Transport and Environment in Japan

2017





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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 2017", published in March 2017 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 2016

There were a great deal of developments in 2016, 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 CO_2).

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 transportation usage, and logistics efficiency improvements.

■Automobile and the environment related developments

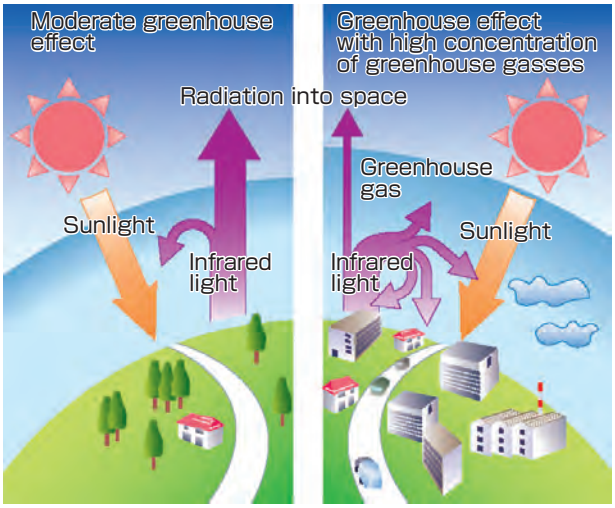
According to the Japan Automobile Dealers Association and Japan Light Motor Vehicle and Motorcycle Association, light motor vehicles accounted for half of the top ten models in the new vehicle sales, and all models were hybrid vehicles or passenger vehicles with hybrid options.

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.

●Mechanism of the greenhouse effect



(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 (CO_2) 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℃ 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℃, 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.

●Forecast of increase in average global surface temperature

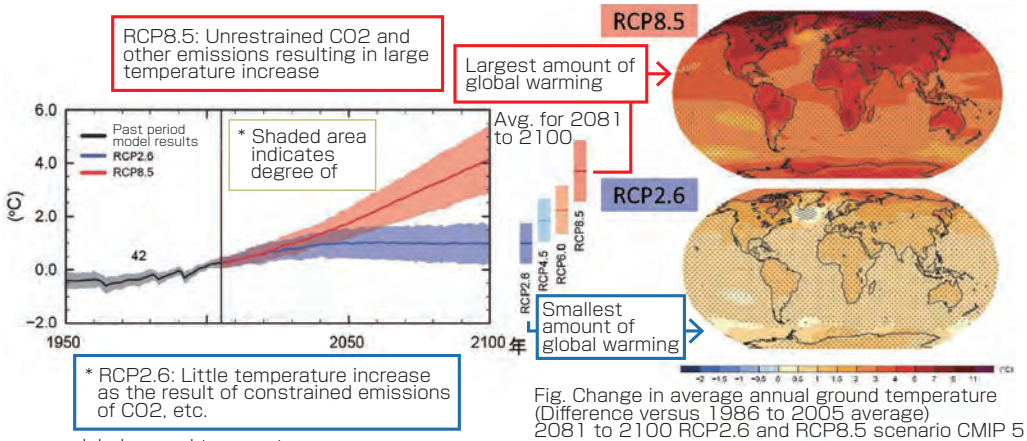


Fig. Change in average global ground temperature between 1986 and 2005
CMIP5 simulated timeline based on multiple models (1950 to 2100)
Source: Figure: IPCC AR5 WG I SPM Fig. SPM.7(a)

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 tempertature 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 2014 carbon dioxide accounted for 93% of all greenhouse gas contributions to global warming, an extremely high figure.

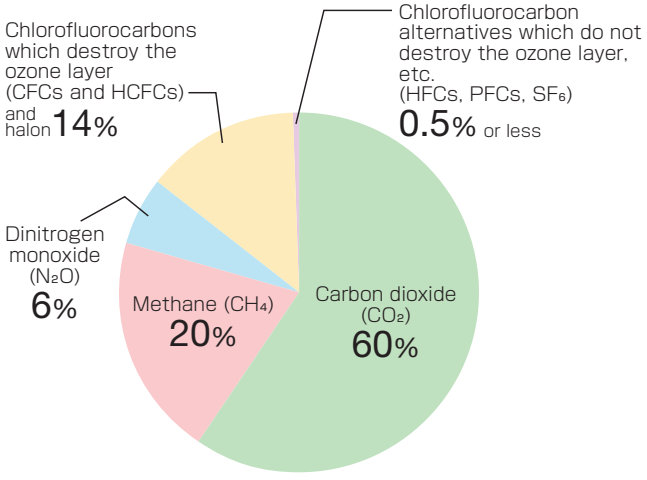
●Greenhouse gas and global warming potential (100 year period)(*1)

	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

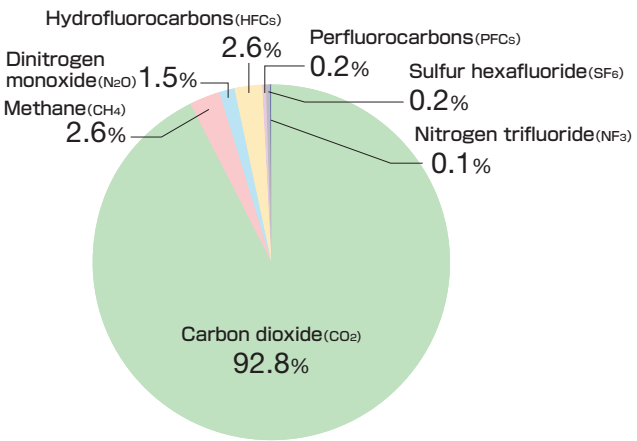
Source: IPCC (2007)

●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 2014)



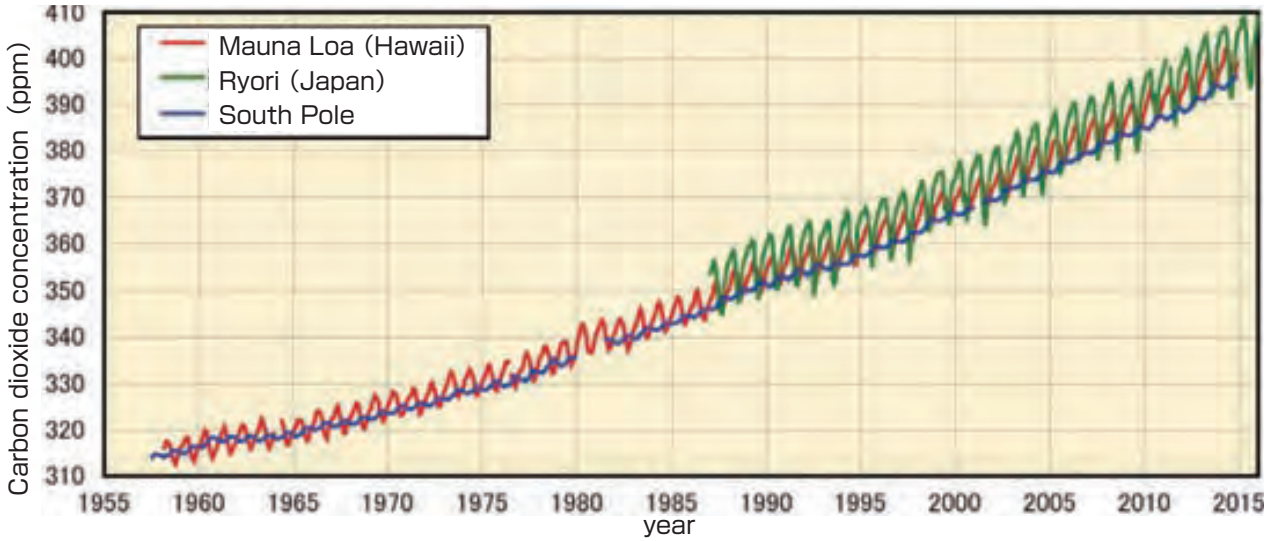
Source: GIO "Greenhouse Gas Inventory"

■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 2014 was 397.7ppm, significantly higher than the concentration before the industrial revolution.

●Change in carbon dioxide concentration at typical global observation points

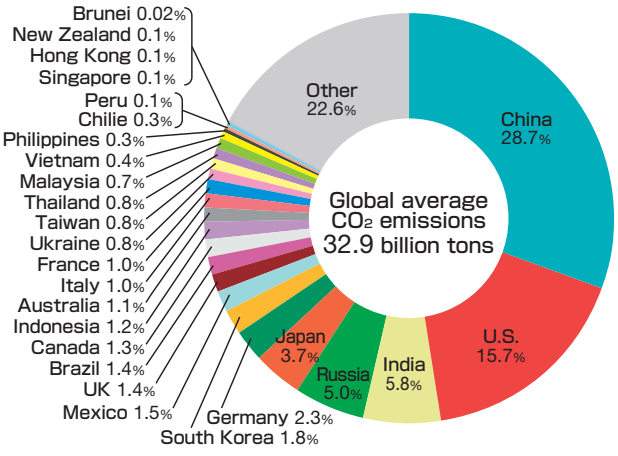


Source: Japan Meteorological Agency (JMA) "Climate Change Monitoring Report 2015" (Tentative Translated by Eco-Mo Foundation)

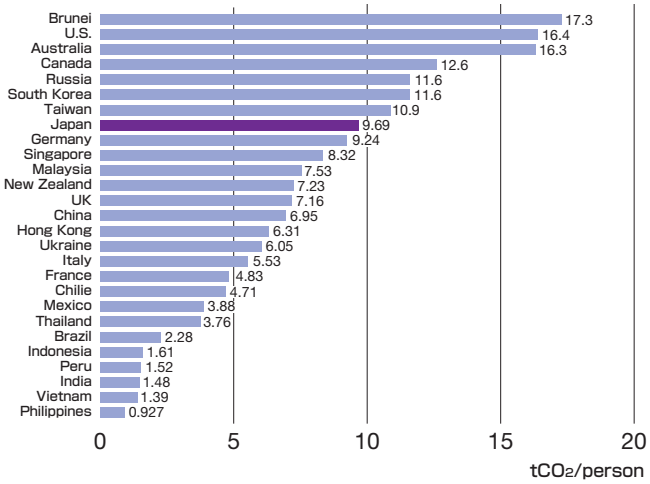
■Carbon dioxide emission volume by country

In 2013, Carbon dioxide emission volume by country is as follows: China 28.7%, U.S. 15.7%, India 5.8%, Russia 5.0%, followed by Japan at 3.7%. In terms of per capita emissions by country, Japan is number 8.

●Share of carbon dioxide emission volume by country (2013)



●Per capita carbon dioxide emission volume by country (2013)



Source: EDMC "Handbook of Energy & Economic Statistics in Japan 2016"

(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.

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The results of the November 2016 COP22 are shown below.

The 22nd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 22),
The 12th Session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP12),
The 1st Session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA1)
(Overview and Assessment)

November 18, 2016

The 22nd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 22) and the 12th Session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP12) took place from November 7 to 18 in Marrakech, Morocco. From November 15 to 18, the 1st Session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA1) also took place, following by the entry into force of the Paris Agreement on November 4. Mr. Kouichi Yamamoto, 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.

Japan's involvement in these meetings, the outcome and the assessment of the conferences are as follows.

1. Overview of the conferences and Japan's contribution

Japan participated in the sessions with three main objectives: (i) ensuring inclusiveness in the decision-making process, (ii) furthering discussions on the modalities, procedures and guidelines of the Paris Agreement and (iii) promoting Japan's contribution on climate change. These three objectives have largely been achieved through the various phases of the conferences.

(1) Regarding the negotiating modalities on the relevant guidelines of the Paris Agreement, including the decision-making process, after the CMA1, Japan considered it important to ensure the inclusiveness through participating in their discussions. This would enable all Parties to have the ownership of the relevant guidelines of the Paris Agreement, regardless of whether they are Parties to the Agreement. With its conclusion of the Paris Agreement in November 8, Japan exchanged the views with Ms. Espinosa, UNFCCC Executive Secretary and Ambassador Mekouar of Morocco, the COP Presidency. In these meetings, Japan proposed that the streamlined and procedural COP/CMA decisions are needed in order to clarify the negotiating modalities after CMA1, and that the COP Presidency provides draft decisions of a basis for discussion.

(2) During the discussions on the relevant guidelines of the Paris Agreement, some developing countries argued that there should be different treatment between developed and developing countries in implementing the Paris Agreement, and developed countries were against to these arguments. Japan emphasized, with other developed countries, that the guidelines should promote all countries' efforts on climate change and should not be bifurcated between developed and developing countries. Japan also stressed that the concrete work plans until the next session to be held in May 2017 are needed in order to further the technical discussions in a timely manner toward adopting the relevant guidelines by 2018.

(3) Regarding the promotion of Japan's contribution on climate change, Minister Yamamoto met with his counterparts (such as EU, Germany, Italy, Morocco, China and Thailand) and CEOs of the international organizations (such as GEF and UNFCCC) and exchanged the views on the possible cooperation. They shared the recognition that each country needs to come together and send a strong message to the international society for combatting global warming. Minister Yamamoto emphasized that Japan is willing to lead such role. Japan released "Japan's Assistance Initiatives to address Climate Change Responding to Needs of the Developing Countries" in November 11, and introduced its activities and willingness to address climate change.

Regarding the implementation of the Paris Agreement, there needs to be effective support to developing countries provided in a coordinated fashion. Minister Yamamoto participated in relevant events concerning the international partnership and initiatives including the launching event of the NDC Partnership. He stated that Japan would support developing countries to implement the Agreement through working together with the domestic and international research institutions and support organizations.

Throughout the COP22/CMP12/CMA1, the Government of Japan set up an event space, called the Japan Pavilion, where it held a large number of events to introduce and discuss the efforts of 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".

(4) At the high-level segment of COP22/CMP12/CMA1, Minister Yamamoto delivered a speech. He welcomed the early entry into force of the Paris Agreement, expressing great respect for the efforts and passion of all countries. He added that Japan completed the conclusion process and would contribute to rule-making under the Agreement. He referred to "the Plan for Global Warming Countermeasures" decided by the cabinet, and stated Japan's intention to address the long-term low greenhouse gas emission development strategy and the support for developing countries. Furthermore, he expressed that he realized the political leadership in the efforts against climate change will become more important than it was before.

(5) With regard to climate finance, the second biennial High-Level Ministerial Dialogue was held and Parties discussed matters related to adaptation finance. In this dialogue, Japan explained that it had put emphasis on adaptation measures, especially on disaster reduction, and had contributed to developing countries through Sendai Framework for Disaster Risk Reduction 2015-2030. Japan has initiated to

hold meetings with approximately 30 recipient countries including climate change negotiators through Japanese embassies in recipient countries so as to create better climate-related projects which reflects recipients' needs particularly in the area of adaptation. Japan also participated in the facilitative dialogue and expressed the importance of support through the Capacity Building Initiative for Transparency (CBIT) for the implementation of the Paris Agreement. Japan announced that it supported the work of CBIT and has seriously considering contributing to the initiative. Japan took part in the joint statement on the CBIT with other donor countries.

(6) Market mechanisms are one of the major pillars of the Paris Agreement. Japan held "the 4th JCM Partner Countries' High-Level Meeting" where 16 partner countries of the Joint Crediting Mechanism (JCM) to promote bilateral cooperation on market mechanisms. At the meeting, Japan and the representatives of the 16 countries welcomed the progress of the JCM including issuance of JCM credits and confirmed further promotion of the JCM. Furthermore, Japan held a side event to present the outcome of the First Strategic Dialogue of the Carbon Market Platform held in Tokyo in June 2016 co-chaired by Japan and Germany and to discuss the areas of the Platform activities in the coming years.

2. Outcome of the conference

(1) Regarding the negotiation on negotiating modalities on the relevant guidelines of the Paris Agreement including the decision-making process after the CMA1, the inclusiveness, which Japan has emphasized, was ensured. It was agreed that relevant guidelines would be adopted by 2018. More specifically, following procedures for the negotiation were agreed as the COP and CMA decisions.
(i) The negotiation on the relevant guidelines will continue with participation of all Parties.
(ii) The CMA1 will be reconvened in 2017 and review the progress of the negotiation.
(iii) The CMA1 will be reconvened in 2018 and adopt the relevant guidelines.

(2) Regarding the discussions on the relevant guidelines of the Paris Agreement at the related bodies including the Ad Hoc Working Group of the Paris Agreement (APA), the work plans on each agenda item (mitigation, market mechanism, adaptation, transparency, global stocktake etc.) until the next session in May 2017 were decided in order to further the technical discussions efficiently at the next session. At the meeting, each Party expressed the various views, including on how to consider the respective capabilities of developed and developing countries. The guiding questions on each agenda item were provided based on those views after the meeting.

(3) With regard to climate finance, decisions of the COP and its Subsidiary Bodies (SB) welcomed the outcome in 2016. It includes the second biennial assessment. Through the discussion, Parties identified points of contention and reached a common ground how they deepen their discussion on climate finance in following meetings. For the discussion related to the accounting modalities of climate finance, Parties exchanged their views on the issue through workshops and contact groups, and established a basis of discussion for identifying some elements that integral for the accounting modalities. Such basis would allow Parties to move forward towards positive discussion on improvement of transparency. The discussion will be continued in SB46. Moreover, the submission made voluntarily by the developed country Parties, "Roadmap to $ 100 billion" which was announced before the pre-COP held in October 2016, was welcomed by developing country Parties.

(4) Morocco, the COP22 Presidency, released the Marrakesh Action Proclamation for our Climate and Sustainable Development to call for climate action of each Party. The High-level event on accelerating climate action was convened during the conference with a view to strengthening the actions of governmental and non-governmental actors such as local governments and private sectors. The Marrakech Partnership was established towards furthering such actions.

(5) The COP/CMP decisions related to the following issues were also adopted: the review of the Warsaw International Mechanism on loss and damage, the Paris Committee on Capacity Building, linkages between the Technology Mechanism and the Financial Mechanism of the Convention.

(6) It was decided that the COP23 presidency will be Fiji and the COP23 will be held in November 2018 at Bonn in Germany.

3. Assessment

The three primary objectives on which Japan considered important for the COP22 negotiation were largely achieved. Japan welcomes the early entry into force of the Paris Agreement and highly values the decision to continue the negotiation on the relevant guidelines of the Paris Agreement with participation of all Parties. The decision to adopt the relevant guidelines by 2018 is also important in terms of facilitating the discussions. Some developing countries maintained their pre-Paris positions that only developed countries be required to take actions despite the adoption of the Paris Agreement. The differences of the each Party's position have become evident through the conference. The challenge of finding a way to move forward the discussions constructively and timely will remain for the future conferences.

After Mr. Donald Trump won the Presidential election in the United States on November 9, its climate policy of the next administration attracted much attention from many countries represented during the COP22. Many participants expressed their views that all Parties should move towards resolving the critical global issue of climate change through international cooperation.

Source: Ministry of Foreign Affairs of Japan website

(3) Current status of global warming issues in Japan

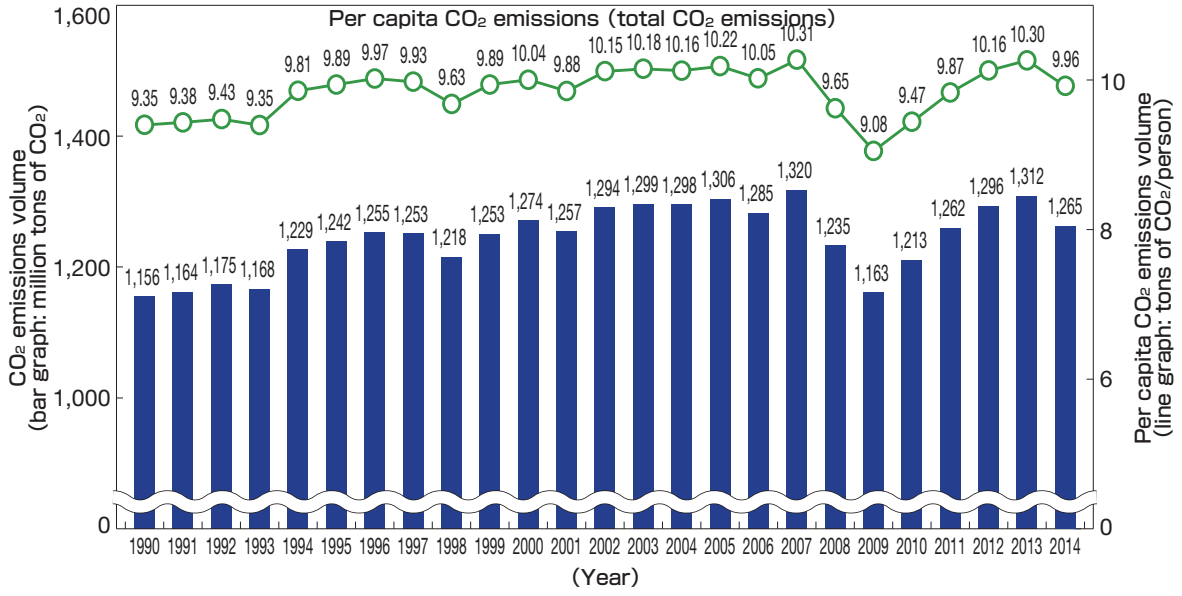
①Current status of carbon dioxide emissions in Japan

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 2014 Japan emitted approximately 1,265 million tons of carbon dioxide, roughly 9.5% more than it did in 1990. The per capita emissions volume in 2014 was approximately 9.96 tons.

●Trends in carbon dioxide emissions in Japan

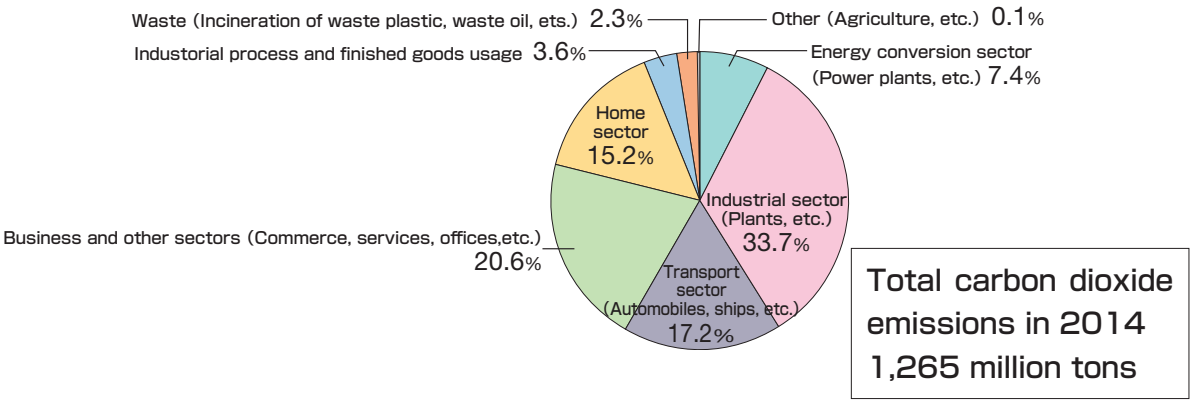


Source: GIO "Greenhouse Gas Inventory"

■Ratio of carbon dioxide emissions in Japan by sector

The industrial sector accounts for 33.7% of Japan's carbon dioxide emissions, the transport sector for 17.2%, business and other sectors account for 20.6%, and the home sector accounts for 15.2%.

●Amount of carbon dioxide emissions in Japan (by sector) 2014



Source: GIO "Greenhouse Gas Inventory"

②Energy 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. Real GDP fell by 1.0% in 2014 from 2013, and final energy consumption also fell by 3.2%.

