creation of bicycle travel spaces based primarily on street usage. In July 2016 the committee reformulated the “Guideline for Creating a Safe and Pleasant Environment for Bicycle Use.” Announcements and technical advice, etc., regarding the Guidelines were provided, and, through collaboration with related ministries and agencies, etc., plans are being created and implemented, and the thorough application of traffic rules is being promoted.

In order to further promote the use of bicycles, the Law for the Promotion of Bicycle Use was implemented on May 1, 2017 and based on the foregoing law, a Headquarters of the Promotion of Bicycle Use was established within MLIT.

④ Improvement of freight distribution efficiency

■ Creation of sustainable logistics systems through collaboration between freight owners and logistics operators

○ Green Logistics Partnership Conference

Promoting the creation of a greener overall logistics system requires greater collaboration between freight owners and logistics operators, and the expansion of sustainable logistics systems for global warming countermeasures improving productivity, etc.

The Green Logistics Partnership Conference, launched in 2004 and composed of companies and organizations united by this goal, strives to promote mutual understanding of the importance of the Green Logistics and improve coordination between freight owners and logistics operators, in order to carry out modal shifts and improve truck transport efficiency.

As part of these activities, the Joint Guidelines on the Method for Calculating CO₂ Emissions by the Logistics Sector (Ver. 3.0) (METI, MLIT) were formulated. These guidelines establish a unified method of calculating carbon dioxide emissions by the logistics sector, and can be used by both freight owners and logistics operators for smoother collaboration. They make it possible to objectively evaluate the effectiveness of individual measures. Each year the organization gathers proposals from its members regarding specific Green Logistics Partnership implementation projects in order to promote measures for reducing CO₂ emissions. Particularly successful good practice example projects involving logistics operators and freight owners engaging in partnerships to reduce CO₂ emissions, to create sustainable logistics systems for improving productivity, etc. are recognized by MLIT Minister awards.

Green Logistics Partnership Conference (Facilitator: Takehiko Sugiyama, Express Highway Research Foundation of Japan Director-General.) Established April 2005	
Organizers: MLIT, METI, Japan Federation of Freight Industries, JILS	
Collaboration: Nippon Keidanren	
Members:	Logistics operators, freight owners, industry organizations, think-tanks, research organizations, local agencies of the central government, municipalities, individuals, others
Policy Planning Committee <ul style="list-style-type: none"> * Overall Green Logistics Partnership Conference management * Planning and proposal of policies related to corporate awareness building and PR strategy, etc. 	Business Promotion Committee <ul style="list-style-type: none"> * Selection of good practice examples * Follow-up of subsidiary projects

Source: Green Logistics Partnership Conference (Tentative Translated by Eco-Mo Foundation)



(Pamphlet of The Joint Guidelines on the Method for Calculating CO₂ Emissions)

■Promotion of modal shift and increased efficiency of freight distribution

○Enhanced coastal shipping competitiveness and modal shift to sea transport

The MLIT is engaged in efforts aimed at strengthening the competitiveness of the coastal shipping industry and promoting a modal shift to sea transport.

As part of these efforts it is implementing the Eco-Ship Modal Shift Project, which promotes modal shift by selecting companies which contribute to modal shift by using some degree of sea transport, and permitting those companies to use the Eco-Ship Mark. As part of this project, the Eco-Ship Modal Shift Project Executive Committee has implemented an Eco-Ship Mark certification system (the Eco-Ship Mark indicates that a company is contributing to environmental efforts by using sea transport). Since August 2017, 127 freight owners and 143 logistics operators have received Eco-Ship Mark certification. Eco-Ship Mark certified companies are also selected to receive MLIT Maritime Bureau Chief awards.

**平成29年度
エコシップ・
モーダルシフト事業
優良事業者の募集**

平成20年、モーダルシフトの推進を目的にスタートした「エコシップマーク認定制度」は今年で10年目を迎えます。これまで200を超える事業者が「エコシップマーク」の認定を受け、環境にやさしい企業としてイメージアップに役立っています。
平成29年度も引き続きモーダルシフトに貢献する荷主企業および物流事業者を募集いたします。

RORO船 コンテナ船 長距離フェリー

平成29年度 募集期間 平成29年11月1日(水)開始 ▶ 第一次締切 平成30年1月31日(水)
第二次締切 平成30年3月31日(土)

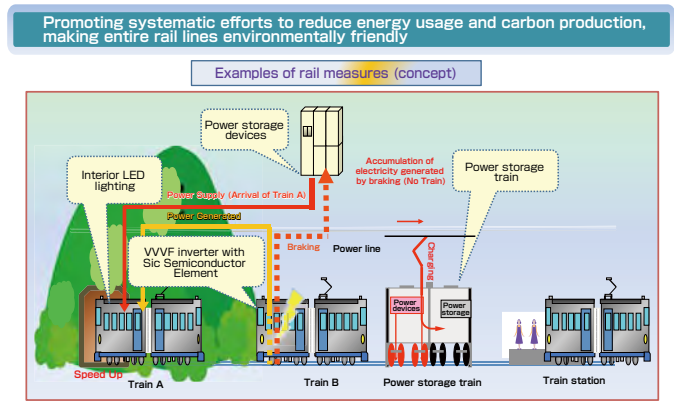
国土交通省海事局 エコシップ・モーダルシフト事業実行委員会
<http://www.ecoship.jp>

Source: Committee for Implementation of Eco-Ship Modal Shift Operations (Tentative Translated by Eco-Mo Foundation)

○Eco Rail Line Project

Railroads are essential parts of the daily lives and economic activities of the people of Japan. It is vital that they will be capable of maintaining regular operation even in the event of emergency situations such as power restrictions. Implementing cutting edge efforts to reduce energy consumption and carbon emissions from rail lines, which are used by 60 million people a day, contributes to greater societal energy conservation and environmental awareness. The MLIT is implementing the Eco Rail Line Project, supporting rail operators who are implementing systematic efforts to reduce power consumption and carbon emissions for entire rail lines by using renewable energy in train stations and train control centers and installing energy saving facilities for efficient energy usage. Through this support, the project promotes reductions in energy usage by rail lines and the adoption of carbon emissions reducing technologies.

●Overview of the Eco Rail Line Project



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

○“Eco Rail Mark” system promotion and expansion

The “Eco Rail Mark” was established in 2005 to certify companies and products which are proactively working to achieve low environmental impact rail freight transport. By supporting companies and products certified with the “Eco Rail Mark”, awareness of environmental impact reduction efforts increases, among freight owner companies such as manufacturers, as well as consumers, with the goal of promoting a corresponding modal shift to rail freight transport. The MLIT and Railway Freight Association (RFA) are striving to further promote and expand the “Eco Rail Mark”. As of September 22, 2017 there are 188 “Eco Rail Mark” product certifications for 213 products, 85 certified companies, and 31 certified supporting companies.



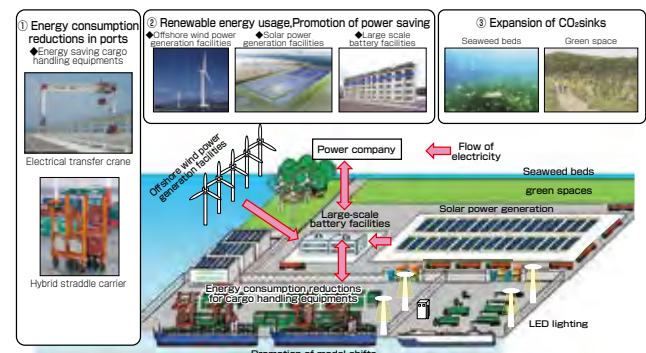
Source: RFA (Tentative Translated by Eco-Mo Foundation)

○Promotion of comprehensive reductions in carbon emissions by ports

Port areas have large concentrations of cargo and passenger vessels, function as sites of industrial activity where land and sea freight distribution systems meet, and produce large amounts of greenhouse gasses. MLIT is striving to effectively reduce these emissions.

Specifically, it is providing support for the deployment of energy saving facilities, promoting modal shifts and transport efficiency improvements through the use of reverse logistics-related sea transport, promoting the smoother deployment and utilization of renewable energy, improving port green areas which

●Comprehensive reductions in carbon emissions in ports



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

help absorb CO₂, and creating seagrass beds.

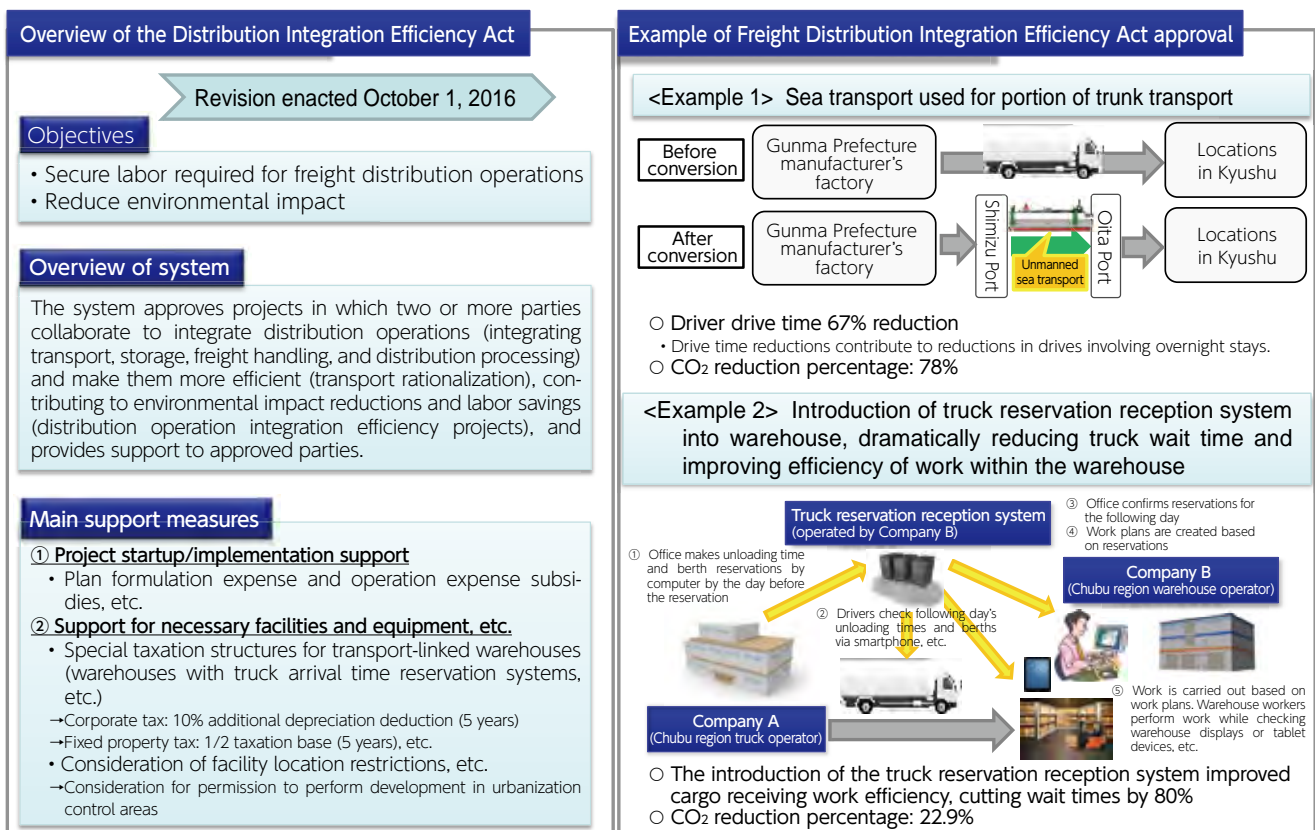
○With regards to the partial revision of the Act on Advancement of Integration and Streamlining of Freight Distribution Business (Distribution Integration Efficiency Act), in order to increase distribution efficiency and reduce environmental impact, plans have been approved for a project aimed at integrating and improving the efficiency of advanced freight distribution facilities with a specified minimum scale (specified freight distribution operation facilities) and other facilities. Roughly 300 projects have been approved since the establishment of Distribution Integration Efficiency Act on October 1, 2005.

On October 1, 2016, a revision to the Act was enacted, requiring two or more parties to collaborate during the implementation of projects. This revision was enacted in response to labor shortages in the distribution field, with the aim of expanding modal shifts among support recipients and measures which do not require joint delivery, etc., specified distribution operation facilities.

Based on this, as of end of December, 2017, 63 diverse projects, including modal shifts, joint delivery, and special freight distribution operation facility wait time reduction, have been approved, and measures have been implemented to achieve freight distribution labor savings, improve freight distribution efficiency, and reduce environmental impact.

On February 20, 2018, an initiative was launched for the first time in Japan to jointly transport the cargo of multiple businesses on the same vehicle by means of a consolidated passenger/cargo bus service and co-operative transport business.

Distribution Integration Efficiency Act and labor savings



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Measures aimed at reducing amount of parcel service redeliveries

In recent years number of parcel service deliveries has risen rapidly (by 18% in five years) due to the major increase in e-commerce transactions. Approximately 20% of parcel service deliveries are redeliveries. According to calculations by the MLIT, these parcel service redeliveries produce massive societal losses, such as generating approximately 420 thousand tons of carbon dioxide, equivalent to 1% of the annual emissions of commercial trucks, or an amount whose absorption which would require a cedar forest 2.5 times the size of the area enclosed by the Yamanote Line, and requiring roughly 180 million hours of labor (equivalent to about 90,000 workforce) per year.

The MLIT has held deliberation sessions, in which operators including delivery, e-commerce sales, convenience store, and locker operators have participated, and conducted a questionnaire* regarding parcel service redelivery. According to the results of the questionnaire, roughly 70 percent of redeliveries were the result of recipients not knowing that packages would be delivered, and being out despite knowing packages would be delivered.

Reducing the social losses caused by redeliveries will contribute to slowing global warming and addressing the truck driver shortage resulting from the shrinking and aging population. Wasteful redelivery must also be reduced in order to continue to maintain and further improve Japan's high level of delivery service.

To reduce the number of redeliveries, operators must collaborate more closely and employ new approaches and measures, and all members of society must understand the social losses resulting from redelivery and cooperate in reducing the need for redelivery.

The MLIT has outlined the following concrete measures aimed at reducing redeliveries.

<Major concrete measures>

- ① Introduce simpler web or app-based delivery time selection methods
- ② Promote the understanding of the social losses caused by redelivery and provide benefits to package recipients based on their contributions to redelivery reductions
- ③ Expand the range of delivery and e-commerce services handled at convenience stores and provide greater convenience through improvements to receiving procedures, etc.
- ④ Promote the installation of delivery boxes for residences, and streamline package sizes to fit in delivery boxes
- ⑤ Introduce and expand new receiving methods by, for example, installing delivery boxes in train stations, etc.

* Questionnaire to redelivery recipients by the Committee for Deliberation Regarding the Promotion of the Diversification of Methods for Receiving Packages in Order to Reduce Redelivery

● Parcel service locker



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Promotion of the Green Management Certification System

In recent years there has been an increasing focus on environmental problems such as global warming and air pollution. Satisfying both environmental and economic concerns and creating a sustainable economic society has become an urgent challenge. The Eco-Mo Foundation has created and distributed a green management promotion manual containing checklists for self-assessment in order to promote environmental conservation activities by transport related companies. This manual, based on the concepts of ISO14031 (an international environmental performance evaluation standard), contains checklist items for environmental conservation items to be addressed, and descriptions of specific corresponding environmental efforts. This makes it easy to set and evaluate environmental targets, thereby achieving greener management.

Green management consists of companies assessing their own environmental conservation efforts, using promotion manuals as references in considering improvement measures based on the results of these environmental conservation efforts, creating action plans which include these improvement measures, and implementing them in order to achieve the improvements. This cycle makes it possible to implement proactive, ongoing environmental conservation activities.

The MLIT is striving to promote this green management as a countermeasure against environmental problems.

In order to promote green management, the Green Management Certification System was established in 2003. The Eco-Mo Foundation acts as the certification body under this system, objectively certifying and publicizing environmental improvement efforts by companies, based on the green management promotion manual. This produces greater understanding and motivation of the green management certified businesses by other companies and users, with the ultimate objective of reducing the environmental impact of the transport industry.

グリーン経営 認証
エコモ財団

グリーン購入法では環境にやさしい取組みをしているトラック、バス、タクシーの利用が求められています。

■ グリーン購入法とは、環境負荷の少ない製品・サービスを普及させることを目的に制定され、19年度に宅配便などの輸配送(トラック)、20年度に貸切バス、タクシーが調達品目に追加されました。

運輸部門のグリーン経営認証

トラック、バス、タクシー、倉庫、港湾運送、内航海運、旅客船の事業ごとに環境にやさしい取組みをしている運輸事業者を認証する制度がグリーン経営認証です。国土交通省および各業界団体の協力を得て、エコモ財団が発議しています。

エコドライブや自転車の点検整備などの具体的な環境活動を評価され、約7,000事業所以上が認証を取得しています。

中小企業でも取組みやすく、費用向上はもとより、社員の意識改革のツールにもなっている有効性の高い制度です。

● 自動車(トラック、バス、タクシー)の保有している車両台数は、約20万台を超えています。

● 認証取得後2年間で燃費が1.5~3.4%向上しています。

「認証基準」、「取組事例」、「講習会開催予定」など詳細は [グリーン経営](#) で [検索](#)

公益財団法人 交通エコロジー・モビリティ財団
〒102-0076 東京都千代田区五番町10番地五番町Kビル3階
Tel: 03-3221-7636 http://www.ecomo.or.jp

トラック運送事業における
グリーン経営推進マニュアル

2017年4月

公益財団法人 交通エコロジー・モビリティ財団

(Manual of the Green Management Certification System)

⑤ Promotion of usage of public transport

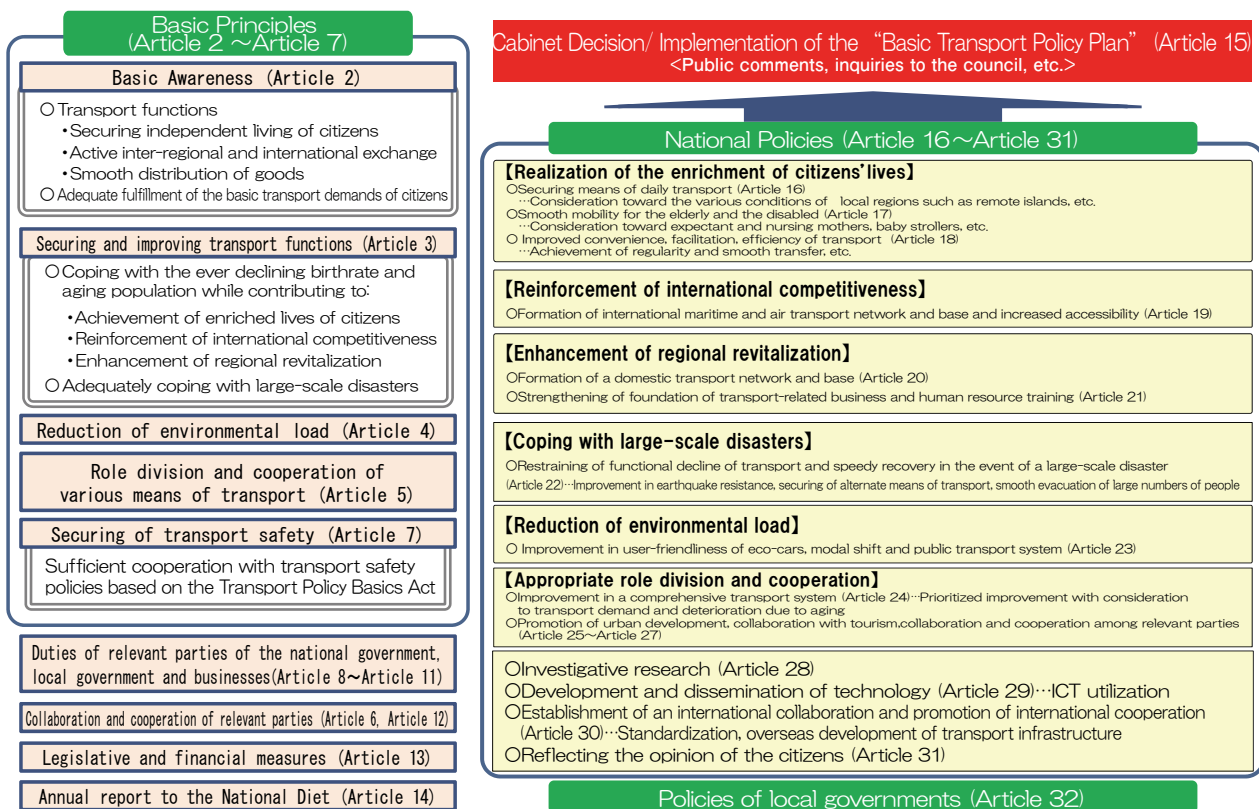
Creating new railroad lines and new transport systems, and making rail and bus transport more convenient, contribute a shift in passenger transport from private cars to public transport, which has less of an environmental impact. This leads to reductions in automobile CO₂ emissions, so various measures are being implemented in order to achieve this shift.

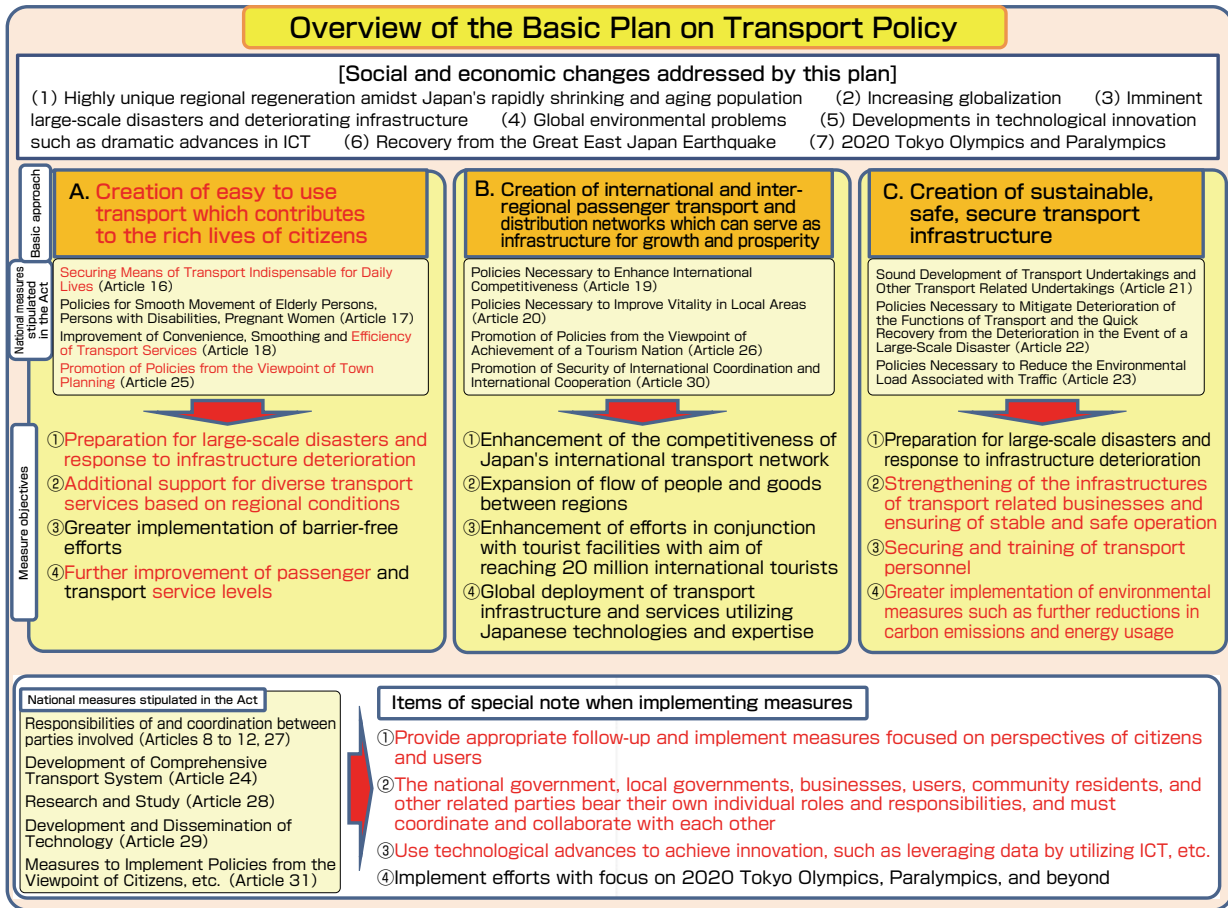
■ Establishment of the Basic Act on Transport Policy

The Basic Act on Transport Policy defines the basic philosophy underpinning transport related measures in order to promote measures necessary for the national government to coordinate closely with local governments and transport companies in implementing comprehensive and systematic measures from the perspectives of increasing international competitiveness and regional vitality, and ensuring preparedness for large-scale disasters. This act applies to the international transport, national transport, and regional transport which acts as the infrastructure supporting Japan's economic and social activities. The Basic Traffic Policy Plan which received Cabinet approval on February 13, 2015 stipulates 2014 to 2020 as the planning period and promotes transport policies both comprehensively and systematically.

