

2015

# Transport and Environment in Japan



Publisher

Foundation for Promoting Personal Mobility and Ecological Transportation

## Legal Notice

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 2015", published in March 2015 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.

# Table of Contents

I . Developments Related to Environmental Issues in 2014 .....	1
II . Current Status of Major Environmental Problems of the Transport Sector .....	2
1 Current Status of Global Environmental Problems .....	2
( 1 ) Current status of global warming .....	2
( 2 ) The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and new legal frameworks ...	5
( 3 ) Current status of global warming issues in Japan .....	8
( 4 ) Current status of global warming issues in the transport sector .....	10
(Column: Automobile ownership rates around the world) .....	14
2 Current status of automobile gas emissions .....	15
3 Current status of waste and recycling .....	17
III . Measures in Response to Major Environmental Problems of the Transport Sector .....	20
1 Promotion of global warming countermeasures .....	20
( 1 ) Transport sector countermeasures .....	20
(Column: EV / PHV town concept) .....	25
(Column: Ecological and safe driving support services which use truck drive data) ...	27
(Column: Eco-tires) .....	28
(Column: Near future eco-ship concept) .....	32
(Column: Effectiveness of car sharing in reducing environmental impact) .....	47
( 2 ) Energy Saving Act-based measures .....	48
( 3 ) Emissions trading system measures .....	50
2 Promotion of emissions gas measures for trucks and busses (diesel vehicles), etc. ...	51
( 1 ) Promotion of emissions gas measures for diesel vehicles .....	51
( 2 ) Appropriately maintained vehicle usage and appropriate fuel usage guidance .....	53
3 Environmentally friendly vehicle promotion measures (vehicle taxation reevaluation) .....	53
4 Creation of a recycling-oriented society .....	55
( 1 ) Creation of recyclable resource distribution systems .....	55
( 2 ) Creation of vehicle recycling system .....	56
( 3 ) FRP ship recycling .....	57

<b>5</b>	<b>Measures by local governments, companies, citizens' groups, etc.</b>	58
(1)	Measures by local governments	58
(2)	Measures by companies in the transport sector	62
(3)	Measures by citizens' group	69
(4)	Measures by the Eco-Mo Foundation	70
<b>IV.</b>	<b>Measures in Response to Other Environmental Issues</b>	79
<b>1</b>	<b>Noise related measures</b>	79
(1)	Automobile noise countermeasures	79
(2)	Rail noise countermeasures	80
(3)	Airplane noise countermeasures	80
<b>2</b>	<b>Sea pollution countermeasures</b>	81
(1)	Large scale oil spill countermeasures	81
(2)	Countermeasures against harmful aquatic organisms in ballast water	81
<b>3</b>	<b>Ship exhaust gas countermeasures</b>	82
	(Column: Promoting the turning off of ships engines when stopped!)	83
<b>4</b>	<b>Chemical matters countermeasures</b>	84
(1)	Dioxin, etc. countermeasures	84
(2)	Endocrine disruptors countermeasures	84
(3)	Asbestos countermeasures	85
(4)	PRTR (Pollutant Release and Transfer Register) system	85
<b>5</b>	<b>Ozone layer destruction prevention</b>	86
<b>6</b>	<b>Global environmental observation and monitoring</b>	89
(1)	Climate change observation and monitoring	89
(2)	Himawari 8 and 9	90
(3)	Sea observation and monitoring	90
(4)	Ozone layer observation and monitoring	91
(5)	Promotion of steady observation at the south pole	91



# I. Developments Related to Environmental Issues in 2014

There were a great deal of developments in 2014, both inside Japan and overseas, related to environmental issues. Below are some of the developments in global warming, automobiles and the environment, and waste.

## ■ Global warming related developments

The first commitment period of the Kyoto Protocol, which went into effect in 2008, ended in 2012. Japan met its greenhouse gas emissions reduction targets. International talks aimed at creating a framework for 2013 and beyond (post-Kyoto) began with the COP13/MOP3 talks held in Bali, Indonesia. In the COP18/CMP8 talks held in Doha, Qatar in December 2012 it was announced that negotiations would take place regarding establishing a new legal framework which would apply to all countries from 2020 and beyond, with a consensus to be reached by 2015. The eight year period from 2013 to 2020 is the second commitment period of the Kyoto Protocol, but Japan decided not to participate in the second commitment period, instead choosing to implement voluntary measures. Due to the energy problems resulting from the Great East Japan Earthquake and nuclear power plant disaster (2011), the government revised Japan's 2020 emissions reductions target (25% reduction compared to 1990), submitted to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat in 2010, from the ground up. At COP19, held in November 2013, Japan announced a tentative post-Kyoto Protocol reduction target of 3.8% compared to 2005 by 2020.