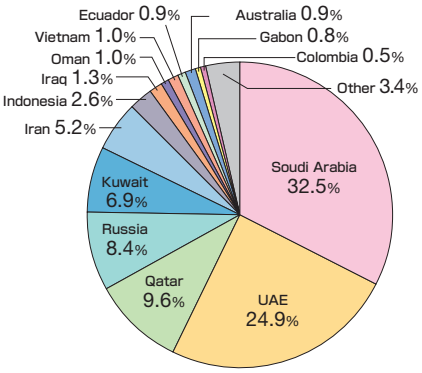
Looking at energy consumption trends from 1973 to 2014, energy consumption for the company and business sector grew 1.0-fold (0.8-fold for industrial sector and 2.4-fold for business and other sectors), and 2.0-fold for the home sector ,1.7-fold for transport sector. Since the oil crises, the company 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 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, home, and transport sectors accounted, respectively, for 74.7%, 8.9%, and 16.4% of total energy consumption in 1973, in 2014 these ratios had changed to 62.7%, 14.3%, and 23.1% 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 2014 Japan supplied 0.3% of the crude self-sufficiency raito. Japan's major oil fields are located in Niigata Prefecture, Akita Prefecture, and Hokkaido. Because of this low level of self-sufficiency, in 2014 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 2014 the U.S. depended on the Middle East for 24.3% of its crude oil, and European OECD countries depended on the Middle East for 15.8% of their crude oil. In 2014 Saudi Arabia was Japan's largest supplier of crude oil, supplying 32.5%, followed by the UAE (24.9%), Qatar (9.6%), and Russia (8.4%).

●Crude oil imports by supplying country (2014)



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

(Source: METI "Energy White Paper 2016" (Tentative Translated by Eco-Mo Foundation))

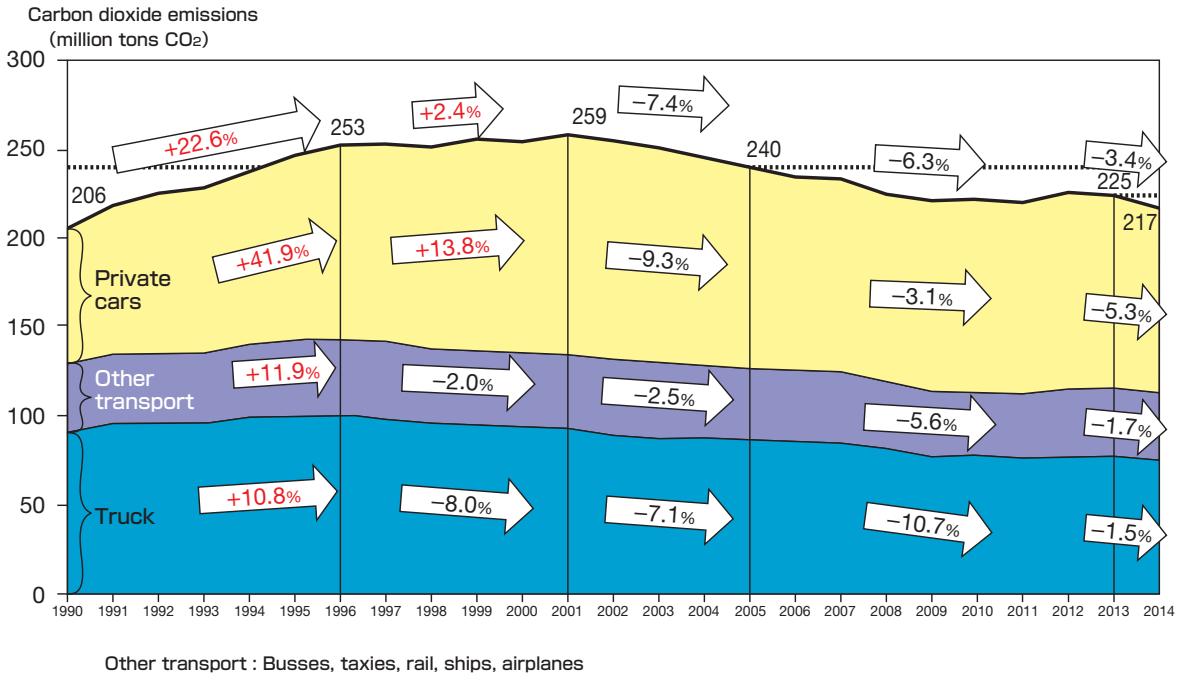
(4) Current status of global warming issues in the transport sector

①Current 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 2014 the amount of carbon dioxide emissions was approximately 217 million tons, 5.3% more than in 1990.

●Trends in carbon dioxide emissions by the transport sector



Other transport : Busses, taxies, rail, ships, airplanes

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

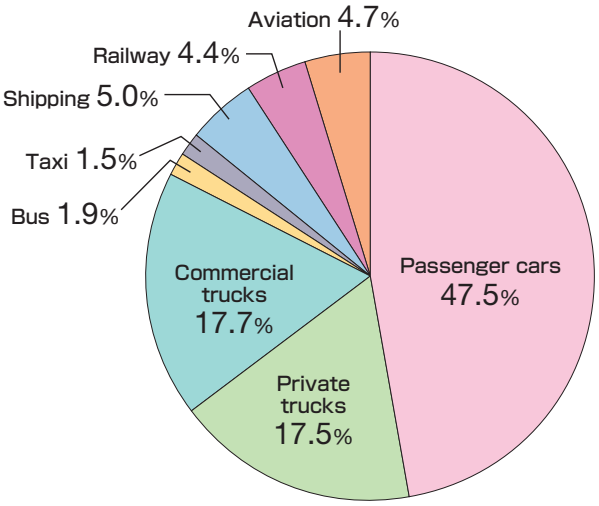
Carbon dioxide emissions from automobiles accounts for 86.0% of total carbon dioxide emissions produced by the transport sector. 47.5% of these carbon dioxide emissions are produced by private cars.

■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 6.0 times more carbon dioxide than rail transport. Therefore in order to reduce carbon dioxide emissions, the use of public transportation, which has smaller carbon dioxide emission rates than private vehicles, need to be promoted.

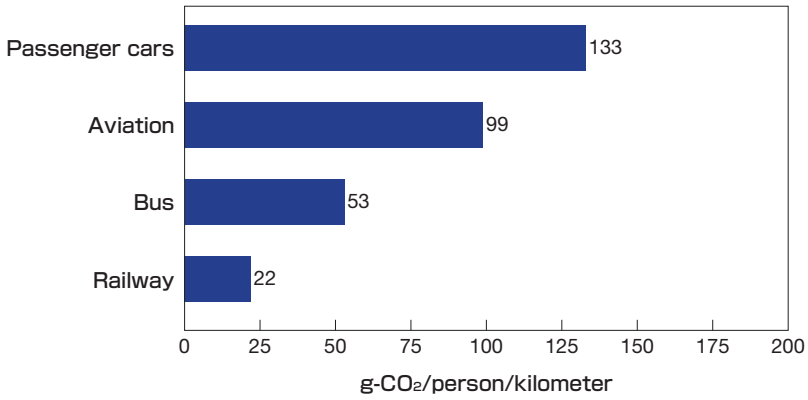
For freight transport carbon dioxide emission rates (the amount of carbon dioxide emitted in transporting one ton of freight for 1km), private trucks emit 49 times more carbon dioxide than trains, 32 times more than ships, and 6 times more than commercial truck. There need to be a modal shift, moving to efficient use of commercial truck, ships, and trains, improving distribution efficiency.

●Amount of carbon dioxide emissions from the transport sector (by means of transportation) 2014

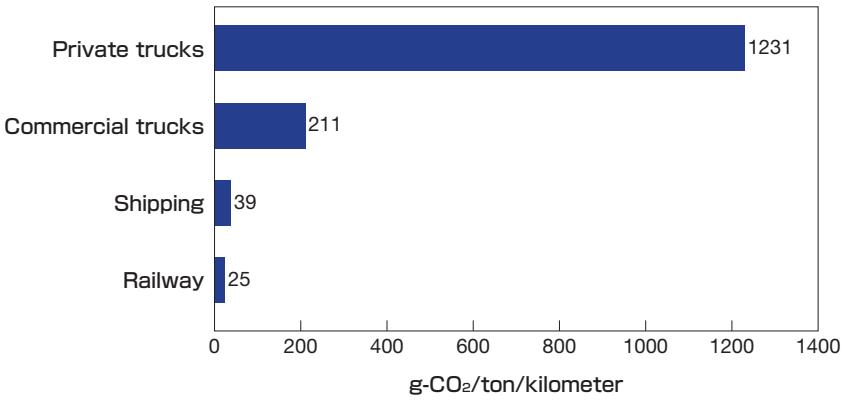


Source: MLIT website (Tentative Translated by Eco-Mo Foundation)

●Carbon dioxide emission rates by passenger transport mode (2014)

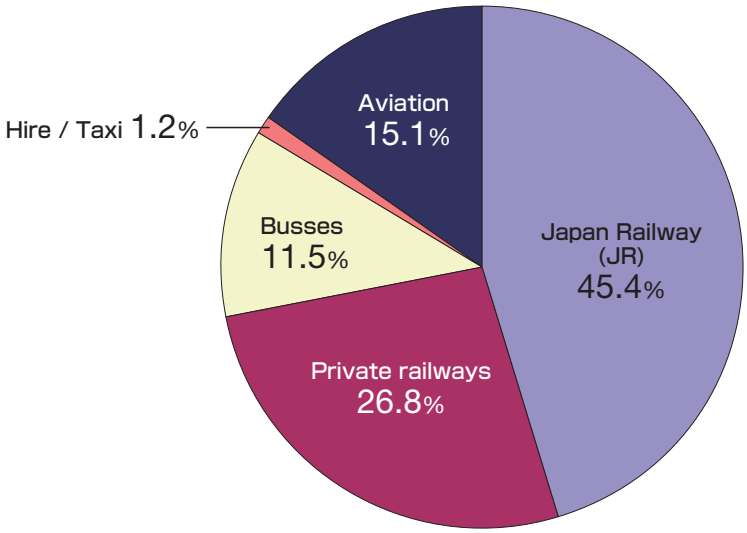


●Carbon dioxide emission rates by freight transport mode (2014)



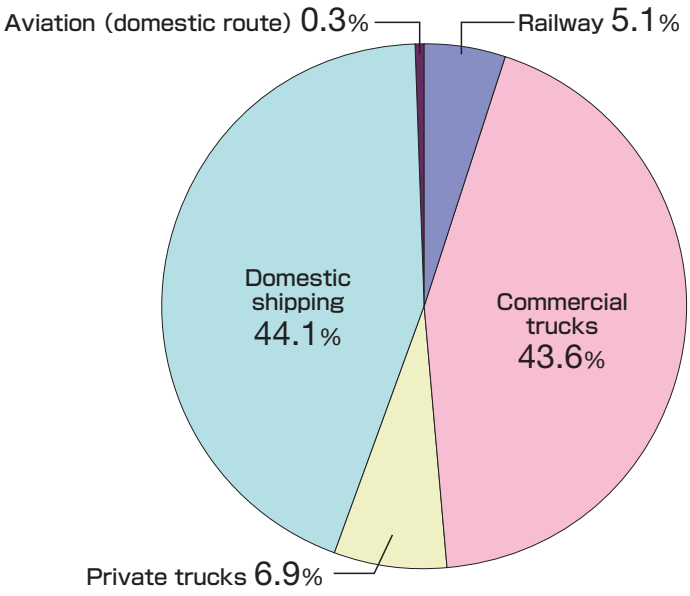
Source: MLIT website (Tentative Translated by Eco-Mo Foundation)

●Modal shares of domestic passenger transport (per person per kilometer), 2014



*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), 2014



*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 2011" (Tentative Translated by Eco-Mo Foundation)

②Energy consumption by the transport sector

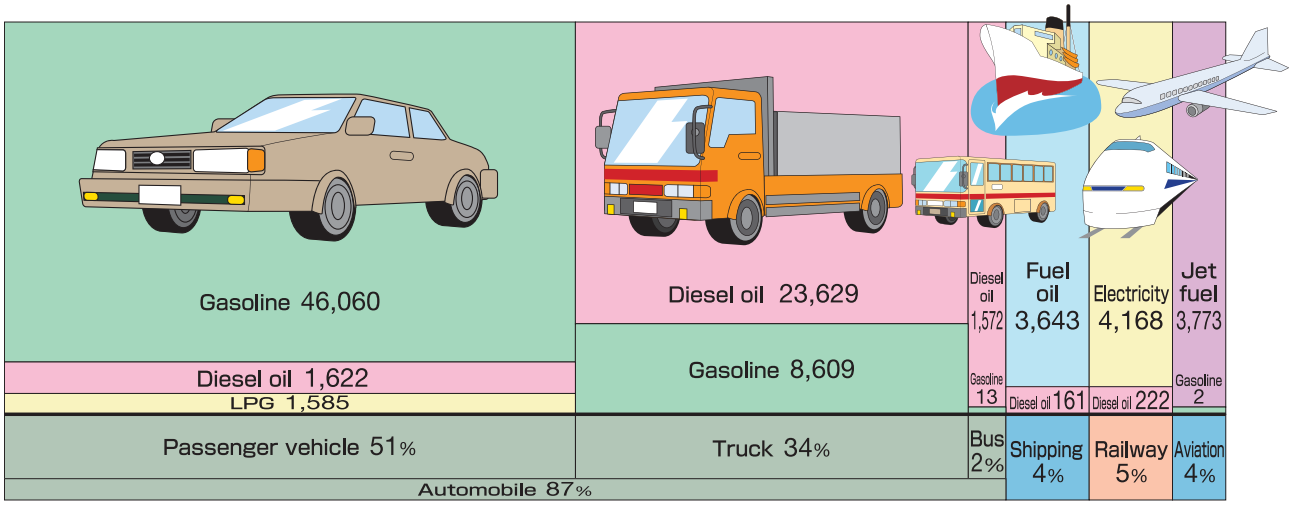
Within the transport sector, automobiles account for the largest amount of energy consumption, roughly 87% of the sector's total energy consumption. The majority of this is energy consumption is by cars and trucks. In terms of consumption by oil type, gasoline and diesel oil account for 87% of the transport 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 2014 were 217 million tons.

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

●Ratios of energy consumption type and volume of oil used by means of transport (2009)

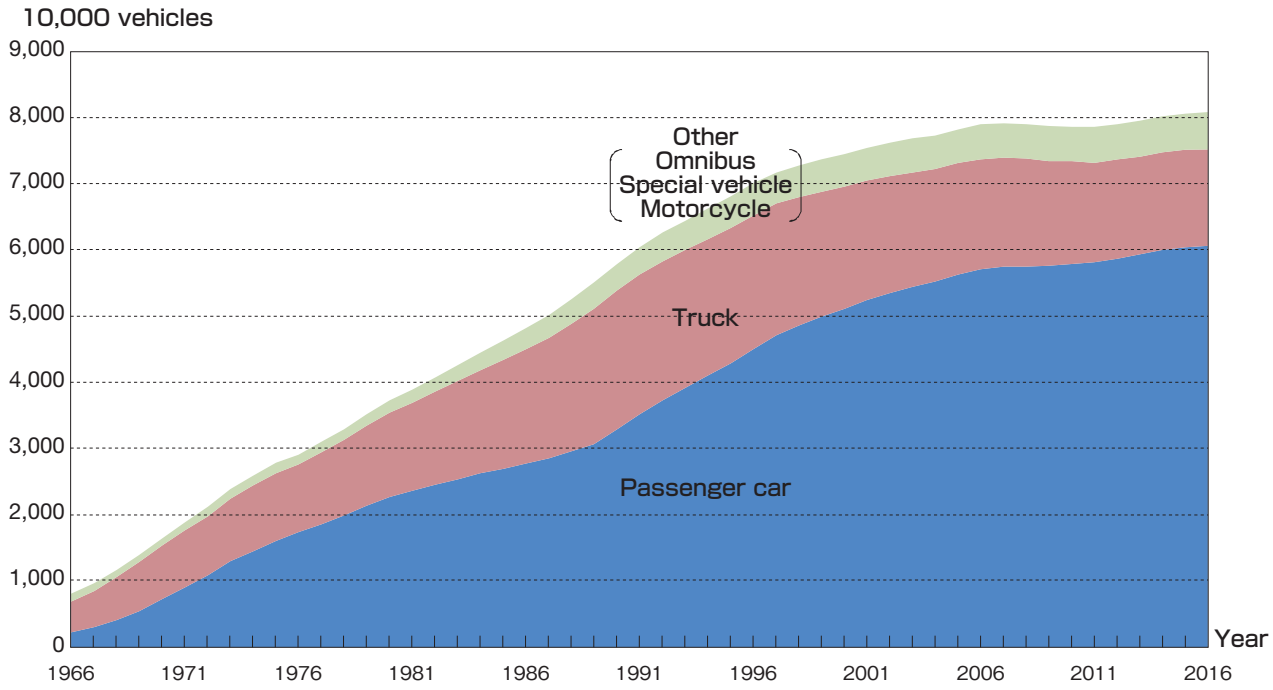
(Unit: 1,000kl)



Total: 95,059,000kl crude oil equivalent
Note: Does not include oversea ocean shipping or international aviation

Source: MLIT "Transportation Statistics Collection" (Tentative Translated by Eco-Mo Foundation)

●Automobile ownership trends



1: Passenger vehicles include mini-vehicles.
2: Number of vehicles as of the end of March of each year.

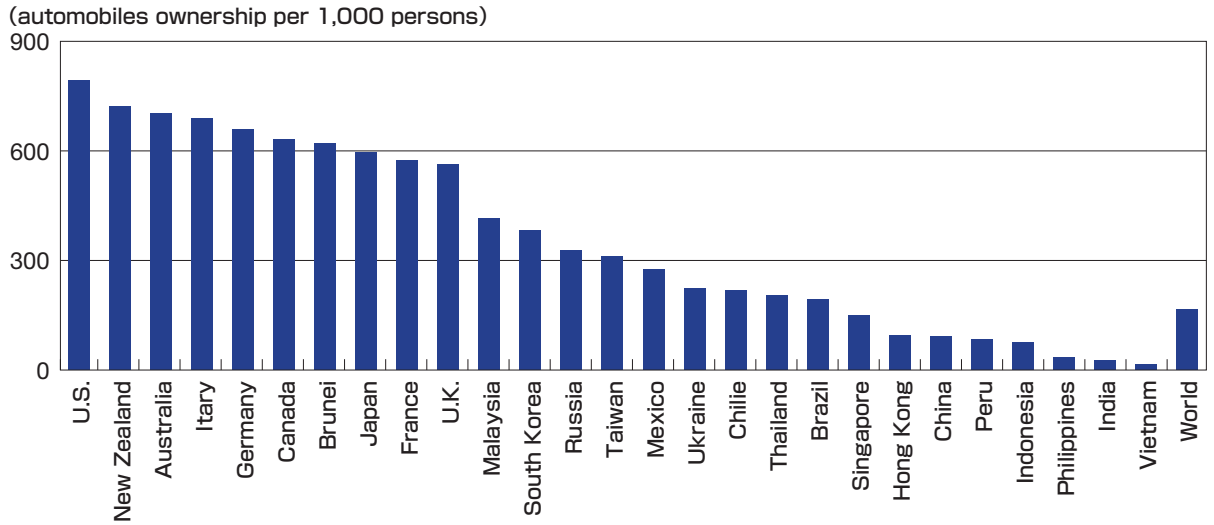
Source: Automobile Inspection & Registration Information Association website (Tentative Translated by Eco-Mo Foundation)

Column

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 798 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 2.4% globally in 2013, but in China it grew by 15.3%, and in India by 8.1%. 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 2013



Source: EDMC "Handbook of Energy & Economic Statistics in Japan 2016"

2 Current status of automobile gas emissions

Road transportation related environmental problems involving the transport sector include atmospheric pollution produced by suspended particulate matter (SPM) and nitrogen oxides (NOx) such as nitrogen dioxide (NO_2) emitted from automobiles. NOx 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 2014 air quality standards achievement rates for NO_2, with 100% achievement rates for nine consecutive years since 2006. Automobile exhaust gas monitoring stations have seen a slight decline in target achievement, at 99.5% compared to 2013. For automobile exhaust gas monitoring stations in areas implementing Automobile NOx/PM Act measures the achievement rate was 99.1%. For SPMs, nationwide air quality standards achievement rates were 99.7% for air pollution monitoring stations and 100% for automobile exhaust gas monitoring stations. These have fallen slightly, for both types of stations, in comparison to 2013 (air pollution monitoring station: 97.3%, automobile exhaust gas monitoring station: 94.7%).

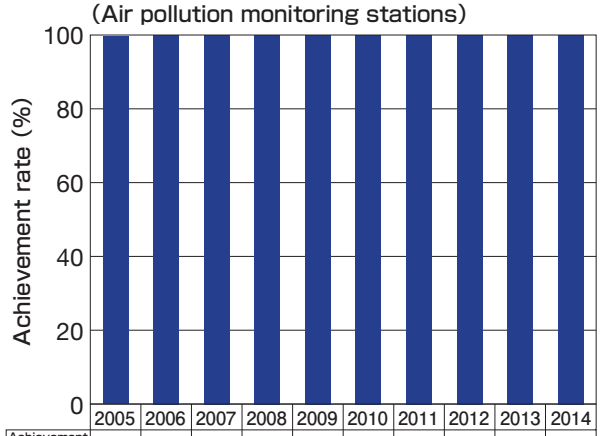
SPM 2014 air quality standards achievement rates for areas implementing Automobile NOx/PM Act measures were 99.8% for both air pollution monitoring stations and 100% for automobile exhaust gas monitoring stations, have fallen slightly.