In addition, the Basic Transport Policy Plan requires Cabinet Decision on the Transport Policy White Paper and Report to the Diet each year, and the 2017 version was created in May, 2017.

● Summary of the Basic Transport Policy Plan





Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Measures for promoting rail use

The MLIT provides support for efforts by rail operators to promote the use of urban rail, achieve greater speeds on existing arterial railroads, achieve greater speeds on freight rail lines, convert freight rail lines into passenger rail lines, smooth interconnections, make comprehensive improvements to railway stations, and implement barrier-free measures in railway stations, etc.

Service and convenience

- ◆ **Arterial railroad, etc. vitalization projects**
 - Conversion of freight rail lines to passenger rail lines, Osaka outer loop line (Shin-Osaka to Hanate)
- ◆ **Rail station comprehensive improvement projects**
 - JR East Kannai Station, Keikyu Corporation Kanazawa Hakkei Station, Hankyu Corporation/Keifuku Electric Railroad Saiai Station, Sagami Railway Ebina Station, Tokyu Electric Railroad Ikegami Station, Odakyu Electric Railway Chuurinkan Station
- ◆ **City railroad convenience promotion projects**
 - Speed improvements - Sotetsu / JR through line (Nishiya Station - Yokohama Hazawa Station area), Sotetsu / Tokyu through line (Yokohama Hazawa area - Hiyoshi)

It is also collaborating with rail operators in the “Eco Rail Campaign”, promoting the use of rail transport as an handy environmental action.

Support for the establishment of next generation streetcar systems (LRTs*), which are increasingly in the spotlight, is being provided as part of the Ministry’s regional public transport provision, maintenance, and improvement project.

* LRT: Short for “Light Rail Transit”. These next generation streetcar transport systems use low-floor trams (LRVs), improve their track and stop to provide easy boarding and unboarding, punctuality, travel speed, comfort, and other features.



(Campaign for eco using railways)
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Overview of LRT systems

Overview of LRT systems

What is LRT (Light Rail Transit)? LRT is an improvement on the driving areas, carriages, and other aspects of conventional streetcars, effectively utilizing existing road, rail, and other infrastructure. It is a public transport system which is friendly to people and to the environment, providing greater speeds, punctuality, and transport capabilities. It is gaining greater attention for its barrier free access and environmental friendliness, contributing to the restoration of urban and regional areas by vitalizing central urban districts.

Features

High speeds and punctuality levels

* LRT offers high speeds and high levels of punctuality through high performance carriage, the use of dedicated tracks, partial grade separation, signal prioritization, fare payment system improvements, and more.

Driving area (right-of-way)

Automobiles can physically enter the track area → Tracks and road are separated * Priority signals are used

Toyama Light Rail Toyama Ekikita area
Tracks and road are separated by a curb divider

Town planning efforts

* Installation of LRT as a town symbol to create lively center
* Can be installed in conjunction with other town planning measures such as development of station plaza and conversion of adjacent streets into transit malls, creation of park & ride parking lots, development of public facilities along the line, etc.

Unified appearance

Conventional design → Train designed to match local scenery

Sufficient transport capacity

* High frequency and articulated carriage are combined appropriately to ensure sufficient transport capacity

Train transport capacity (maximum capacity)

Approx. 90 people (Single-car: Hiroshima Electric Railway train) → Approx. 150 people (Five-car: Hiroshima Electric Railway train)

Environmentally-friendly

* In addition to providing the environmentally friendly streetcar feature of producing CO₂ emissions less than automobiles, LRT systems also reduce noise and vibration through the use of resilient wheels and vibration control tracks

Track structure

Normal track → Vibration control track
87dB ⇒ 76dB

(Noise comparison)
Measured at a distance of 7.5m from the center line between tracks, at a height of 1.2m above ground, for an LRT traveling at 40km/h.

Fukuji Railway city tracks, Fukuji Ekimae area
Uses embossed tracks to reduce noise and vibration

People-friendly

* Low carriage floors, boarding and disboarding slopes, etc., eliminate height differences and ensure ease in transferring to other means of transport

Floor height

780mm ⇒ 330mm

Height difference makes steps necessary

Train can be boarded directly from platform, with no height difference

CO₂ emissions

Mode	CO ₂ emissions per person per kilometer transported (g)
Privately owned car	188
Minibus	94
LRT streetcar	38

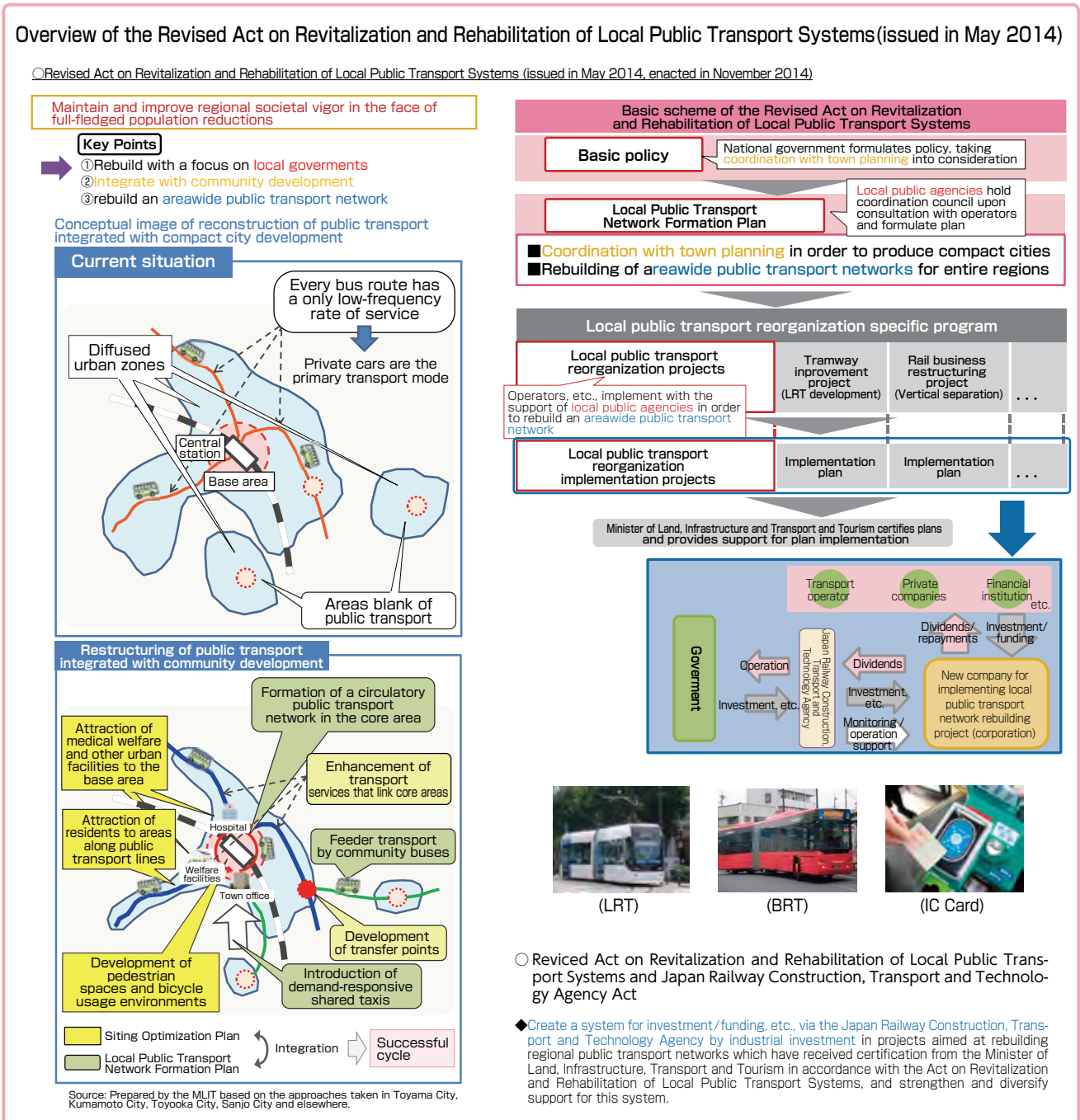
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Revised Act on Vitalization and Rehabilitation of Local Public Transport Systems

In May 2014 a revision to the Basic Act on Transport Policy was issued, and enacted in November of the same year.

Also, the August 26, 2015, the Revised Act on Revitalization and Rehabilitation of Local Public Transport Systems and Japan Railway Construction, Transport and Technology Agency Act (Act No. 28 of 2015) created a system for funding, etc., projects for improving certified rail transport, etc.

Overview of the Revised Act on Revitalization and Rehabilitation of Local Public Transport Systems



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Promotion of eco-commuting

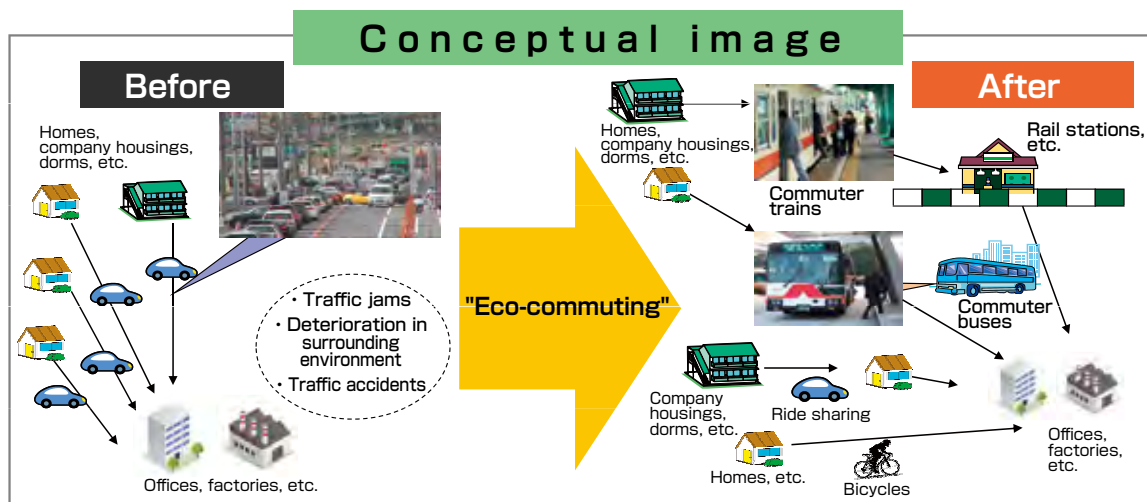
There is a growing demand for a shift in means of transport, from the use of private cars to low carbon dioxide emission measure, by promoting the use of public transport. In order to promote highly effective measures which match both user side efforts and transport operator side efforts, a Conference on Promotion of Public Transport was held in March 2005, involving transport operators, members of the business sector, and members of the government.

In November 2007 the “Eco-commuting Promotion Action Program through the Mobility Management Project” was adopted to promote conversion from the use of private cars to public transport, bicycles and on foot for commuting.

From June 2009 thereby promoting eco-commuting, the “Excellent Eco-Commuting Business Site Certification System” was launched to certify businesses which voluntarily and actively promoted eco-commuting. As of the end of December 2017, 645 business sites have been registered.

What is "Eco-commuting"?

"Eco-commuting" is an approach that encourage company workers to change their means of commuting from private cars to public transport, bicycles and on foot.

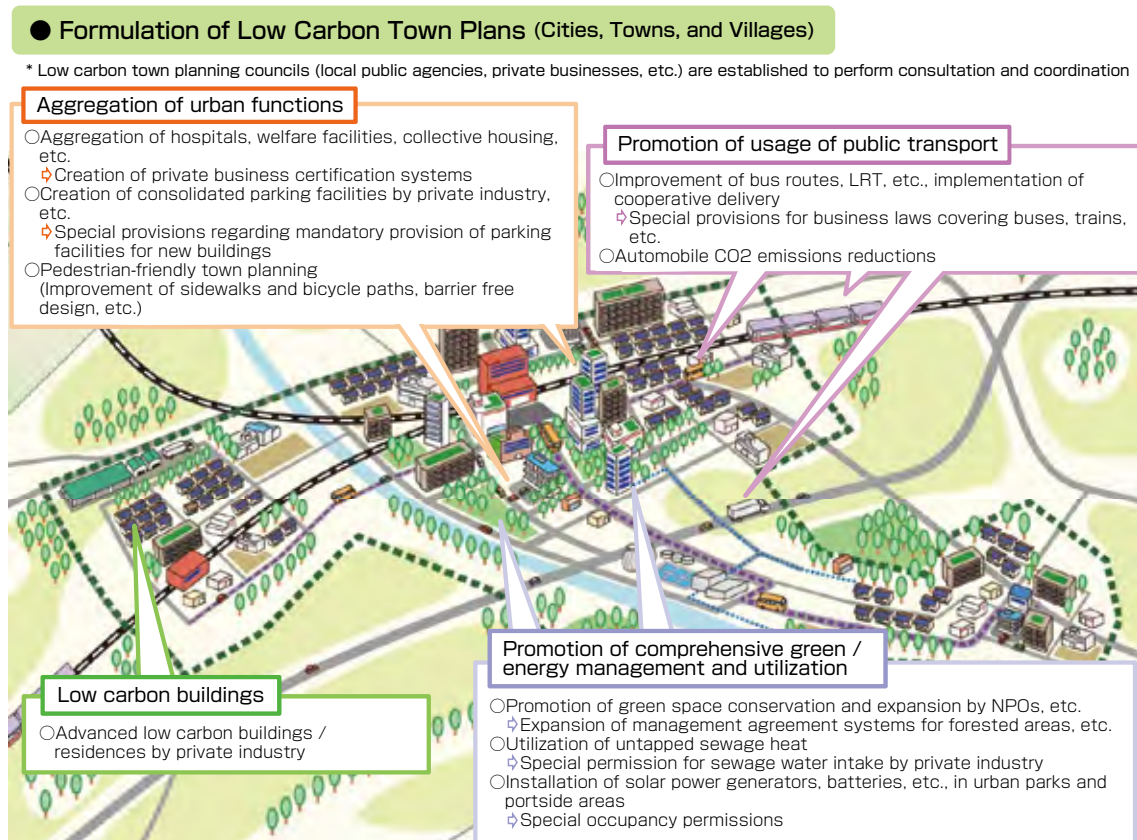


Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Low Carbon City Promotion Act

It is important to build up a collection of success cases of rationalization of energy usage and urban and transport carbon emissions reduction, promote greater adoption and vitalize the housing market and local economies, by promoting private investment in urbanization areas, etc. based on changes in energy supply and demand triggered by the Great East Japan Earthquake and increasing energy and global warming awareness among citizens.

The Low Carbon City Promotion Act was passed by the Diet in September 2012 and enacted in 2012 December of the same year. As of July 2017, 23 cities have created low carbon town plans. These plans are listed on the MLIT website.



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

⑥ Promotion of Environmentally Sustainable Transport (EST)

In order to reduce carbon dioxide emissions by the passenger transport sector, it is important to implement measures to reduce the excessive dependence on private vehicles, which account for the majority of the sector's emissions, and promote the use of public transport, etc. It is essential, when doing so, to employ measures which reflect the local area's features, and for measures to be driven by the community with the collaboration of related parties.

In order to achieve this, the MLIT has implemented an "EST Model Project", selecting areas which are implementing leading efforts at achieving Environmentally Sustainable Transport (EST), and related ministries and agencies collaborate to provide support in the areas such as promoting the use of public transport, implementing measures to smooth automobile traffic flow, promoting the use of low-emission vehicles, and promoting awareness raising.

Over the three year period from 2004 to 2006, 27 areas were selected as EST Model Project areas, and each area has implemented three year model projects. related ministries and agencies are coordinating with each other, providing support and making information regarding the results of these projects available in order to expand EST to a nationwide scale. As part of these efforts, the MLIT website provides an EST Database with the results of these model projects, sharing information about how to effectively implement EST activities.

● MLIT website "EST Database"

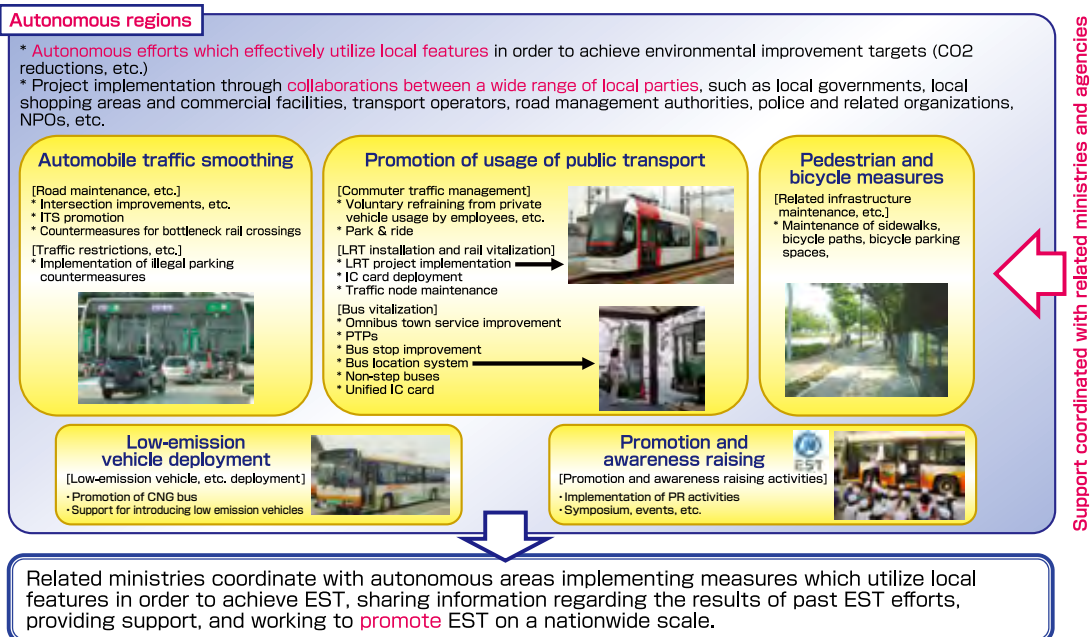


Source: MLIT website

● Promotion of Environmentally Sustainable Transport (EST)

Achieving Environmentally Sustainable Transport (EST)

* From 2004 to 2006, 27 areas were selected as EST model areas due to their leading efforts at achieving EST, such as promoting the use of public transport and implementing measures to smooth automobile traffic flow. Related ministries and agencies have collaborated to provide these model regions with concentrated support.
 * In the future the leading efforts of these 27 EST model regions will be applied on a nationwide scale in order to promote EST.



Source: MLIT "White Paper on Land, Infrastructure, Transport and Tourism in Japan" (Tentative Translated by Eco-Mo Foundation)

Regional EST Forum in Asia

The Regional EST Forum in Asia is a high level governmental policy discussion forum, jointly launched by the United Nations Centre for Regional Development (UNCRD) and the MOEJ with the aim of achieving Environmentally Sustainable Transport (EST) in the Asian region. Currently, there are 25 members countries (including Russian Federation) of the Forum. Participants include high level of government officials in charge of environment and transport agencies as well as experts in areas of environment and transport.

At the 10th Anniversary Regional EST Forum in Asia hosted by the Government of Lao PDR in Vientiane from 14-16 March 2017, the member states adopted the “Vientiane Declaration on Sustainable Rural Transport towards Achieving the 2030 Agenda for Sustainable Development”, recognizing the important role played by rural transport in the context of livelihood security and poverty alleviation. Some of the key messages of the Vientiane Declaration include —

- Rural transport remains a grossly neglected sector, yet sustainable rural transport is a key driver for improving rural wellbeing, economic development, community empowerment as well as livelihood and food security;
- Improved rural transport infrastructure and services are a key enabler to increased rural resiliency, rural empowerment and rural socioeconomic transformation through poverty eradication, hunger elimination, social integration, increased food security and improved supply chain logistics;
- Climate adaptive and disaster resilient transport investments in rural areas can help secure all-season access to markets and essential services and prevent isolation of fragile or remote communities, thus contributing to economic development and well-being;
- Improved rural transport connectivity to wider local, national and regional transport networks is key to achieve economic growth in rural areas; and
- It is important to explore innovative solutions to improve rural-urban connectivity; to improve and green supply chain logistics (from producers to consumers); to achieve safe and sustainable rural access, among others, are key to achieve sustainable regional development.
- The next 11th Forum is scheduled to be held in Ulaanbaatar, Mongolia in September 2018.

10th Forum opening ceremony



Source: UNCRD

■ Comprehensive support for energy creation, storage and saving in towns, residences and transport

Japan is facing unprecedented challenges, such as a shrinking and aging population, financial constraints, intensifying international competition, and energy restrictions prompted by the increasingly severe global environmental situation and Japan's earthquake and nuclear power plant disaster. In order to overcome these challenges and create a brighter future for Japan, the MLIT is working as one to carry out sustainable, energetic national and regional planning. The creation of a low carbon, recycling-oriented society is one new direction of policy development, and is an essential part of creating a sustainable society.

In disaster-affected areas, Future Cities, and comprehensive special zones, regional local governments, private businesses, and others are taking the lead in considering how to create a low carbon, recycling-oriented society. The MLIT is engaged in a wide range of fields closely tied to the economy and the lives of citizens. In these fields, the Ministry is providing comprehensive support for leading efforts by regions and businesses to create, store, and save energy in towns, residences, and transport by demonstrating practical capabilities, responsive capabilities, and comprehensive capabilities.

The Ministry is also supporting the formation of advanced concepts by local governments and private businesses for the creation of models tailored to city scales and local features, etc., in order to create, store, and save energy in towns, residences, and transport.

● Planning supports for comprehensive support model creation for energy creation, storage and saving in towns, residences and transport

2015

Implementing Region	Sponsor (Representative Organization)	Co-sponsor	Title
Sapporo City (Hokkaido)	Sapporo City		Sapporo City Center Self-Sustaining Distributed Energy Network Concept - Spreading the global word of Sapporo's efforts to use high efficiency energy to lead the way into the future -
Nagai City (Yamagata Prefecture)	Nagai City		The New Recycling-Based Community Development and Vitality Creation Concept of Nagai City, "The Water and Rainbow Plan City" - Rebuilding an energy recycling model using community resources and striving to firmly establish a low carbon transport society -
Hokuei Town (Tottori Prefecture)	Hokuei Town		Concept for Achieving Town Vitalization and Carbon Emissions Reduction by Utilizing Hokuei Town's Community Resources - Low carbon community development using wind power, farming, and Conan -
Kitsuki City (Oita Prefecture)	Kitsuki City		Concept for Generating, Storing, and Saving Energy in Kitsuki City, Accelerating Convection between Urban and Hilly Areas - Achieving a recycling-based Kitsuki which people will want to live in for 100 years -
Yatsushiro City (Kumamoto Prefecture)	Yatsushiro Future Development Council	Hinagu Onsen Ryokan Cooperative Society DFC Corporation	"Yatsushiro City Locally Generated Energy-Based Community Rebuilding and Transformation" Concept - Creating a new hot springs area utilizing community assets and striving to achieve a strong, energy economy recycling community -

2016

Region	Sponsor (representative group)	Co-sponsor	Title
Rikuzen Takada City, (Iwate Prefecture)	Research Institute for Sustainable Community	Rikuzen Takada City, Saneiwok Incorporated (Nippon TV group), Furukawa Electric Co., Ltd., Okano Electronics Co., Ltd.	Revitalization concept for a new Rikuzen Takada City by means of energy creation, storage and conservation for disaster prevention and transport infrastructure. - Aiming to build on the experience and lessons from the earthquake disaster to create a sustainable community -
Kurobe City, (Toyama Prefecture)	Kawabata Tekko KK	Geo Energy Co., Ltd., I'll Inc., Japan Asia Group Ltd., Kurobe City	A sustainable Kurobe urban development concept by means of small hydroelectric generation and expansion of transport network. - Aiming to achieve a city in which many citizens can receive the benefits of its abundant water resources -
Tamano City (Okayama Prefecture)	Unokotochi Co., Ltd.		Concept of transforming central Tamano City into a high value-added hub by means of energy creation, storage and conservation. - Port city Tamano situated along the Seto Inland Sea where people gather and interact -
Saikai City, (Nagasaki Prefecture)	Saikai City		Saikai Junkan Initiative which enhances the unique qualities of sea, hills and inlets. - Carbon-free Park Land concept which promotes the creation, storage and conservation of energy utilizing the features of the local sea environment -
Tsushima City, (Nagasaki Prefecture)	Tsushima City	Tokyo Institute of Technology AES Center	"Tsushima Model" concept which utilizes local energy products for local consumption with focus on hydrogen. - Low-carbon transport model project focusing on renewable energy-derived hydrogen -

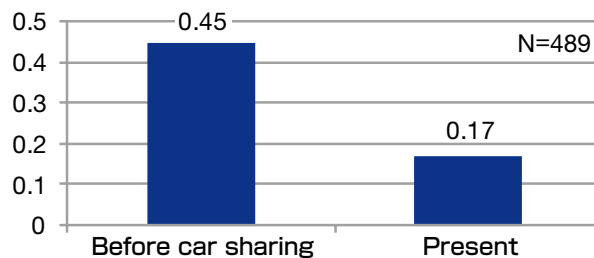
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Effectiveness of car sharing in reducing environmental impact

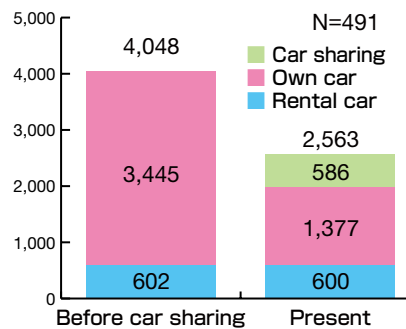
Car sharing, in which people can use cars when they need them, without owning the cars, is growing in popularity worldwide. Over 1million people in Japan utilize in car sharing (according to March 2017 survey by the Eco-Mo Foundation).