## ■ Automobile and the environment related developments

According to the Japan Automobile Dealers Association and the Japan Mini Vehicle Association, the first place and the fifth to tenth place best-selling automobiles were mini vehicles, and the second and fourth place best-selling vehicles were hybrids. Environmentally conscious vehicles such as mini vehicles and hybrids accounted for the majority of the top-selling automobiles. 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.

## ■ Waste related developments

Waste disposal remains a major societal problem, but the Waste Disposal System Expert Committee, established in September 2008 by the Central Environment Council, released a report concerning waste disposal systems in January 2010. Key revision points included strengthening and thoroughly enforcing the responsibilities of waste disposal operators, maintaining a licensing system for waste disposal work, promoting improvements in the field, strengthening and thoroughly enforcing illegal waste disposal countermeasures, etc., promoting and thoroughly implementing waste reductions and reuse measures, and aligning regulations with those of a low-carbon society.

# I. Current Status of Major Environmental Problems of the Transport Sector

## 1 Current Status of Global Environmental Problems

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

### (1) Current status of global warming

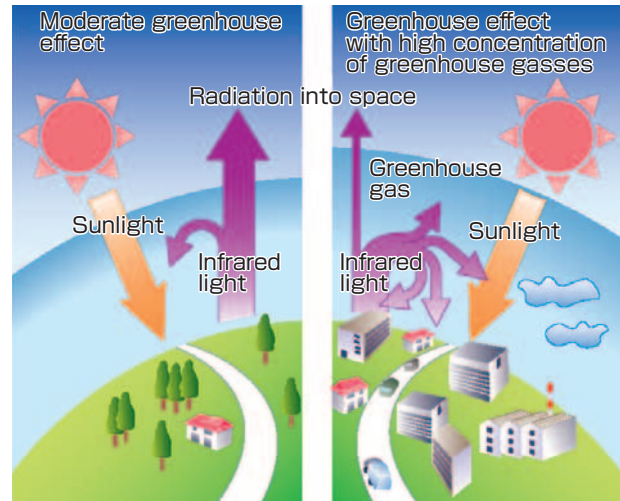
#### ■ The mechanism behind and impact of global warming

In order to produce energy, we burn fossil fuels such as petroleum, coal, and natural gas, generating gasses such as carbon dioxide (CO<sub>2</sub>) and releasing them into the atmosphere.

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

However, factors such as the rise of industry have increased the amount of daily activity, producing a rapid rise in the amount of greenhouse gasses emitted into the atmosphere. This has intensified the greenhouse effect, producing a commensurate increase in climate temperature. This is called global warming. The 5th assessment report of the Intergovernmental Panel on Climate Change (IPCC), published between 2013 and 2014, states that the average global temperature rose 0.85 ° C between 1880 and 2012, and that the temperatures of every ten year period of the past 30 years have been warmer than any of the preceding ten year periods 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 rising, resulting in further global warming. The IPCC report says it is highly likely that the average global temperature at the end of the 21st century will have risen by 0.3 to 4.8° C, and that the average sea level will have risen by 0.26 to 0.82m. Risks resulting from climate change include droughts, flooding, rainfall changes, food shortages, negative impacts on health, and reductions in biodiversity.

#### ● Mechanism of the greenhouse effect



● Forecast of increase in average global surface temperature

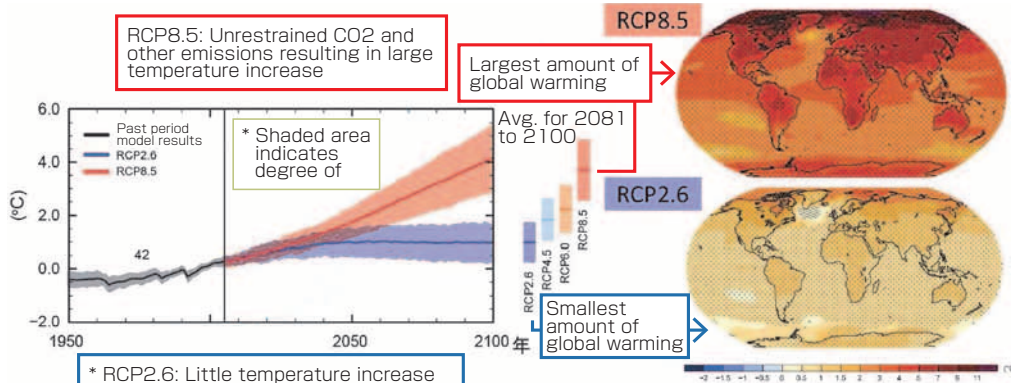


Fig. Change in average global ground temperature between 1986 and 2005 CMIP5 simulated timeline based on multiple models (1950 to 2100) Source: Figure: IPCC AR5 WG I SPM Fig. SPM.7(a)