※ 1 Air pollution monitoring station:
Monitoring stations performing regular monitoring of general atmospheric pollution conditions. (Nationwide: 1,494 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: 416 stations)

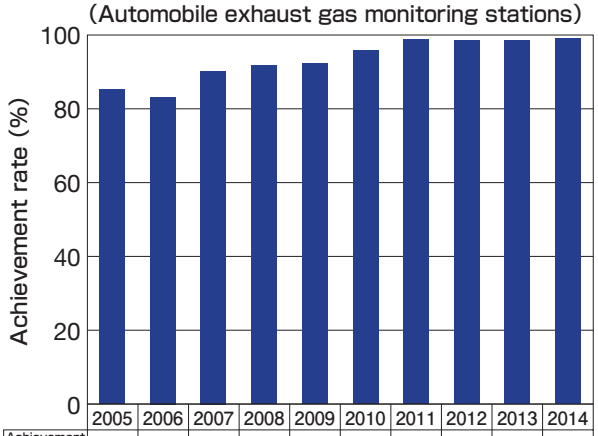
●NO_2 air quality standards achievement rates in regions implementing Automobile NOx/PM Act measures (2005 to 2014)

(Air pollution monitoring stations)



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Achievement rate	99.8%	100%	100%	100%	100%	100%	100%	100%	100%	100%
No. of effective stations	448	441	436	436	438	411	425	418	411	413
No. of achieving stations	447	441	436	436	438	411	425	418	411	413

(Automobile exhaust gas monitoring stations)

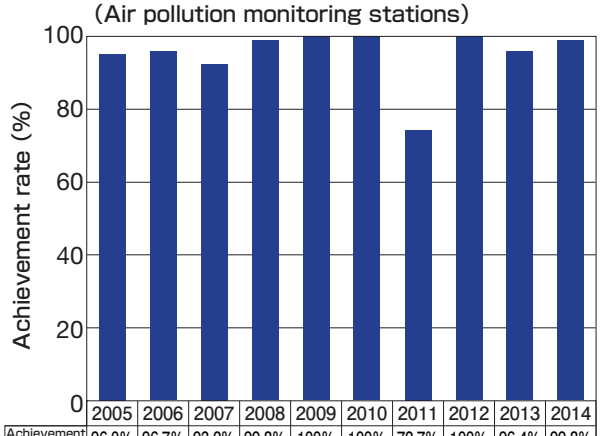


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Achievement rate	85.1%	83.7%	90.6%	92.0%	92.9%	95.7%	99.1%	98.6%	98.6%	99.1%
No. of effective stations	222	227	224	225	226	207	219	216	218	216
No. of achieving stations	189	190	203	207	210	198	217	213	215	214

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

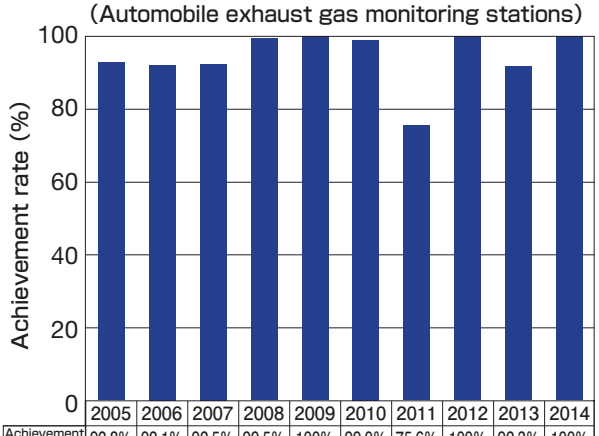
●SPM air quality standards achievement rates in regions implementing Automobile NOx/PM Act measures (2005 to 2014)

(Air pollution monitoring stations)



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Achievement rate	96.0%	96.7%	93.2%	99.8%	100%	100%	72.7%	100%	96.4%	99.8%
No. of effective stations	452	448	443	440	439	415	429	421	415	415
No. of achieving stations	434	433	413	439	439	415	312	421	400	414

(Automobile exhaust gas monitoring stations)



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Achievement rate	92.8%	92.1%	92.5%	99.5%	100%	99.0%	75.6%	100%	92.3%	100%
No. of effective stations	209	215	212	213	214	197	209	207	209	208
No. of achieving stations	194	198	196	212	214	195	158	207	193	208

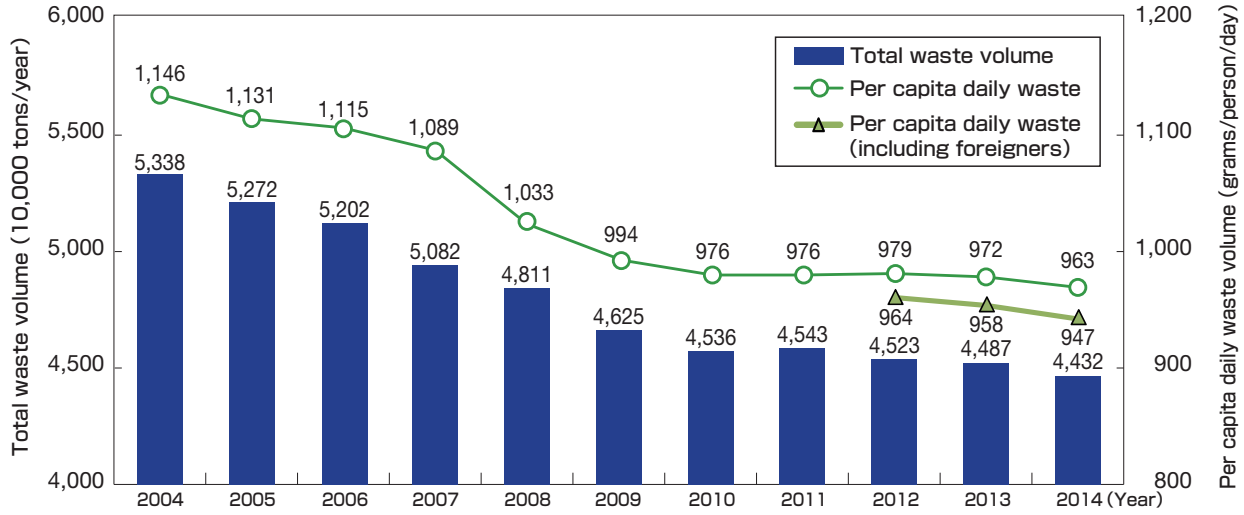
Source: MOE website (Tentative Translated by Eco-Mo Foundation)

3 Current status of waste and recycling

①Trends 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 2014 the total amount of waste was 44.32 million tons. The total amount of recycled waste in 2014 was 9.13 million tons. The ratio of total waste which was recycled has grown tremendously, from 5.3% in 1990 to 20.6% in 2014 (similar to the previous year).

●Total waste volume and per capita daily waste volume

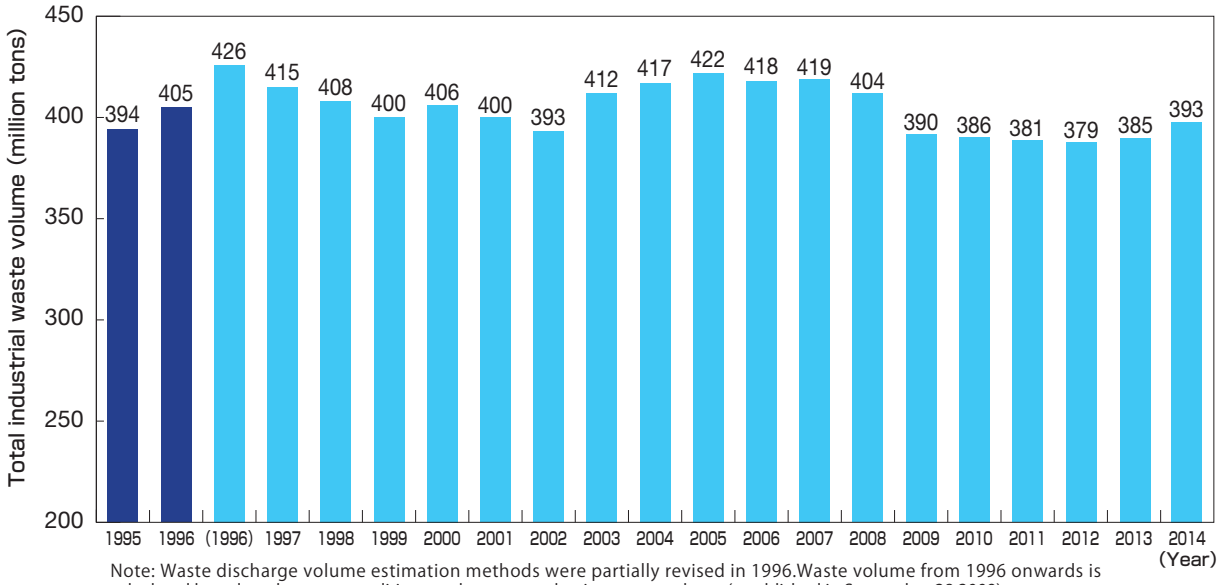


Source: MOE website (Tentative Translated by Eco-Mo Foundation)

②Trends in industrial waste volume

The amount of industrial waste produced has stayed roughly 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).

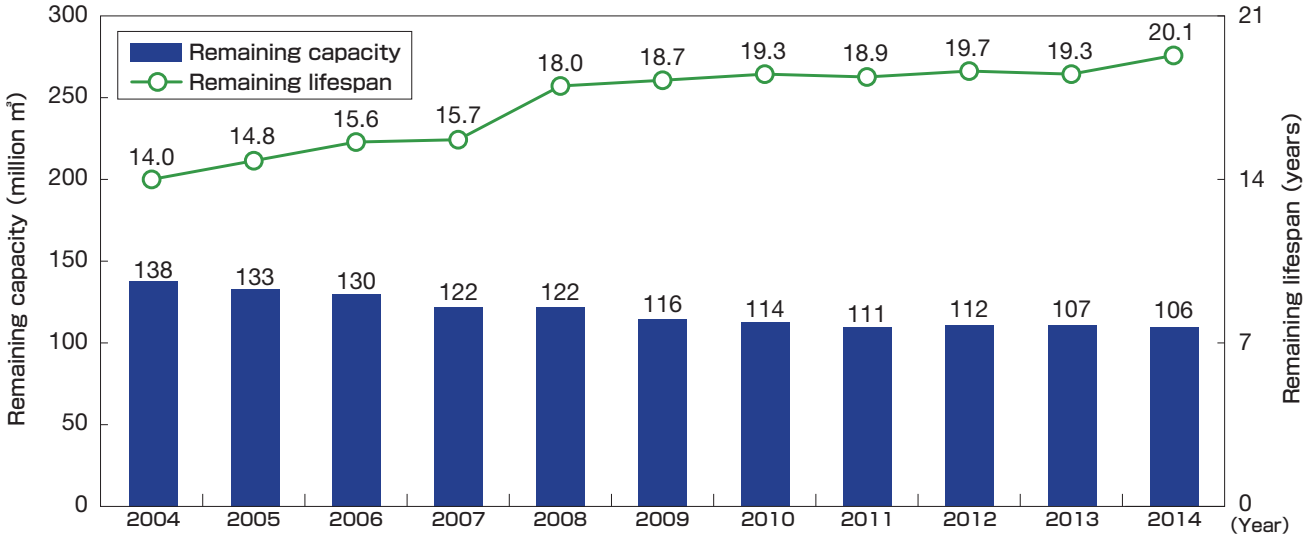
Source: MOE website (Tentative Translated by Eco-Mo Foundation)

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

As of the end of 2014 there were 1,698 general waste final disposal sites in Japan with a remaining capacity of 105.82 million m³. The average remaining lifespan was 20.1 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 2013 was 171.81 million m³, 10.90 million m³ less than the previous year. The average nationwide remaining lifespan is 14.7 years. Slight improvements are being made, but the remaining lifespan in the Tokyo area is 5.2 years, and remaining capacities are particularly low for major metropolitan areas.

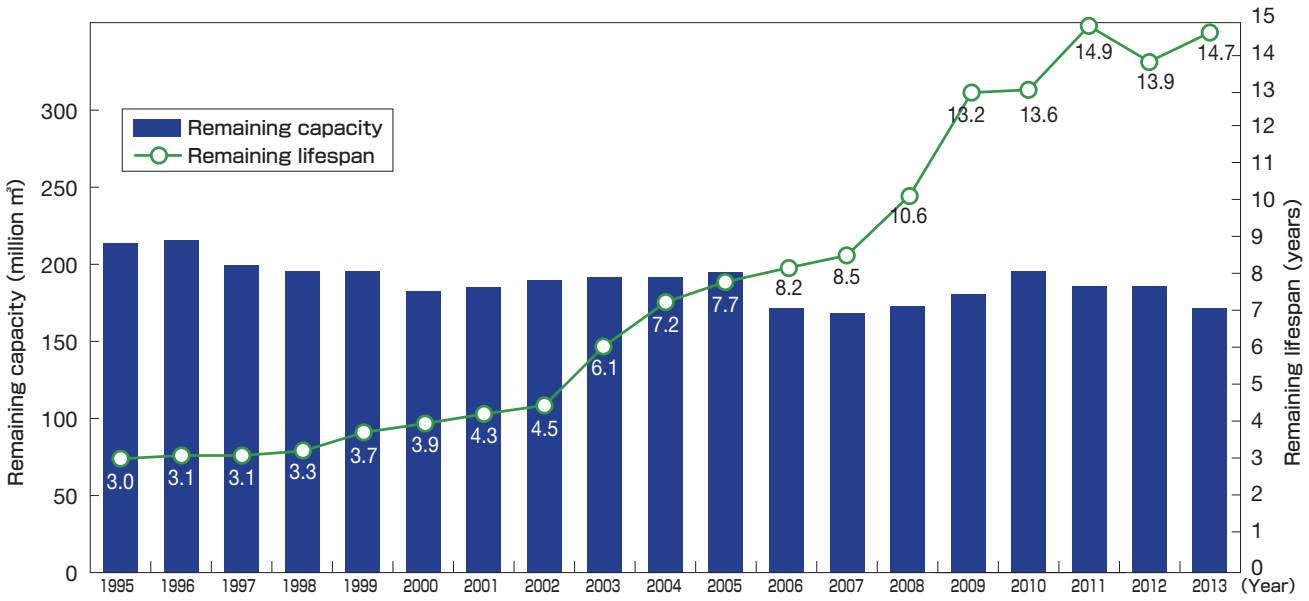
●Remaining lifespans and remaining capacities of final disposal sites (general waste)



Note: Of the remaining capacity revised through aerial measurements, etc., in 2005, the increase (7,737,000m³) have been added to the data for 2004 and earlier, and the remaining capacities and remaining lifespans for each year have been recalculated. Because of this, the figures differ from those announced in 2004.

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

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

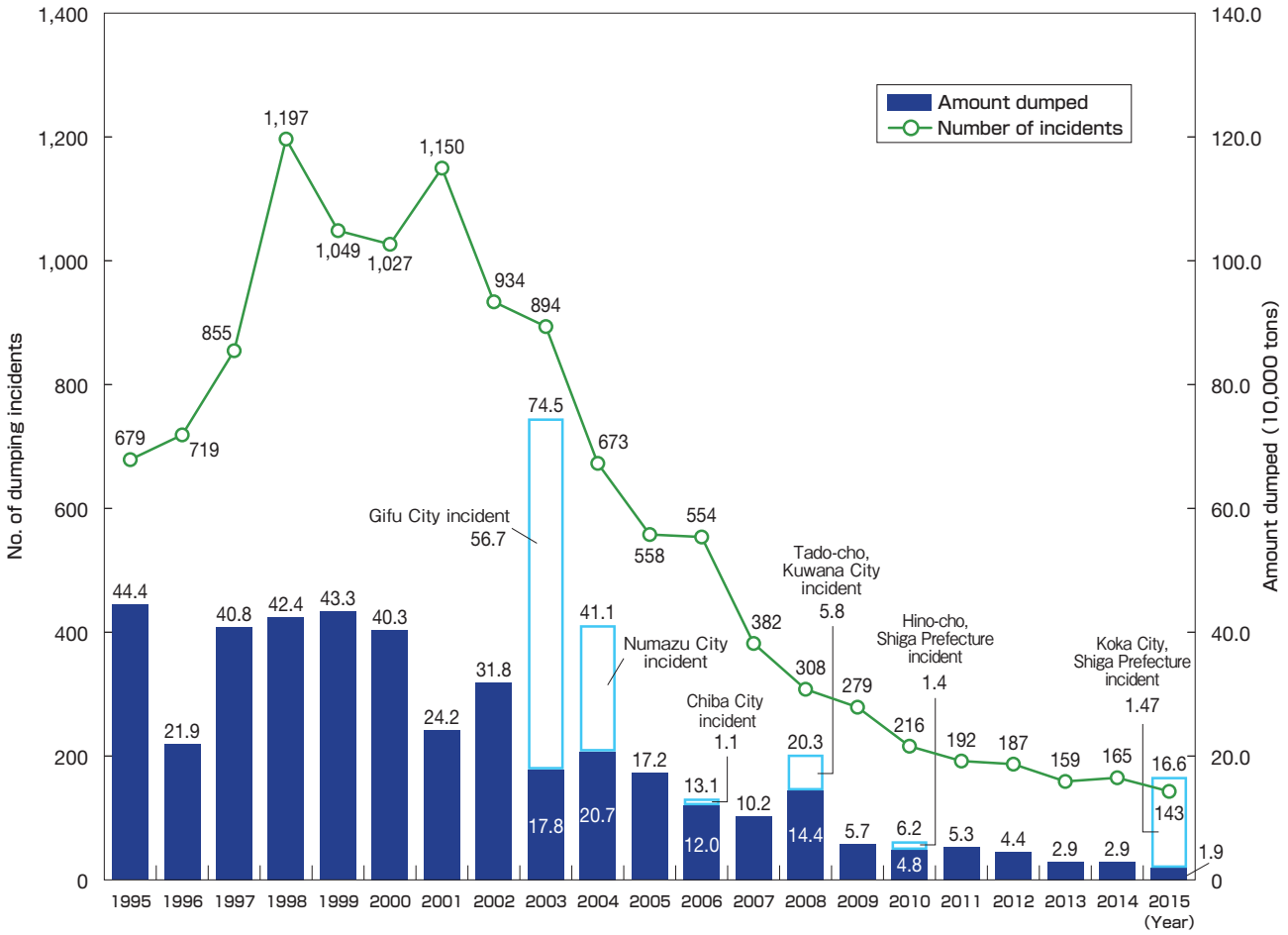


Source: MOE website (Tentative Translated by Eco-Mo Foundation)

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

143 incidents of illegal dumping of industrial waste, a total of 166,000 tons of waste, were discovered in 2015, along with 261 incidents of improper disposal (400,700 tons). The number of incidents, and volume of waste involved, has decreased yearly in conjunction with enhanced enforcement of the Waste Management and Public Cleansing Act.

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



Note)
1. 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).
2. 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.
3. The sulfate aid pitch were not included in this study and are covered separately.
4. Ferosilt dumping incidents were not included in this study. 720,000 tons of Ferosilt were sold and used as backfilling material since August 2001, but it was later discovered that the manufacturer and seller of Ferosilt 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 Ferosilt 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)

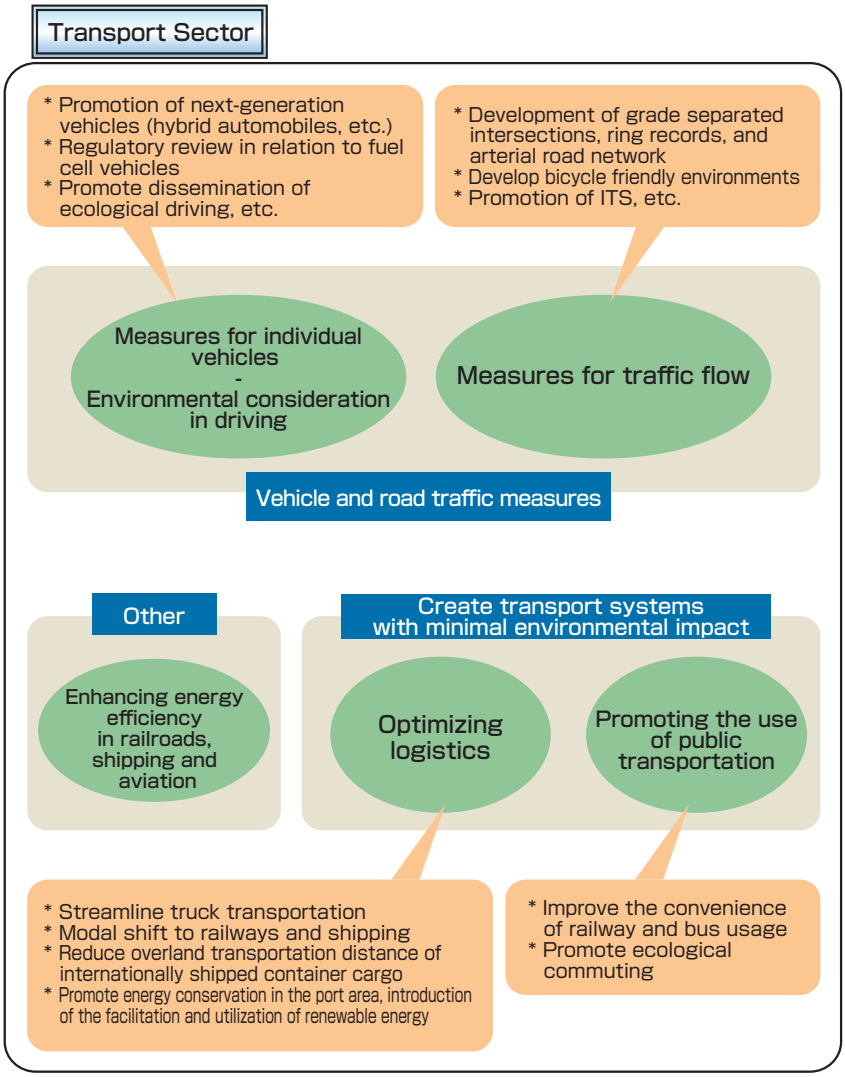
Ⅲ. Measures in Response to Major Environmental Problems of the Transport Sector

1 Promotion of global warming countermeasures

(1) Transport sector countermeasures

The amount of carbon dioxide emitted by the transport sector in 2014 was 5.3% 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 transportation.

●Global warming countermeasures of MLIT



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

①Promotion 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 CO_2 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.

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 of 10 people 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 divided 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 CO_2 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).

- ○ 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

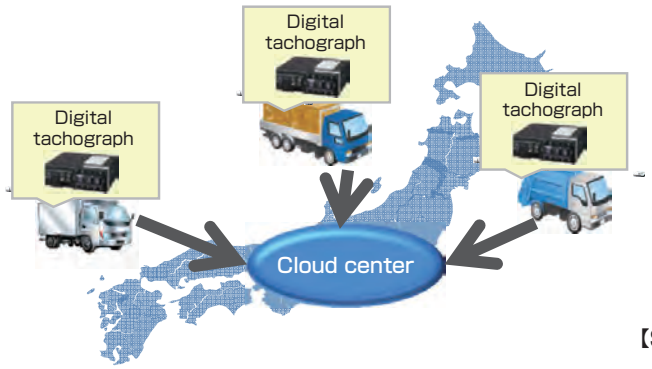
Source: The Eco-Drive Promotion Liaison Commitee

Column

Ecological and safe driving support services which use truck drive data

The promotion of "eco-driving" by truck operators is an important environmental conservation measure for the transport sector. Advances in ecological and safe driving support services which use truck drive data, combined with the effects of deploying digital tachographs, have produced services which improve fuel efficiency by approximately 15%. In addition to their environmental benefits, they also encourage safer driving, contributing to reduce traffic accidents.

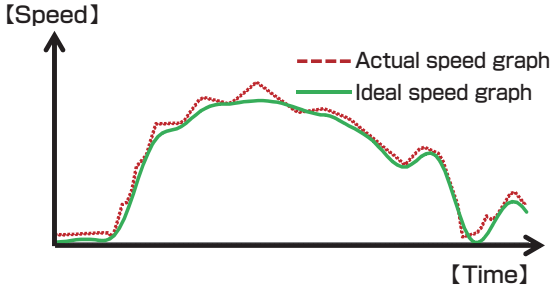
●Service example (TRIAS-TR-Saas Eco & Safety Benchmark Service)



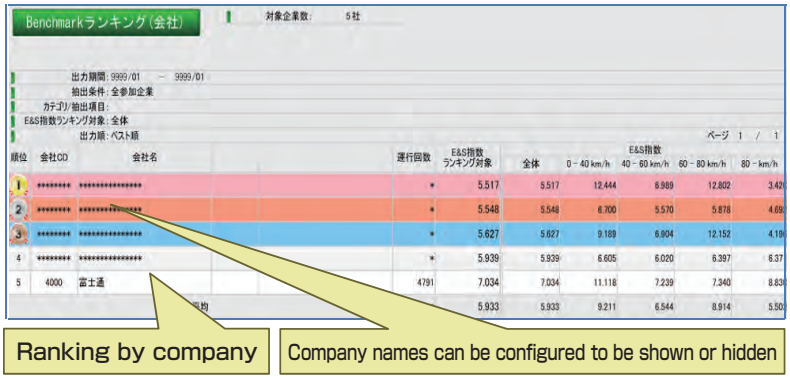
Drive data collected from digital tachographs is collected and analyzed at the cloud center to provide services which contribute to more ecologically friendly and safe driving, as well as reduced costs for transport companies.

【Shifting from sensory to quantitative evaluation of driving levels】

As shown at right, the differences in actual speed graphs and ideal speed graphs are calculated at the cloud center for use as quantitative (*) evaluations of driving levels.



[Service Content]
Collecting E&S index data in a cloud center makes it possible compare eco-driving and safe driving results against other companies, which was not possible in the past.
(Nationwide rankings can be compared for various categories, such as by company, by business site, and by driver.)



This encourage healthy competition, increased ecological and safety awareness, and contributes to further improvements.

(*) "E&S (Ecology & Safety) indices" indicate the level of ecologically friendly and safe driving by individual drivers, and make it possible to provide specific driving improvement guidance.