In 2012 the Eco-Mo Foundation performed an evaluation of the effectiveness of car sharing at reducing environmental impact. A survey of car sharers was carried out with the cooperation of five major car sharing operators. The survey found a decrease of over 60% in the number of cars owned per household after joining a car sharing scheme, a decrease of just under 40% in average annual miles driven, and an average annual reduction in automobile CO₂ emissions of 0.34t (45%). A report containing detailed survey results and measures for popularizing car sharing in the future can be found on the Eco-Mo Foundation website.

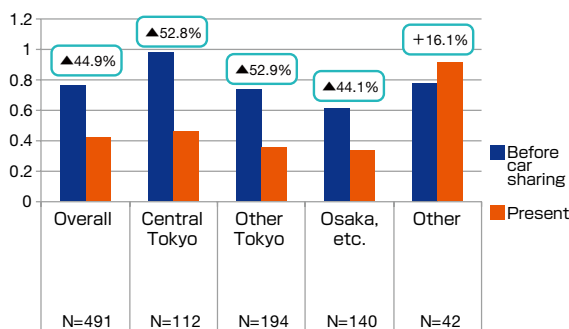
● Change in average number of automobiles owned per household



● Changes in annual total distance driven (km/year/household)



● Change in annual CO₂ emissions from automobile use (t-CO₂/year/household)



Note 1) Central Tokyo: Chiyoda ward, Minato ward, Chuo ward, Shibuya ward, Shinjuku ward, Bunkyo ward, Toshima ward

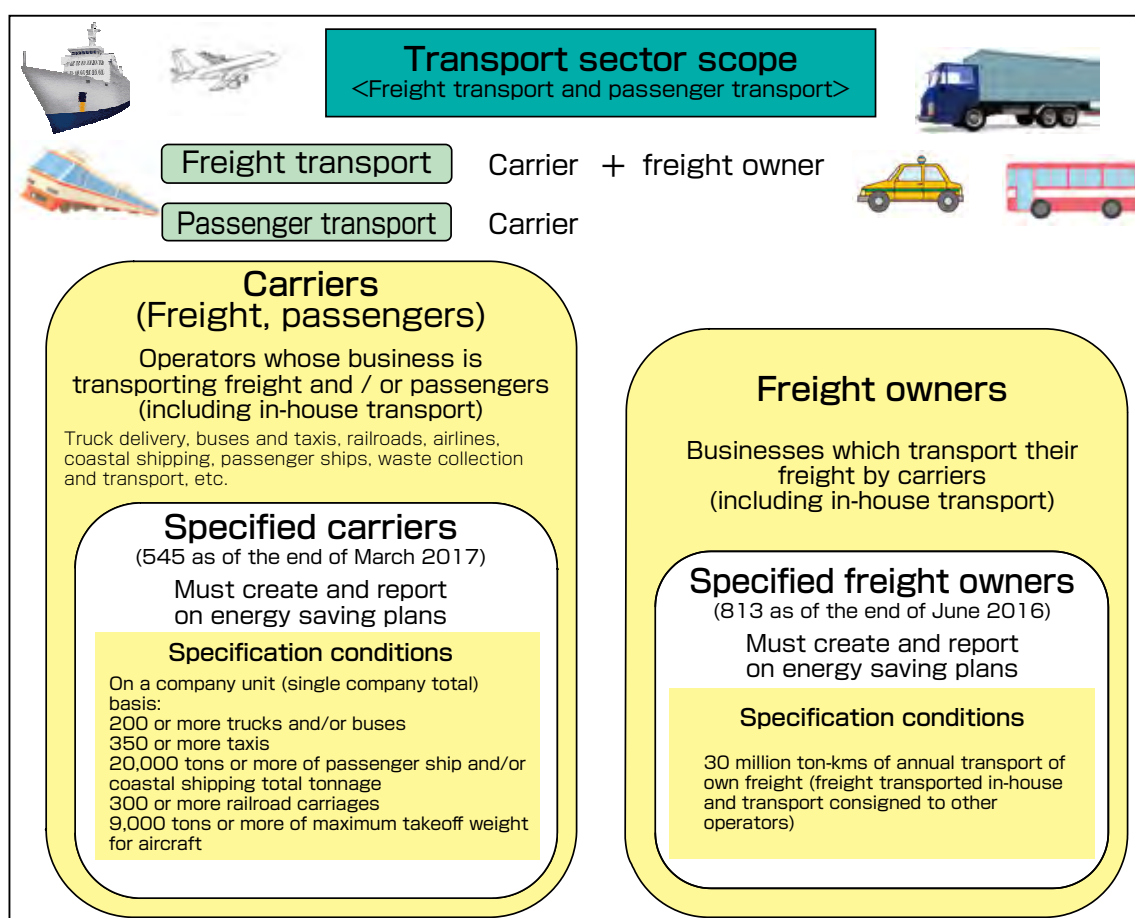
Note 2) Osaka, etc: Osaka Prefecture, Hyogo Prefecture, Kyoto Prefecture, Aichi Prefecture, Kanagawa Prefecture

(2) Energy Saving Act-based measures

The steady implementation of energy saving measures is an important challenge in tackling global warming.

The Act on the Rational Use of Energy (the Energy Saving Act) seeks to rationalize the use of energy based on operator's decision criteria defined by the national government. Operators (specified operators) using a specified amount of energy or more are required to report on their energy usage yearly, and formulate plans (medium to long term plan) (3-5 years) for rationalization of energy use. The transport sector was added in the April 2006 revision to the Act.

In order to ensure energy reductions within freight distribution sector, the Act applies not only to carriers but freight owners as well.



Specified carrier designation status (total of 545 companies as of the end of March 2017)

	Freight				Passengers				Aviation	Total
	Railway	Commercial trucks	Private trucks	Shipping	Railway	Buses	Taxis	Shipping		
No. of carriers	1	276	79	33	26	93	23	12	2	545

[Overview of determination criteria for carriers with respect to energy usage rationalization, etc.]

The following items are specified.

- (1) From a medium- and long-term perspective, each carrier should set as a target an annual reduction of 1% or more in energy consumption rates or electrical demand equalization evaluation rates.
- (2) Operators should formulate policies indicating their energy saving efforts, and appoint energy saving measure administrators and establish promotion systems for energy saving measures.
- (3) Carriers should strive to perform the following.

	Measures to be Taken
Common	· Enhance collaboration with freight owners and other carriers
Rail	· Introduce energy saving trains · Introduce freight trains capable of carrying large containers · Secure a transport capacity which accurately matches transport demand by adjusting the number of trains operated, etc. · Perform appropriate train inspections and maintenance
Automobiles	· Introduce low-emission vehicles · Promote eco-driving through driver education and use of digital drive records, etc. · Promote increases in truck and trailer sizes in accordance with freight volume · Perform cooperative delivery and improve loading rates through use of return cargo, etc.
Ships	· Introduce high fuel efficiency ships · Implement reduced energy consumption operation, such as economical speed operation · Promote increases in ship sizes in accordance with freight volume · Perform cooperative delivery to improve loading rates
Airplanes	· Introduce airplanes with superior energy usage efficiency · Rationalize ground operation energy usage · Promote appropriate equipment selection in accordance with freight volume · Coordinate aircraft operation, such as by reducing ferry flight distances

【Freight owner's decision criteria】

From a medium- and long-term perspective, freight owners will aim for an annual reduction of 1% in energy consumption rates or electrical demand equalization evaluation rates by implementing measures such as those below:

- Appointing energy saving measure administrators
 - Providing in-house training
 - Selecting environmentally-friendly cargo carriers (carriers who have obtained ISO14001 or green management certifications)
 - Promoting modal shifts
 - Shifting from the use of private tracks to commercial trucks
 - Performing cooperative delivery with other companies
- etc.

(3) International marine and air transport sector countermeasures

Introduction of international marine transport CO₂ regulations

The Kyoto Protocol does not cover carbon dioxide emissions from international marine transport. Instead, this topic is considered within the deliberation scope of the International Maritime Organization (IMO). Japan led an international framework for reducing carbon dioxide emissions, and in July 2011 adopted a revised convention that introduced fuel efficiency regulations that apply universally to international marine transport, applying equally to developed and developing countries.

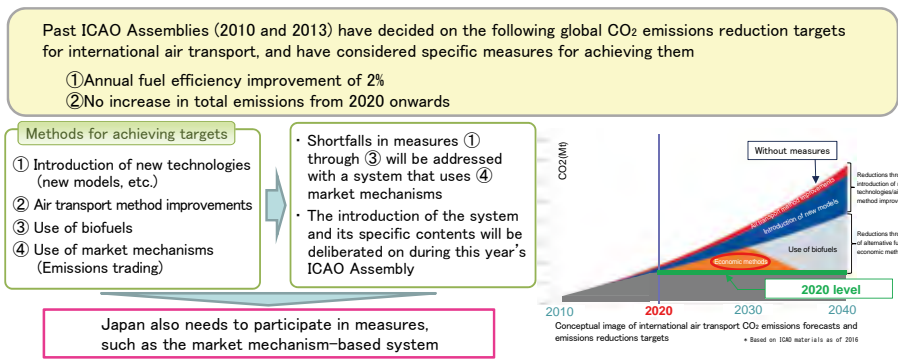
In order to comply with this revised convention, in 2012 the Act Relating to the Prevention of Marine Pollution and Maritime Disasters was revised, and regulations went into effect from January 2013. In order to increase the international competitiveness of Japan's maritime industry, which possesses exceptional CO₂ emissions reduction and energy-saving technologies, Japan is leading the development of an international framework which includes phased enhancement of fuel efficiency regulations and a fuel consumption figure reporting system. In the IMO Marine Environment Protection Committee meeting held in October 2016 (MEPC70), under Japan's leadership, it has been decided to adopt a treaty revision which introduces a fuel consumption amount reporting system. This system, which seeks to promote the reduction of greenhouse gas emissions from vessels by visualizing fuel consumption for individual vessels, requiring that they report fuel consumption amounts and other navigation data to the IMO from 2019. Furthermore, as of April 2018, we are aiming towards the formulation of a new IMO GHG reduction strategy which will enable IMO to set a greenhouse gas (GHG) emission target. The strategy will also outline future measures to reach the target and international negotiations are presently being conducted to that end. There is great expectation for Japan, as one of the world's leading maritime industrial countries, to take the initiative to attain a reasonable strategy balancing both contribution to the global warming measures and feasibility.

International air transport sector greenhouse gas emissions reduction measures

With regards to greenhouse gas emissions reductions in the international air transport sector, the International Civil Aviation Organization (ICAO) has engaged in deliberations aimed at defining global reduction targets ([1] annual fuel efficiency improvement of 2%, [2] prevention of total emissions from increasing from 2020 onwards), introducing new technologies, improving transport methods, utilizing alternative fuels, and creating a Global Market-Based Measure (GMBM) system which utilizes market mechanisms.

The 39th ICAO Assembly was held from September 27 to October 6, 2016, and consensus was reached regarding the GMBM. From 2021 autonomously participating countries will begin implementing reductions in greenhouse gas emissions by purchasing emissions rights based on the system, and from 2027 onwards participation will be mandatory for all countries except those with emissions levels below a defined threshold.

International air transport global warming countermeasures



The contents of the proposed system being deliberated on by the ICAO Assembly are as follows

(Based on proposal built on the results of the August 26, 2016, board of directors meeting)

Period:	2021 to 2026	2027 to 2035
Scope:	Voluntary participation by individual countries	Mandatory participation * Excluding countries with low emissions amounts, least developed countries, etc.
Airline emissions rights purchasing:	Increases in international air transport emissions from 2020 onwards to be allotted based on emissions by individual transport operators However, from 2030 onwards, individual reduction efforts by airlines will be reflected in stages	
Forecast Japanese airline burden (initial MLT calculation):	The total for Japanese airlines is expected to rise in stages from slightly over a billion yen per year in the first year of the system to several tens of billions of yen per year by 2035	

Note: International air industry average annual growth rate: 5.3%, Japanese airline average annual growth rate: 4.6%, Emissions credit price: 6 to 20 dollars/ton in 2020, 10 to 33 dollars/ton in 2030, Exchange rate: 105 yen/dollar

Source: MLIT (Tentative Translated by Eco-Mo Foundation)

Emissions trading system measures

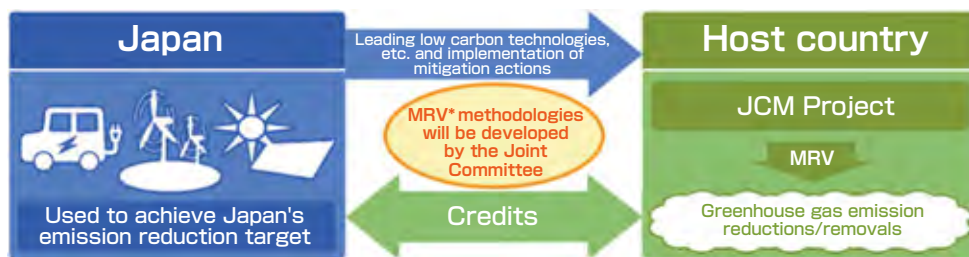
The Japanese government has proposed a Joint Credit Mechanism (JCM) for international emissions trading. With the end of the adjustment period for the first commitment period of the Kyoto Protocol (by 2015), countries not participating in the second commitment period cannot internationally transfer or acquire Kyoto Mechanism credits.

Japan is operating and promoting the J-Credit Scheme for domestic emissions trading.

■ Joint Credit Mechanism (JCM)

Japan has proposed the Joint Credit Mechanism (JCM) as a system for flexibly and rapidly transferring technologies and implementing countermeasures in accordance with conditions in developing countries in order to contribute to global emissions reductions and absorption. This mechanism quantitatively evaluates Japan's contributions to greenhouse gas emission reductions and absorption through usage and implementation of greenhouse gas reduction technologies, products, systems, services, infrastructure, and the like. This is used to help Japan achieve its emission reduction targets.

With the collaboration of host countries, the design of the mechanism will be further accelerated in the future, the mechanism will be put into effect soon, specific, concrete projects will be implemented, and the mechanism will provide transparency in order to contribute to UN discussions.



* MRV (Measurement Reporting Verification)

Source: New Mechanisms Information Platform (Tentative Translated by Eco-Mo Foundation)

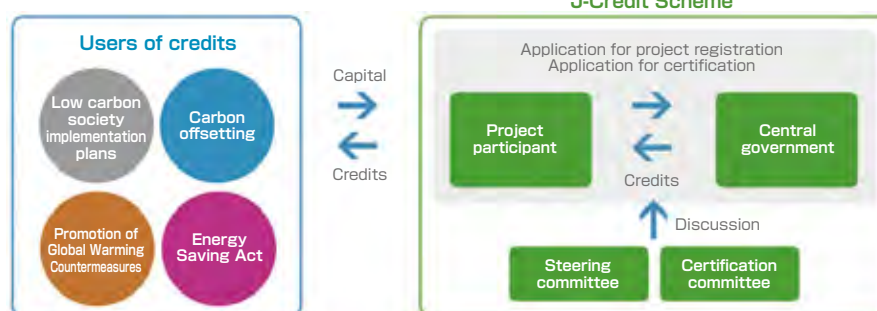
■ J-Credit Scheme

The J-Credit Scheme is system in which reductions and absorption of greenhouse gasses such as CO₂ through measures such as the deployment of energy-saving devices and forest management are certified by the national government as “credits”.

This system is an extension and merging of the domestic credit system and offset credit system (J-VER), and is operated by the national government.

The credits produced by this system can be used for various purposes, such as achieving “Commitment to a Low Carbon Society” and for use as carbon offsets.

● Outline of the J-Credit Scheme



Source: J-Credit Scheme website (Tentative Translated by Eco-Mo Foundation)

2 Promotion of emissions gas measures for trucks and busses (diesel vehicles), etc.

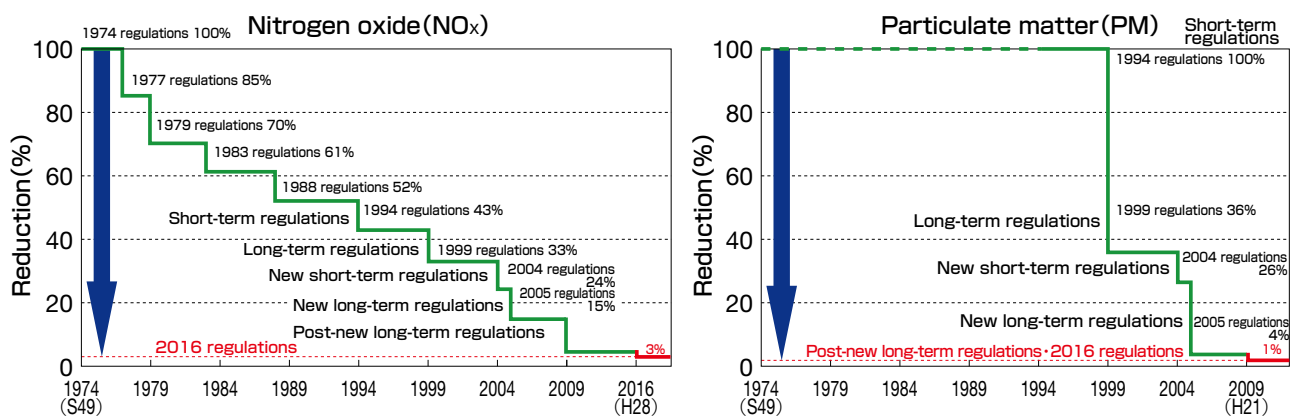
The problem of vehicle exhaust gas became a serious social problem with the rapid urbanization which began in the mid-1960s and the increase in vehicle traffic. For emissions gas measures for diesel vehicles it is especially important to reduce the amount of emissions of nitrogen oxide (NOx), which is a cause of respiratory disorders and causes photochemical smog and acid rain, and particulate matter (PM), a carcinogen. In order to do this, the government strengthened exhaust gas regulations by enacting vehicle composition regulations and repeatedly revising road vehicle safety standards. Furthermore, in 1992 the Automobile NOx Reduction Law (now the Automobile NOx/PM Law) was enacted to reduce NOx and PM emissions.

(1) Promotion of emissions gas measures for diesel vehicles

① Restrictions on manufacturers

In 2016 with the introduction of measures such as cold engine exhaust gas testing, the scope of exhaust gas regulations came to include vehicles with actual NOx emissions of about 1/3 of those included in previous regulations. As a result of the regulations, the vehicles will successively be replaced by clean diesel vehicles with dramatically improved exhaust gas performance.

● Vehicle exhaust gas restrictions (diesel-powered heavy vehicles)



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

②Restrictions on users

In urban areas where Automobile NOx/PM air quality standards had not met, nitrogen oxide countermeasure areas and particulate matter countermeasure areas were defined and restrictions were placed on vehicle users with the aim of achieving air quality standards in the areas by roughly 2010. Specifically, for areas specified in the regulations, users are prohibited from registering vehicles which do not meet specific exhaust standards (model prohibition) and mandate the submission of exhaust gas regulation plans by specified operators. Tokyo Metropolis, Saitama Prefecture, Chiba Prefecture, Kanagawa Prefecture, Hyogo Prefecture, and Osaka Prefecture have also defined ordinances restricting the inflow of non-compliance vehicles from other regions, for further reducing nitrogen oxide and particulate matter emissions.

In order to differentiate between vehicles which do and do not meet these standards, complied vehicles are issued with stickers, preventing the influx of illegal vehicles. Despite the implementation of restrictions affecting users in areas implementing these measures, non-compliance vehicles from other areas pass through intersections with heavy traffic, resulting in areas not meeting air quality standards. In response to this situation, the Automobile NOx/PM Law was partially revised in 2008 to apply to users outside regulation-specified areas as well.

Furthermore, in March 2011 the Automobile NOx/PM Law enforcement and ministerial orders were revised, extending the application of the regulations to users in order to achieve air quality standards targets in urban areas by 2020.

	Automobile NOx/PM Law	Tokyo, Saitama, Chiba, and Kanagawa Prefectures	Hyogo Prefecture Ordinance	Osaka Prefecture Ordinance
Category	National law	Ordinance	Ordinance	Ordinance
Regulated material	Nitrogen oxide (NOx), particulate matter (PM)	Particulate matter (PM)	Nitrogen oxide (NOx), particulate matter (PM)	Nitrogen oxide (NOx), particulate matter (PM)
Contents of regulation	Prohibits registration of vehicles which do not conform with exhaust standards (vehicles do not pass ongoing vehicle inspections)	Prohibits driving of vehicles which do not conform with exhaust standards	Prohibits driving of vehicles which do not conform with exhaust standards	Prohibits driving of vehicles which do not conform with exhaust standards
Vehicles affected	Vehicles whose use is based in specified measure implementation areas	Diesel vehicles driving in the area covered by the ordinance	Diesel vehicles driving in the area covered by the ordinance	Vehicles which arrive at or depart from the restricted area (does not apply to vehicles passing through the area)
Vehicle models affected	Diesel passenger vehicles, trucks, buses, special purpose vehicles (not including light motor, special vehicles, and passenger vehicles which use gasoline or LPG as fuel)	Diesel vehicles with license plate numbers 1-, 2-, 4-, 6-, or 8- (except for passenger vehicles with 8- license plate numbers)	Vehicles with total weights of 8t or more which cannot be registered due to their use being based in non-regulated areas specified by the Automobile NOx/PM Law (for buses, buses with capacities of 30 people or more)	All trucks, buses, and special vehicles other than passenger vehicles covered by the Automobile NOx/PM Law

(2) Appropriately maintained vehicle usage and appropriate fuel usage guidance

① Appropriately maintained vehicle usage

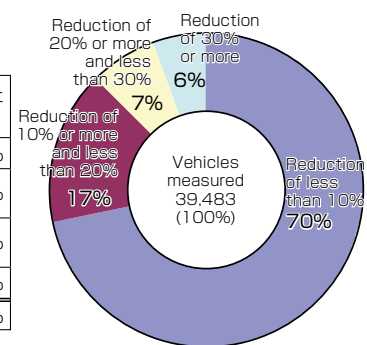
In order to reduce the environmental impact of vehicles, it is essential that they should be properly maintained and that they consistently maintain exhaust gas performance during operation. Insufficiently maintained vehicles emit greater amounts of NOx and PM than properly maintained vehicles, creating major environmental problems.

A study of reductions in emissions of black smoke after maintenance on diesel vehicles brought in for maintenance found that 30% of all the vehicles examined are found reduced the black smoke concentration 10% or more. This confirmed that inspection and maintenance significantly reduces diesel black smoke emissions.

● Reduction in black smoke emissions as the result of inspection and maintenance / Number of vehicles brought in for maintenance in October 2014

(According to a study by the Japan Automobile Service Promotion Association)

	Vehicles Measured	Percent age
Reduction of less than 10%	27,745	70%
Reduction of 10% or more and less than 20%	6,973	17%
Reduction of 20% or more and less than 30%	2,575	7%
Reduction of 30% or more	2,190	6%
Total	39,483	100%



(Breakdown of reductions in black smoke emissions as the result of inspection and maintenance)

② Appropriate fuel usage guidance

Since 2005 the MLIT has conducted street inspections to check fuel sulfur content. When incidents of use of illegal diesel fuel with high sulfur content are discovered, warnings or orders to switch to proper fuel are issued, with the goal of eliminating the use of illegal diesel fuel.