Fig. Change in average annual ground temperature (Difference versus 1986 to 2005 average) 2081 to 2100 RCP2.6 and RCP8.5 scenario CMIP 5 multiple model average distribution diagram (IPCC AR5 WG I SPM Fig. SPM. P.20, lines 21 to 22)

The north pole area will warm faster than the global average, and the average increase in temperature will be greater for land areas than sea areas. (IPCC AR5 WG I SPM Fig. SPM. P.20, lines 21 to 22)

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

■ 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 2012 carbon dioxide accounted for 95% 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)	SF <sub>6</sub>
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

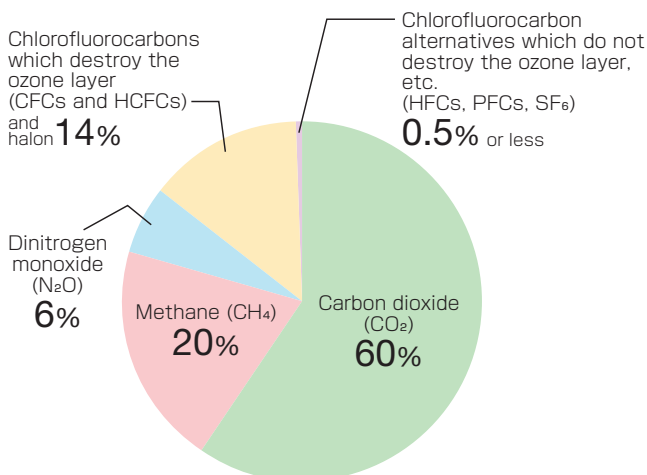
Calculated for HFC-134a, a typical HFC used as a coolant

\*3: PFC

Calculated for PFC-5-1-14, a typical PFC used in rectifiers

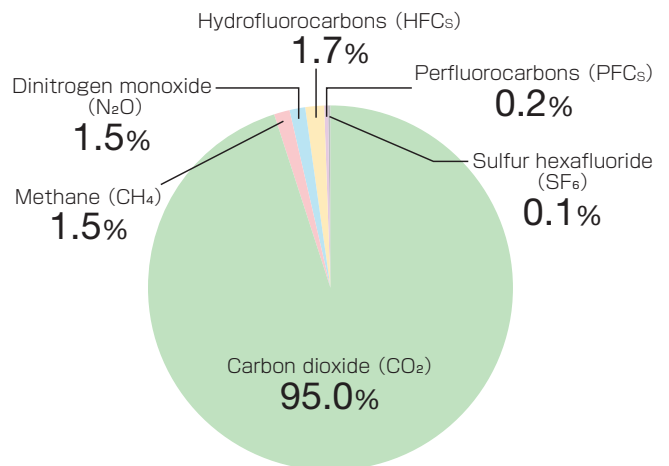
Source: IPCC (2007)

● 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 2012)