Column

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)

Rolling resistance coefficient	Grade
RRC≦6.5	AAA
6.6≦RRC≦7.7	AA
7.8≦RRC≦9.0	A
9.1≦RRC≦10.5	B
10.6≦RRC≦12.0	C

Unit (%)

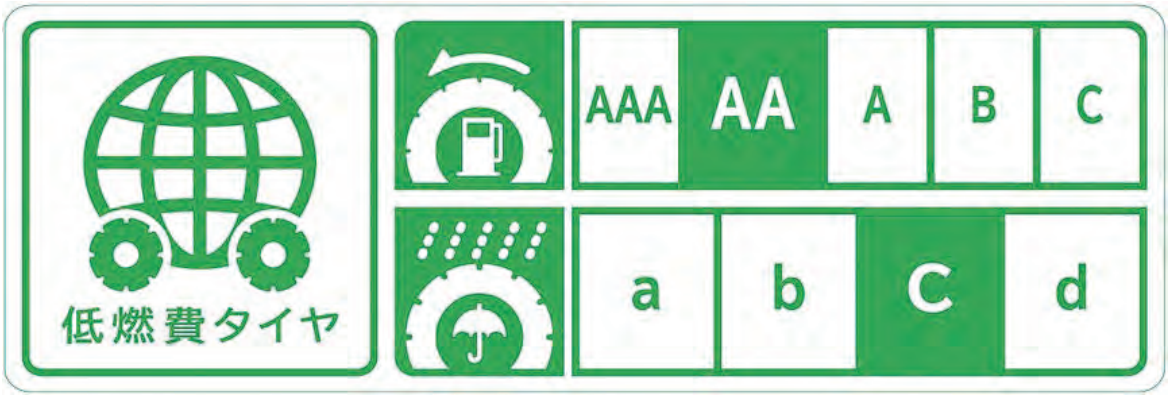
Wet grip performance (G)	Grade
155≦G	a
140≦G≦154	b
125≦G≦139	c
110≦G≦124	d

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 Laveling

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)

③Promotion of traffic flow measures

Smoother 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 transportation 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 transportation used in everyday life, and means of leisure transportation 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.

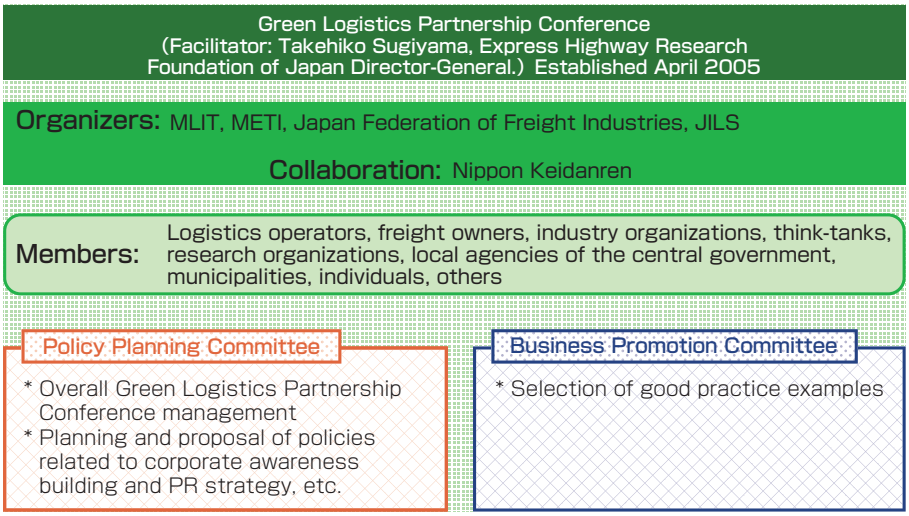
Because of this, the Ministry of Land, Infrastructure, Transport and Tourism, in conjunction with the National Police Agency, has held meetings of an exploratory committee of experts to consider how to create bicycle network plans and promote the creation of bicycle travel spaces based primarily on street 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.

④Improvement of freight distribution efficiency

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

○Green Logistics Partnership Conference

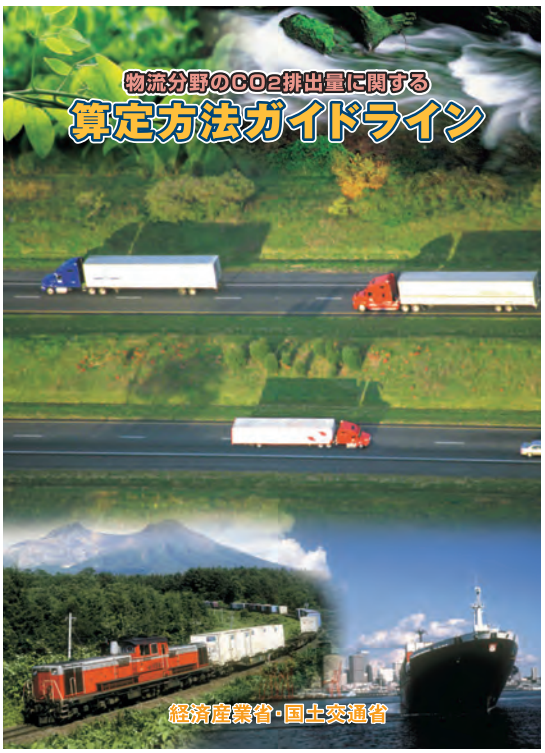
Promoting the creation of a greener overall logistics system requires greater collaboration between freight owners and logistics operators, and the expansion of sustainable logistics systems for global warming countermeasures improving productivity, etc.



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

The Green Logistics Partnership Conference, launched in 2004 and composed of companies and organizations united by this goal, strives to implement and promote logistics improvement measures involving coordination between freight owners and logistics operators, with the support of the MLIT, 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 CO_2 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 CO_2 emissions. Particularly successful good practice example projects involving logistics operators and freight owners engaging in partnerships to reduce CO_2 emissions, to create sustainable logistics systems for improving productivity, etc. are recognized by MLIT Minister awards.



(Pamflet of The Joint Guidlines on the Method for Calculating CO_2 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.

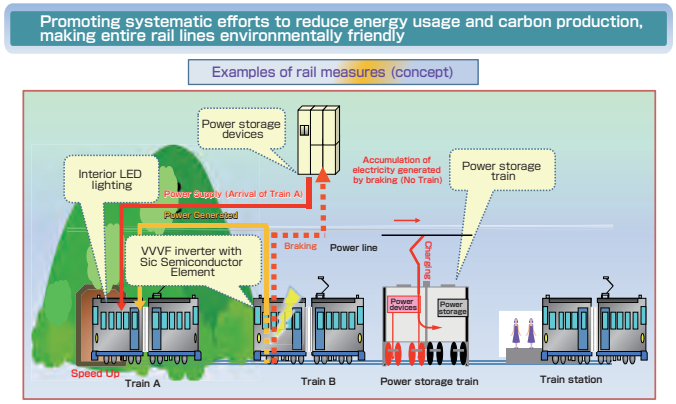
As part of these efforts it is implementing the Eco-Ship Modal Shift Project, which promotes modal shift by selecting companies which contribute to modal shift by using some degree of sea transport, and permitting those companies to use the Eco-Ship Mark. As part of this project, the Eco-Ship Modal Shift 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 2016, 105 freight owners and 122 logistics operators have received Eco-Ship Mark certification. Eco-Ship Mark certified companies are also selected to receive MLIT Maritime Bureau Chief awards.

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)

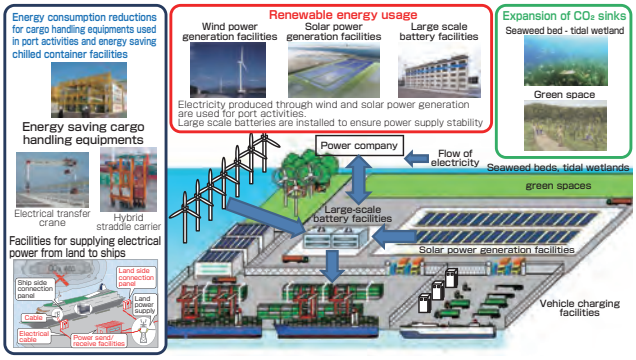
○"Eco Rail Mark" system promotion and expansion

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 are striving to further promote and expand the "Eco Rail Mark". As of September 7, 2016 there are 318 "Eco Rail Mark" product certifications for 201 products, 88 certified companies, and 29 certified supporting companies.

Source: Railway Freight Association (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. The Ministry of Land, Infrastructure, Transport and Tourism is striving to effectively reduce these emissions.



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

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 help absorb CO_2, 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 February 13, 2017, 13 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.

Distribution Integration Efficiency Act and labor savings

Overview of the Distribution Integration Efficiency Act

Revision enacted October 1, 2016

Objectives

- Secure labor required for freight distribution operations
- Reduce environmental impact

Overview of system

The system approves projects in which two or more parties collaborate to integrate distribution operations (integrating transport, storage, freight handling, and distribution processing) and make them more efficient (transport rationalization), contributing to environmental impact reductions and labor savings (distribution operation integration efficiency projects), and provides support to approved parties.

Main support measures

① Project startup/implementation support
- Plan formulation expense and operation expense subsidies, etc.

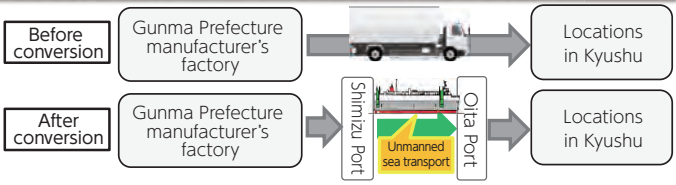
② Support for necessary facilities and equipment, etc.
- Special taxation structures for transport-linked warehouses (warehouses with truck arrival time reservation systems, etc.)

→Corporate tax: 10% additional depreciation deduction (5 years)
→Fixed property tax: 1/2 taxation base (5 years), etc.
- Consideration of facility location restrictions, etc.

→Consideration for permission to perform development in urbanization control areas

Example of Freight Distribution Integration Efficiency Act approval

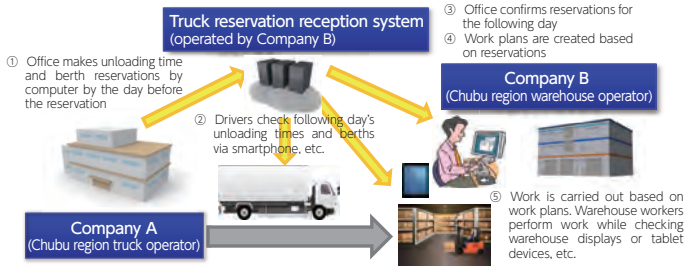
<Example 1> Sea transport used for portion of trunk transport



○ Driver drive time reduction: 2,976 hours/year (67% reduction)
- Drive time reductions contribute to reductions in drives involving overnight stays.

○ CO_2 reduction percentage: 78%

<Example 2> Introduction of truck reservation reception system into warehouse, dramatically reducing truck wait time and improving efficiency of work within the warehouse



○ The introduction of the truck reservation reception system improved cargo receiving work efficiency, cutting wait times by 80%

○ CO_2 reduction percentage: 22.9%

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

Column

Measures aimed at reducing amount of parcel service redeliveries

In recent years number of parcel service deliveries has risen rapidly (by 16% 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 (equibalent 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 40 percent of redeliveries were the result of recipients not knowing that packages would be delivered, or 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

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

●Parcel service locker

■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 transportation 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 transportation industry.

(Manual of the Green Management Certification System)

⑤Promotion of usage of public transportation

Creating new railroad lines and new transportation systems, and making rail and bus transportation more convenient, contribute a shift in passenger transportation from private cars to public transportation, which has less of an environmental impact. This leads to reductions in automobile CO_2 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 was enacted on December 4, 2013.

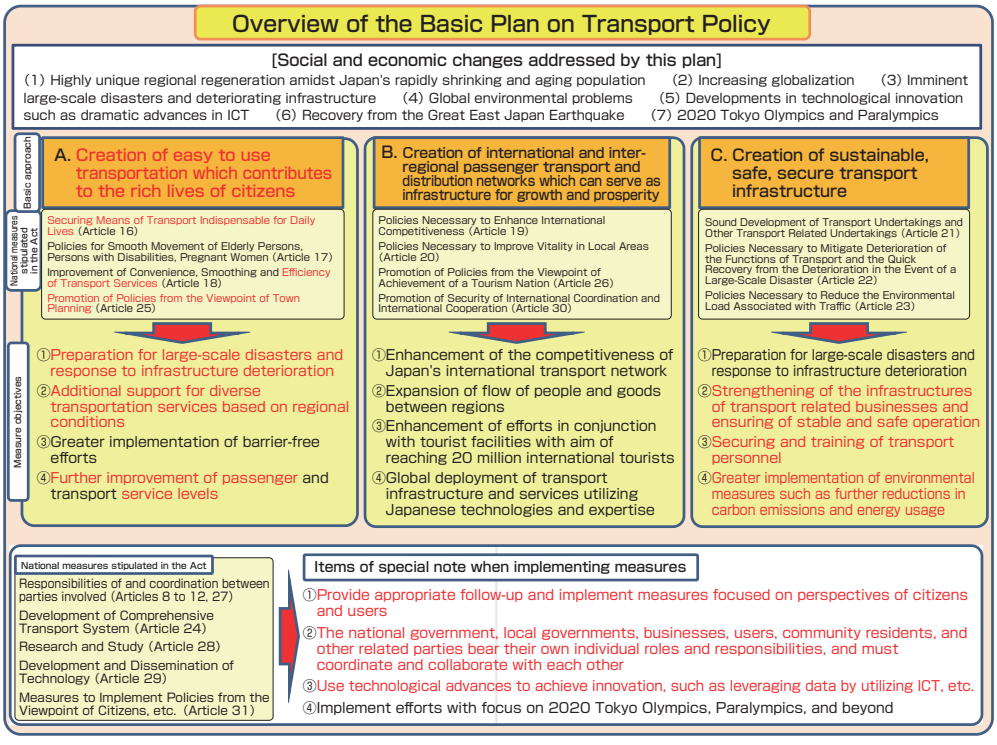
This act defines the basic philosophy underpinning transport related measures in order to promote measures necessary for the national government to coordinate closely with local governments and transport companies in implementing comprehensive and systematic measures from the perspectives of increasing 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 act clearly specifies the responsibilities of involved parties, and mandates that the Cabinet approve a Basic Plan on Transport Policy and present it to the Diet. The Cabinet approved the first Basic Plan on Transport Policy on February 13, 2015.

Furthermore, in May 2016, in accordance with the Basic Act on Transport Policy, the second White Paper on Transportation Policy was approved by the Cabinet and released by the Diet.

●Overview of the Basic Act on Transport Policy

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

●Overview of the Basic Plan on Transport Policy



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

Hanshin Electric Railway Koshien Station, JR East Kannai Station, Keikyu Corporation Kanazawa Hakkei Station, Hankyu Corporation/ Keifuku Electric Railroad Saiin Station, Sagami Railway Ebina 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)
- Transport interchange function advancement - Hanshin Sannomiya Station

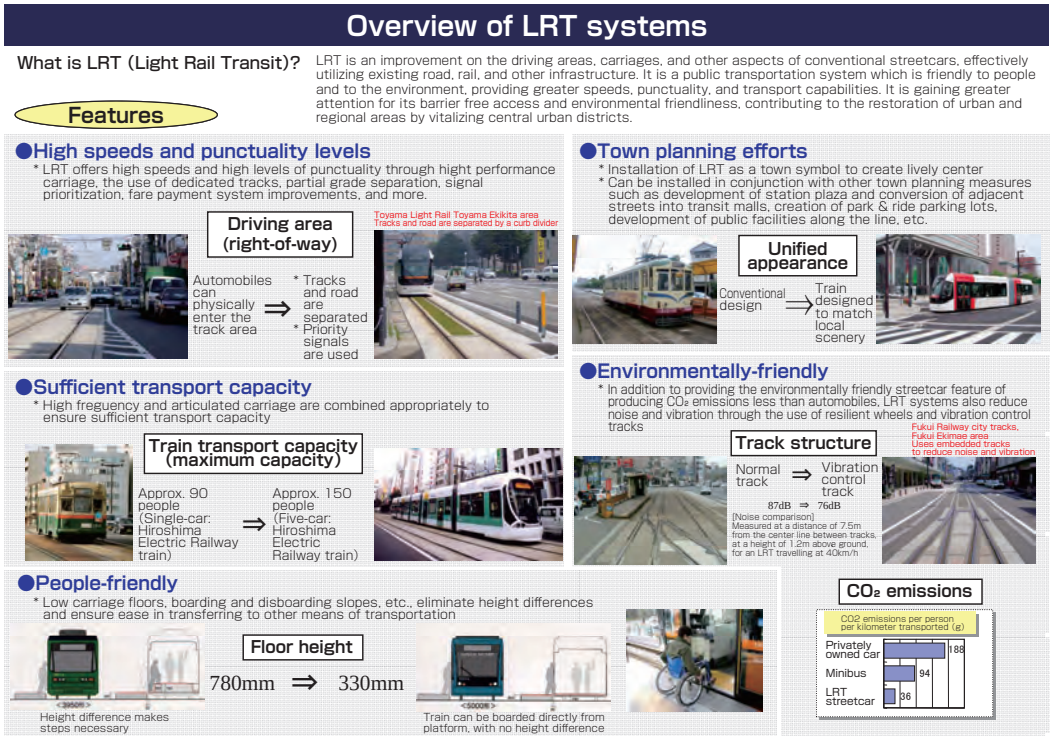
It is also collaborating with rail operators in the "Eco Rail Campaign", promoting the use of rail transportation as an handy environmental action.

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

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 transportation provision, maintenance, and improvement project.

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

●Overview of LRT systems



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

■Revised Act on Vitalization and Rehabilitation of Local Public Transportation 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 Transportation 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 Vitalization and Rehabilitation of Local Public Transportation Systems

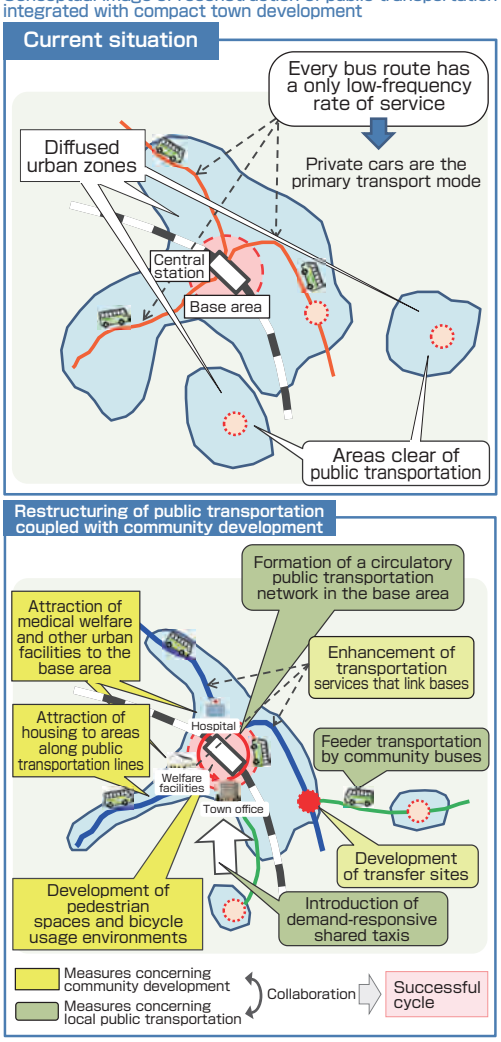
Overview of the Revised Act on Vitalization and Rehabilitation of Local Public Transportation Systems (issued in May 2014)

○Revised Act on Vitalization and Rehabilitation of Local Public Transportation Systems (issued in May 2014, enacted in November 2014)

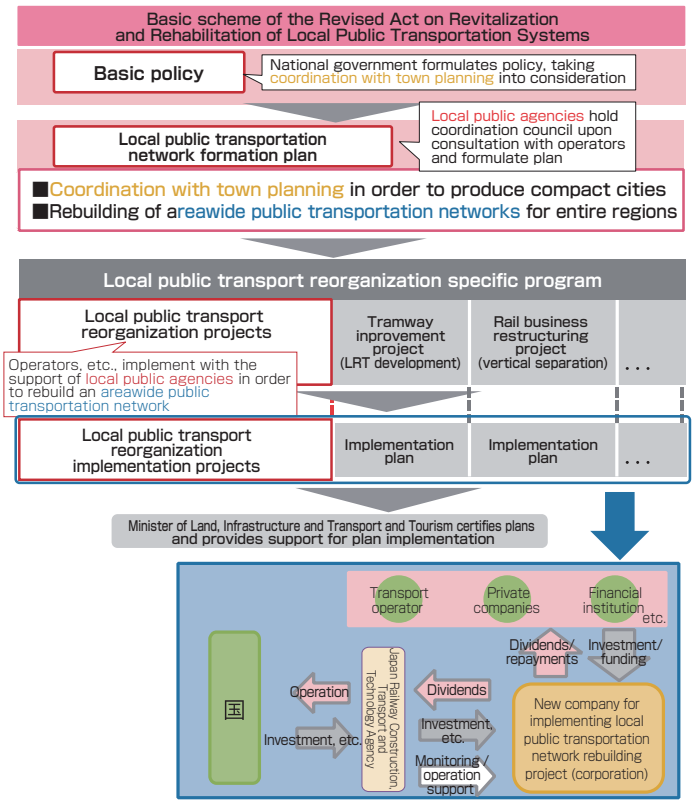
Maintain and improve regional societal vigor in the face of full-fledged population reductions

Key Points
①Rebuild with a focus on local public agencies
②and community development
③recreate an areawide public transportation network

Conceptual image of reconstruction of public transportation integrated with compact town development



Source: Prepared by the MLIT based on the approaches taken in Toyama City, Kumamoto City, Toyooka City, Sanjo City and elsewhere.




(LRT)


(BRT)


(IC Card)

○Reviced Act on Revitalization and Rehabilitation of Local Public Transportation Systems and Japan Railway Construction, Transport and Technology Agency Act

◆Create a system for investment/funding, etc., via the Japan Railway Construction, Transport and Technology Agency by industrial investment in projects aimed at rebuilding regional public transportation networks which have received certification from the Minister of Land, Infrastructure, Transport and Tourism in accordance with the Act on Revitalization and Rehabilitation of Local Public Transportation Systems, and strengthen and diversify support for this system.