<Illegal diesel fuel>

Illegal diesel fuel refers to diesel fuel mixed with kerosene or fuel oil, and to manufactured diesel fuel which has been produced by adding sulfuric acid, etc. to fuel oil. Industrial waste such as sulfate pitch, which is discharged during the production of illegal diesel oil, is mostly disposed of by illegal dumping, creating environmental problems nationwide. Using illegal diesel fuel in diesel vehicles also increases the amount of air pollutants PM and NOx in their exhaust.

An illegal diesel fuel which mixes diesel oil and A-type fuel oil equally increases diesel vehicle exhaust gas PM levels by 14 to 17% and NOx levels by 7 to 8% in their exhaust gas.

● Illegally dumped sulfate pitch which has leaked out of its containers



3 Environmentally friendly vehicle promotion measures

The 2016 Eco-car tax reduction and green tax provision revision and extension, are described on the following page.

<Motor vehicle tonnage tax, automobile acquisition tax, light motor tax, etc.>

Eco-car tax reductions and green tax provisions have been reviewed and extended for two years, as indicated below.																																																																																																																																																																																																								
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Source: MLIT (Tentative Translated by Eco-Mo Foundation)

4 Creation of a recycling-oriented society

(1) Creation of recyclable resource distribution systems

① Formation of a recyclable resource distribution system using sea transport

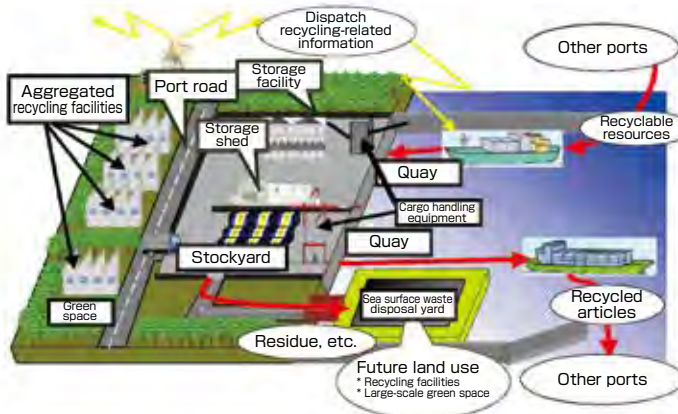
In order to create a recyclable resource cycle as part of the creation of a recycling-oriented society, 22 ports nationwide have been designated as Recycle Ports (integrated reverse logistics ports), centers of wide-area circulation of recyclable resources. The MLIT provides the support necessary to improve port facilities such as shipment transfer, storage facilities, and other recyclable resource handling support facilities, and implements modal shift and transport efficiency improvement-based low carbon reverse logistics promotion projects in order to reduce carbon emissions and costs using reverse logistics systems which utilize Recycle Ports.

● Recycle Port locations and Recycle Port image

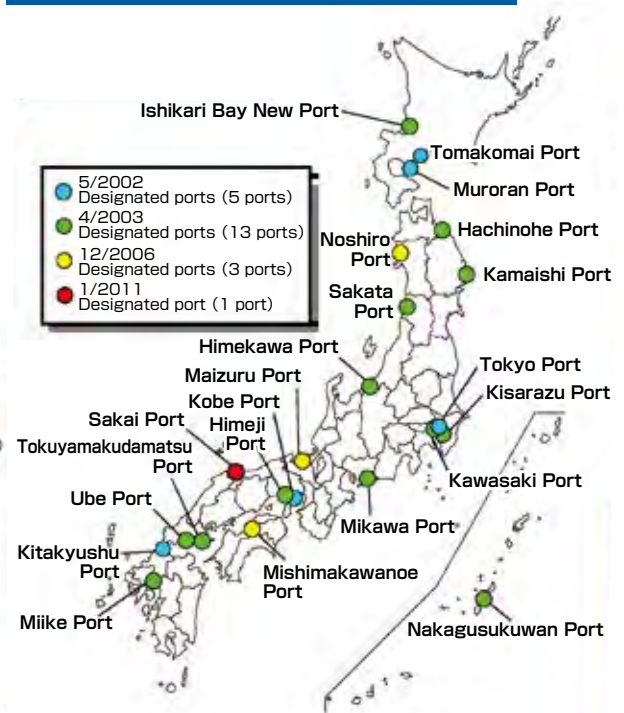
Recycle Port Policy

- Securing port facilities such as quays
- Providing support for the maintenance of shipment transfer and storage facilities, etc. (subsidized with subsidy rate of 1/3)
- Support (subsidies) for the creation of low carbon reverse logistics systems based on sea transport
- Improvement of operations related to recyclable resource handling
- Promotion of coordination between the government and private industry (use of the Recycle Ports Promotion Council, etc.)

Recycle Port Image



Designated Recycle Ports (22 ports)



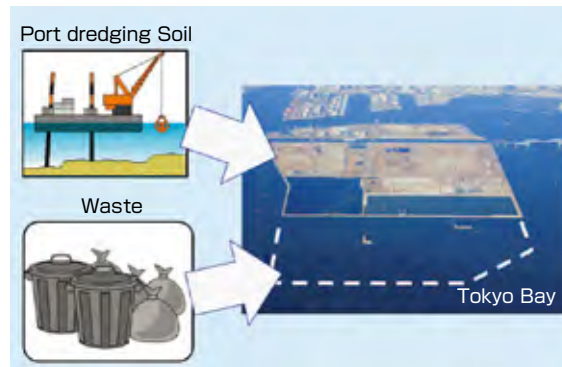
[Expected benefits] Support for the creation of a recycling-oriented society, reduction of environmental impact, reduction of recycling costs, and vitalization of coastal area industry

Source: MLIT (Tentative Translated by Eco-Mo Foundation)

② Systematic securing of sea surface waste disposal yards

In order to dispose of dredge soil from port improvement works and waste which is difficult to handle at the inland final disposal site, a systematic development of sea surface treatment plant is underway. In particular, at Osaka Bay, a wide-area treatment plant based on the Osaka Bay Phoenix Plan is being developed which enables the disposal of waste generated from the Osaka Bay area. In addition, construction-generated soil from the Tokyo Metropolitan Area is transported by sea based on the Super Phoenix Plan and is used on a wide scale as landfill material in ports and harbors nationwide..

● Promotion of planned improvement of sea surface waste disposal yards



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

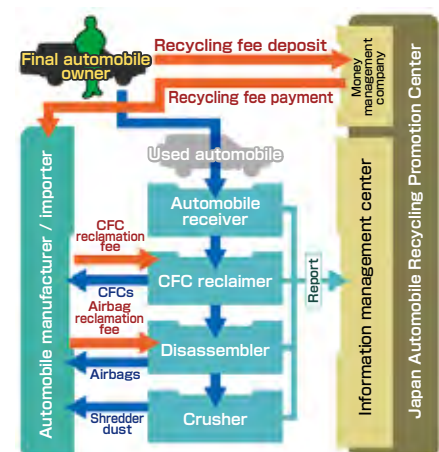
(2) Creation of vehicle recycling system

Every year between 4 and 5 million used vehicles are disposed of. Landfill space is running out, making it urgent to further increase the recycling rate, which is current roughly 80%. As of 2004, over 195,000 automobiles were improperly stored on roads, etc. each year. And over 20,000 automobiles were illegally dumped. These have a negative impact on living environments and disposal involves tremendous social costs, making it urgent to implement countermeasures.

In response to this situation, the Act on Recycling, etc. of End-of-Life Vehicles was enacted in January 2005. This law mandated appropriate divisions of duties between the parties involved in end-of-life vehicle disposal, focusing on automobile manufacturers. At the same time revisions were made to the Road Transport Vehicles Act mandating that vehicle registration be deleted only after confirming that vehicles were disassembled as specified in the Act on Recycling, etc. of End-of-Life Vehicles, and a motor vehicle tonnage tax reimbursement system was instituted for end-of-life vehicles. The aims of these efforts were the promotion of appropriate processing of end-of-life vehicles and the prevention of illegal dumping.

As a result of these efforts the nationwide number of improperly stored vehicles was 4,660 at the end of 2015 (a decrease of 97.6% versus the number in 2004), and the number of illegally dumped vehicles was 929 (a decrease of 95.9% versus the number in 2004), succeeding in both dramatic reductions.

● Act on Recycling, etc. of End-of-Life Vehicles system



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

(3) FRP boat recycling

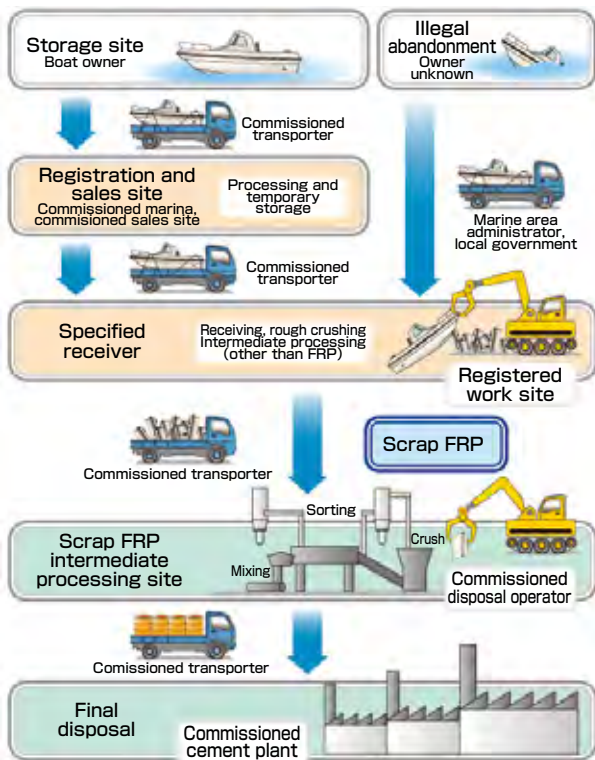
Ship recycling* is carried out primarily in developing countries such as India, Bangladesh and Pakistan. Industrial accidents and environmental pollution at ship recycling facilities, have come to be recognized as major problems. In order to resolve these problems, under Japan's leadership, organizations, especially the IMO, have engaged in discussions and adopted the "Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009" (tentative title) (also known as the "Ship Recycling Convention"). This convention requires that both ships and ship recycling facilities undergo inspections and maintain certificates, and requires the prohibition of usage of materials such as asbestos and polychlorinated biphenyl (PCB) in new ships.

Japan, seeking the rapid enactment of the Ship Recycling Convention, In an endeavor to expedite the conclusion of the treaty with India, a major recycling country, an ODA grant for India's ship recycling facility improvement project was determined at the Japan-India Summit held in September, 2017, and the intention for an early conclusion of the treaty was reaffirmed by the leaders of both countries. Japan promoting the creation of the domestic laws and regulations needed to join the convention.

The majority of privately owned pleasure boats are made of indestructive fiber-reinforced plastic (FRP), and there is a need for the establishment of appropriate disposal routes, so Japan has worked to establish FRP boat recycling technologies and processing routes. As a result of these measures, in 2005 the Japan Marine Industry Association has led nationwide FRP boat recycling activities, and currently approximately 540 boats are appropriately recycled every year.

* Ships which have reached the end of their lifespans are disassembled and the majority of the ships' materials are used for steel.

●FRP boat recycling system



Source: Japan Marine Industry Association FRP Boat Recycling Center (Tentative Translated by Eco-Mo Foundation)

5 Measures by local governments, companies, citizens' organizations, etc.

(1) Measures by local governments

Local governments are implementing global warming countermeasures, tailored to their local features, in the transport and traffic sectors. This section looks at efforts by Sendai City (population: 1,090,000), Himeji City (population: 530,000), and Kanazawa City (population: 470,000).

■ Sendai City – Subway-focused community development –

In preparation for the opening of the Tozai Subway Line (on December 6, 2015), Sendai City implemented various transport environmental measures, both physical and systematic, under the “Sendai Urban Transport Plan.”

Major activities included a restructuring of the city's bus network, integrating with its rail network. This included the holding of roughly 60 explanatory meetings with members of the community regarding the creation of the feeder routes, carrying out measures while gaining the understanding of transport users. The functions of transport nodes, such as station-front plazas, park-and-ride parking lots, and bicycle parking lots, have been enhanced, and “Datebike” community bicycles are used to help support transport at network terminus points. Furthermore, ongoing mobility management is being used to promote the usage of public transport under the “Sendai Smart” mobility management plan, aimed at diverse users such as companies, new residents, university students, and elementary school students.

These diverse traffic environment measures are positioned as part of comprehensive transport-based community development and being carried on from a medium- and long-term perspective.

● Sendai City's Tozai Subway Line



Source: Sendai City

■ Himeji City

-Urban Development Based on Public Transport (Railway and Buses)-

In Himeji City, “Himeji City Integrated Transport Plan Based on Public Transport” was formulated in August, 2008, and relevant departments are promoting the various policies. By promoting the foregoing plan, the goal is to increase the number of users for public transport which are on a downward trend and to maximize the effect from 3 perspectives, namely “economy,” “safety and security”, and “environment,” such as by alleviating traffic congestion in the city center and CO₂ reduction in the transport sector. According to this plan, the policies are being developed based on the following 3 pillars, i.e. “improvement in the user-friendliness of public transport,” “improvement in the usage environment” and “promotion of participation and cooperation”

Improvements in transport hubs and passenger terminals in areas surrounding the station including the development of new stations are being implemented, as well as operation of community buses in remote areas. Particularly around JR Himeji Station, development of a public square in front of the station is underway with a dramatic increase in environmental space and passage of general vehicles are regulated in transit malls. In addition, a share cycle system has been introduced, as a secondly means to promote public transport.

A bus location system has been introduced for fixed-route buses and improvements are being made in cooperation with transport operators such as IC tickets for railways and fixed-route buses, etc.

With emphasis on the promotion of public transport usage and triggered by West Japan Railway Company’s transport improvement project and trial increase in the number of services, JR Kishinsen has begun a “3-million persons challenge campaign” with towns along the route and business operators, exerting continuous effort to achieve continuous increase in the number of of passengers while utilizing local resources. Moreover, each year, public transport classes are being held by transport operators with elementary school children as the target to prepare the next generation with regard to this endeavor.

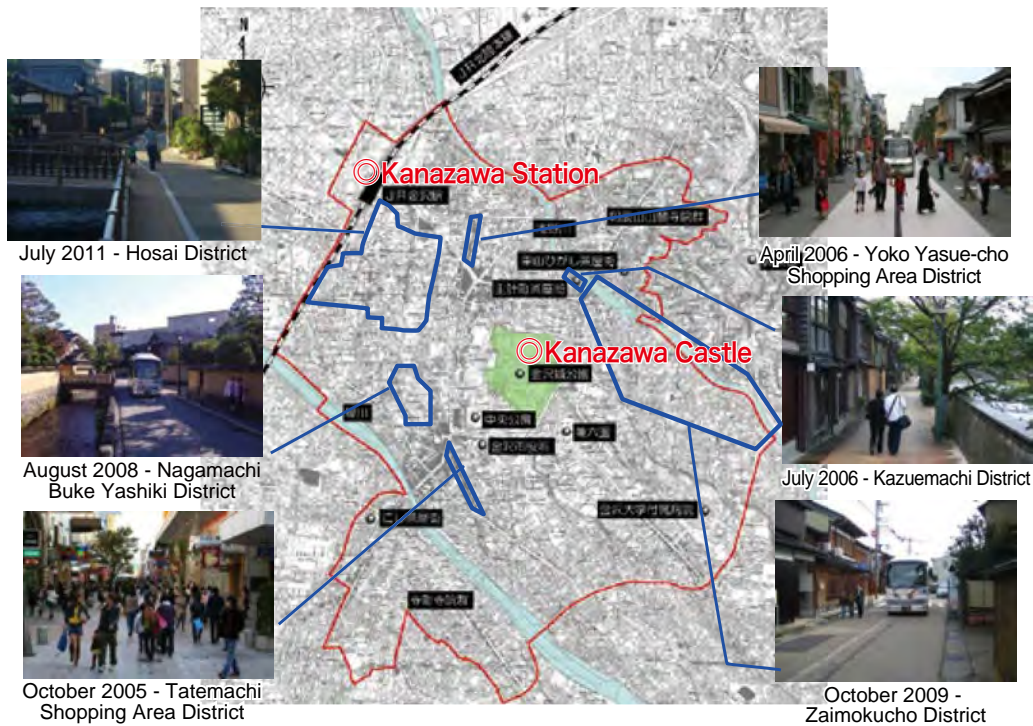
● Himeji Station North Public Square and Transit Mall (World Heritage Site and National Treasure Himeji Castle shown in the front)



Source: Himeji City

Kanazawa City - Walkable town development (pedestrians and bicycles) -

Kanazawa City is implementing walkable town development. Walkable town development agreements have been entered with six of the city's districts, contributing to the creation of pedestrian-friendly environments through traffic restrictions such as preventing access by personally-owned vehicles.



Source: Kanazawa City (Tentative Translated by Eco-Mo Foundation)

The city has also introduced “Machinori” public rental bicycle system. There are 21 cycle ports in the city, and the share cycle system allows users to pick up and return bicycles from any cycle port. Usage is growing, particularly by tourists.



- 21 cycle port locations
- Located at train stations, major sightseeing spots, and public facilities



Source: Kanazawa City (Tentative Translated by Eco-Mo Foundation)

(2) Measures by companies in the transport sector

① Aviation companies

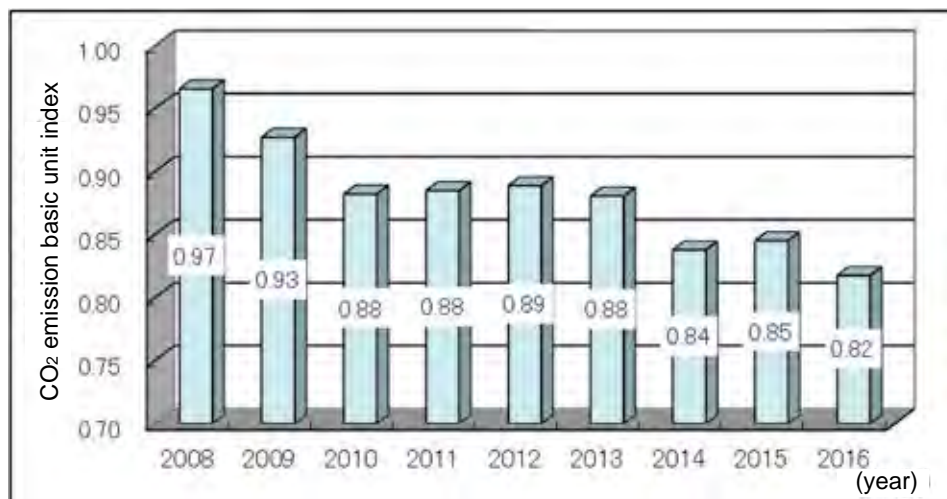
The Scheduled Airlines Association of Japan, a Japanese association of air transport operators, has implemented environmental measures. Major measures are the following.

○Global warming prevention targets:

Target: Reduce energy consumption base units in 2020 by 21% in comparison to 2005

CO₂ emission basic units: 0.00095t-CO₂/RTK (revenue ton kilometers)

Achievement: Reduce energy consumption base units in 2016 by 18% in comparison to 2005



Source: The Scheduled Airlines Association of Japan (Tentative Translated by Eco-Mo Foundation)

Contents of measures:

- Introduce new high fuel efficiency airplanes
- Using area navigation etc, a high-precision navigation method, to reduce flight distances and times
- Reduce weight of loaded articles (reduce weights of cargo containers and in-flight meal facilities, optimize amounts of fuel and drinking water)
- Recover engine performance and improve fuel efficiency by cleaning engines
- Working with related parties to identify issues involved in introducing alternative fuels such as biojet fuel, and considering measures for resolving these issues

○Support for the creation of a recycling-oriented society

Target: Lower industrial waste final disposal rate to 2.4% or below for 2020

Achievement: Industrial waste final disposal rate in 2016 was 3.8%

Contents of measures: Promote garbage separation and reclamation, promote reuse and recycling, and select waste processing companies with resource recycling technologies, etc.

○Environmental awareness raising activities

- Participation in afforestation around airports nationwide and coral planting in Okinawa and development of eco-tours related to the foregoing activities
- In order to raise environmental awareness of children who represent the future, environment seminars by pilots will be held.

② Railway companies

The Association of Japanese Private Railways, an association of railway operators in Japan, has formulated "Commitment to a Low Carbon Society" and carried out the following principal measures as part of this plan.

Target: Reduce power usage base units in 2020 by 5.7% in comparison to 2010

Reduce power usage base units in 2030 by over 5.7% in comparison to 2010

Contents of primary measures:

○Introduction of energy saving cars

Energy saving trains such as VVVF controlled trains, which consume less power, and regenerative brake-equipped trains, which efficiently use power, are being introduced.

●Rates of introduction of energy saving cars by 16 major private rail companies

(as of March 31, 2017)

	Control method	No. of cars owned	
			Number of reduced weight cars
Cars with regenerative brakes	VVVF control	11,443 cars*	10,226 cars
	Chopper control	2,512 cars*	1,306 cars
	Resistance control, other	616 cars*	237 cars
Cars without regenerative brakes	Resistance control, other	2,564 cars	314 cars*
Total number of cars owned		17,135 cars (A)	12,803 cars
Number of energy saving cars (trains with regenerative brakes or reduced weight cars)		14,885 cars (B) (total of cars indicated with a *)	
Share of energy saving cars		86.9% (B/A)	

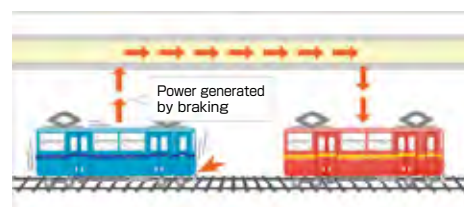
Note 1: As a general rule, only commercially used cars are included (funicular lines and new transport lines are not included)

Note 2: "Reduced weight cars" are cars made with stainless steel or aluminum.

Source: The Association of Japanese Private Railways (Tentative Translated by Eco-Mo Foundation)

○Usage of energy saving systems (regenerative brakes, regenerated power storage devices)

Trains with regenerative brakes, which generate power when braking and return the power to the overhead power lines for re-use, are being actively introduced.



○Noise and vibration reduction

Efforts to reduce noise and vibration include the introduction of reduced noise trains, the use of long rails to reduce the number of rail joints, the use of synthetic cross-ties, and the installation of elastic material such as rubber between concrete railbeds and cross-ties.



○Use of natural energy

Solar panels and wind power generators are being installed on the roofs of stations, using sunlight and wind to generate the power used by the station.



Source: The Association of Japanese Private Railways (Tentative Translated by Eco-Mo Foundation)

③ Truck, bus, and taxi companies

Each industry associations have formulated voluntary action plans as environmental measures, striving to popularize green management certification and promote eco-driving, etc.

■ Japan Trucking Association

Target: Reduce CO₂ emission basic units per ton kilometer from commercial trucks in 2020 by 22% in comparison to 2005.

Contents of measures:

- Promote introduction of low-emission vehicles
 - ◇ Provide aid for the introduction of CNG vehicles and diesel hybrid vehicles
 - ◇ Distribute pamphlets, etc. which raise awareness of replacing vehicles with low-emission vehicles
- Promote eco-driving
 - ◇ Hold eco-driving training sessions and promote attendance at the said sessions
 - ◇ Distributed by data download from website energy saving driving manuals, energy saving driving recommendations, eco-driving promotion notebooks, eco-driving promotion manuals
 - ◇ Promote drive recorders.
 - Provide subsidies for the introduction of vehicles with eco-driving management systems and/or drive recorders, which are effective at ensuring eco-driving
 - ◇ Provide subsidies for the introduction of devices which support the shutting off of engines when parked
 - Provide subsidies for the acquisition of vehicle-mounted heating and cooling devices (air heater, truck battery driven coolers) which can be used continuously for long periods of time when engines are stopped during truck driver breaks, when waiting for cargo to be loaded, etc.

■An Example of Initiatives Implemented by Businesses: Tomijima Unyu Co., Ltd.

Tomijima Unyu Co., Ltd. carries out business ranging from transport, storage, loading, shipping to customs clearance of export cargo. The Yokohama Distribution Center has acquired a “Green Management Certificate” and is tactfully incorporating various global environmental conservation elements into their business such as generous investment toward control of energy use as well as originality and ingenuity with regard to waste management and is working proactively to that end.