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

Promotion of eco-commuting

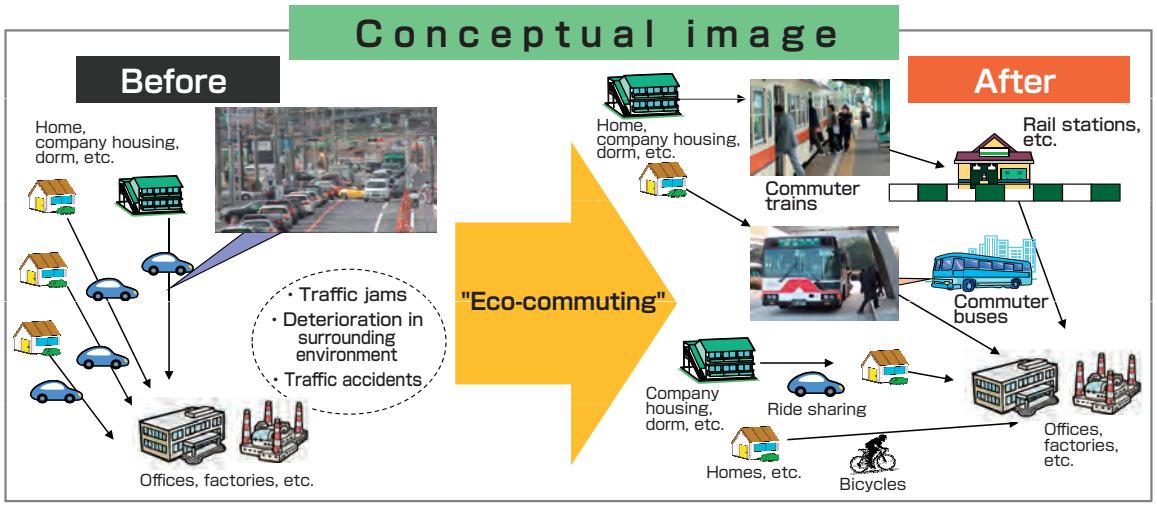
There is a growing demand for a shift in means of transportation, from the use of private cars to low carbon dioxide emission measure, by promoting the use of public transportation. In order to promote highly effective measures which match both user side efforts and transportation operator side efforts, a Conference on Promotion of Public Transportation was held in March 2005, involving transportation 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 transportation, 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 2016, 649 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 transportation, bicycles and on foot

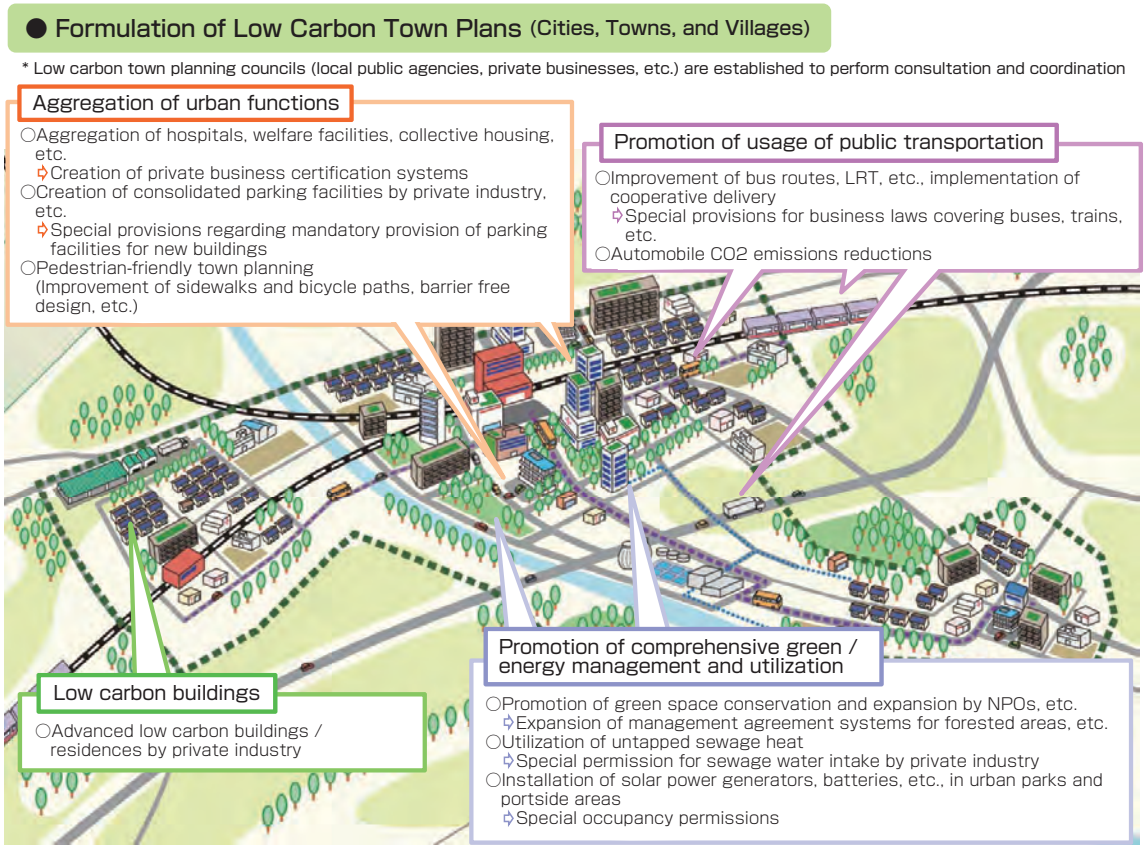


Source: MLIT (Tentative Translated by Eco-Mo Foundation)

■Low Carbon City Promotion Act

It is important to build up a collection of success cases of rationalization of energy usage and urban and transportation carbon emissions reduction, promotive 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 August 2016, 23 cities have created low carbon town plans. These plans are listed on the MLIT website.



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

⑥Promotion 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 transportation, 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.

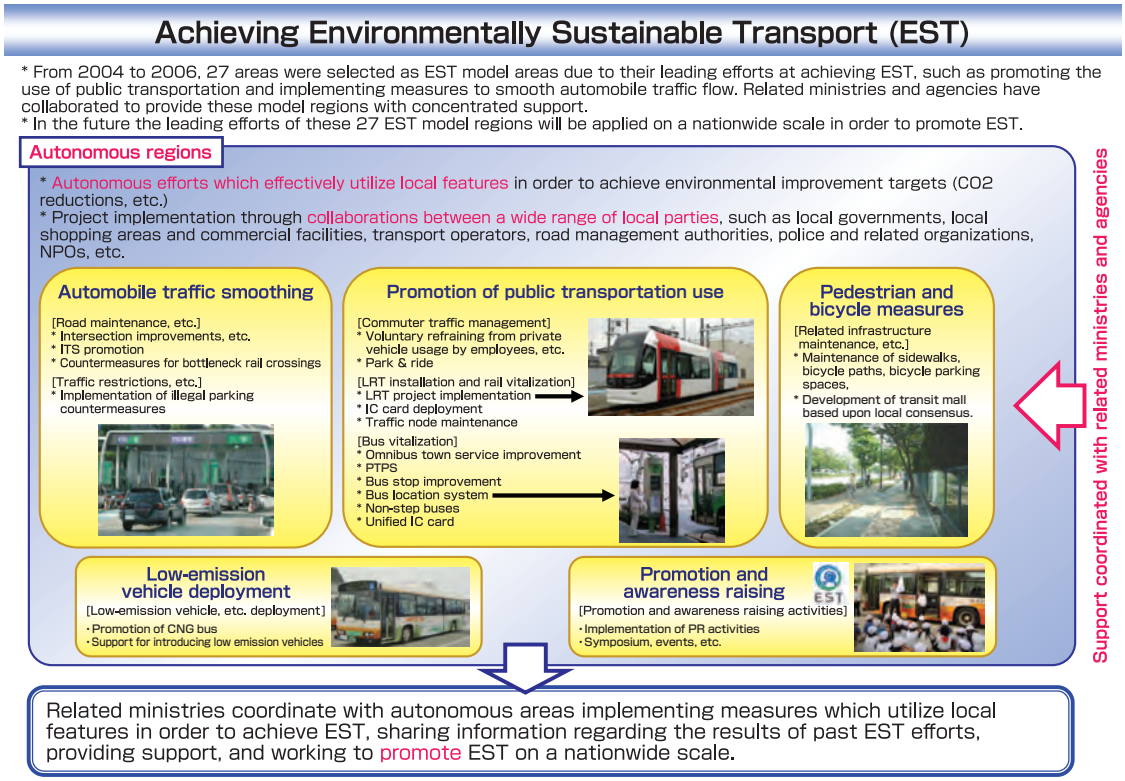
In order to achieve this, the MLIT has implemented an "EST Model Project", selecting areas which are implementing leading efforts at achieving Environmentally Sustainable Transport (EST), and related ministries and agencies collaborate to provide support in the areas such as promoting the use of public transportation, 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)



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.

●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 demonstraiting 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

2014

Region	Sponsor (Representative Organization)	Cosponsor	Title
Odawara City (Kanagawa Prefecture)	Odawara City	Houtoku Energy Co., Ltd. Odawara Gas Co., Ltd. Dynacity Corporation	Odawara City Nakazato Area Energy Network and Low Carbon Transportation System Modeling Concept - Urban development using locally generated energy, creating cities where anyone can go out freely using environmentally-friendly transportation -
Matsumoto City (Nagano Prefecture)	Matsumoto City		Matsumoto City, Shiga Region Hilly Area Energy Creation and Storage Modeling Concept - Using community activities led by residents of hilly areas with declining and aging populations -
Osaka City (Osaka Prefecture)	Osaka City	Kansai Electric Power Co., Inc. Osaka Gas Co., Ltd. Nippon Telegraph And Telephone West Corporation	Umekita Phase 2 District Energy Concept - Creation of models of energy systems contributing to the implementation of the Osaka energy local generation and local consumption promotion plan -
Kobe City (Hyogo Prefecture)	Kobe City		Kobe Center Sannomiya Region Next Generation Smart Energy Infrastructure Concept - Creation of a conduit line network utilizing existing underground commercial areas -
Yakushima Town (Kagoshima Prefecture)	Energy Efficient Construction Institute	Yakushima Town Junior Chamber International Yakushima	Yakushima Clean Energy Island Concept - Discovering optimal environment sharing methods in order to create an energy-efficient, locally circulating regional economy -

2015

Implementing Region	Sponsor (Representative Organization)	Cosponsor	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 transportation 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 –

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

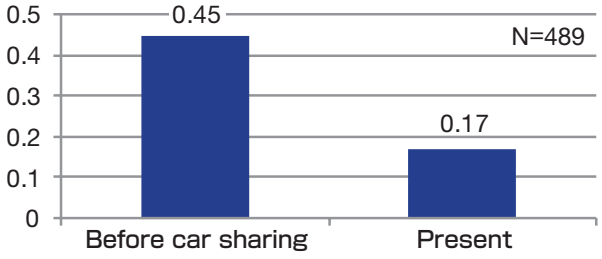
Column

Effectiveness of car sharing in reducing environmental impact

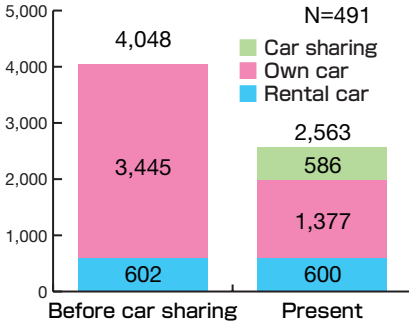
Car sharing, in which people can use cars when they need them, without owning the cars, is growing in popularity worldwide. Over 840,000 people in Japan utilize in car sharing (according to March 2016 servey by the Eco-Mo Foundation).

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 CO_2 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.

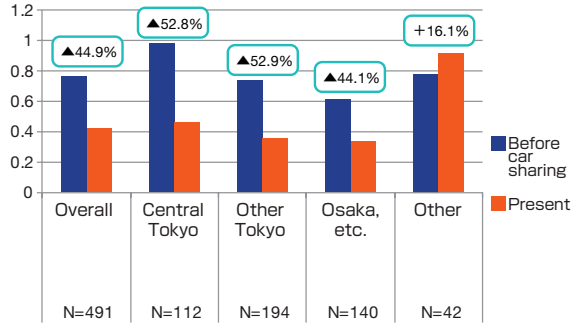
●Change in average number of automobiles owned per household



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



●Change in annual CO_2 emissions from automobile use ($t\text{-}CO_2$/year/household)



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

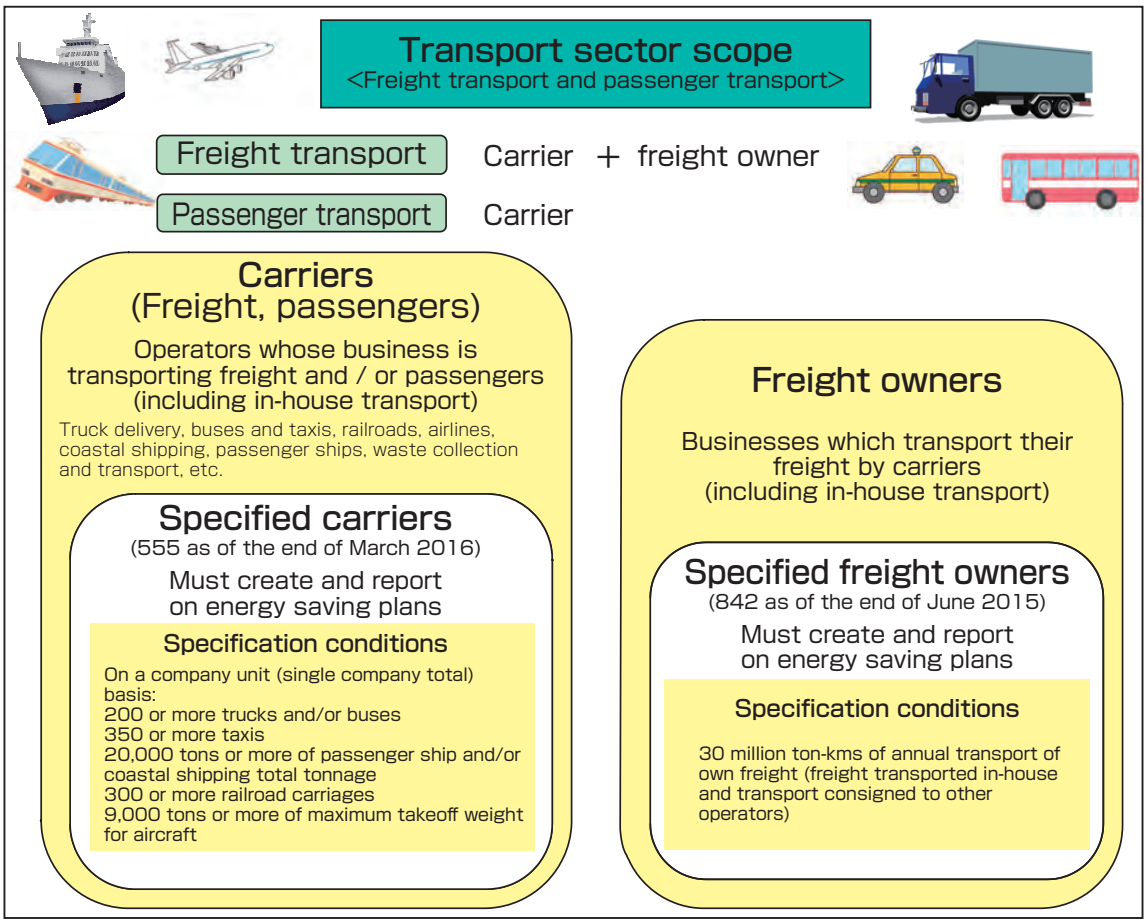
Note 2) Osaka, etc: Osaka Prefecture, Hyogo Prefecture, Kyoto Prefecture, Aichi Prefecture, Kanagawa Prefecture

(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 555 companies as of the end of March 2016)

	Freight				Passengers				Aviation	Total
	Railway	Commercial trucks	Private trucks	Shipping	Railway	Buses	Taxis	Shipping		
No. of carriers	1	282	81	32	26	94	25	12	2	555

[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 CO_2 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 CO_2 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, will apply to all vessels engaged in international marine operation with a total tonnage of 5,000 tons or more, requiring that they report fuel consumption amounts and other navigation data to the IMO from 2019. It has also been decided that an IMO GHG reduction strategy, which would define future measures for reducing greenhouse gas emissions, are to be formulated by 2018, and a roadmap has been created that sets forth the concrete work schedule for implementing these decisions.

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 7, 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

International air transport global warming countermeasures

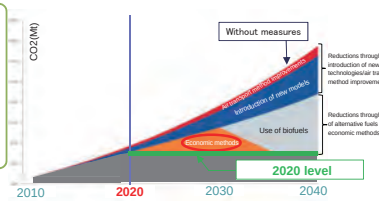
Past ICAO Assemblies (2010 and 2013) have decided on the following global CO_2 emissions reduction targets for international air transport, and have considered specific measures for achieving them

①Annual fuel efficiency improvement of 2%
②No increase in total emissions from 2020 onwards

Methods for achieving targets

① Introduction of new technologies (new models, etc.)
② Air transport method improvements
③ Use of biofuels
④ Use of market mechanisms (Emissions trading)

- Shortfalls in measures ① through ③ will be addressed with a system that uses ④ market mechanisms
- The introduction of the system and its specific contents will be deliberated on during this year's ICAO Assembly



Conceptual image of international air transport CO_2 emissions forecasts and emissions reductions targets

* Based on ICAO materials as of 2016

Japan also needs to participate in measures, such as the market mechanism–based system

Overview of system

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 MLIT 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)

Column

Emissions trading system measures

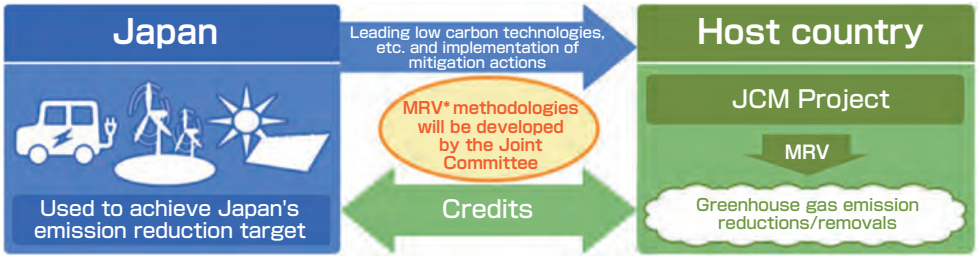
The Japanese government has proposed a Joint Credit Mechanism (JCM) for international emissions trading. With the end of the adjustment period for the first commitment period of the Kyoto Protocol (by 2015), countries not participating in the second commitment period cannot internationally transfer or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

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

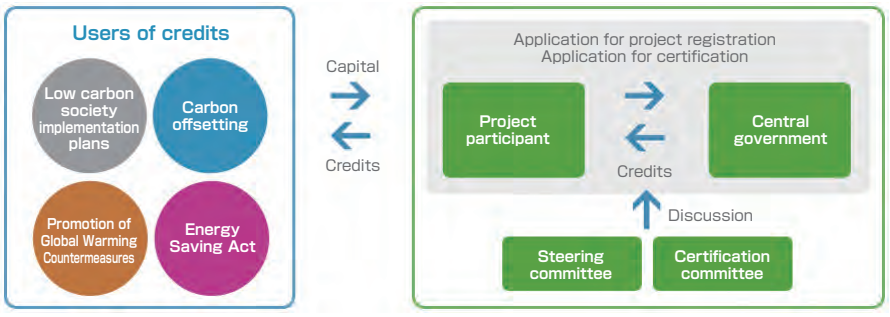
■J-Credit Scheme

The J-Credit Scheme is system in which reductions and absorption of greenhouse gasses such as CO_2 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.

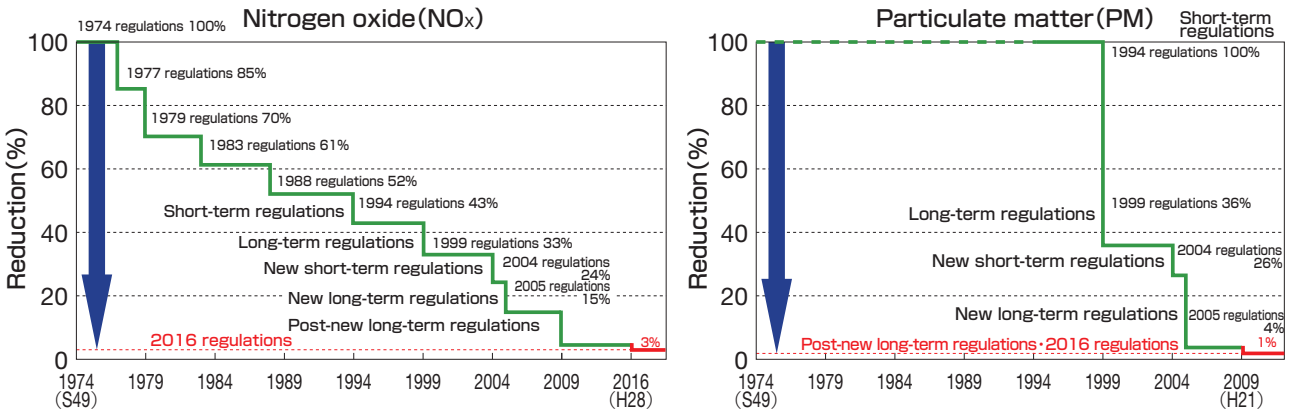
The problem of vehicle exhaust gas became a serious social problem with the rapid urbanization which began in the mid-1960s and the increase in vehicle traffic. For emissions gas measures for diesel vehicles it is especially important to reduce the amount of emissions of nitrogen oxide (NOx), which is 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

①Restrictions 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 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 futher 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

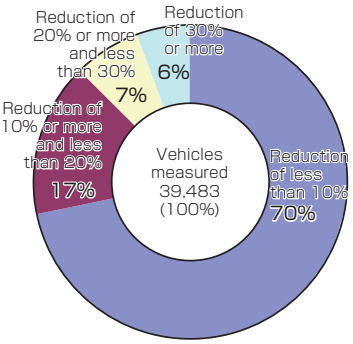
①Appropriately maintained vehicle usage

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 examind 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	Percentage
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)

②Appropriate 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.

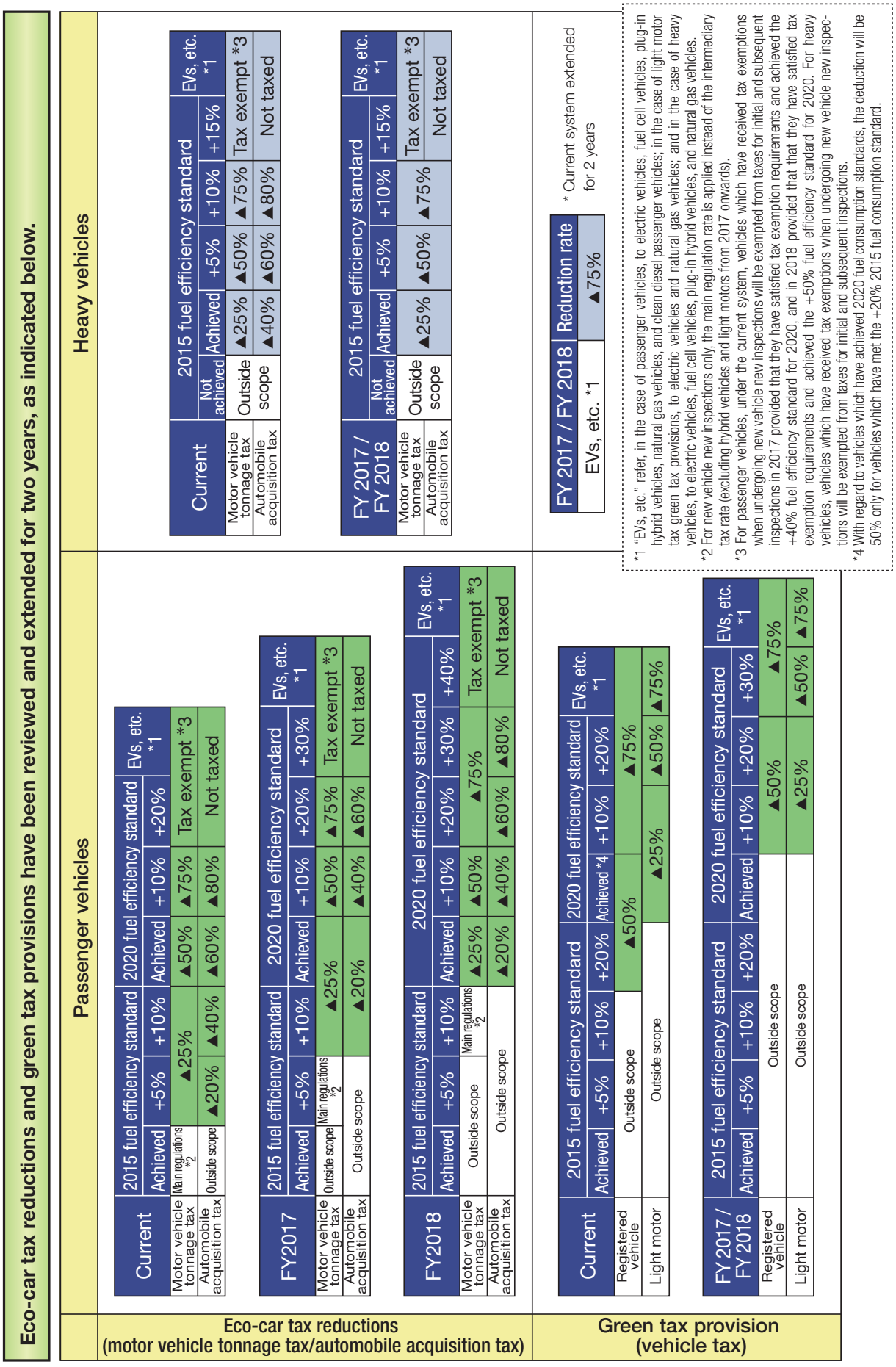
●Illegally dumped sulfate pitch which has leaked out of its containers

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

3 Environmentally friendly vehicle promotion measures (vehicle taxation reevaluation)

The 2017 automobile acquisition tax and light motor tax green tax provision revision and extension, and the 2018 introduction of environmental performance based tax reduction, are described on the following page.