<Acquisition of a “Green Management Certificate” for the Realization of “Contribution to Environmental Conservation”>

The objective that our company had in aiming for the acquisition of a “Green Management Certificate” was “Contribution to Environmental Conservation.” However, enhancing energy efficiency is effective not only in reducing CO₂ emission but also in cost reduction, making it a matter on which companies should be focused. Proper treatment of wastes and promotion of recycling are indispensable for environmental conservation. In order to continue such efforts, we realized that it would be effective to incorporate them into daily duties. Consequently, this certificate was acquired so that we could create a structure and develop a system to achieve this goal.

<Promoting of the Initiative in Accordance with Environmental Policies Heightened the Awareness of Employees>

In carrying out environmental activities, a thorough grasp of the total energy consumption such as electricity and fuel is extremely vital; however, we had no awareness in this regard. Owing to the “Green Management Certificate” effort, an accurate figure was obtained and such figures were displayed to all employees engaged in this effort at morning assemblies and on notice boards. By being able to see the effects of daily efforts, interest toward the environment on the part of the employees was heightened, contributing to awareness raising. Next, we will introduce activities we have developed in accordance with our environmental policies.

Environmental Policies

Basic Policies

- ① Laws and regulations pertaining to the environment shall be adhered to and efforts shall be made toward environmental conservation.
- ② Efforts shall be made to enhance energy efficiency with regard to electricity and fuel and to promote energy saving measures.
- ③ Education and awareness activities shall be implemented with regard to environmental conservation.
- ④ Appropriate disposal of wastes in accordance with laws and ordinances shall be implemented, and efforts shall be made to prevent environmental destruction.
- ⑤ 3R (reduce, reuse, recycle) with regard to packaging materials for business shall be promoted in order to reduce wastes and save resources.
- ⑥ These policies shall be implemented, maintained and thoroughly communicated to all employees.
- ⑦ These policies shall be made public outside the company.

<Reduction of Diesel Fuel Use by No Idling Measure>

By having a “NO IDLING” sign on the “On-Site Parking Permit” for vehicles entering into the premises, we are urging the reduction of unnecessary idling of vehicles. In addition, but making a sign with white ink on the wheels of forklifts, we are endeavoring to make exceeding the speed limit obvious at a glance and are calling for all not to waste fuel unnecessarily.

In 2012, a solar power system was introduced to curtail the purchase of power to the extent possible and to achieve CO₂ reduction. The electric power generation between January and August of 2016 was 9,707kWh, covering approximately 2.0% of the total power consumption. In addition, skylight windows in facility buildings was installed in order to reduce the usage of lighting and power usage was monitored by introducing a demand surveillance system. The demand surveillance system issues a warning when the hourly power consumption exceeds the target level. There is an in-house rule to thin the lighting in designated areas and the managers provide power-saving instructions in accordance with the rule. Such efforts have proven effective and the ratio of solar power to total power usage is increasing each year.

<Separation and Compression of Wastes>

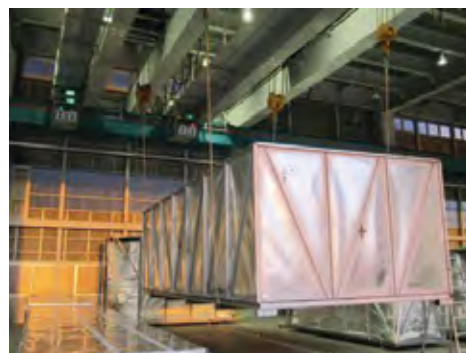
Recyclable items and wastes are separated on-site, and recyclable items are further re-separated by machine and made into valuable resources. Recyclable items and wastes are compressed by a press and transported by a commercial company. Furthermore, by compressing the waste, mass transport becomes possible, contributing to reduction in expenses as well as transport efficiency for the transport company. All employees are required to take turns in carrying out the compression task so that they are motivated not to throw trash out indiscriminately and to sense the importance of separating trash.

<Cases Contributing to Environmental Conservation>

In addition to initiatives outlined under environmental policies, there are many cases which are contributing toward environmental conservation. We will introduce some examples:

◇ Steel packaging

Protective frame for transporting large cargo is being changed over from wood to steel. This not only contributes to protection of forest resources but enables miniaturization of the package size, aiding in cost reduction for the customers as well. In addition, steel scraps are 100% recyclable, thus proving effective in waste reduction.



Steel packaging

◇ Provision of wood scraps

As part of waste reduction measures, discarded wood scraps are provided free of charge to neighboring public bath houses (sento) and stock farms.

◇ Utilization of barges (ship to transport cargo to foreign trading vessels)

Barges have 10 times the transporting capacity of trailers. They enable mass transport; thus, by changing the method of transport to the trading vessel, from land transport to sea transport using barges, reduction in the environmental load may be attained.



A ship transporting cargo from a barge to a foreign trading vessel
Promotion of environmental measures through the use of barges

◇ Peripheral cleaning activities

As a corporate endeavor, we are proactively participating in the industrial park cleanup day (once a month).

<Aiming for Further Environmental Conservation >

As future plans for activity, by promoting LED use for mercury lamps within the premises, we expect to save approximately 5 million yen per year in electricity rates and achieve an energy-saving effect of 69.7%. The service life of lamps has also been extended by approximately 5 fold, thereby raising expectations for various effects such as CO₂ emission reduction, cost reduction and waste reduction.

Furthermore, by changing aging forklifts to the latest models that are compatible with emission regulations, anti-polluting exhaust may be achieved. Moreover, we will promote new environment load reduction measures, strengthen and promote further measures for the separation of wastes, and work towards the enhancement of education, thereby maintaining a high awareness level on a corporate-wide scale.

■ Nihon Bus Association

- Bus business "Commitment to a Low Carbon Society" -

Target:

○Cut CO₂ emission intensity in 2030 by 6% in comparison to 2015.

○Promote shift from use of private vehicles to buses.

Specific activity contents:

○CO₂ emission rates reduction measures

- Nationwide promotion of eco-driving

Member companies are striving to ensure drivers thoroughly engage in eco-driving, such as by stopping their engines when idle, and avoiding quick acceleration and quick braking. During Eco-Driving Promotion Month, of which the Nihon Bus Association is a leading advocate, the association takes even more intensive measures, such as carrying out checks of eco-driving implementation. The association is also actively equipping buses with devices which contribute to eco-driving, such as start-stop (idling-stop) devices and digital drive recording devices.

- Promotion of introduction of high fuel efficiency buses

When purchasing new vehicles, national, local government, and Nihon Bus Association subsidy systems are used to actively strive to deploy hybrid buses and high fuel efficiency buses.

- Enforcement of detailed inspections and maintenance which help maintain fuel efficiency performance

○Measures for promoting shifting from use of private vehicles to buses

- Bus usage promotion

The association is implementing the following measures in order to improve omnibus convenience and promote bus usage.

◇Popularization of non-step buses and pleasant, comfortable buses

◇Promotion of installation and improvement of shared card systems and IC card systems

◇Popularization of information systems such as bus location systems

◇Active participation in regional measures such as Park & Bus Ride and omnibus town systems

- Driving environment improvement

◇Issuing of requests to related organizations whenever possible regarding the creation of bus-only and bus-priority lanes, bus-prioritizing traffic signals, the removal of illegally parked vehicles in streets used by buses, etc.

■ Japan Federation of Hire-Taxi Associations

- Hire-taxi industry “Commitment to a Low Carbon Society” (voluntary action plan) -

Target level:

- 2020 target (total volume of emissions target)
Reduce CO₂ emissions by 20% in comparison to 2010.
- 2030 target (total volume of emissions target)
Reduce CO₂ emissions by 25% in comparison to 2010.

Basis used to establish targets:

- 2020 target
30% of taxis will consist of HVs, EVs, or other environmentally friendly vehicles. CO₂ emissions will be reduced by reducing fuel consumption through demand and supply optimization.
- 2030 target
40% of taxis will consist of HVs, EVs, or other environmentally friendly vehicles. CO₂ emissions will be reduced by reducing fuel consumption through demand and supply optimization.

Specific plans:

- Global warming countermeasures
In order to achieve hire-taxi industry target levels, the following countermeasures will be promoted and the federation will coordinate and collaborate with national and local governments as necessary.
- Switchover to environmentally friendly taxi vehicles
 - ◇By 2020 30%, by 2030 40% of taxis will consist of HVs, EVs, or other environmentally friendly vehicles, and the association will encourage automobile manufacturers to speedily launch HV vehicles which use LP gas.
- Optimization of the number of taxi vehicles
 - ◇Based on the “Act on Special Measures Concerning the Rectification and Vitalization of the General Passenger Vehicle Transport Business in Specific Regions”, revised in November 2013, the federation is promoting the elimination and suspension of vehicles in order to eliminate excess supply.
- Taxi usage promotion
 - ◇The federation is promoting universal driver training and cultivating high quality drivers.
 - ◇The federation is striving to improve user convenience and promote taxi usage by improving taxi stands and promoting the deployment of advanced technologies such as smartphone-based technologies.
 - ◇The federation is working to expand shared taxi use and reduce the amount of private vehicle usage.
- Enrichment of and PR for sightseeing taxis
 - ◇The federation is striving to enrich and engage in PR for sightseeing taxis in order to reduce the usage of private vehicles on freeways and at destinations, cut exhaust gas emissions, mitigate traffic congestion and parking space shortages, and reduce the number of traffic accidents.
 - ◇Multilingual audio translation system and foreign language sheets which can be used by pointing at phrases are being prepared and supplied in order to enable taxi drivers to accommodate foreign passengers.
- Improvement of operation efficiency
 - ◇The federation is promoting the use of GPS-AVM-based taxi assignment systems and advanced technologies such as smartphone-based technologies in order to improve operation efficiency and reduce exhaust gas emissions.
 - ◇Requests are being issued to related organizations to establish and improve taxi pools in order to reduce the amount of unoccupied taxi operation.

- Eco-driving
 - ◇The federation is working to ensure thorough stopping of engines when vehicles are stopped, prevention of excess vehicle cooling and heating, and prevention of quick acceleration and braking.
 - ◇Engines are to be stopped when drivers are taking rests, naps, and washing vehicles.
 - ◇Green management is being promoted through measures such as expanding the number of operators with green management certification.
 - ◇The federation is promoting the stopping of engines when vehicles are stopped and the deployment of EMS (digital tachographs) in order to support eco-driving.
- Office and business site measures
 - ◇Air conditioner thermostats in offices and business site are set to 28 degrees or higher during the summer and 20 degrees or lower during the winter.
 - ◇Training regarding environmental measures and fuel efficiency improvements are provided to mechanics and drivers through maintenance managers and driving managers.
- Improvement of environmental issue related implementation systems
 - ◇Environmental measure related policies such as carbon offset policies are considered by committees such as technical and environmental committees.
- PR regarding global warming countermeasures
 - ◇The federation will use websites, posters, stickers applied to taxis, and other means to publicize the taxi industry's efforts to reduce CO₂ emissions and increase awareness among the general public regarding the prevention of global warming.
- Creation of a recycling-oriented economic society

Disposable economic society will be reevaluated from the position of effective resource utilization, and hire-taxi operators will do their utmost to achieve the following, in order to systematically reduce waste production, and to recycle resources.

 - ELVs will be processed appropriately in accordance with the Act on Recycling, etc. of End-of-Life Vehicles.
 - End-of-life tires, etc. will be appropriately processed as industrial waste.
 - Recycling will be promoted through measures such as the proactive purchasing of recycled products.

④ Warehouse operators

The Japan Association of Refrigerated Warehouses is continuing its efforts to reduce “CO₂ emissions and energy usage” in 2017 as well, through measures such as: ① Subsidy support for the promotion of investment of energy conservation (subsidizing 1/3 of project costs) and Energy conservation promotion project of industrial-use refrigeration and air conditioning equipment in order to achieve a CFC-free society (subsidizing 1/2 of project costs), ② carrying out “Energy usage fact-finding studies” and “Coolant studies” to collect basic data related to CO₂ emissions reductions, and ③ promoting the acquisition of green management certifications (subsidizing part of the cost of acquiring new green management certifications).

(3) Measures by citizens' organizations

The expansion of lifestyles which are dependent on the use of private cars has resulted in chronic traffic congestion and the waning of public transport. In order to create a shift from the use of private cars to public transport, Car-free Day are taking place.

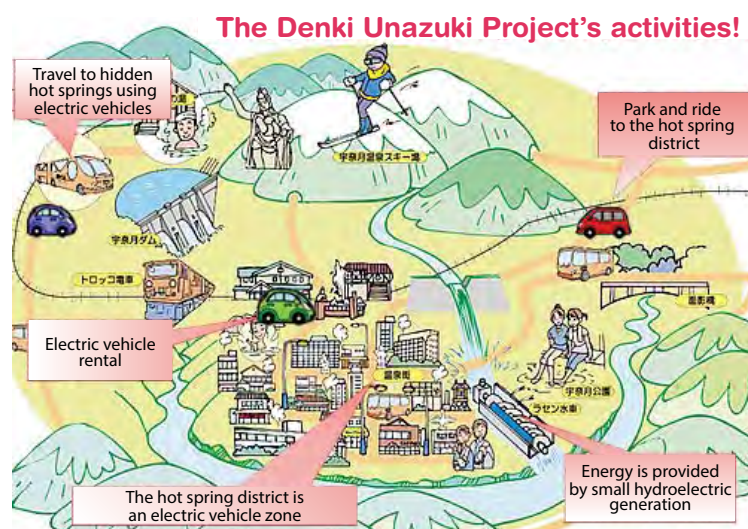
Every year cities around the world take part in Mobility Week (September 16 to September 22), initiatives in which residents refrain from using their own personal vehicles in central city areas and consider the issues of traffic and its effects on the environment, and urban life and how to best use vehicles. These transport measures and events, which began in Europe, have spread to roughly 2,000 cities around the world, linked by a common objective and working at the same time in a global environmental and transport event. In 2017 12 cities in Japan participated. (Sendai City, Saitama City, Yokohama City, Zushi City, Matsumoto City, Kanazawa City, Fukui City, Toyohashi City, Kyoto City, Osaka City, Takamatsu City, Naha City. The main Car-free Day event was canceled due to stormy weather in two cities of them.)

In addition, the non-profit corporation, Earth Life Network is conducting a joint eco-drive project with Shizuoka Prefecture and various automobile-related organizations within Shizuoka Prefecture (Automobile Business Association of Shizuoka, Japan Automobile Dealers Association Shizuoka Branch, and Japan Automobile Federation (JAF) Shizuoka Branch, Shizuoka Prefecture Designated Driving School Association) by establishing the “Fuji-no-kuni ‘Eco-de-anzen’ Drive Promotion Consortium.”

Particularly with automobile dealer employees as the main target, a seminar including practical training is being conducted for the purpose of training “communicators” for fellow employees and general users. In addition, the project is carried out on a wide scale, such as having OJT at various dealerships as the venue to hold eco-drive seminars for general customers. PR booths have been placed at such events as “Fuji-no-kuni Traffic Safety Prefectural Citizens Fair,” collection of “Eco-drive Statement Cards” consolidating eco-drive points is being made, and dissemination of knowledge regarding eco-drive is carried out at various driving schools with the cooperation of the Driving School Association.

The Denki Unazuki Project Planning Committee was established in July 2009, and with the cooperation of community residents, it has carried out activities aimed at creating a natural energy public transport system that exists in harmony with the rich natural environment though measures such as small hydroelectric generation, with the aim of achieving local consumption of locally produced energy. In July 2013 the unincorporated association became the Association of Denki Unazuki Project.

At the Unazuki Hot Spring, it introduced a public transport project using renewable energy such as small hydroelectric generation and EV busses (eCOM-8 low-speed eight wheel electric community vehicles, known as “EMU”). The Association is working to attract tourists to Unazuki Hot Spring, which has flourished as an advanced eco-hot spring resort as the result of this power development, and to promote autonomous community development from the perspective of local consumption of locally produced energy.



Source: Denki Unazuki Project website (Tentative Translated by Eco-Mo Foundation)

Nationwide Bus Map Summit (Bus map creation initiative by residents)

The Nationwide Bus Map Summit is held roughly once a year by the Nationwide Bus Map Summit Planning Committee, which is composed of citizens' organizations and other bus map creating organizations.

Approximately 100 people from across Japan participate in each summit, sharing the map creation expertise of citizens, not transport operators or administrative authorities, and engaging in passionate discussions about the future of public transport.

●List of citizen's organizations in the Nationwide Bus Map Summit Planning Committee

Region	Name	Bus Map, etc.
Sapporo	Yourun	Sapporo Super Convenient Bus Map Hakodate Super Cool Bus Map Iwamizawa Super Rice Bus Map
Hirosaki	H · O · T Managers	"Hotto" informational magazine
Sendai	Community Development Policy Forum	100 Yen Pakku Map
Tokyo (Metropolitan Area)	YUKAI. (3-chome) RACUMobi	Bus Service Map
Niigata	Niigata Environment and Transport Research Society	Niigata City Transport Map
Fukui	ROBA (Railway, Omnibus, Bicycle & Walk Machizukuri Association)	Fukui Norinori Map BUS-DENSYA-NET FUKUI
3 Tokai Prefectures (Aichi, Gifu, Mie)	Public Transport Usage Promotion Network	Rosenzu.com Gifu City Bus Map, etc.
Wakayama	Wakayama City Planning Council - Wakayama Komachi	wap
Matsue	Project UI	Doko Demo Bus Net Doko Demo Bus Book Doko Demo Bus Map Sugoroku
Okayama	Rail transport system Amenity Community Design Association (RACDA)	Bokke Convenient Bus Map Nonbe Convenient Map
Hiroshima	Hiroshima BRT Research Society	Bus Supermap
Takamatsu	Grutto Takamatsu Public Transport Development Group	Ittenmai Takamatsu City Bus Map
Okinawa	Bus Map Okinawa	Bus Map Okinawa

Source: The Nationwide Bus Map Summit website (Tentative Translated by Eco-Mo Foundation)

●Bus maps example (wap)



Reverse side (English) →

Source: Wakayama City Planning Council — Wakayama Komachi

(4) Measures by the Eco-Mo Foundation

① Implementation of the transport business Green Management (low environmental impact business management) Certification System

The Green Management Certification System, which objectively certifies the efforts of companies to make environmental improvements, strives to encourage companies to engage in environmental efforts, and contributes to reductions in the environmental impact of industry by fostering understanding and cooperation between certified companies, society, and users. The system, with the Eco-Mo Foundation as its certifying body, certifies and register transport operators whose environmental activities meet or exceed levels defined in the Green Management Promotion Manual*. The system was launched for the truck industry in October 2003, for the bus and taxi industry in April 2004, and for the passenger ship, coastal shipping, port transport, and warehouse industries in July 2005. As of the end of 2017 there are 3,559 certified businesses and 6,966 certified business sites. These are indicated as “Environmentally-friendly transport operators” on the Eco-Mo Foundation website, and each month press releases are issued to newspaper companies containing newly certified businesses. Vehicles owned by certified truck, bus, and taxi operators account for between 11.9% and 16.7% of the vehicles owned by companies within Japan.

※ The Green Management Promotion Manual contains specific measures for individual environmental conservation items, based on the concepts of ISO14031 (an international standard for environmental performance evaluation). They make it easy to establish targets and carry out evaluations, which in turn make it easy to implement environmental management on an ongoing basis.

● Number of vehicles owned

	Certified Companies as of December 31, 2017	Companies Nationwide	Percentage Owned by Certified Companies	Notes
Trucks	147,842	1,245,603 (Note 1)	11.9%	(Note 1): Number of vehicles owned as of the end of March 2016. This includes the number of commercial trucks (excluding trailers) and the number of commercial special purpose vehicles as indicated in the “Transport Statistics Collection” (from the MLIT). It does not include the number of registered light trucks.
Buses	17,981	113,742 (Note 2)	15.8%	(Note 2): Number of vehicles owned as of the end of March 2016. Based on the “Transport Statistics Collection” (MLIT).
Taxis	33,920	203,280 (Note 3)	16.7%	(Note 3): Number of corporate taxis owned as of the end of March 2016. Based on information on the Japan Federation of Hire-Taxi Associations website

■ Evaluations of Green Management Certification

The results of various green management efforts have been tested and verified, and this certification system has come to be evaluated highly, even being included as an element in government measures.

○ Freight owner considerations required by notices based on the Energy Saving Act

One of the energy saving measures required of freight owners under the Energy Saving Act (enacted in April 2006) is the selection of environmentally-friendly freight carriers (carriers who have obtained ISO14001 or green management certifications).

○ Addition of transport and delivery, chartered buses, and taxis to the procurement items specified in the Act on Promoting Green Purchasing

The 2007 basic policy on the Act on Promoting Green Purchasing (Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities) was approved by the Cabinet on February 2, 2007. It added **【transport and delivery】*** to the list of specified procurement items. The 2008 basic policy was approved by the Cabinet on February 5, 2008, and added **【chartered buses and taxis】** to the list. The decision criteria are the “neutral evaluation by a third party” of measures such as “implementing measures for promoting eco-driving”. In general, this corresponds with green management certified companies.

* Transport and delivery operations within green procurement scope: Domestic correspondence, parcel delivery, parcel post, mail express

○ Express inclusion in the “Guidelines for the Selection and Use of Chartered Buses in Order to Ensure Transport Safety”

【Published: June 29, 2012】

The MLIT has formulated and issued guidelines which clearly explain the key points involved when travel companies, local governments, educational institutions, etc. select and use chartered bus operators.

These guidelines clearly specify “green management certification” as one of the “evaluation items and evaluation elements involved in comprehensive evaluation” indicated in the guidelines’ “key points regarding the selection of chartered bus operators” and “key points regarding bidding, etc., for chartered bus procurement”.

○ Express inclusion in the “Community Bus Deployment Guidelines” as specified in the notice regarding the revision of the Road Transport Act

【Notice: MLIT Notice 633, April 10, 2013 “Concerning the Approach of the MLIT to Regional Public Transport Councils”】

The notice clearly states that the perspective of “environmentally consciousness” is to be included by cities, towns, or villages, etc. when selecting community bus operators, and specifies “acquisition of Eco-Mo Foundation Green Management Certification or ISO14001 certification” as a means of evaluating this environmental consciousness.

○ Relaxation requirements for Superior Hybrid Vehicles and CNG Vehicles deployment subsidy systems

In order to promote the greater use of low-emission vehicles, the MLIT provides systems for partial subsidization of the difference in prices between low-emission vehicles and standard vehicles. Subsidy requirements such as fleet size limitations are relaxed for truck transport operators who have received the Green Management Certification.

○ Certification acquisition subsidy systems

Local governments:

8 organizations (Chuo-ku, Tokyo; Shinjuku-ku, Tokyo; Sumida-ku, Tokyo; Katsushika-ku, Tokyo; Yokohama City, Kanagawa Prefecture; Ina City, Nagano Prefecture; Shiojiri City, Nagano Prefecture and a local governments)

Industry group

Japan Association of Refrigerated Warehouses and 37 prefectural Trucking Association (Hokkaido, Aomori Prefecture, Iwate Prefecture, Akita Prefecture, Fukushima Prefecture, Ibaraki Prefecture, Tochigi Prefecture, Gunma Prefecture, Saitama Prefecture, Chiba Prefecture, Tokyo Metropolis, Kanagawa Prefecture, Niigata Prefecture, Yamanashi Prefecture, Nagano Prefecture, Fukui Prefecture, Gifu Prefecture, Shizuoka Prefecture, Aichi Prefecture, Mie Prefecture, Shiga Prefecture, Osaka Prefecture, Hyogo Prefecture, Nara Prefecture, Wakayama Prefecture, Tottori Prefecture, Okayama Prefecture, Hiroshima Prefecture, Tokushima Prefecture, Kagawa Prefecture, Kochi Prefecture, Fukuoka Prefecture, Nagasaki Prefecture, Kumamoto Prefecture, Oita Prefecture, Miyazaki Prefecture, Kagoshima Prefecture)

② Implementation of the Excellent Eco-Commuting Business Establishment Certification System

The Excellent Eco-Commuting Business Establishment Certification System has been implemented since June 2009 to certify business establishment which actively promote eco-commuting, widely sharing information on their efforts in order to promote greater adoption of eco-commuting.

The Conference on Promotion of Public Transport, consist of various transport operator organizations, economic organizations, related government bureaus, and other organizations, acts as its certification body. The MLIT and the Eco-Mo Foundation jointly operate the certification system as the secretariat. By the end of December 2017, 645 business sites have been certified.