〈Motor vehicle tonnage tax, automobile acquisition tax, light motor tax, etc.〉



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

4 Creation of a recycling-oriented society

(1) Creation of recyclable resource distribution systems

①Formation of a recyclable resource distribution system using sea transport

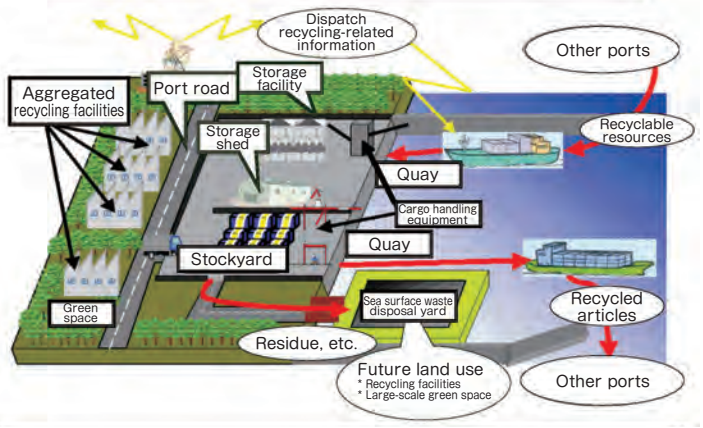
In order to create a recyclable resource cycle as part of the creation of a recycling-oriented society, 22 ports nationwide have been designated as Recycle Ports (integrated reverse logistics ports), centers of wide-area circulation of recyclable resources. The MLIT provides the support necessary to 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

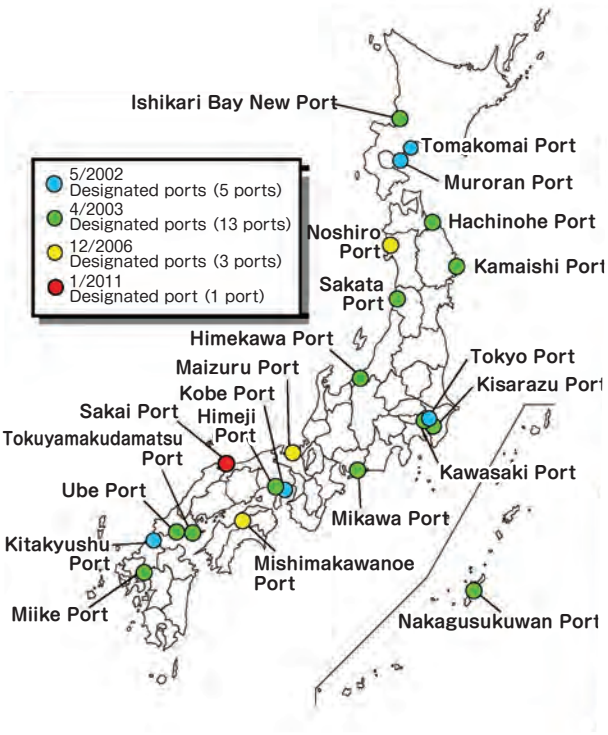
Recycle Port Policy

- 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

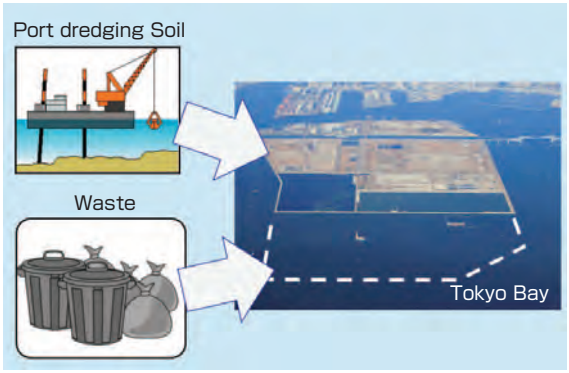
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

②Systematic securing of sea surface waste disposal yards

In order to respond to the pressing problem of waste disposal, The Basic Plan for Establishing a Recycling-Based Society puts forth the concept of building a port-centered final waste disposal is being performed of general waste which must be disposed of in landfills after appropriate recycling and waste volume reduction. This is being performed at sea surface waste disposal yards in ports across the country, while ensuring sufficient consistency with appropriate port development, usage, and conservation. In particular, based on Osaka Bay Phoenix Plan, a wide area disposal yard improvement project, general waste is being accepted and processed for cities, towns, and villages within designated areas in the Osaka Bay area.

Soil produced by construction in the Tokyo area, which the area is having difficulty disposing of, is being effectively used over a wide area as a construction material in ports across the country as part of the Super Phoenix Project.

●Promotion of planned improvement of sea surface waste disposal yards



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

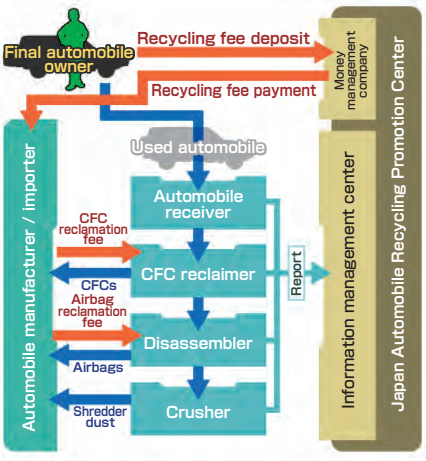
(2) Creation of vehicle recycling system

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

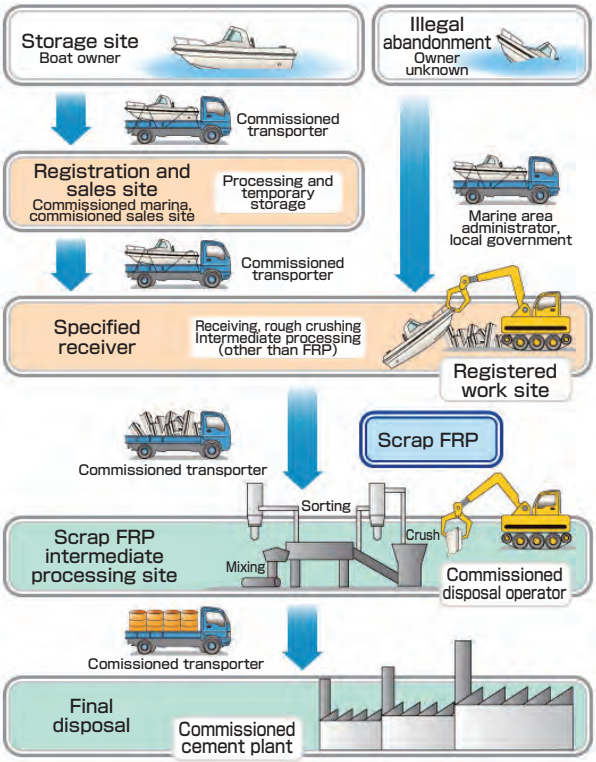
Ship recycling* is carried out primarily in developing countries such as Bangladesh and India, and repeated injuries and fatalities at ship recycling facilities, and the sea pollution these activities produce, have come to be recognized as major problems. In order to resolve these problems, under Japan's 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, has engaged in deliberations regarding the creation of the domestic laws and regulations needed to join the convention. For the convention to be enacted major ship recycling countries will also need to join the convention, so Japan is also promoting initiatives aimed at the entry of India, the world's largest recycler of ships.

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 550 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)

Source: MLIT Chugoku District Transport Bureau

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), Fujisawa City (population: 430,000), 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 transportation users. The functions of transportation 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 transportation at network terminus points. Furthermore, ongoing mobility management is being used to promote the usage of public transportation 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

■Fujisawa City – Bus-focused community development –

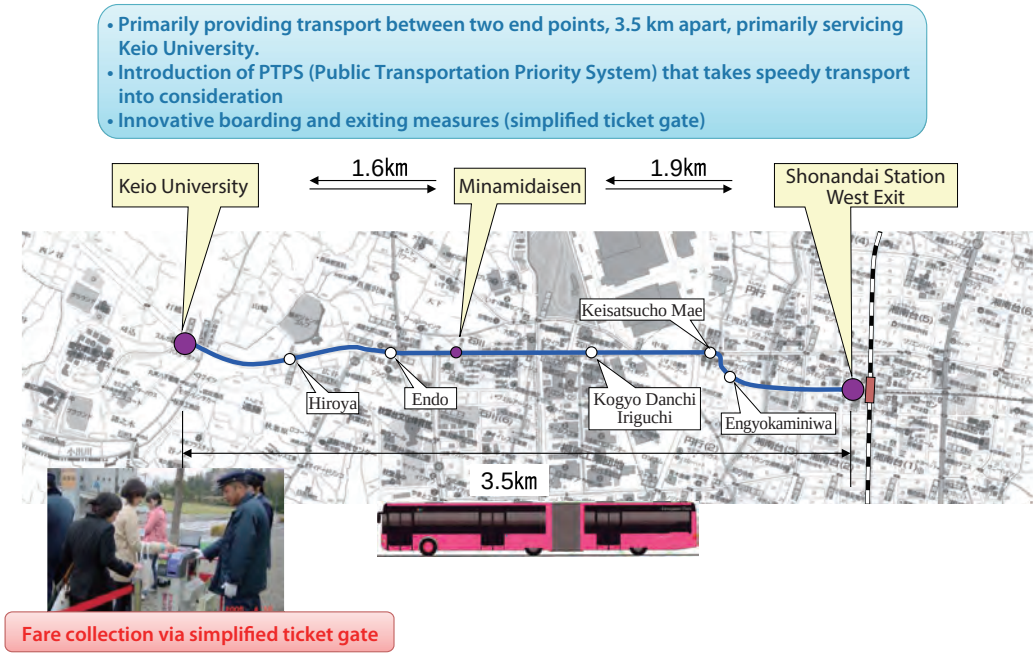
In 1999 Shonandai Station in Fujisawa City became a connecting point for three rail lines, and the sudden increase in rail users caused the Shonandai Station West Exit Plaza to reach its saturation point. Improving its traffic functions has been a critical issue in Fujisawa City's transport plans.

In order to resolve this problem, various related parties, such as the MLIT and Kanagawa Chuo Kotsu Co., Ltd. engaged in mutual deliberations, and in March 2005 launched regular bus operations in a public transportation system which combines articulated busses and ITS.

This was the first case in Japan of deploying step-free, Barrier-Free Transportation Act-compliant articulated busses. These busses have roughly twice the transportation capacity as conventional large busses, and operate between Shonandai Station and the Keio University Shonan Fujisawa Campus.

Based on the results produced by the introduction of these articulated busses, Fujisawa City and Kanagawa Chuo Kotsu Co., Ltd. are working on a project to deploy them in other new areas as well.

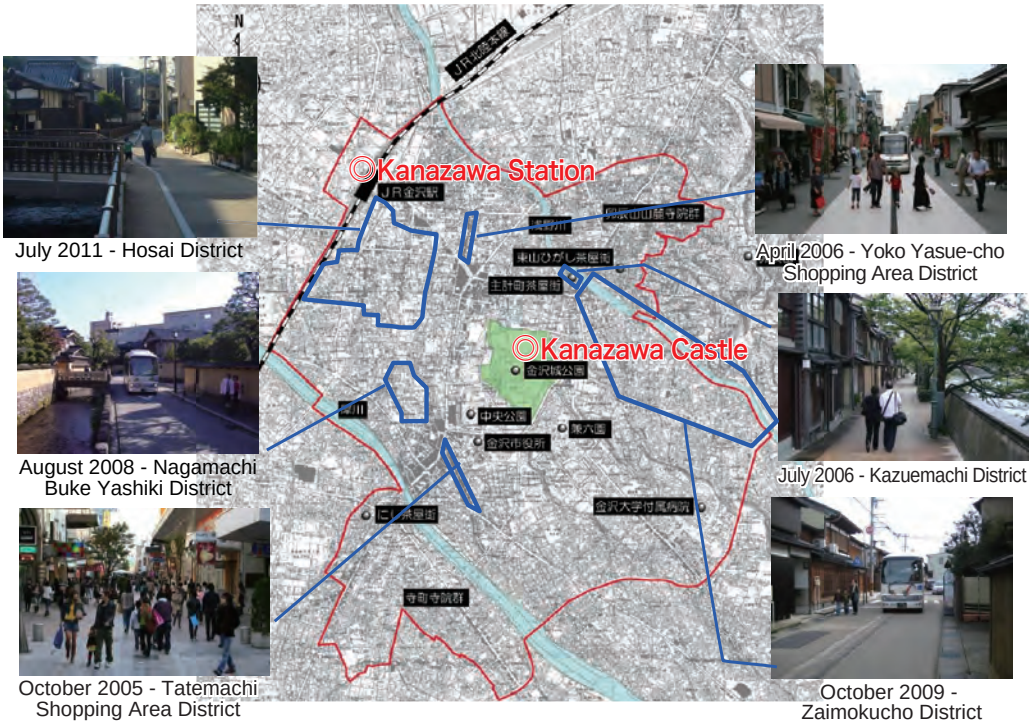
Source: Fujisawa City



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

■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 transportation 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

①Aviation companies

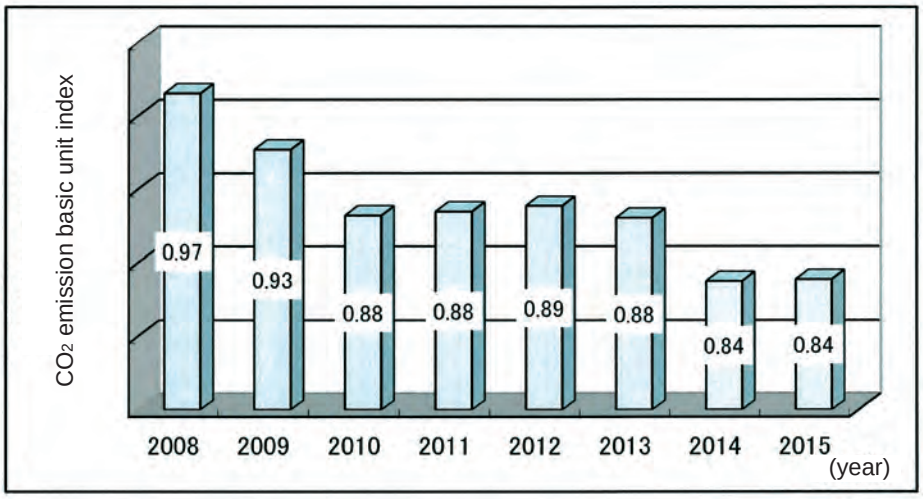
The Scheduled Airlines Association of Japan, a Japanese association of air transport operators, has implemented environmental measures. Major measures are the following.

○Global warming prevention targets:

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

CO_2 emission basic units: 0.00095t-CO_2/RTK (revenue ton kilometers)

Achievement: Reduce energy consumption base units in 2015 by 16% 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 3.6% or below for 2015

Achievement: Industrial waste final disposal rate in 2015 was 3.5%

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

- Close window shades when parked to prevent temperatures inside airplanes from rising (make in-flight announcements requesting that passengers lower the window shades when leaving the plane, reducing the amount by which the interior of the airplane warms up while the airplane is parked, shortening air conditioner usage times and thereby reducing CO_2 emissions)
- Offer eco-tours, teaching tour participants about the environment

②Railway companies

The Association of Japanese Private Railways, an association of railway operators in Japan, has formulated "Commitment to a Low Cabon 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, 2016)

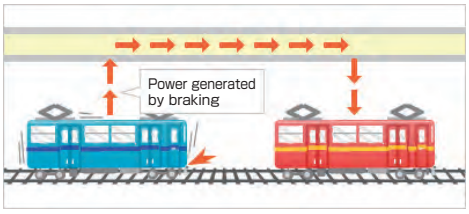
	Control method	No. of cars owned	
			Number of reduced weight cars
Cars with regenerative brakes	VVVF control	11,077 cars*	9,862 cars
	Chopper control	2,709 cars*	1,427 cars
	Resistance control, other	623 cars*	234 cars
Cars without regenerative brakes	Resistance control, other	2,663 cars	318 cars*
Total number of cars owned		17,072 cars (A)	11,841 cars
Number of energy saving cars (trains with regenerative brakes or reduced weight cars)		14,727 cars (B) (total of cars indicated with a *)	
Share of energy saving cars		86.3% (B/A)	

Note 1: As a general rule, only commercially used cars are included (funicular lines and new transportation 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.

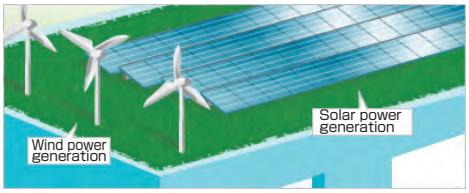


○Noise and vibration reduction

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 crossties, and the installation of elastic material such as rubber between concrete railbeds and crossties.

○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)

③Truck, 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 CO_2 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.

■Nihon Bus Association

- Bus business “Commitment to a Low Carbon Society” -

Target:

◯Cut CO_2 emission intensity in 2020 by 6% in comparison to 2010.

◯Promote shift from use of private vehicles to buses.

Specific activity contents:

◯CO_2 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

The association strives to maintain fuel efficiency performance by establishing voluntary inspection standards, as necessary, for the vehicle components which affect fuel efficiency (tires, air cleaners, air conditioners, etc.).

◯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

◇Popularization of environmental bus passes, etc.

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

◇Deployment and expansion of high grade bus stops, legible bus route information, etc.

・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.

◇Utilization of various subsidization systems to deploy and improve systems for improving bus driving environments through the use of ITS such as PTPS.

The Nihon Bus Association gathers information and considers various potential measures, led by its “Environmental Measure Council”, which promotes the implementation plan described above.

The association also issues requests to the MLIT, NPA, and other related government agencies regarding the further enrichment of subsidy systems, tax systems, and the like, and improvements to driving environments, 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 CO_2 emissions by 20% in comparison to 2010.

○2030 target (total volume of emissions target)

Reduce CO_2 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. CO_2 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. CO_2 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 Transportation 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 CO_2 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.

④Warehouse operators

The Japan Association of Refrigerated Warehouses is continuing its efforts to reduce CO_2 emissions and energy usage in 2016 as well, through measures such as: ① promoting the introduction of energy saving devices through active use of the assistance project for energy usage rationalization operators (subsidizing 1/3 of project costs) and the popularization promotion project for energy saving natural cooling devices using advanced technologies (subsidizing 1/2 of project costs), ② carrying out energy usage fact-finding studies and coolant studies to collect basic data related to CO_2 emissions reductions, and ③ promoting the acquisition of green management certifications (subsidizing part of the cost of acquiring new green management certifications).

■Measures by companies: Japan Logistic Systems Corp.

Japan Logistic Systems Corp.'s main business is truck transport, but it also engages in a diverse range of businesses, such as freight handling and distribution center operation and storage and real estate asset business. It is extremely active in its environmental activities, in which it uses both physical and systematic approaches. These activities include the acquisition of Green Management Certification at over half of its Japanese sites and its promotion of ISO14001 certification efforts.

<Practicing logistics that is friendly to both people and the Earth>

"Japan Logistic Systems will practice logistics that is friendly to people and to the Earth" -- Our Environmental Policy as a logistics operator represents our dedication to sincerely tackling environmental issues as part of our providing sound logistics. Under this policy we strive every day to make further improvements, and have introduced third-party certification systems as a measure for realizing our environment activities. In addition to the Green Management Certification obtained in our main business sectors, the truck transport business sector and center operation (warehouse) business sector, we have also obtained ISO14001 certification, and our entire company is working as one in our environmental efforts.

●Posting clear information on the contents of environmental activities in order to foster shared environmental awareness

<Sharing environment awareness through environmental visualization boards and education>

We have installed environmental visualization boards in our headquarters, which we use to post recommended environmental management activity techniques (air conditioner handling, lighting management, copy paper management, green procurement, 4R, modal shifting) and their results, fostering a shared environmental awareness among all employees.

We also include environmental curricula within annual employee training schedules at each business site, providing all employees with education focused on environmental laws and waste disposal. In addition to the textbook-based education provided in accordance with ISO14001 regulations, we also use DVDs and other materials to offer easy-to-understand education focused on environmental conservation.

<Introduction of power demand equipment>

Thorough management of electric power usage, a major source of CO_2 production, is critical for warehouse operations.

Due in part to the increased focus on energy usage reductions since the Great East Japan Earthquake, devices for controlling power demand (peak demand) has been installed in the company's business sites. These devices make it possible to see power usage amounts at a glance, enabling the daily management and control of usage conditions and reduction of peak power usage, helping save electricity. Energy Saving Act restrictions apply to us as a business operator, so we are also enhancing these measures from a compliance perspective. Power demand devices have been deployed in our headquarters as well. Thanks to our day-to-day power usage management efforts, we have succeeded in reducing our electricity costs by roughly 20%.

<Devices which draw large amounts of power are carefully managed>

Main and deputy managers are appointed at each business site to manage equipment, such as air conditioners or lights, which draws large amounts of power. These managers responsibly and closely manage equipment in order to reduce power consumption.

① Efficient air conditioner operation

Air conditioners account for the greatest percentage of our power consumption. Large business sites have as many as 100 air conditioners, and at some sites air conditioners account for over half of the power used. Efficient air conditioner operation is therefore directly linked to power savings. We eliminate the wasting of power by regularly cleaning air conditioner filters, washing them with water once per year, and preventing decreased performance due to clogging. In order to ensure that this is performed smoothly, air conditioner managers closely manage air conditioners, checking that each is thoroughly cleaned and used within the prescribed temperature ranges. Cleaning dates and room temperature ranges are clearly indicated on control panels, ensuring that everyone is aware of when the next cleaning will be performed.

② Lighting is also a major consumer of power

Large warehouses can use up to 10,000 fluorescent lights. These consume large amounts of power, but measures can be implemented to achieve major power savings.

We are gradually switching over to LED lighting, cutting power usage from a hardware approach. We also strictly require lights to be turned off during break times and when not required for work, and lighting managers perform timely inspections to check that these rules are being observed. At one work site, only two of the 30 lights were on. When asked if this interfered with work, employees responded, “It’s no problem at all.” This mentality has spread to employees in other sites, which we see as a positive trend.

● Green management board containing training information and activity reports

Green management boards posted at sites present the results and interim reports of measures such as these, as well as training contents for employees. Posting information which has already been conveyed enables employees to reaffirm it. Presenting the results of day-to-day efforts is also important for ensuring that these efforts are maintained and further improved. We carry out our environmental activities while always striving to visualize information.

<4R promotion, solar power generation usage, and other diverse environmental activities>

Warehousing produces a large amount of used materials. These include paper, cardboard, plastic, and plastic wrap. In the past, we had an industrial waste contractor dispose of this waste.

However, with our increased focus on the four Rs (refusing, reducing, reusing, and recycling) in our environmental activities, we decided to take the lead in reusing whatever material was possible to reuse.

Warehouses produce an especially large amount of plastic wrap, which is used to secure cargo. We have installed compressors to compact this plastic wrap, which is then recycled. Paper and cardboard is similarly prepared and then recycled. We make up to several million yen each year from the sale of these recyclable materials.

Last year we also installed solar panels on the roofs of our warehouses and began selling generated power.
The 100 m x 50 m panels have a generating capacity of up to 500 kWh. We generate power in addition to judiciously using it as part of our environmental activities.

All of the employees of Japan Logistic Systems will continue to actively implement measures such as this, satisfying our corporate social responsibility as a logistics company and further “practicing logistics that is friendly to both people and the Earth,” in accordance with our environmental policy.

(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 transportation. In order to create a shift from the use of private cars to public transportation, 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 transportation 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 transportation event. In 2016 11 cities in Japan participated. (Sendai City, Saitama City, Yokohama City, Zushi City, Matsumoto City, Fukui City, Toyohashi City, Kyoto City, Osaka City, Takamatsu City, Naha City)

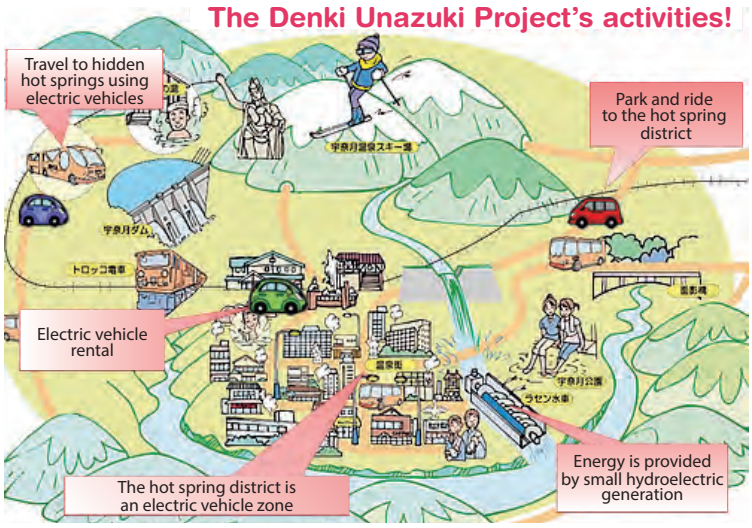
During Mobility Week & Car-Free Day 2016, Car-Free Day Japan selected and announced winners of awards such as the Town Planning Contribution Award, Event Project Award, and Citizens' Appeal Award as part of the "Mobility Week & Car-Free Day Japan Awards 2016" (Chief judge: University of Tokyo Professor Emeritus Katsutoshi Ohta) in order to provide city residents with opportunities to consider mobility related problems and to contribute to the development of new urban transportation policies.

●2016 Mobility Week & Car-Free Day Japan Awards main award results

Award	Recipient
Town Planning Contribution Award	Kyoto Car-Free Day Planning Committee
Event Project Award	Matsumoto City No My Car Day Promotion Residents' Council
	Naha Mobility Week & Car-Free Day Planning Committee
Citizens' Appeal Award	not applicable

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 transportation 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)

Column

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.

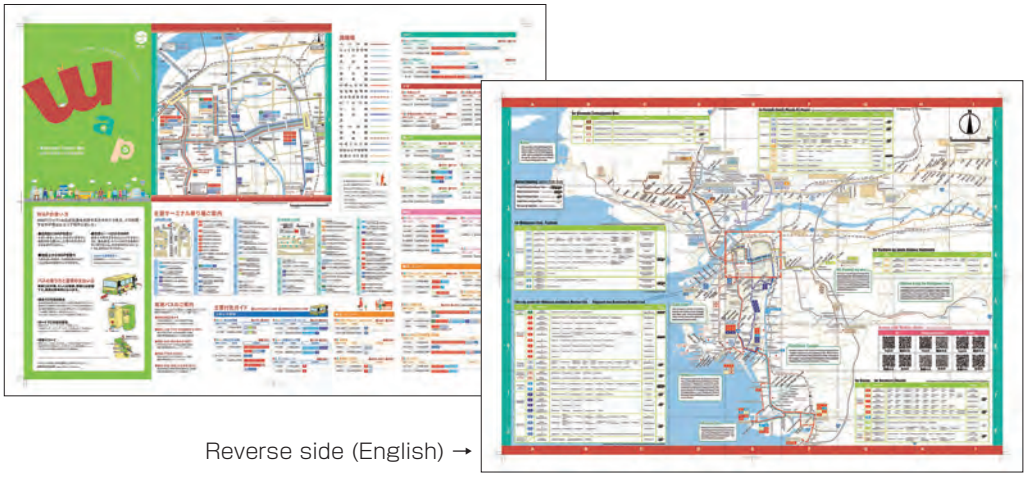
Approximately 100 people from across Japan participate in each summit, sharing the map creation expertise of citizens, not transport operators or administrative authorities, and engaging in passionate discussions about the future of public transportation.

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

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 Transportation Research Society	Niigata City Transportation Map
Fukui	ROBA (Railway, Omnibus, Bicycle & Walk Machizukuri Association)	Fukui Norinori Map BUS-DENSYA-NET FUKUI
3 Tokai Prefectures (Aichi, Gifu, Mie)	Public Transportation 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 Transportation 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

①Implementation 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 2016 there are 3,621 certified businesses and 7,119 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 12.2% and 16.1% 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, 2016	Companies Nationwide	Percentage Owned by Certified Companies	Notes
Trucks	150,673	1,231,758 (Note 1)	12.2%	(Note 1): Number of vehicles owned as of the end of March 2015. This includes the number of commercial trucks (excluding trailers) and the number of commercial special purpose vehicles as indicated in the "Transportation Statistics Collection" (from the MLIT). It does not include the number of registered light trucks.
Buses	17,750	111,344 (Note 2)	15.9%	(Note 2): Number of vehicles owned as of the end of March 2015. Based on the "Transportation Statistics Collection" (MLIT).
Taxis	32,935	204,190 (Note 3)	16.1%	(Note 3): Number of corporate taxis owned as of the end of March 2015. 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 transportation 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【transportation 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.

※Transportation 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 Transportation 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 Transportation Act

【Notice: MLIT Notice 633, April 10, 2013 "Concerning the Approach of the MLIT to Regional Public Transportation 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 natural gas vehicle and hybrid vehicle 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:

9 organizations (Chuo-ku, Tokyo; Katsushika-ku, Tokyo; Sumida-ku, Tokyo; Shinjuku-ku, Tokyo; Yokohama City, Kanagawa Prefecture; Shiojiri City, Nagano Prefecture; Ina City, Nagano Prefecture; Kameyama City, Mie Prefecture; Fukuyama City, Hiroshima Prefecture, other local governments)

Industry groups:

Japan Association of Refrigerated Warehouses and 38 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, Ehime Prefecture, Kochi Prefecture, Fukuoka Prefecture, Nagasaki Prefecture, Kumamoto Prefecture, Oita Prefecture, Miyazaki Prefecture, Kagoshima Prefecture)

②Implementation 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 Transportation, 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 2016 649 business sites have been certified.

Certified business sites implementing best measures may also be recommended for MLIT awards. In 2016 Bridgestone Corporation and Kochi Prefecture was selected as the winner of the "2016 Minister's Award for Excellent Business Implementing Traffic-Related Environmental Conservation Efforts"

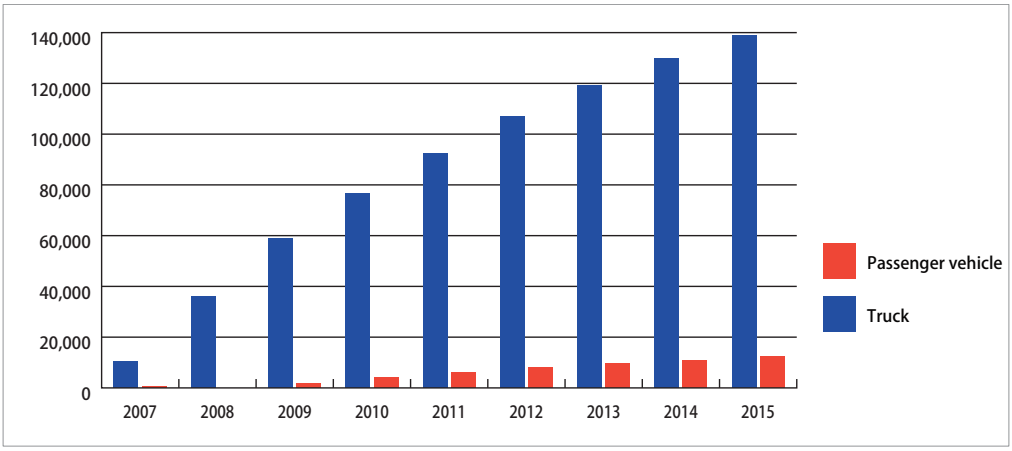
●Measures implemented by Bridgestone Corporation and Kochi Prefecture

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 (transportation 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 "2016 Eco-Drive Symposium" on November 18.

●Accumulated number of completed certificates issued



●2016 Eco-Drive Activity Contest award ceremony

●Contest leaflet

④Promotion of Environmentally Sustainable Transport (EST)

The OECD has proposed Environmentally Sustainable Transport (EST) (see page 39), 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 2016 the Eco-Mo Foundation collaborated with the Regional Transport Bureau in holding workshops for local governments and transport operators (EST Emergence Seminars) in Sapporo City, Kurobe City, and Matsue City. In addition to these workshops, tours and review sessions were also held as part of a three day personnel development training session (the 6th such session) in Sendai City. The 8th EST transport Environment Awards, recognizing exceptional regional transport environment efforts, were also held. In 2016 Kanazawa City received the MLIT's Minister Award, and Kintetsu Group Holdings received the MOE's Minister Award. The awards ceremony was held as a part of the 10th 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).

●8th EST Traffic Environment Award results

Award	Recipient	Name of Main Project
Grand Prize	**[Minister of Land, Infrastructure, Transport and Tourism Award]** ○Kanazawa City	Community Development through Transportation
Grand Prize	**[Minister of the Environment Award]** ○Kintetsu Group Holdings Co., Ltd.	Comprehensive Environmental Activities Leveraging Coordination within the Kintetsu Group
Outstanding Performance Award	○Matsue City Public Transportation Usage Promotion Citizens' Council	"Great Bargain Bus Usage Project" "Matsue City Leave Your Car at Home Week," etc.
Incentive Award	○Association of Denki Unazuki Project	Community transportation development through the operation of low-speed electric busses in Unazuki Hot Springs
Incentive Award	○Himeshima Ecotourism Promotion Council	New mobility adoption promotion research and commercialization
Incentive Award	○Earth Life Network	Fujinokuni "Eco de Safety" drive promotion consortium project

●Kanazawa City's Kanazawa Loop Bus

●Kintetsu Railway's "Blue Symphony" sightseeing express train

⑤Promotion 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.

In 2015, case examples were added to the guidebook containing the curricula used in supporting municipality and school education as reference information for future efforts by educators. A digest version was also created in order to further promote this education.

From 2016 the educational support has been offered to the local governments of Obihiro City, Fujisawa City, and Kyoto City.

Guidebook digest version

<Measures by supported local governments>

Obihiro City:

Alongside the workshops provided in the past, new programs tied to coursework and easy for educators to implement have been finalized. On January 27, a forum was held to promote the programs to educators. The forum was attended by many participants, including members of nearby local governments.

Fujisawa City:

The programs considered in the period up to last year were improved, and new educational materials, such as materials which are linked to health and physical education, were created and used.

Kyoto City:

At the three model schools programs tailored to local features were deliberated on and implemented, and methods for promoting these programs were considered.

Fujisawa City

Obihiro City

Support for schools has been provided to the following nine schools. And various measures are being implemented such as nearly practiced in health and physical education.

●Names of supported schools and educational themes

Name of School	Theme	Subject
One Elementary School, Hadano City, Kanagawa Prefecture	Traffic streamlining education – Smart car usage –	the Period for Integrated Stiudies
The University of Tokyo Secondary School Attached to the Faculty of Education	Considering accessible design in familiar public transportation	the Period for Integrated Stiudies
Honcho Elementary School, Hadano City, Kanagawa Prefecture	Health mobility management education using physical activity meters	Physical education
Oshio Elementary School, Echizen City, Fukui Prefecture	– JR Hokuriku Line Oshio Station junior stationmaster – "Poppoya Project"	the Period for Integrated Stiudies
Atago Elementary School, Okazaki City, Aichi Prefecture	Town exploration using local public transportation	Life Environment Studies
Kawada Elementary School, Sabae City, Fukui Prefecture	Saving lives with homemade Safety Boy	the Period for Integrated Stiudies
Kotobukikita Elementary School, Kanoya City, Kagoshima Prefecture	Let's learn about our city	the Period for Integrated Stiudies
Nagano School for the Blind , Nagano Prefecture	Let's travel home by bus and train	the Period for Integrated Stiudies, social studies, independence studies
Kodaira 12th Elementary School, Kodaira City, Tokyo	"Our Kodaira City" – Let's think about our local transportation –	Social studies

In order to further promote these measures, the 1st Mobility Management Education Promotion Seminar (JCOMM Seminar 2016 in Hiroshima) was held on March 7, 2016 in Hiroshima City. The seminar introduced the active efforts of Toyama City and Kawanishi City, and during the panel discussion participants shared opinions aimed at further promoting activities.

⑥Eco-Products 2016 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 2016 data: Exhibitors: 705 companies and organizations. Visitors: Approx. 170,000. Eco-Mo Foundation booth visitors: Approx. 4,500)

⑦13th Eco-Products Awards

The Eco-Products Awards are held by the Eco-Products Awards Promotion Council (consist of Global Environmental Forum, Japan Environmental Management Association for Industry, Eco-Mo Foundation, and Japan Organics Recycling Association). It was established in order to encourage the spread of eco-friendly products by awarding excellent products and services which reduced environmental load.

In 2016 Takenaka Corporation won the product category Minister of Land, Infrastructure, Transport and Tourism Award for its Wood-based, rapid, low-CO_2 seismic reinforcement technology. The winners were presented with their awards at the Eco-Products 2016 Exhibition, held in December.

●13th Minister of Land, Infrastructure, Transport and Tourism Award
Wood-based, rapid, low-CO_2 seismic reinforcement technology

Earthquake-resistant wall

Anti-seismic brace

⑧Promotion of usage of carbon offsets in the transportation 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 and transportation 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 transportation and tourism sector, in December 2009 the Eco-Mo Foundation established the "Transportation 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 CO_2 emissions and purchase emissions rights via the web. The system is already being used by local government transportation 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 CO_2 emissions for the base fare distance (2km) of each taxi trip departing from the taxi stand was offset by the company

Taxi stand

Leaflet

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

The waning of public transportation 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 transportation 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 for the last three years, and societal pilot tests have finally begun, but necessary information has yet to be shared by related parties within Japan, so starting this year 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 collected, and the results have been presented in a seminar.

Further deliberations regarding the use of electric compact low-speed vehicles will be conducted together with representative members of local governments and business operators.

Wajima City

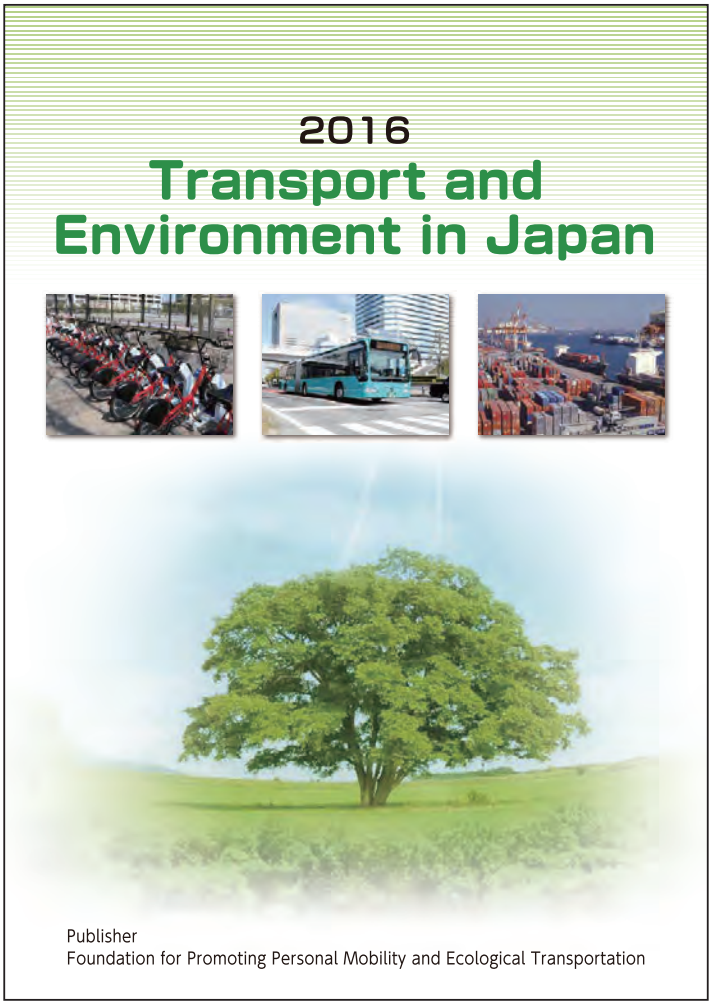
Ofunato City

⑩Publication 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 and transportation 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 traffic environment measures and countermeasures overseas.

(The English version can be downloaded from the Eco-Mo Foundation website.)

●Transport and Environment in Japan 2016



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 2014 found that of the 7,794,100 homes studied, 529,500 (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. 256,300 homes (3.3%) exceeded environmental noise standards both during the day and at night.

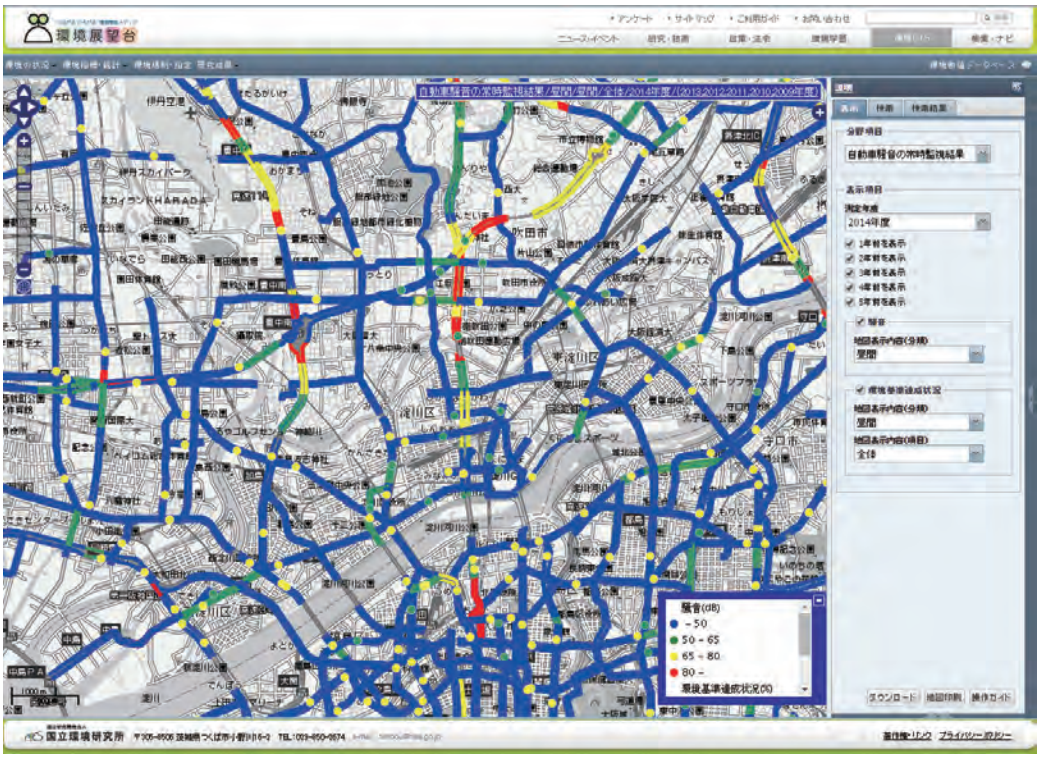
Of the 3,279,200 homes in areas along major arterial road, 373,900 (11.5%) homes exceeded environmental noise standards during the day, at night, or both. Of those, 179,000 (5.5%) homes exceeded environmental noise standards both during the day and at night.

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 urban expressways. Of the 70,100 homes located in these areas, 5,600 homes (8.0%) 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.

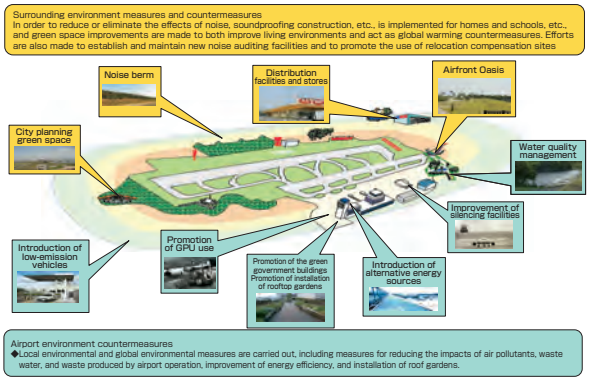
Shinkansen noise countermeasures include raising noise barriers, installing pantograph covers, and re-profiling rails to prevent the actual production of noise. When these measures are insufficient to meet environmental noise standards, subsidies are provided for performing soundproofing on existing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

The most effective measure for reducing airplane noise levels is the introduction of low noise airplanes. When comparing the 80dB(A)(adjusted based on human hearing characteristics) noise levels, the noise impact scope of the current B767 is roughly 90% smaller than that of the previously used DC8. In areas in which noise is still a problem soundproofing world, etc. is being carried out on houses. For the most part, this soundproofing work has been completed, except for follow-up maintenance. Improvements are being made in the area of airplane noise, and noise countermeasure areas are being reviewed and readjusted in airports such as Osaka International Airport. Nevertheless, measures for further reducing noise will remain important for achieving harmony between airports and their surrounding areas.

●Eco-airport conceptual diagram



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

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).

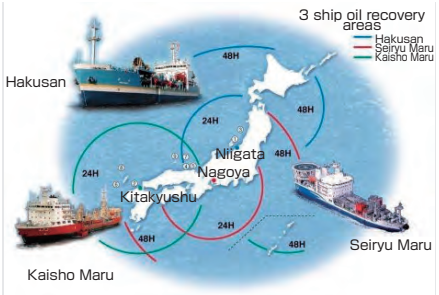
2 Sea pollution countermeasures

(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.

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



"Hakusan" can start oil recovery operation within 24 hours in the Japan Sea area, and even in the Hokkaido sea area can start operation within 2 days. Together with the "Seiryu Maru" and the "Kaisho Maru", it helps further enhance Japan's ability to respond to oil spills around Japan.

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

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.

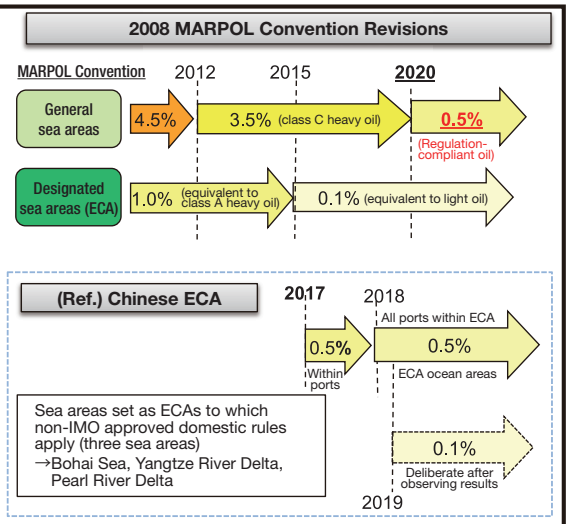
As of November 2013 nine ballast water management systems have been approved. The first unit of the "JFE Ballast Ace", a ballast water processing system developed by JFE Engineering Corporation and commercially released after being the first system to receive model approval by the MLIT, was installed 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.