Certified business sites implementing best measures may also be recommended for MLIT awards. In 2017 Ehime Prefecture was selected as the winner of the “2017 Minister’s Award for Excellent Business Implementing Traffic-Related Environmental Conservation Efforts”

● Measures implemented by Ehime Prefecture

「E自転車・バスで行こう」推進事業の概要

1 目的
公共交通の利用促進を図るため、これまでの利用向上のための取組みだけでなく、県民に直接公共交通の利用促進を図る。県民の公共交通の重要性、必要性の理解を深めることにより、マイカー偏重のライフスタイルからの意識改革を促す施策として、「E自転車・バスで行こう」推進事業を実施する。
※E自転車・バスの「E」→「えひめE自転車」E自転車（E自転車）E自転車、E自転車、E自転車

2 事業の内容
(1) 優良公共交通利用推進宣言 <実施主体：県>
○内容 安全で安心できる交通社会、自動車（自家用車）と公共交通が共存したバランスのとれた社会づくりに向けて、県民・行政・交通事業者等が共に考え、連携、協働して地域の公共交通を育てる。
愛媛県では、公共交通を地域社会に欠かすことのできない「みんなの足、県民の足」として明確に位置づけ、本県の公共交通利用を強力に推進していくことを宣言する。
○時期 平成18年8月22日（発効）
(2) ノーマイカー通勤デーの推進 <実施主体及び参加者：県、市町、県内企業、一般市民ほか>
○内容 ノーマイカー通勤デーを設定し、通勤時におけるマイカー等（バイク・原付を含む）利用から徒歩、自転車または公共交通機関利用への転換を促すことにより、過度な自家用車利用から公共交通を利用するライフスタイルへの転換を図る。
○時期 第1回：平成18年9月22日（金）【県庁前・ノーマイカー通勤デー】
第2回以降：毎月1回【県庁前4本曜日、市町・企業・県民は任意に定めた1日】
○地域 県下全域
○参加者 県、市町、県内企業、一般市民等
○その他 参加者に対するサービス提供（自転車、自転車）
(3) 公共交通利用推進優良企業の認定 <実施主体：県>
○内容 公共交通の利用促進に際する取組みを通じて、社会に貢献する企業、団体を優良企業として認定し顕彰する。
○時期 第1回認定：平成19年3月22日 第2回認定：平成20年3月25日
第3回認定：平成21年3月26日 第4回認定：平成22年3月25日
第5回認定：平成23年3月24日
○対象 県内に事務所または事業所のある企業、団体等
○要件 ①ノーマイカー通勤デーへの積極的な参加
②公共交通利用促進への取組
③利用促進に際する具体的な取組みの実施

3 年次別の取組実績

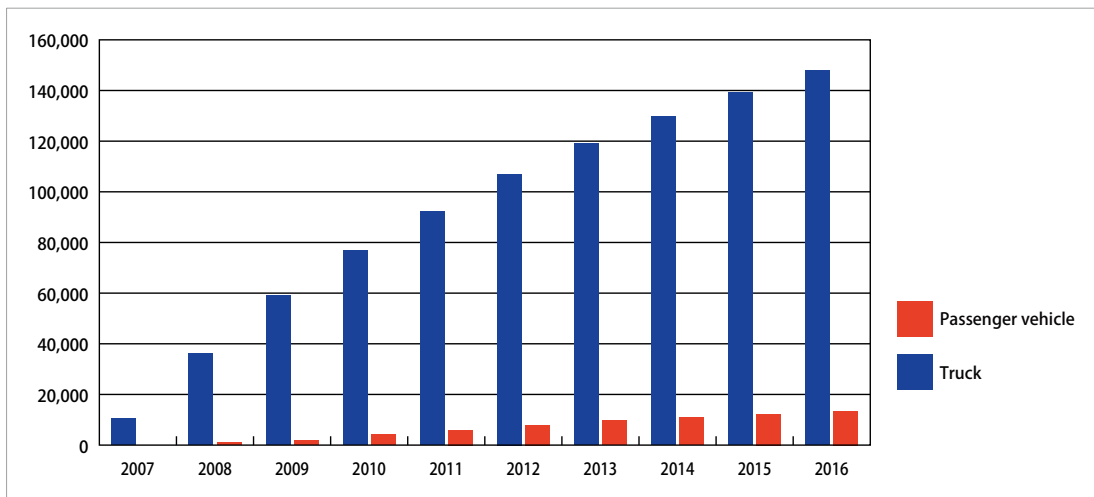
年度	取組実績
18年度	公共交通利用推進宣言、ノーマイカー通勤デーの実施（第1次認定企業：E自転車） 優良企業の認定（5社）：伊予銀行・愛媛銀行・E自転車・E自転車社会福祉協議会・E自転車
19年度	ノーマイカー通勤デーの実施（第2次認定企業：E自転車・E自転車） 優良企業の認定（4社）：E自転車・E自転車・E自転車・E自転車
20年度	ノーマイカー通勤デーの実施（第3次認定企業：E自転車・E自転車） 優良企業の認定（3社）：E自転車・E自転車・E自転車
21年度	ノーマイカー通勤デーの実施 優良企業の認定（4社）：E自転車・E自転車・E自転車・E自転車
22年度	ノーマイカー通勤デーの実施 優良企業の認定（2社）：伊予銀行、E自転車
23年度	ノーマイカー通勤デーの実施

③Promotion of eco-driving

The Eco-Mo Foundation acts as the secretariat of the Eco-Drive Promotion Implementation Council (consist of 16 transport related organizations), established based on the results of the “COP3 to the UNFCCC” held in Kyoto in 1997. It also carried out various unique eco-driving promotion activities. Since April 2007 it has offered truck eco-driving training certification, and then passenger vehicle eco-driving training from September 2008, and presents students who have successfully completed training at certified organizations with completion certificates.

Since 2011 it has also held the “Eco-Drive Activity Contest” with the support of the Eco-Drive Promotion Liaison Committee (consist of the NPA, METI, MLIT, and MOE) and the Eco-Drive Promotion Implementation Council. Since 2014 Minister of Land, Infrastructure, Transport and Tourism Award (transport business category) and Minister of the Environment Award (general category) have been conferred, and the award ceremony for top winners was held as part of the “2017 Eco-Drive Symposium” on November 29.

●Accumulated number of completed certificates issued



●2017 Eco-Drive Activity Contest award ceremony



●Contest leaflet



④ Promotion of Environmentally Sustainable Transport (EST)

The OECD has proposed Environmentally Sustainable Transport (EST) (see page 40), and organizations such as Japan's MLIT have implemented EST model projects. In order to achieve greater use of EST by local governments and transport operators, since 2006 the Eco-Mo Foundation has worked with academic experts, related groups, EST related ministries and agencies, and other organizations to promote EST.

In 2017 the Eco-Mo Foundation collaborated with the Regional Transport Bureau in holding workshops for local governments and transport operators (EST Emergence Seminars) in Hadano City, Wakayama City, and Ube City. In addition to these workshops, tours and review sessions were also held as part of a three day personnel development training session (the 7th such session) in Kanazawa City. The 9th EST transport Environment Awards, recognizing exceptional regional transport environment efforts, were also held. In 2017 WILLER TRAINS, Inc. and Kita Kinki Tango Railway Corporation, Council for Life and Transport Improvement Plan received the MLIT's Minister Award, and Fukui Prefectural Assembly for Creating a Society Not Reliant on Cars received the MOE's Minister Award. The awards ceremony was held as a part of the 11th EST Promotion Forum, a symposium, in Tokyo, and the awards were also publicized on the EST portal site (<http://www.estfukyu.jp/>), email newsletters, and Twitter (<https://twitter.com/#!/officeEST>).

●9th EST Traffic Environment Award results

Award	Recipient	Name of Main Project
Grand Prize	[Minister of Land, Infrastructure, Transport and Tourism Award] WILLER TRAINS, Inc. and Kita Kinki Tango Railway Corporation, Council for Life and Transport Improvement Plan	Kyoto Tango Railway's initiative in aiming to achieve a user and environmentally friendly regional railway.
Grand Prize	[Minister of the Environment Award] Fukui Prefectural Assembly for Creating a Society Not Reliant on Cars	Creating a society not reliant on cars.
Outstanding Performance Award	Himeji City	Efforts to develop a Himeji City Comprehensive Transport Plan focusing on public transport.
Incentive Award	Kiryu Saisei, Inc., Think Together KK, Gunma University, Kiryu City	Efforts to develop environmentally friendly low-speed electric buses and the promotion of wide use thereof.
Incentive Award	Teshikaga Regional Public Transport Revitalization Council	Teshikaga Eco-Passport Project
Incentive Award	Kawasaki City	Promotion of an eco-transport system to reduce environmental load.

●Tango-no-umi Train, Miyagawa Bridge (Oe~ Oe High School Mae)



●Mutual use of tracks by different railway operators (Fukui City)



⑤ Promotion of mobility management education (transport environment education)

In order to promote transport environment education, the Eco-Mo Foundation provides support to local governments and elementary and junior high schools, creates centers for ongoing education, publishes educational manifestos to serve as guidelines, publishes textbooks, and engages in other education promotion activities.

Regarding support for the local government, support will continue to be provided for Fujisawa City and Kyoto City, and support has begun to be provided for Shiga Prefecture from 2017. In addition, support for Fujisawa City and Kyoto City will be discontinued, and promotional activities will commence from 2018 to make this a citywide initiative.

<Supporting local government initiative>

Fujisawa City: This education has been implemented in 2 model schools, and a “Fujisawa City Implementation Manual for Mobility and Management Education (Transport Environment Learning)” has been prepared which summarizes the efforts made in the model schools over the past 4 years.

Kyoto City: A program adapted to regional characteristics has been prepared and implemented at the 5 model schools, and in March, 2018, a presentation was held summarizing the results of the initiative.

Shiga Prefecture: Apart from the delivery seminar conducted primarily by the prefecture, a learning program was considered to achieve the establishment of a program relevant to the subject which facilitates lesson preparation by the instructor.

Support for schools has been provided to the following 13 schools.

● Names of supported schools and educational themes

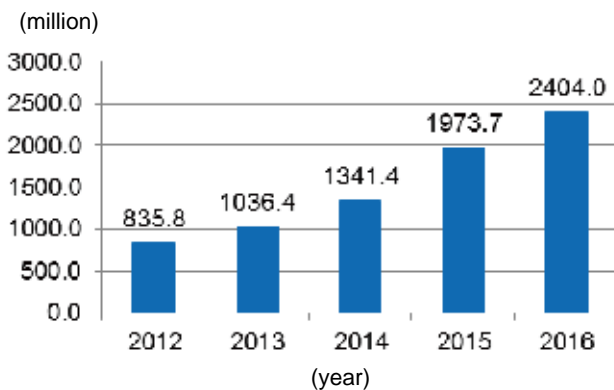
School	Theme	Subject
Hijidai Elementary School, Mitoyo City (Kagawa Pref.)	Challenge! Furusato (Hometown) Transport Eco-plan	Social Studies
Ashiro Elementary School, Higashi Miyoshi City (Tokushima Pref.)	Transport infrastructure acceleration plan based on the expressway SA within the school district	Integrated Studies
Mamigaoka Junior High School, Koryo City (Nara Pref.)	Proposal for tourism revitalization of Koryo City using public transport	Life Environment Studies
Kodaira Dai 12th Elementary School, Kodaira City (Tokyo)	“Our Tokyo” ~ Extensive transport network~	Social Studies
Minamikata Elementary school, Kagoshima City (Kagoshima Pref.)	Integrated learning “Let’s make environment news”	Integrated Studies
Doshisha Junior High School, High School (Kyoto Pref.)	Eiden Hachimanmae Station Project	Special Activity
Oshio Elementary School, Echizen City (Fukui Pref.)	~JR Hokurikusen Oshio Station Child Stationmaster~ “Poppo-ya Project”	Integrated Studies
Minato Elementary School, Wakayama City (Wakayama Pref.)	Let’s learn about various vehicles and trains with consideration to the environmental improvement of Minato	Integrated Studies
Kyowa Elementary School, Honjyo City (Saitama Pref.)	Vehicle exploration	Life Environment Studies
Sapporo Elementary School Attached to Hokkaido University of Education (Hokkaido Pref.)	Implementation of mobility management education in 3rd grade elementary school social studies	Social Studies
Shumei Yachio Junior High School Attached to Shumei University Faculty of Teachers Education (Chiba Pref.)	Our proposal for the safety and security of bus stops	Integrated Studies
Okagata Junior High School, Niigata City (Niigata Pref.)	Okagata Future Planning Conference	Integrated Studies
Neyagawa Shien School, Osaka (Osaka Pref.)	Train use learning and on-train learning ~Let’s go on a train~	Self-learning

⑥ Regional promotion of the smooth mobility of foreign tourists

In March 2006, the Japanese government formulated a “Tourism Vision to Support the Future of Japan” as a medium- to long-term goal for the tourism policy. Under this goal, specific figures of 40 million inbound tourists and 8 trillion yen in travel consumption by foreign tourists in 2020 and 60 million inbound tourists and 15 trillion yen in travel consumption in 2030 were presented. In order to achieve such goals, various efforts and numerical targets have been set, such as “opening up of public facilities such as Akasaka Palace (State Guest House) and Kyoto State Guest House”, “improved access to tourist destinations,” and “making Internet reservations possible for major transport facilities from overseas.”

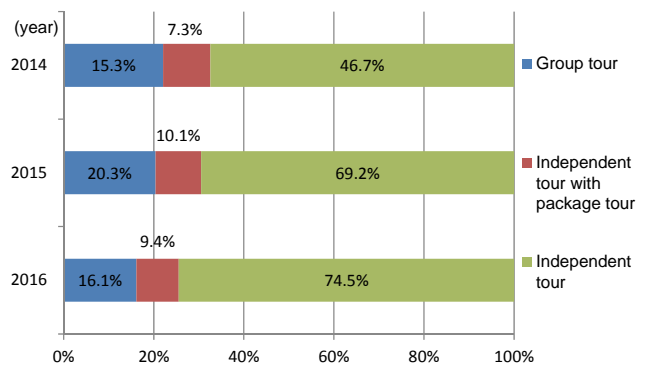
As a result, in 2016, the number of inbound tourists exceeded 24 million and the number of foreign tourists are increasing each year. On the other hand, foreign independent tours (FIT) in which travelers make independent airline and accommodation reservations are increasing and the need for an improved environment to enable smooth and comfortable mobility for such independent travelers is an urgent issue.

● Transition of inbound foreign tourists



Source: Japan National Tourism Organization (JNTO)

● Form of travel of foreign tourists

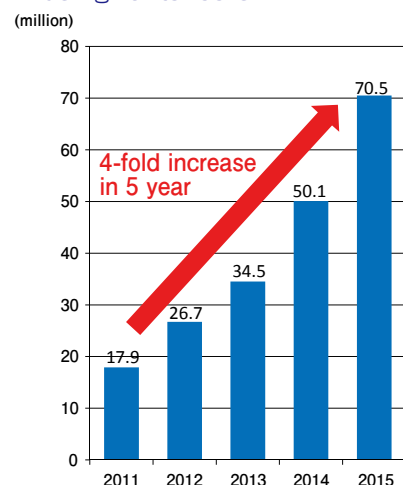


Source: Annual Reports of the Consumer Trends of Inbound Foreign Tourists issued by the Tourism Agency

However, in conjunction with the advancement of motorization in particular, accessibility of the public transport system, secondly transport modes in Japan have declined due to the reduction and discontinuation of the services. In addition, the method of getting on and off public transport varies according to the region and the information signs are not available in multiple languages, making mobility difficult not only for foreign tourists but also for domestic travelers from other regions. Moreover, various problems are on the increase, such as fatal accidents caused by foreign drivers in conjunction with the increase in car rentals and providing pickup services for a fee without a business license.

Thus, from 2017, we are supporting various groups in their efforts related to improvements in transport systems and guidance information as well as widely disseminating such progressive initiatives, thereby embarking on an endeavor to create an environment facilitating the mobility of foreign tourists.

● Transition of inbound foreigners using rental cars



*Foreign passengers departing from the airport using scheduled international flights (estimate)
Source: International Airplane Passenger Survey (Civil Aviation Bureau [CAB])

In April, a public offering was held for support groups and there were 22 applications from around the country. As a result, the “Committee for the Promotion of Smooth Transport for Foreign Tourists in Various Regions” (Chairman: Haruo Ishida, Specially-appointed Professor of University of Tsukuba) which was formerly established within this Foundation, selected 2 groups. We aim to achieve the initiatives of these 2 groups over the next 3 years by providing support in the areas of funding, know-how and consensus-building.

●2 selected support group and their project

Group	Project and summary
Tokachi District Intermodal Passenger Transport Revitalization Promotion Council	Tokachi District Project for the Smooth Transport of Foreign Tourists. Focusing on buses and taxis, multiple language signs at bus stops and on websites will be created and tour plans for foreign tourists using intermodal passenger transport will be made. In addition, communication tools of drivers to cater to foreign tourists will be developed.
Miyoshi City	Miyoshi City “Sennen-no-kakurenbo Smooth Transport Project for Tourist Areas Cooperation with accommodation facilities, community groups and tourism associations will be established to improve intermodal passenger transport signs at stations and to prepare tour maps around the station for foreign tourists. In addition, considerations will be given to the introduction of on-demand excursion taxis to cater to foreign tourists.

⑦Eco-Products 2017 Exhibition

The Eco-Products Exhibition, held annually since 1999 in order to promote environmentally-friendly products and services, is a comprehensive environmental exhibition held at Tokyo Big Sight. It is one of the largest-scale exhibitions in Japan, attended by business persons, members of the government, and general consumers.

The Eco-Mo Foundation has operated booths at the exhibition featuring videos and panels explaining the current state of the global warming issues related to the transport sector, global warming countermeasures, and the activities of the foundation.

(Eco-Products 2017 data: Exhibitors: 616 companies and organizations. Visitors: Approx. 160,000. Eco-Mo Foundation booth visitors: Approx. 4,500)



⑧ Promotion of usage of carbon offsets in the transport and tourism sectors

One global warming countermeasure is the use of “carbon offsets”, which eliminate or absorb greenhouse gasses to compensate for emissions made elsewhere as the result of the usage of products or services. Product or service users or providers bear the costs of purchasing emissions rights produced elsewhere to compensate for their emissions. In the transport sector, carbon offsets are already being used by airlines, rail operators, bus operators, taxi operators, truck operators, and travel companies.

Carbon offsets don't only highlight the efforts being made by the companies which use them to prevent global warming, but they can also promote voluntary greenhouse gas reductions across a wide spectrum of users, including individuals. They also serve to provide funding to projects for reducing or absorbing greenhouse gasses.

In order to promote greater usage of carbon offsets by the transport and tourism sector, in December 2009 the Eco-Mo Foundation established the “Transport and Tourism Carbon Offset Support System.” This system reduces the burden placed on companies in introducing carbon offsets for transport and tourism related services, and makes it possible to calculate CO₂ emissions and purchase emissions rights via the web. The system is already being used by local government transport bureaus and a wide range of companies, including major private rail operators, bus companies, taxi companies, truck companies, and tourism companies.

● Example of carbon offsets using the support systems

Implementing company: Kokusai Motorcars
 Name: Environmentally-friendly taxi stand
 Overview: A taxi stand exclusively for taxis from Kokusai Motorcars, part of the KM Group, was set up at the main Isetan location in Shinjuku, and the CO₂ emissions for the base fare distance (2km) of each taxi trip departing from the taxi stand was offset by the company



Taxi stand



Leaflet

⑨ Use of electric compact low-speed vehicles within communities and sightseeing areas

The waning of public transport in provincial regions of Japan has produced a greater environmental impact as the result of growing use of personally-owned vehicles and created mobility problems for senior citizens unable to drive.

Electric compact low-speed vehicles have little environmental impact and can coexist harmoniously with pedestrians due to their low maximum speed of under 20km/h. Hopes are high for the potential these vehicles have to address environmental impact and reduced senior mobility problems when used for living activities within communities and as a means of transport in tourist destinations, helping achieve an even lower carbon society.

However, there has been little research regarding the use of electric compact low-speed vehicles. Golf carts have been permitted to drive on public roads since 2014, and societal pilot tests have finally begun, but necessary information has yet to be shared by related parties within Japan, so starting from 2016 studies are being conducted of cases of actual electric compact low-speed vehicle usage. The use of golf carts in Wajima City and Ofunato City has been observed, promotion scenarios for a range of uses have been studied, and the results have been presented in a seminar in 2016.

In 2017, looking ahead to potential personal uses of small electric low-speed vehicles, a survey of personal uses of small electric low-speed vehicles in the United States was conducted, and preparations for demonstration experiments to be carried out in 2018 were made.

●Wajima City



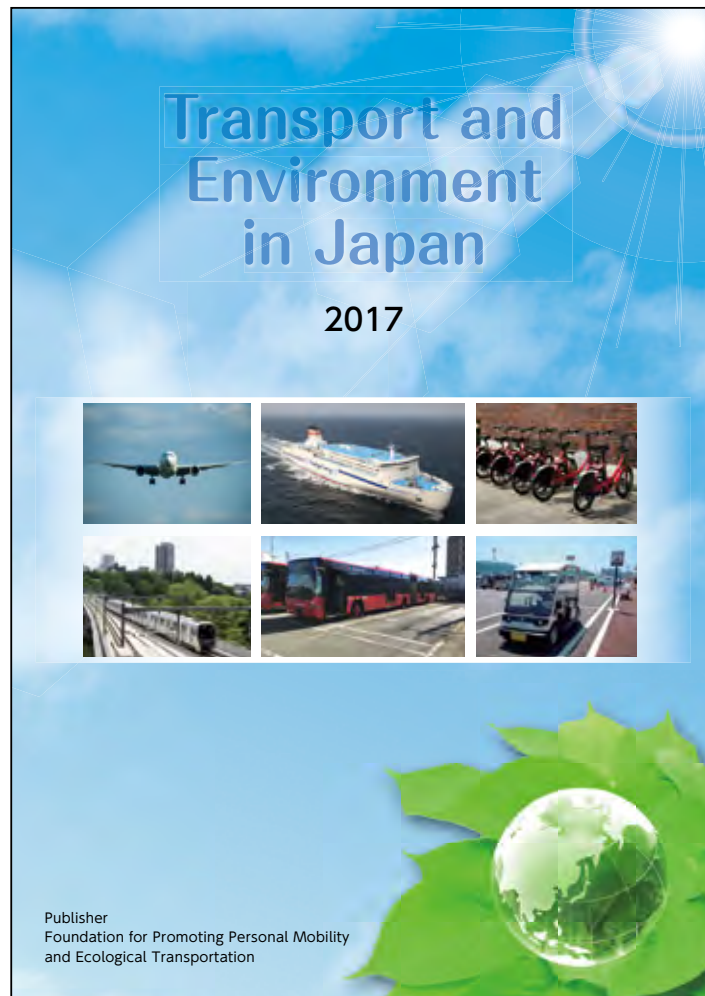
●USA(California Santa Catalina Island)



⑩ **Publication of “Transport and Environment in Japan”**

The Foundation has published “Transport and Environment in Japan,” which provides basic data and the latest countermeasures against the environmental problems and challenges of the transport sector (global warming, air pollution, waste, recycling, sea pollution, noise, etc.), as well as introducing the activities of local governments, businesses, citizens’ groups, the Eco-Mo Foundation, and more. Since 2016 an English version has also been published to showcase Japan’s transport environment measures and countermeasures overseas. (The English version can be downloaded from the Eco-Mo Foundation website.)

● **Transport and Environment in Japan 2017**



IV. Measures in Response to Other Environmental Issues

1 Noise related measures

(1) Automobile noise countermeasures

A study of motor vehicle noise environmental standard compliance status conducted in 2015 found that of the 8,185,300 homes studied, 552,700 (6.8%) homes had motor vehicle noise levels which exceeded environmental standards either during the day (6:00 a.m. to 10:00 p.m.), at night (10:00 p.m. to 6:00 a.m.), or both. 247,900 homes (3.0%) exceeded environmental noise standards both during the day and at night.

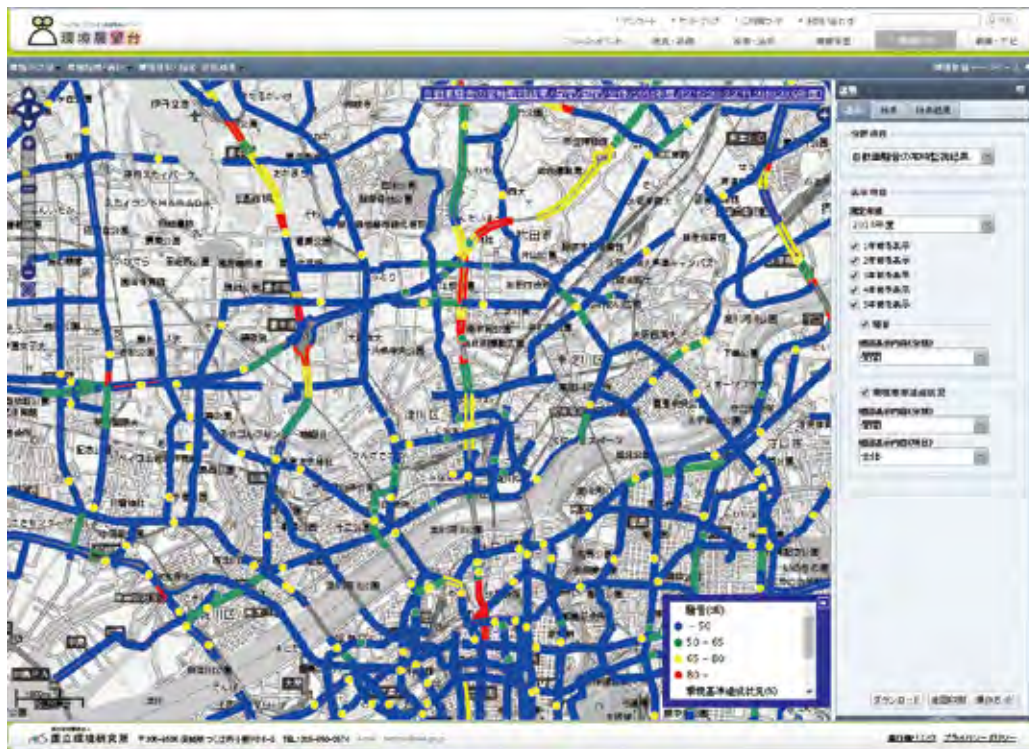
Of the 3,450,700 homes in areas along major arterial road, 368,200 (10.7%) homes exceeded environmental noise standards during the day, at night, or both. Of those, 171,300 (5.0%) homes exceeded environmental noise standards both during the day and at night.

Changes in the compliance of environmental noise standards must take into consideration changes in the homes investigated each year, but within the reported scope there appears to have been a gradual improvement over time.

Broken down by road type, the largest share of homes in areas exceeding environmental noise standards either during the day, at night, or both were located near general national highway. Of the 2,268,300 homes located in these areas, 239,800 homes (10.6%) exceeded environmental noise standards.

This information is provided together with corresponding maps on the Nationwide Motor Vehicle Noise Map (Environmental GIS Motor Vehicle Noise Survey Report) website, operated by the National Institute for Environmental Studies (NIES).

● Nationwide Motor Vehicle Noise Map



Source: NIES

(2) Rail noise countermeasures

With regard to Shinkansen noise, relevant administrative authorities and companies have implemented so-called “75 decibel measures” in order to bring noise levels in dense residential areas along Shinkansen lines to or below environmental noise standards (primarily residential areas: 70 decibels or below, primarily commercial or industrial areas: 75 decibels or below).

Four stages of 75 decibel measures have been implemented. The stage 4 study found that only one of the measurement sites in the areas where the measures were implemented had a noise level which exceeded 75 decibels. Some of the areas where the measures were not implemented still do not meet the 75 decibel standard, so “75 decibel measures” will continue to be implemented in order to achieve environmental noise standards.

Shinkansen noise countermeasures include raising noise barriers, installing pantograph covers, and re-profiling rails to prevent the actual production of noise. When these measures are insufficient to meet environmental noise standards, subsidies are provided for performing soundproofing on existing houses.

In the case of conventional railway line noise countermeasures, in accordance with the “Noise Countermeasure Guidelines Regarding the New Installation or Large Scale Modification of Conventional Railway Lines”, railway operators are instructed to implement measures to ensure that noise levels do not exceed specified values for newly installed lines, and to ensure that noise levels are reduced when performing large scale modification of existing lines.

(3) Aircraft noise countermeasures

Aircraft noise countermeasures in Japan can be broadly categorized into source control, improvement of the airport structure and environmental measures in areas surrounding airports. Combinations of these measures are being implemented in a balanced way according to the characteristics of each airport.

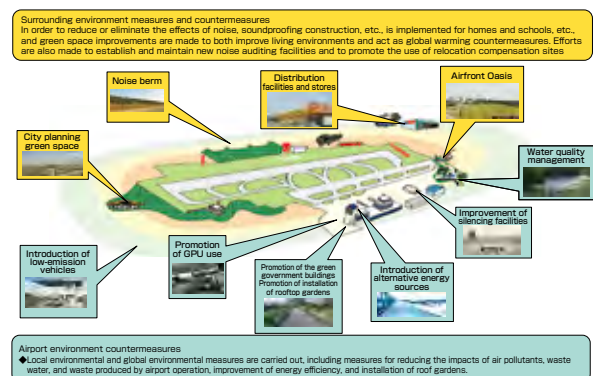
Regarding the source control, there are such measures as noise reduction of aircrafts, improvement in the operation method and restrictions on departures and landings. As a result of advancements in noise reduction technology, the latest aircrafts can achieve an approximately 30dB noise level reduction in comparison to aircrafts 50 years ago.

As for improvement of the airport structure, efforts are being made to open offshore airports where the effects of noise are minimal, as well as to install sound-insulating walls.

With regard to environmental measures in areas surrounding airports, based on the Act on Prevention of Damage Caused by Aircraft Noise in Areas Around Airports (Act No. 110 of 1967), subsidies for noise prevention works in residences and schools are being granted and development of green belts, etc. is being carried out.

The Eco-Airport Guidelines were established in order to assist with environmental protection and creation for airports and their surrounding communities. Based on these guidelines, eco-airport design is being implemented in airports through measures such as the creation of environmental plans for airports and their surrounding areas, and through support for the installation of Ground Power Units (GPUs).

●Eco-airport conceptual diagram



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

2 Sea pollution countermeasures

(1) Large scale oil spill countermeasures

One of the major factors behind the large scale oil spills in recent years is the existence of ships which do not meet the standards set forth in marine safety and sea environmental conservation treaties (sub-standard ships). In order to eliminate these ships, Japan is participating in international efforts such as the creation of an international ship database (EQUASIS), as well as enhancing port state control (PSC) by performing onboard inspections of foreign vessels stopping in Japanese ports confirming that they meet treaty standards.

The creation of a system, advocated for by the Japanese government, for checking that flag state governments are fulfilling their duties to monitor and supervise ships flown under their flags was approved at the 2005 IMO general meeting as a voluntary system.

Based on the efforts that followed, this system was made mandatory from January 2016.

Japan maintains three large dredging and oil reclamation ships to quickly reach and clean up oil spills in the seas around Japan, and in accordance with the Act on the Prevention of Sea Pollution, a joint public-private oil pollution prevention and cleanup system has been created. Furthermore, Japan, China, the Republic of Korea, and Russia have established a collaborative system for cleaning up large spills of oil or hazardous substances in the Sea of Japan, the Sakhalin area, and the Sea of Okhotsk. The system of international collaboration and coordination is being strengthened through the “Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP) Regional Oil and Hazardous and Noxious Substances (HNS) Spill Contingency Plan” (2008).

(2) Countermeasures against harmful aquatic organisms in ballast water

Organisms such as plankton in ship ballast water (sea water used to weigh empty ships for greater safety) can contaminate areas where they are not normally found when ballast water is purged, harming the local ecosystem as well as having negative effects on human health and economic activity. In February 2004 the International Maritime Organization (IMO) adopted the Ballast Water Management Convention in order to regulate ballast water countermeasures using a consistent global standard. Japan became a party to the convention in October 2014.

As of November 2013 nine ballast water management systems have been approved. The first unit of the “JFE Ballast Ace”, a ballast water processing system developed by JFE Engineering Corporation and commercially released after being the first system to receive model approval by the MLIT, was installed in August 2010 in the Emerald Leader, a vehicle carrier owned by NYK. Other ballast water countermeasures are also being earnestly implemented. These include the FineBallast®OZ ozone-based ballast water processing system, jointly developed by Mitsui Engineering & Shipbuilding, the Japan Association of Marine Safety, and five other companies, which received approval by the MLIT in June 2011.

● Coverage scope of system of 3 large dredging and oil reclamation ships



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

3 Ship exhaust gas emissions countermeasures

As part of air pollution control measures, in order to reduce the emission of sulfur oxides (SOx) and particulate matter (PM) from ships, sulfur concentration in fuel oil is being regulated on a global scale. This regulation reduces the sulfur contained in fuel oil of ships in stages, and regulation levels will be set according to general sea areas (all sea areas) and designated sea areas (North Sea, Baltic Sea, etc.). Due to revisions in the International Convention for the Prevention of Pollution from Ships made in 2008, the regulation level of sulfur in fuel oil in general sea areas (present level 3.5% or less) will become 0.5% or less from 2020. Based on the global demand estimate prepared by IMO of oil that meet the regulations, it was determined that the contracted nations would determine whether or not ships are compatible with the regulations. According to the revision, if proven incompatible, the regulations will enter into force from 2025. At the 70th Maritime Environment Protection Committee (MEPC70), the starting period of the regulations was deliberated based on the revised clause, and it was determined that the regulations would enter into force from 2020.

In response to the above, the Pollution Prevention and Response (PPR) Committee which is under MEPC and which considers more technical matters, is steadily implementing these regulations and are moving forward in considering uniform measures to implement these regulations in order to secure impartial competitive measures in the maritime transport industry. In Japan, a “Liaison and Coordination Conference” with participants from the maritime transport industry, petroleum industry and relevant ministries such as Ministry of Infrastructure, Transport and Tourism (MLIT) and Ministry of Economy, Trade and Industry (METI) has been launched. Through this conference, in-depth discussions are held through information exchange and opinion exchange with relevant parties so that both industries may smoothly manage the tightening of these regulations.

● International regulations aimed at reducing sulfur oxide (SOx) and particulate matter (PM) emissions

- Air pollutants (SOx, PM, etc.) cause health impairments such as respiratory disorders, so countries implement their own land emissions source and mobile discharge source regulations.
- Emissions from ships, both coastal and ocean-going, are globally regulated by the International Maritime Organization (IMO) under the International Convention for the Prevention of Pollution from Ships (MARPOL Convention).
- The amount of SOx and PM in ship emissions gasses is dependent on the sulfur content of the fuel oil, so restrictions are placed on maximum sulfur content concentration (%). Regulations are strengthened in stages for general sea areas and designated sea areas (ECA: Emission Control Areas).
- Under the 2008 revisions to the convention, the **general sea area 0.5% restriction** is specified as going into effect from **January 2020**, but the following **revision conditions** are stipulated.
 - Based on IMO forecasts of global demand for restriction-compliant oil, **signatory countries are to determine** if ships are regulation compliant, and, **if they are not**, the regulations are to be reviewed and to go into **effect from 2025**.
- In October 2016, the IMO committee deliberated regarding the timing of the initiation of regulations given the revision conditions, and decided that the **regulations would go into effect from January 2020**.

2008 MARPOL Convention Revisions

MARPOL Convention	2012	2015	2020
General sea areas	4.5%	3.5% (class C heavy oil)	0.5% (Regulation-compliant oil)
Designated sea areas (ECA)	1.0% (equivalent to class A heavy oil)	0.1% (equivalent to light oil)	

(Ref.) Chinese ECA

Year	Regulation
2017	0.5% (Within ports)
2018	0.5% (All ports within ECA)
2019	0.1% (Deliberate after observing results)

Sea areas set as ECAs to which non-IMO approved domestic rules apply (three sea areas)
 → Bohai Sea, Yangtze River Delta, Pearl River Delta

* There are currently only two IMO-approved designated sea areas (ECA), as indicated below. All other sea areas around the globe are considered general sea areas.



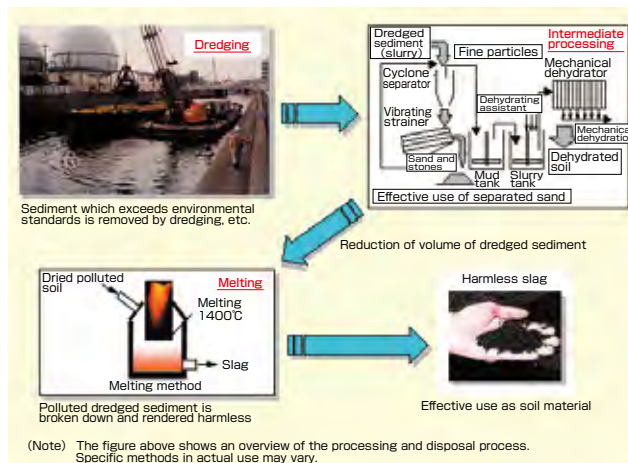
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

4 Chemical substances countermeasures

(1) Dioxin, etc. countermeasures

Dioxins are produced when garbage and other matter are burned. There are concerns about the harm these chemicals cause to the human body. The MLIT is studying dioxins and implementing countermeasures, monitoring marine pollution conditions, and carrying out other measures by establishing a Fundamental Policy Regarding Countermeasures Against Sediment Dioxins, technical guidelines concerning the removal of sediment in ports with dioxin levels exceeding environmental standards for sediment, and revising the “Manual of Sediment Dioxin Countermeasures for Rivers, Lakes, etc.” (the River Manual) and the “Technical Guidelines Regarding Sediment Dioxin Countermeasures for Ports” (the Port Guidelines).

●Dioxin, etc. countermeasures



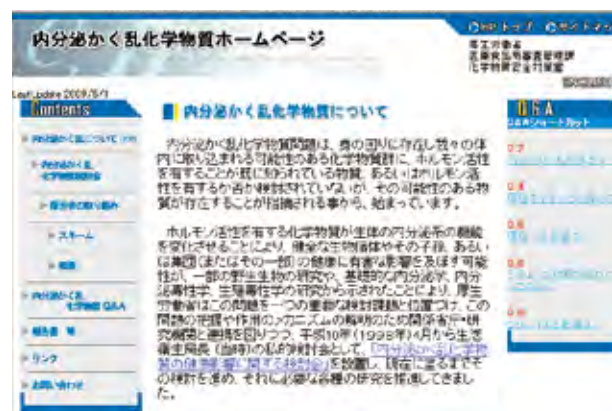
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

(2) Endocrine disruptors countermeasures

Endocrine disruptors (environmental hormones) disrupt the endocrine systems of people and wild animals, producing a number of adverse effects such as reducing sperm counts.

The need for countermeasures in response to these endocrine disruptors is growing year by year. In September 2008 the International Convention on the Control of Harmful Anti-fouling Systems in Ships (AFS Convention) went into effect. This global convention completely prohibits the use of ship hull antifouling paint containing tributyltin (TBT), an endocrine disruptor. The convention prohibits new application of TBT paint, and requires ship owners to completely remove all TBT paint already applied to ships, or to coat painted portions with a protective layer which prevents leaching of TBT into seawater. All foreign ships entering Japanese ports are prohibited from using TBT hull antifouling paint, so when the MLIT actively includes monitoring for TBT hull antifouling paint usage as part of its port state control (PSC) monitoring of whether arriving foreign ships are in conformance with international conventions regarding marine safety and marine environmental conservation, with the aim of eliminating foreign ships on which toxic hull paint has been used.

●Endocrine disruptor website



Source: Ministry of Health, Labour and Welfare (Tentative Translated by Eco-Mo Foundation)

(3) Asbestos countermeasures

Asbestos, used in various facilities, such as warehouses and storage sheds, present a life-threatening hazard. The buildings constructed in the 1970s and onwards, when large amounts of asbestos were imported, are reaching the ends of their lifespans and will be dismantled, so it is important to implement preemptive measures to prevent this work from causing public harm.

The MLIT is following up on the status of asbestos removal and scatter prevention measures for facilities under its jurisdiction in order to advance the removal of asbestos from existing buildings. In addition, measures for removing spray-applied asbestos insulation in existing buildings are being promoted through activities such as subsidies for residence and building safety stock formation operations and local housing subsidies.

In conjunction with revisions to the Building Standards Act the use of spray-applied asbestos insulation etc. in buildings has been prohibited, and Japan is disseminating information in the form of asbestos removal work reference estimates, documents which assist with the process of identifying building materials containing asbestos (visually identifiable building materials containing asbestos), by compiling databases of information regarding building materials containing asbestos, and preparing pamphlets regarding building asbestos countermeasures. Japan is also implementing measures for thoroughly ensuring the prevention of asbestos scattering or exposure during building dismantling.

● Asbestos countermeasure pamphlet



Source: MLIT

(4) PRTR(Pollutant Release and Transfer Register) system

There is growing interest around the world in environmental pollutants such as environmental hormones and new chemical substances produced by high-tech industry. In 1992 the UN Conference on Environment and Development (Earth Summit) indicated the need for a system for managing the discharge and movement of hazardous chemicals in order to reduce their inherent risks.

In response, in 1999 Japan formulated the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Law). This act defines a system for confirming, tabulating, and publicly releasing data on which of a wide range of hazardous chemicals have been produced, by whom they were produced, how much of the chemicals have been released into the environment, and how much of the chemicals have been taken off from company properties in the form of waste products. This system has been in effect since 2001.

Under this act, warehouse operators (limited to warehousing to store farm products or to store gas or liquid in storage tanks) and automobile maintenance operators are also required to report transfers of specified chemical substances.

● PRTR pamphlet



Source: METI and MOE

5 Ozone layer destruction prevention

The ozone layer which envelops the earth plays an important role in protecting life on earth by absorbing harmful ultraviolet radiation. When this ozone layer is damaged, it allows a greater amount of hazardous ultraviolet radiation to pass through, increasing the incidence of skin cancer and cataracts and impairing immunity in humans as well as affecting animal and plant ecosystems.

Fluorocarbons (CFCs and HCFCs), used as coolants in devices such as refrigerators and air conditioners, are known to damage the ozone layer. Fluorocarbons are greenhouse gasses that are hundreds to tens of thousands of times stronger than carbon dioxide, so it is important to prevent fluorocarbons used in devices (CFCs, HCFCs, and HFCs) from being discharged into the atmosphere in order to protect the ozone layer and prevent global warming.

“The Act on the Protection of the Ozone Layer Through the Control of Specified Substances and Other Measures,” passed in 1995, prohibited the manufacturing of specified fluorocarbons (CFCs), and “the Act for Recycling of Specified Kinds of Home Appliances (the Appliance Recycling Act)”, passed in 2001, mandated the reclamation of fluorocarbons from domestic refrigerators and air conditioners. In 2002 “the Act Concerning the Recovery and Destruction of Fluorocarbons (the Fluorocarbon Recovery and Destruction Act)” mandated the recovery of fluorocarbons from industrial air conditioning and refrigeration equipment and vehicle air conditioners.

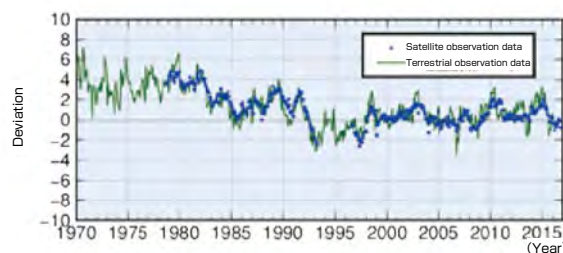
With regard to the recovery of fluorocarbons from vehicle air conditioners and subsequent destruction, due to the fact that vehicle air conditioners are constituent components of automobiles, in January 2005 they were excluded from the scope of “the Fluorocarbon Recovery and Destruction Act”, and regulated together with the disposal of vehicle bodies and engines under “the Act on Recycling, etc. of End-of-Life Vehicles”, which regulates the appropriate processing and disposal of end-of-life vehicles.

In response to a rapid increase in emissions of fluorocarbons (HFCs) with particularly strong greenhouse effects, particularly those used as coolants in air conditioning and refrigeration equipment, in June 2013 the Fluorocarbon Recovery and Destruction Act was revised to require that the manufacturers of fluorocarbons and devices which use fluorocarbons, and the users of industrial air conditioning and refrigeration equipment, rationalize fluorocarbon use and appropriately manage fluorocarbons. It also established mechanisms such as a fluorocarbon filling operator registration system and a recycling operator licensing system, and the name of the law was changed to “the Act on the Rational Use and Management of Fluorocarbons (Fluorocarbon Discharge Prevention Act)”.

● Changes in global amount of ozone over time

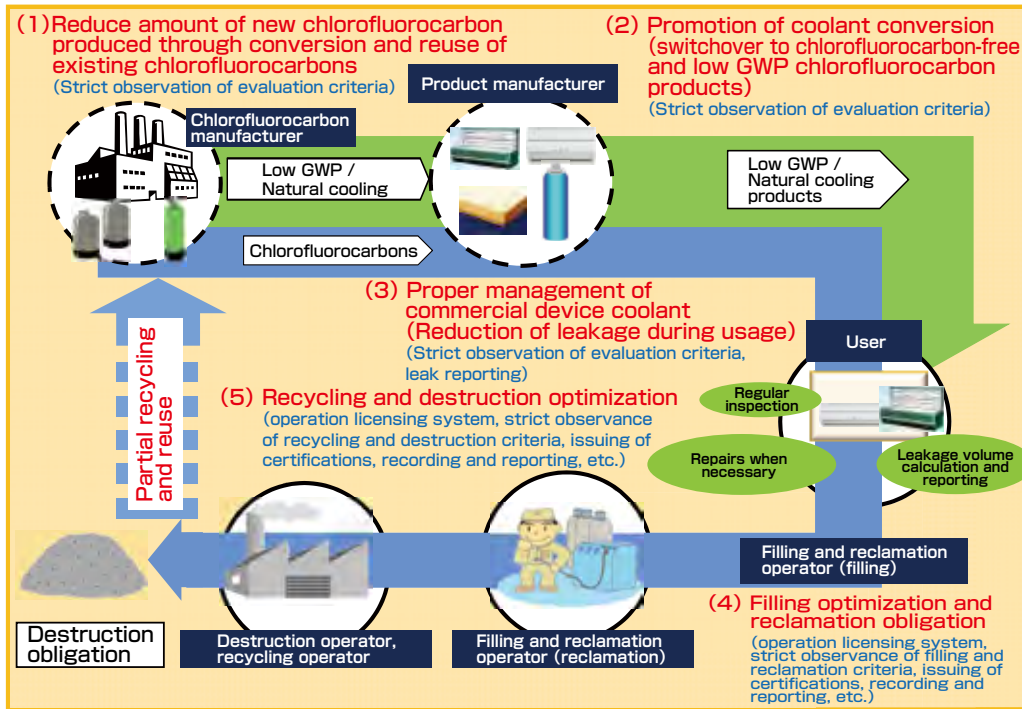
Amount of ozone worldwide

Except for low latitudes, the average amount of ozone worldwide, as measured terrestrially and from satellites, fell significantly from the 1980s to the early 1990s. Since the late 1990s it has remained constant or increased slightly, but the total amount of ozone remains low.



This graph shows the percentage of increase or decrease in the average amount of ozone worldwide compared to the average amount for the 1994 to 2008 period. These value changes have been adjusted to eliminate the influence of seasonal variation. The solid lines indicate data from terrestrial observation sites, and the dots indicate averaged satellite observation data between N70 and S70 degrees latitude. The terrestrial observation site data was supplied by the World Ozone and Ultraviolet Radiation Data Centre. The satellite observation data was obtained from data supplied by the US National Aeronautics and Space Administration (NASA).

● Overview of the Fluorocarbon Discharge Prevention Act



Source: METI and MOE (Tentative Translated by Eco-Mo Foundation)

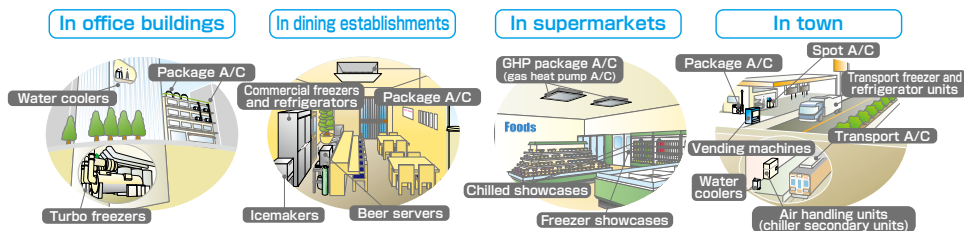
● Fluorocarbon Discharge Prevention Act pamphlet

Fluorocarbons must be reclaimed whenever performing disassembly work!

Under the Act on the Rational Use and Proper Management of Fluorocarbons (Fluorocarbon Release Prevention Act), fluorocarbons must be reclaimed when disposing of commercial air conditioners, refrigerators, or freezers which use fluorocarbons (CFC, HCFC, and HFC).

It is against the law to allow fluorocarbons to be released into the atmosphere when performing disassembly work.