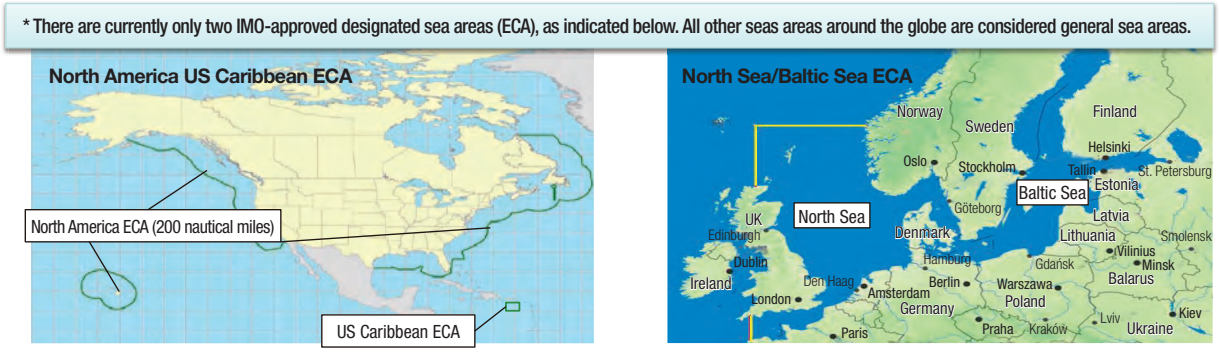
3 Ship exhaust gas emissions countermeasures

The IMO places restrictions on the sulfur content concentration of fuel oils to help prevent air pollution by reducing emissions of sulfur oxide (SOx) and particulate matter (PM) from ships. These restrictions reduce the sulfur content of ship fuel oil in stages, and use different restriction values for general sea areas (all sea areas) and designated sea areas (North Sea, Baltic Sea, etc.). Under 2008 revisions to the International Convention for the Prevention of Pollution from Ships, the limit of sulfur content in fuel oil used in general sea areas (currently 3.5% or less) is to be reduced to 0.5% or less from 2020. 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 revised and to go into effect from 2025. At the 70th Marine Environment Protection Committee (MEPC70), the timing of the initiation of the regulations was deliberated on, based on these revision conditions, and it was decided that the regulations would go into effect in 2020.

●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.





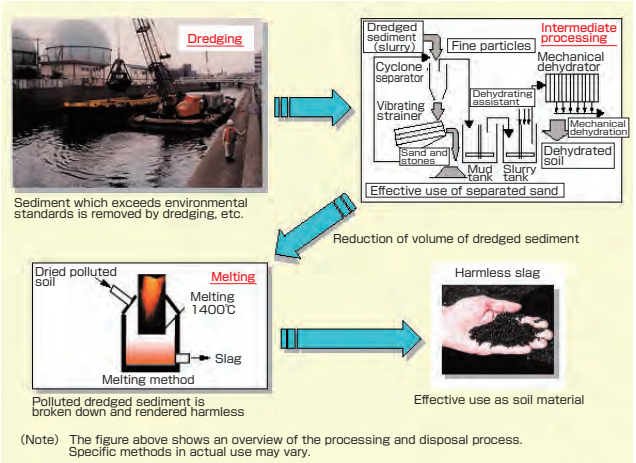
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

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



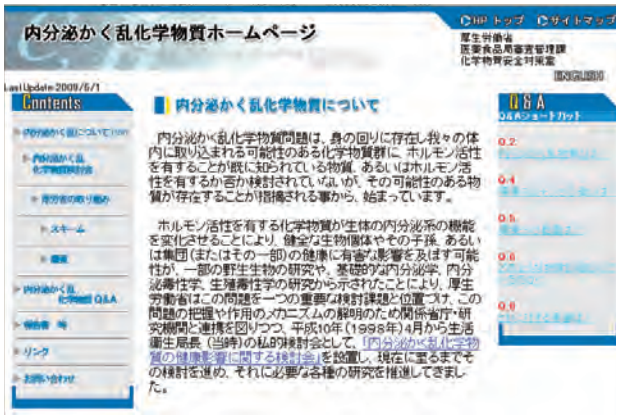
Source: MLIT (Tentative Translated by Eco-Mo Foundation)

(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 countermeasure pamphlet

Source: MLIT

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 though 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.

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

●PRTR pamphlet

Source: METI and MOE

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.

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 for Protection of the Ozone Layer through Regulation of Designated Substances, etc., 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.

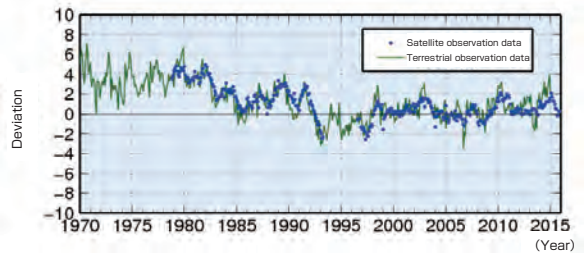
With regard to the recovery of fluorocarbons from vehicle air conditioners and subsequent destruction, due to the fact that vehicle air conditioners are constituent components of automobiles, in January 2005 they were excluded from the scope of the Fluorocarbon Recovery and Destruction Act, and regulated 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

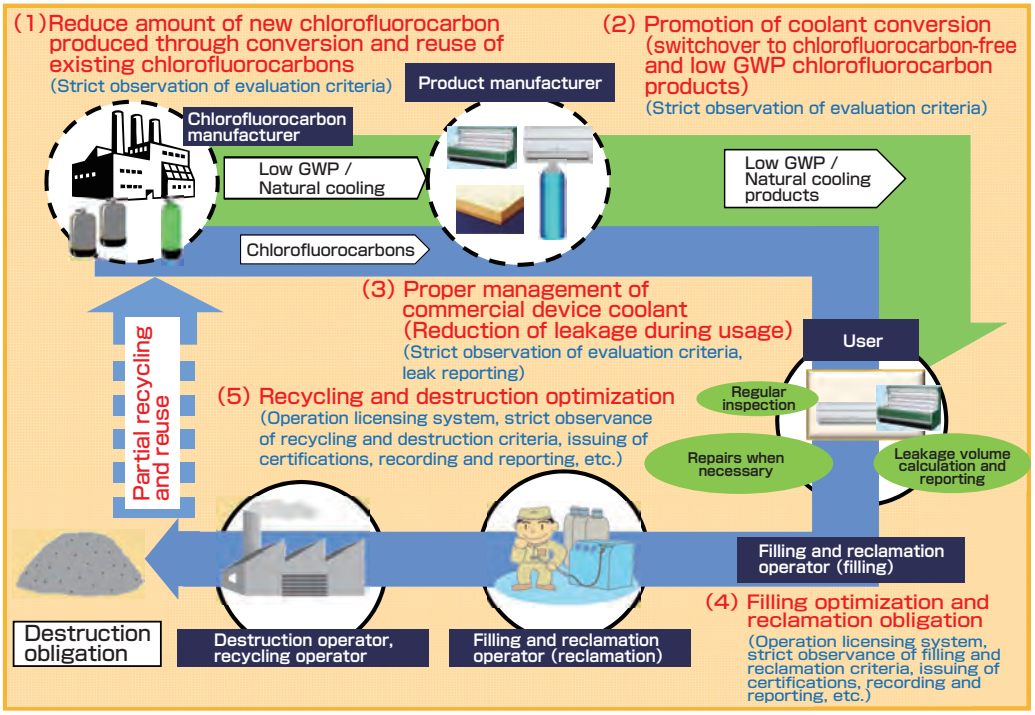
Amount of ozone worldwide

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.



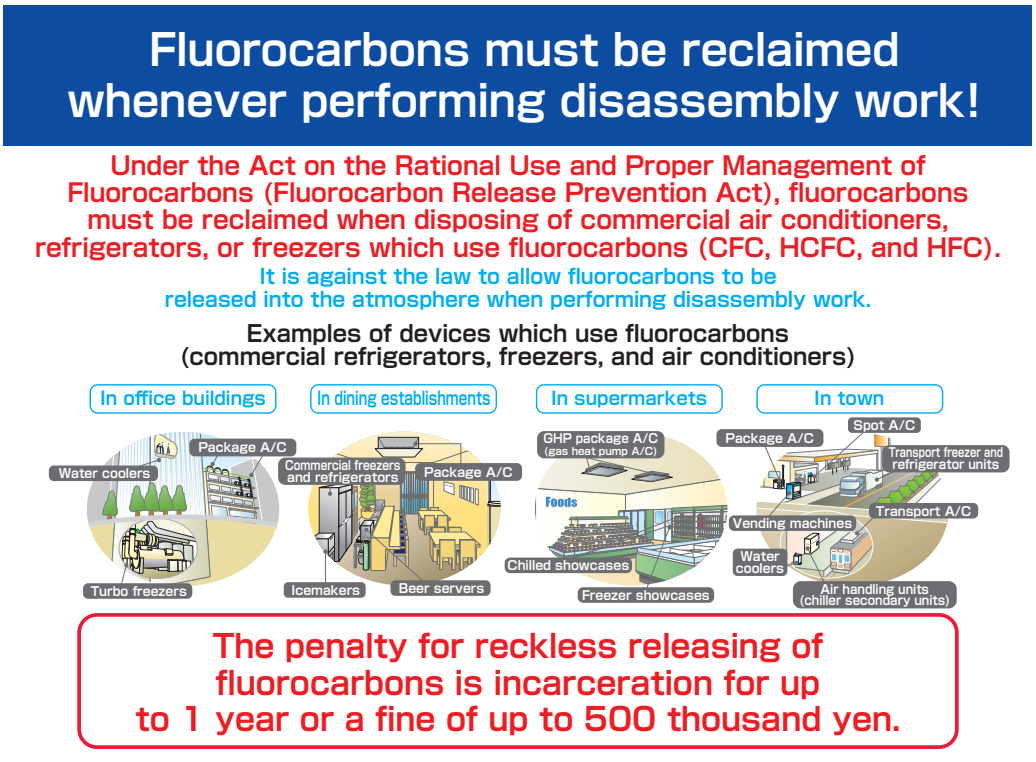
This graph shows the percentage of increase or decrease in the average amount of ozone worldwide compared to the average amount for the 1994 to 2008 period. These value changes have been adjusted to eliminate the influence of seasonal variation. The solid lines indicate data from terrestrial observation 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



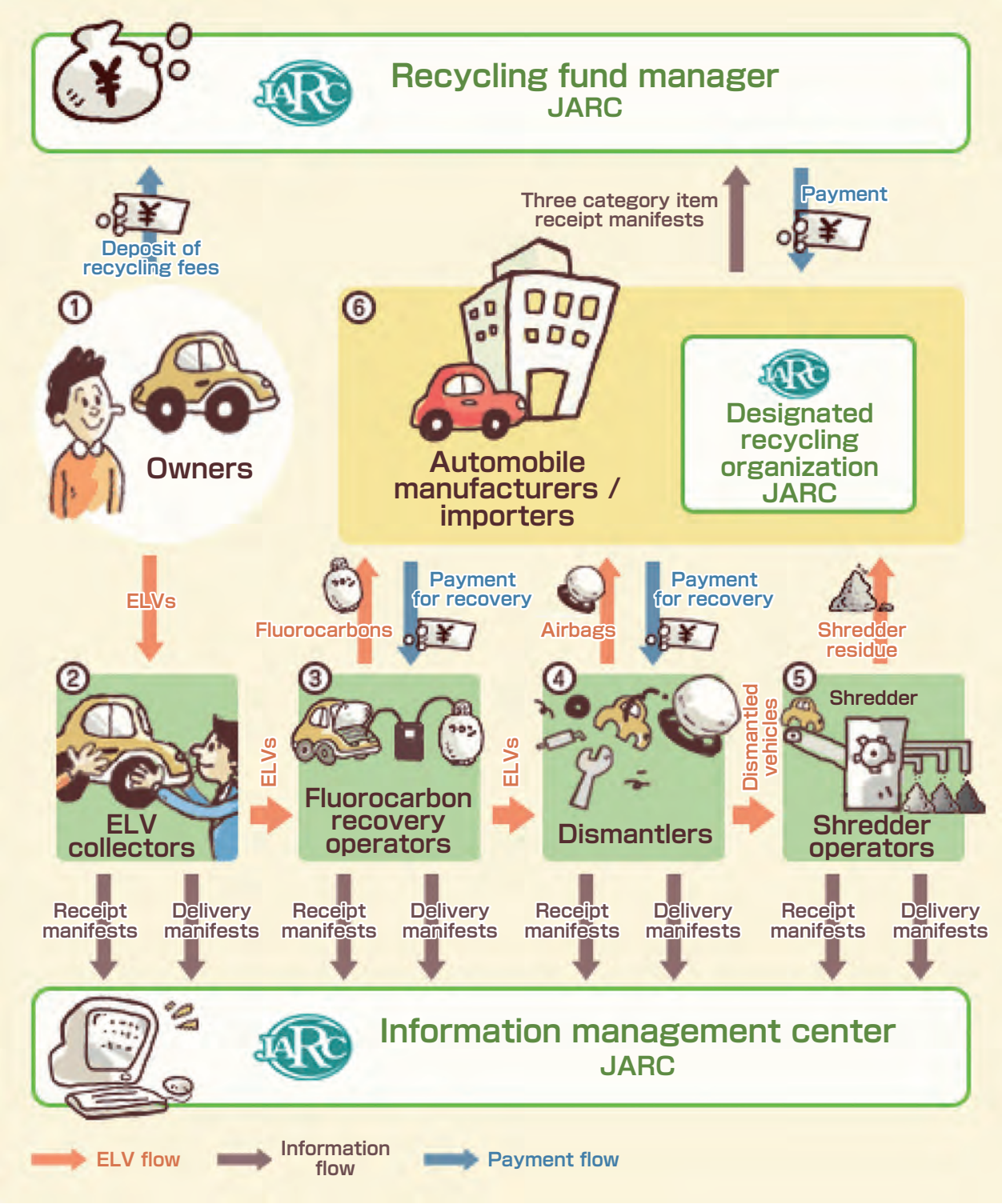
Source: METI and MOE (Tentative Translated by Eco-Mo Foundation)

●Fluorocarbon Discharge Prevention Act pamphlet



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)

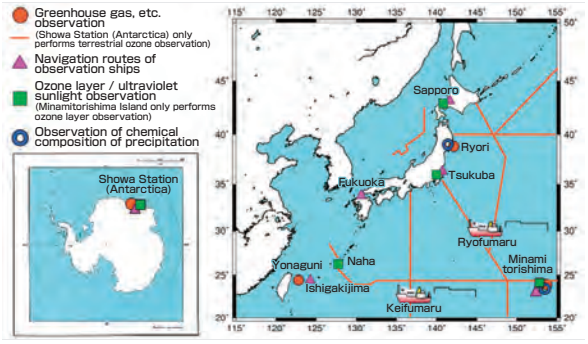
6 Global environmental observation and monitoring

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 enhaced. 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.

●Atmospheric environment monitoring network



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

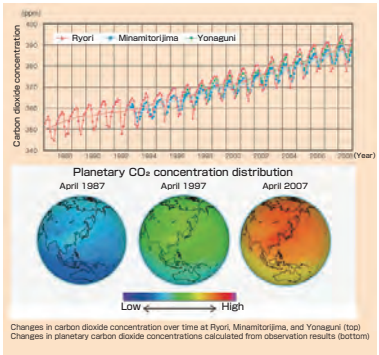
In order to assess greenhouse gas conditions, the amount of CO_2 in the atmosphere is being measured at three locations in Japan and the amount of CO_2 in the surface sea water and the air above the northwest Pacific Ocean is being measured by marine weather observation vessels. Furthermore, since 2009 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.

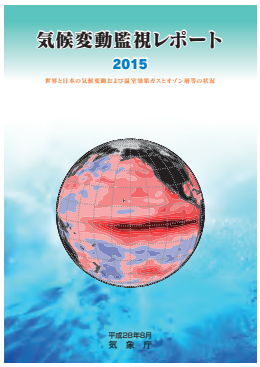
Climate change monitoring reports and anomalous weather reports are created based on observation results, and views on annual climate changes, anomalous weather, and global warming conditions and changes are also released.

●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

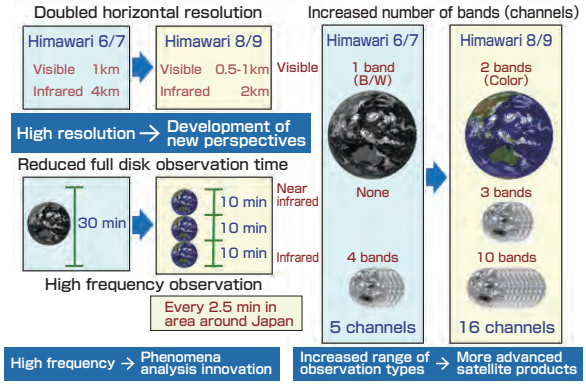


Source: JMA

(2) Himawari 8 and 9

Himawari 8 and 9 are the successors to the Himawari 7 (MTSAT-2) satellite, a multipurpose transportation 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

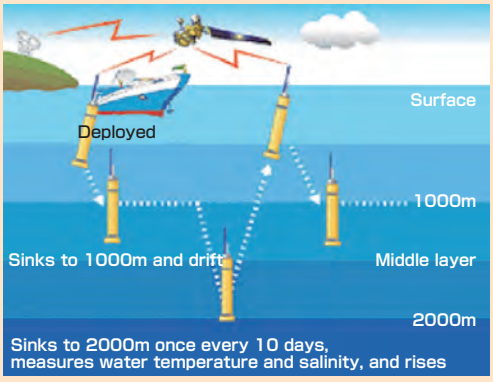


(3) Sea observation and monitoring

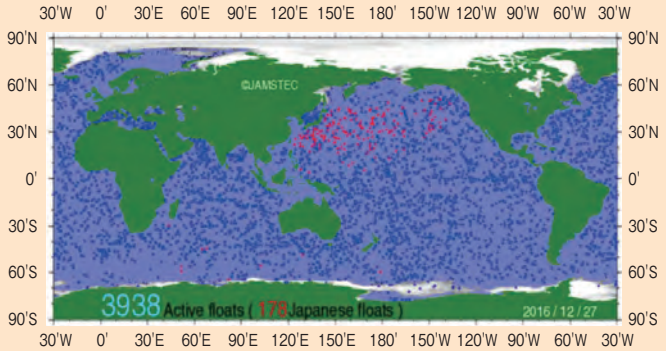
The sea absorbs CO_2, a greenhouse gas, and retains heat, moderating global warming. Sea changes are intrinsically linked to typhoons and anomalous weather conditions, so accurately assessing sea conditions is an important part of responding to global environmental problems.

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



Argo floats deployed at sea by marine weather observation vessels or other vessels sink to a depth of approximately 2,000m every 10 days and then rise again, obtaining vertical water temperature and salinity data and automatically reporting it by transmitting it via satellite.



Worldwide distribution of Argo floats reporting data within the past month (3,938 floats as of December 27,2016. 178 of these floats are Japanese, indicated with a (●).)

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

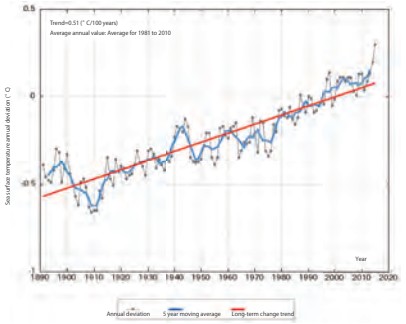
The JMA collects and analyzes data from various sources, such as observation vessels, Argo floats, and satellites, and releases Marine Health Diagnosis Tables, comprehensive diagnoses and future predictions regarding sea change conditions related to the global environment.

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

Diagnosis (2015)

•In 2015 the sea surface temperature was 0.30° 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 0.52° 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.

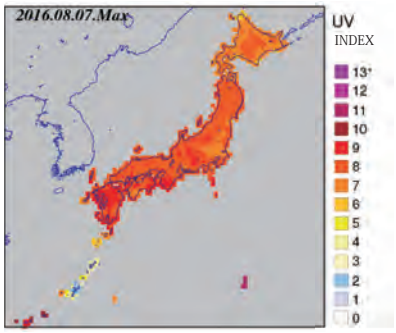
Source: JMA (Tentative Translated by Eco-Mo Foundation)

(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.

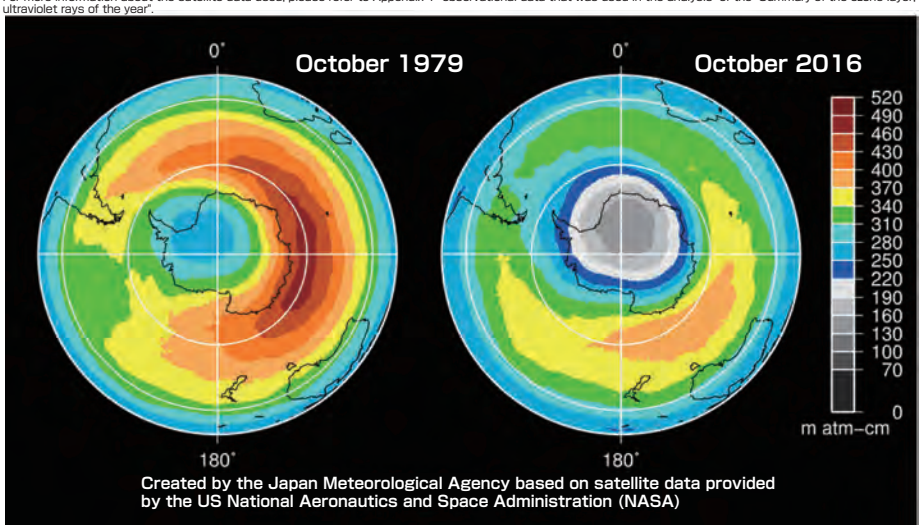
Since 1992 it has, with the collaboration of other countries around the world, compiled a database (global map data) of fundamental global geographical information needed when performing monitoring or analysis of global environmental problems, etc. In 2008 it completed and released the first version of its global map database, which includes land data for the entire world. It has since released the second version of its database, which covers land coverage and woodland coverage rates.

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 2016)

Distribution of average ozone levels in October in the southern hemisphere in 1979, before the southern hemisphere ozone hole appeared, and in 2015.
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)
For more information about the satellite data used, please refer to Appendix 1 "observational data that was used in the analysis" of the "Summary of the ozone layer, ultraviolet rays of the year".



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

●Global map (woodland coverage layer)

Source: "Global Map Project"
Website Management Committee

●Global map

Column

MLIT climate change adaptation measures

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 transportation 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 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 transportation 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 transportation 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

○Flooding
- 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

1) Disaster prevention measures for external forces with relatively high disaster risks
- Thorough facility maintenance
- Improvement of functionality of existing facilities
- Design of facilities to minimize reworking, etc.

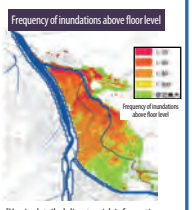
2) Disaster mitigation measures for external forces which exceed facility capacities
(1) Facility measures involving operation, structure, maintenance procedures, etc.
(2) Flood mitigation measures integrated with town planning and community development
(3) Evacuation, first-aid activity, business continuity, and other preparation

○Landslides
- 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

○Storm surges, storm waves, etc.

1) Harbors
- Sea phenomena monitoring and regular evaluation for harbors
- Countermeasures for external forces which exceed protection levels, etc.

2) Coasts
- Disaster risk evaluation and countermeasures for individual disaster risks
- Enhancement of coastal erosion countermeasures, etc.



[Use in detailed disaster risk information evacuation decisions, town planning, etc.]

Water resources/environment

○Water resources
- Measures for thoroughly leveraging existing facilities, using rainwater and reclaimed water, minimizing critical drought damage, etc.

○Water environment
- Monitoring and forecasting related research, water quality improvement measures

Daily life/urban life

○Transportation infrastructure
- (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

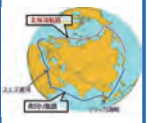

[Subway station flood prevention using water blocking boards]

○Heat island
- 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.)


[Rooftop gardens on private land]

Industrial/economic activity

- Use of Northern Sea route



- Measures for providing information to foreign travelers and countering reputation damage

Infrastructure measures

○Promotion and awareness raising, information provision
- Promotion and awareness raising regarding disaster prevention and climate change information
- Provision of geospatial information, etc.

○Observation, research, and technical development
- 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

○International contributions
- 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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