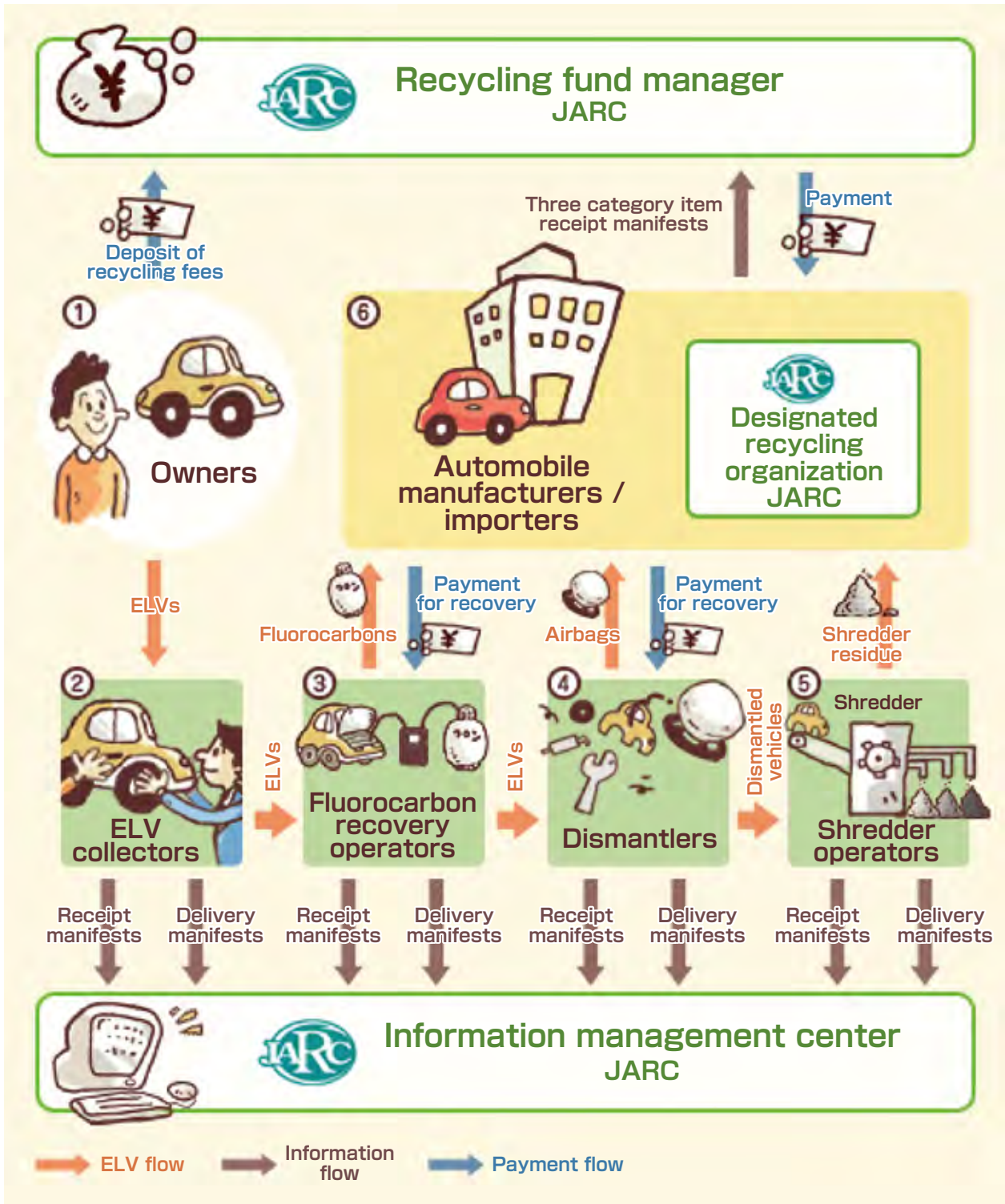
Examples of devices which use fluorocarbons (commercial refrigerators, freezers, and air conditioners)



The penalty for reckless releasing of fluorocarbons is incarceration for up to 1 year or a fine of up to 500 thousand yen.

Source: METI and MOE (Tentative Translated by Eco-Mo Foundation)

● Overview of the Act on Recycling, etc. of End-of-Life Vehicles process



Source: Japan Automobile Recycling Promotion Center (Tentative Translated by Eco-Mo Foundation)

6 Global environmental observation and monitoring

Implementing precise environmental problem countermeasures in the transport sector requires the accurate assessment of air and sea changes through steady, long-term observation and monitoring. Diverse air, sea, and other observation and monitoring are being implemented by global monitoring networks.

(1) Climate change observation and monitoring

International efforts aimed at tackling global environmental issues such as global warming are being enhanced. In addition to its previous ongoing efforts, the JMA is implementing the following measures in accordance with the “Strategic Policy Regarding Future Global Environmental Operations”, formulated and announced in 2008.

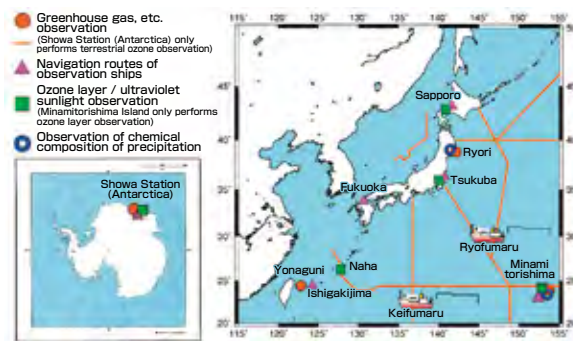
In order to assess greenhouse gas conditions, the amount of CO₂ in the atmosphere is being measured at three locations in Japan and the amount of CO₂ in the surface sea water and the air above the northwest Pacific Ocean is being measured by marine weather observation vessels. Furthermore, since 2009 precise sunlight and infrared radiation measurements have been performed at five locations in Japan.

Sea level increases levels caused by global warming are also being monitored, and information is being released regarding long-term sea level changes along the coast of Japan.

In order to achieve more accurate climate change monitoring and seasonal forecasts, a Long Term Re-Analysis Project is being carried out in conjunction with the Central Research Institute of Electric Power Industry. This project analyzes past global atmosphere conditions using consistent methodology, and the findings of the project are being released to research organizations in Japan and abroad.

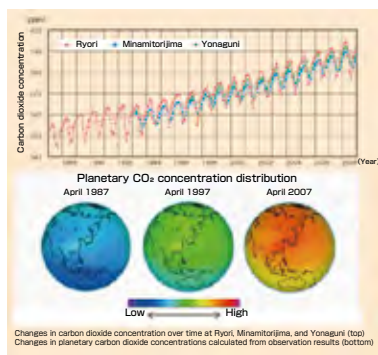
Climate change monitoring reports and anomalous weather reports are created based on observation results, and views on annual climate changes, anomalous weather, and global warming conditions and changes are also released.

● Atmospheric environment monitoring network



Source: JMA (Tentative Translated by Eco-Mo Foundation)

● Changes in carbon dioxide concentrations in Japan and global concentration distribution of carbon dioxide (3 measurement points)



Source: MLIT (Tentative Translated by Eco-Mo Foundation)

● Climate change monitoring report

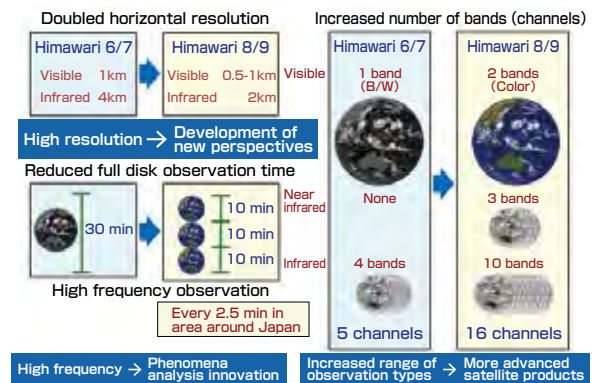


Source: JMA

(2) Himawari 8 and 9

Himawari 8 and 9 are the successors to the Himawari 7 (MTSAT-2) satellite, a multipurpose transport satellite currently in operation. Himawari 8 was launched in October, 7, 2014, and after performing confirmation testing of its functionality while it orbited, full-fledged operation began on July 7, 2015, taking over from Himawari 7. Himawari 9 will be launched in 2016, and will remain in orbit in standby until 2022. Himawari 8 and 9 have radiometers (AHI) which use cutting edge observation technologies, and their deployment ahead of other US and European next generation still imaging satellites has drawn international attention.

● Monitoring capability improvements provided by Himawari 8/9

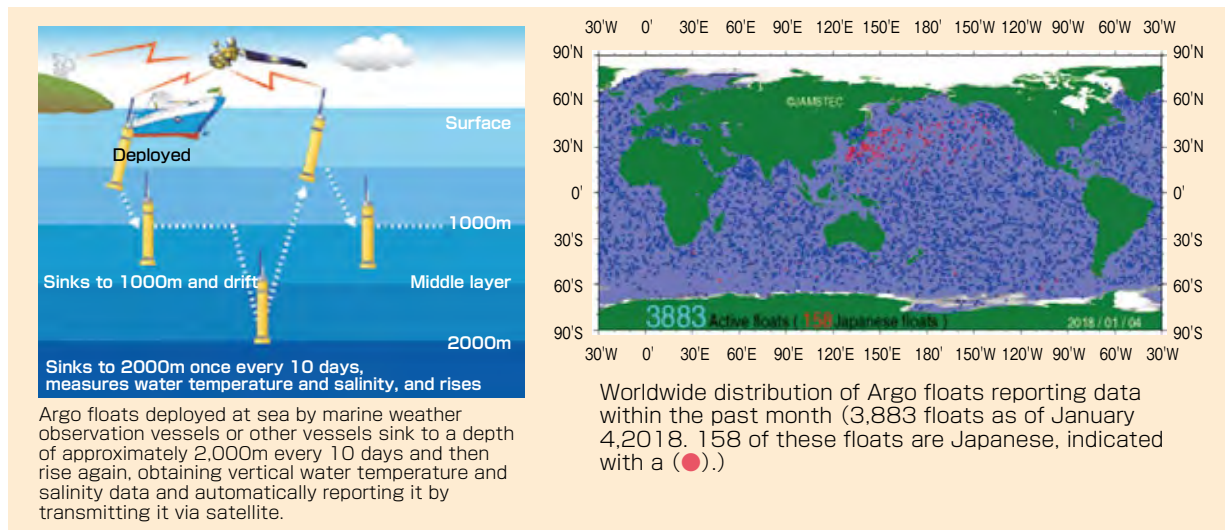


(3) Sea observation and monitoring

The sea absorbs CO₂, a greenhouse gas, and retains heat, moderating global warming. Sea changes are intrinsically linked to typhoons and anomalous weather conditions, so accurately assessing sea conditions is an important part of responding to global environmental problems.

In order to immediately monitor and assess sea changes throughout the world the MLIT is coordinating with other related ministries and agencies, engaging in international collaboration with organizations such as the World Meteorological Organization (WMO) to carry out the Argo project, deploying devices (Argo floats) around the world to automatically observe conditions within the sea.

● Overview of Argo project monitoring and Argo float distribution



Source: MLIT and Japan Agency for Marine-Earth Science and Technology (Tentative Translated by Eco-Mo Foundation)

IV. Measures in Response to Other Environmental Issues

The JMA collects and analyzes data from various sources, such as observation vessels, Argo floats, and satellites, and releases “Marine Health Diagnosis Tables”, comprehensive diagnoses and future predictions regarding sea change conditions related to the global environment.

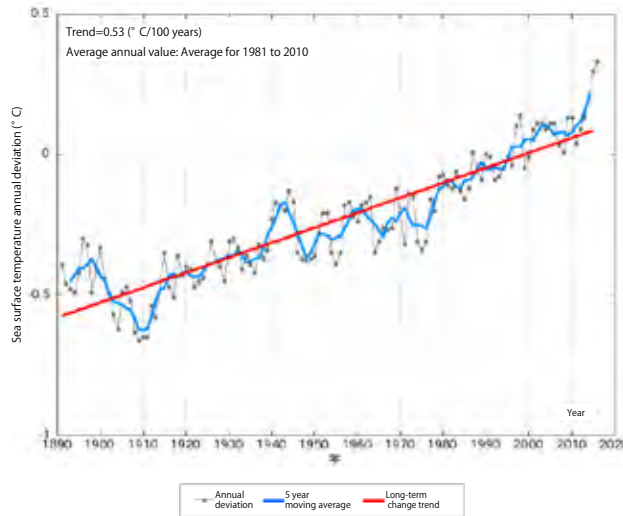
The Japan Coast Guard constantly monitors and assesses Japan Current changes in the area around the Izu Islands using marine short-wave radar. It publishes observation data to supplement the data obtained from Argo floats. The Japan Oceanographic Data Center collects and manages sea data from Japanese oceanic research organizations, and provides it to related organizations and the general public.

● “Marine Health Diagnosis Table”

Yearly average sea surface temperature (global average) anomaly trend

I Diagnosis (2016)

- In 2016 the sea surface temperature was 0.33° C higher than the average annual sea surface temperature (global average). This was the highest value since stastical data first began being gathered in 1891.
- The average annual sea surface temperature (global average) is changing due to marine and atmospheric changes, global warming, etc., on a scale of several years to several decades. The long-term trend has been an increase of 0.53° C per century.



Average annual sea surface temperature (global average) annual deviation trend
 Values for individual years are connected with a black line. 5 year moving average values are connected with a blue line. The long-term change trend is indicated with a red line.
 The average annual value is the average value for the 30 year period from 1981 to 2010.

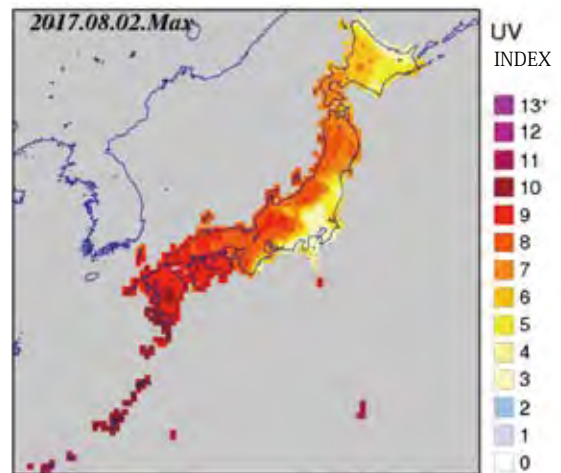
Source: JMA (Tentative Translated by Eco-Mo Foundation)

(4) Ozone layer observation and monitoring

In order to protect the ozone layer, which absorbs harmful ultraviolet radiation from the sun, the production, use, and trading of fluorocarbons and other ozone layer destroying substances is internationally regulated by the Montreal Protocol and other agreements and conventions.

The JMA releases the results of ozone and ultraviolet radiation observation on a yearly basis. It also provides daily data regarding ultraviolet radiation in the form of a UV index, easy-to-understand numerical data indicating the strength of ultraviolet radiation.

● UV index (peak daily values)



Source: JMA

(5) Promotion of steady observation at the south pole

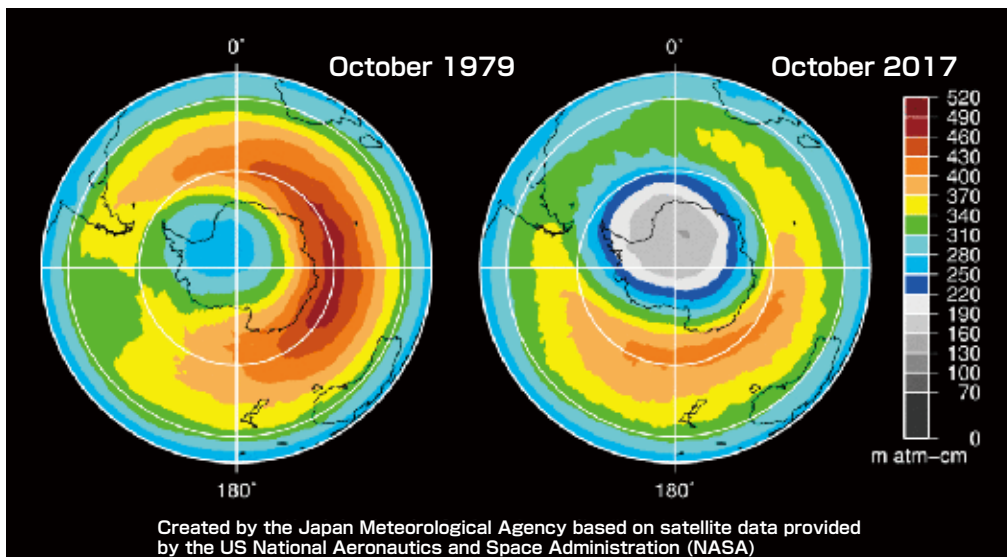
The Geospatial Information Authority creates topographical and other maps based on reference point measurements, gravity measurements, continuous GPS observation, exposed rock area change measurements, and photographic measurements. The results contribute to research regarding global environmental changes in the south pole area, etc., and international activities focusing on land measurement and geographical information.

At the Showa Base the JMA is performing continuous sunlight, radiation, and land and high altitude meteorological observation. This observation is effectively utilized in international measures, contributing to climate change research and monitoring of the south pole ozone hole.

The Japan Coast Guard carries out sea floor topological surveys. It also performs tidal observation, which contributes to monitoring of sea level changes, which are closely linked to global warming.

● Changes in the Antarctica ozone hole (1979 to 2017)

Distribution of average ozone levels in October in the southern hemisphere in 1979, before the southern hemisphere ozone hole appeared, and in 2017. The region with a concentration of 220m atm-cm or less is the ozone hole. Created by the Japan Meteorological Agency based on satellite data provided by the US National Aeronautics and Space Administration (NASA)



Source: JMA and NASA (Tentative Translated by Eco-Mo Foundation)

Climate change adaptation measures of MLIT

The results of climate change resulting from the progress of global warming will not be completely avoidable even if measures to reduce emissions and increase absorbance of greenhouse gasses such as carbon dioxide are implemented to the greatest degree possible. Because of this, it will also be necessary to adapt to the impact of global warming.

In order to prepare for this, in November 2015 the MLIT formulated the “MLIT Climate Change Adaptation Plan,” and is implementing adaptation measures in the land, infrastructure, and transport sectors based on the plan.

The transport and infrastructure sector is already experiencing subway flooding and pavement collapses caused by record rainfalls and typhoons, transport interruptions due to snowfall, and other problems. In the future heavy rains, strong typhoons, and violent weather phenomena such as tornados are expected to occur more frequently, and there are concerns of growing climate risks.

Given these conditions, there is a strong need to smoothly secure facilities and personnel.

● Overview of the MLIT Climate Change Adaptation Plan

(Adaptation plan philosophy) Continue to maintain the infrastructure functions and other functions which support citizens’ lives, assets, and social and economic activity, maintain citizens’ quality of life, and appropriately utilize situational changes by systematically implementing measures based on scientific evidence for minimizing the impact of climate change, with the duties of involved parties divided appropriately, while at the same time implementing mitigation measures.

Potential impact of climate change on transport and infrastructure
 (Natural disasters) Frequent flooding, extremely large-scale flooding, increase in landslide frequency, significant impact on harbors and coasts
 (Water resources/environment) Greater drought frequency, water quality changes
 (Peoples’ lives, industrial activity, etc.) Increased risks to transport infrastructure, large-scale rise in temperatures in urban areas, impact of storm and flood damage on distribution and tourism

Implementation of adaptation measures based on seven fundamental principles

- Accommodative management that takes uncertainty into consideration
- Response to extant phenomena
- Consideration of future impact
- Comprehensive physical and systematic countermeasures
- Consideration of climate change in project plans, etc.
- Harmony with nature and the environment
- Implementation of measures by different groups (local governments, businesses, residents, etc.), reflecting local characteristics

The plan will be regularly reexamined and revised based on findings from ongoing climate change monitoring, climate change forecasting, and research and technology development, etc.

Natural disasters		Water resources/environment		
<p>○Flooding</p> <ul style="list-style-type: none"> • Use facilities to prevent disasters involving flooding and relatively frequent external forces from occurring • When facilities are subject to external forces which exceed their capacity, mobilize all personnel to implement measures to minimize damage • Disaster risk evaluation • Disaster risk information sharing <p>1) Disaster prevention measures for external forces with relatively high disaster risks</p> <ul style="list-style-type: none"> • Thorough facility maintenance • Improvement of functionality of existing facilities • Design of facilities to minimize reworking, etc. <p>2) Disaster mitigation measures for external forces which exceed facility capacities</p> <ol style="list-style-type: none"> (1) Facility measures involving operation, structure, maintenance procedures, etc. (2) Flood mitigation measures integrated with town planning and community development (3) Evacuation, first-aid activity, business continuity, and other preparation <p>○Landslides</p> <ul style="list-style-type: none"> • Measures to address rise in landslide frequency, deep-seated landslide countermeasures • Warning and evacuation for landslides with little lead time • Land usage, dwelling styles, etc., that take disaster risks into consideration <p>○Storm surges, storm waves, etc.</p> <ol style="list-style-type: none"> 1) Harbors <ul style="list-style-type: none"> • Sea phenomena monitoring and regular evaluation for harbors • Countermeasures for external forces which exceed protection levels, etc. 2) Coasts <ul style="list-style-type: none"> • Disaster risk evaluation and countermeasures for individual disaster risks • Enhancement of coastal erosion countermeasures, etc. 	<p>Frequency of inundations above floor level</p> <p>(Use in detailed disaster risk information evacuation decisions, town planning, etc.)</p>	<p>○Water resources</p> <ul style="list-style-type: none"> • Measures for thoroughly leveraging existing facilities, using rainwater and reclaimed water, minimizing critical drought damage, etc. <p>○Water environment</p> <ul style="list-style-type: none"> • Monitoring and forecasting related research, water quality improvement measures 	<p>Daily life/urban life</p> <p>○Transport infrastructure</p> <ul style="list-style-type: none"> • (Rail) Flooding countermeasures for subway stations, etc. • (Harbors) Business continuity plan (harbor BCP) formulation • (Airports) Hazard maps, airport snow removal system review and revision • (Roads) Safety, high reliability road network improvement, promotion of telephone pole-free design, michinoeki (roadside station) disaster function enhancement • (Distribution) Distribution BCP, disaster support supply storage agreements, countermeasures for rail noise produced by rail cargo transport <p>○Heat island</p> <ul style="list-style-type: none"> • Ground surface covering improvements (promotion of installation of rooftop gardens on private land and public spaces, etc., urban park improvement, treated sewage water usage, etc.) • Reduction of artificial exhaust heat (energy savings in homes and buildings, promotion of low-emission vehicles, promotion of usage of sewage heat, etc.) <p>[Subway station flood prevention using water blocking boards]</p> <p>[Rooftop gardens on private land]</p>	<p>Industrial/economic activity</p> <ul style="list-style-type: none"> • Use of Northern Sea route • Measures for providing information to foreign travelers and countering reputation damage
<p>Infrastructure measures</p> <p>○Promotion and awareness raising, information provision</p> <ul style="list-style-type: none"> • Promotion and awareness raising regarding disaster prevention and climate change information • Provision of geospatial information, etc. 	<p>○Observation, research, and technical development</p> <ul style="list-style-type: none"> • Climate, sea level, and land observation and monitoring • Climate change forecasting, analysis of snow and ice environment change trends, etc. • Impact of growing external forces on flooding and inland water measures and countermeasures 	<p>○International contributions</p> <ul style="list-style-type: none"> • Global provision of Japanese disaster sector technologies and expertise • Participation in international observation, monitoring, and research, etc. 		

Source: MLIT (Tentative Translated by Eco-Mo Foundation)

List of Abbreviations

BRT (Bus Rapid Transit)
CMP (Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol)
CNG (Compressed Natural Gas)
COP (Conference of Parties to the UNFCCC)
EDMC (the Energy Data and Modelling Center)
ETC (Electronic Toll Collection System)
EU (European Union)
GIO (The Greenhouse Gas Inventory Office of Japan)
ICT (Information and Communication Technology)
INDC (Intended Nationally Determined Contribution)
IPCC (Intergovernmental Panel on Climate Change)
ISO (International Organization for Standardization)
ITS (Intelligent Transport Systems)
JCM (Joint Crediting Mechanism)
JMA (Japan Meteorological Agency)
LED (Light Emitting Diode)
LNG (Liquefied Natural Gas)
LPAA (Lima-Paris Action Agenda)
LRT (Light Rail Transit)
METI (Ministry of Economy, Trade and Industry)
MLIT (Ministry of Land, Infrastructure, Transport and Tourism)
MOE (Ministry of the Environment)
NPA (National Police Agency)
OECD (Organization for Economic Co-operation and Development)
PM (Particulate Matter)
SPM (Suspended Particulate Matter)
UNCRD (United Nations Centre for Regional Development)
UNFCCC (the United Nations Framework Convention on Climate Change)
VVVF (Variable Voltage Variable Frequency)
WDCGG (World Data Centre for Greenhouse Gases)

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Foundation for Promoting Personal Mobility and Ecological Transportation
Goban-cho KU Bldg. 10, Goban-cho, Chiyoda-ku, Tokyo 102-0076, Japan

TEL +81-3-3221-7636

FAX +81-3-3221-6674

URL <http://www.ecomo.or.jp/>