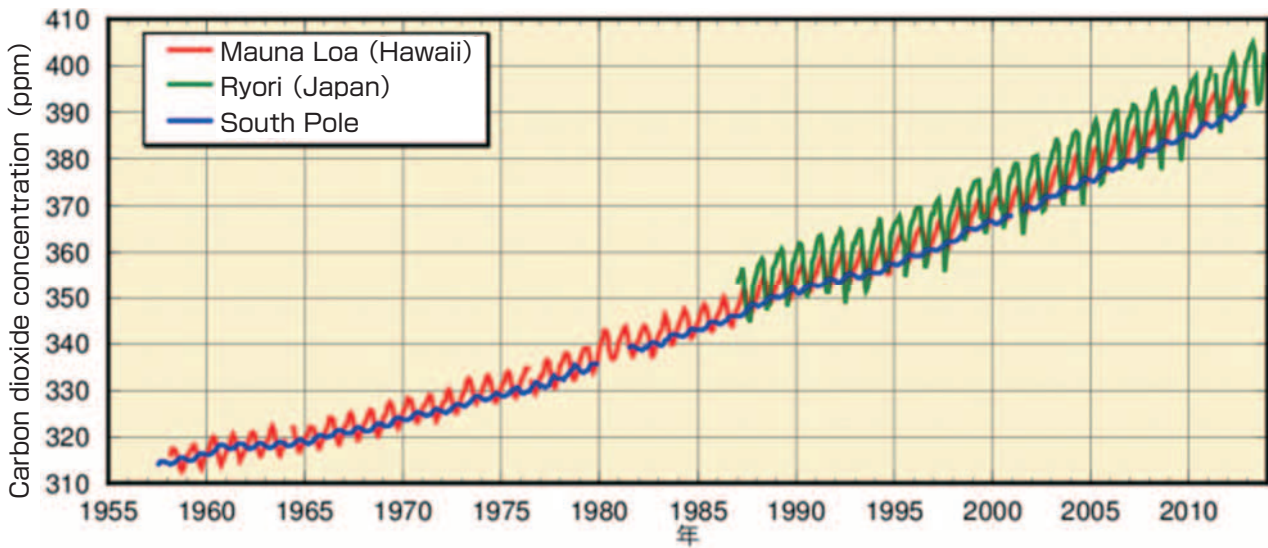
Source: GIO "Greenhouse Gas Inventory"



### 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 IPCC's 5th assessment report the carbon dioxide concentration in 2011 was 390.5ppm, significantly higher than the concentration before the industrial revolution.

#### Change in carbon dioxide concentration at typical global observation points

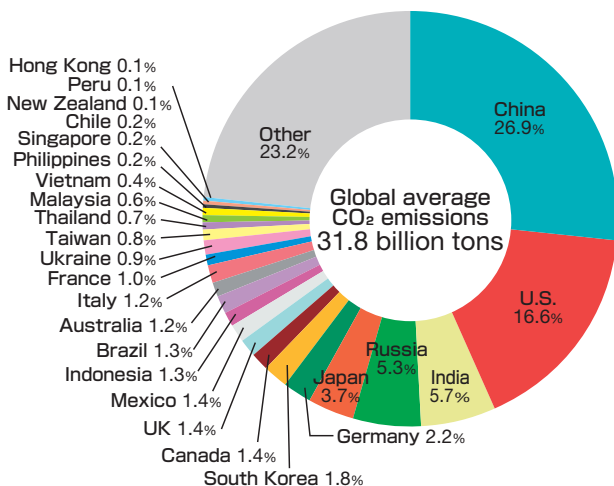


Source: Tentative Translated by Eco-Mo Foundation of Japan Meteorological Agency (JMA) "Climate Change Monitoring Report 2013"

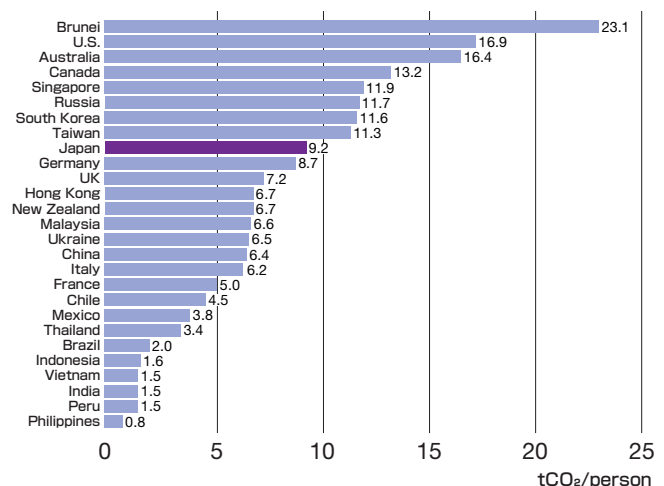
### Carbon dioxide emission volume by country

Carbon dioxide emission volume by country is as follows: China 26.9%, America 16.6%, India 5.7%, Russia 5.3%, followed by Japan at 3.7%. In terms of per capita emissions by country, Japan is number 9.

#### Share of carbon dioxide emission volume by country (2011)



#### Per capita carbon dioxide emission volume by country (2011)



Source: EDMC "Handbook of Energy & Economic Statistics in Japan 2014"

## (2) The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and new legal frameworks

### ■ UNFCCC and the Kyoto Protocol

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 March 2013 the European Union (EU) and 194 countries, including Japan, are signatories. In December 1997 the third Conference of Parties to the UNFCCC (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 versus 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%, America 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.

### ■ New legal frameworks

In order to further accelerate global warming countermeasures and achieve treaty objectives, it is essential that there be a fair and effective new framework in which all countries, including the largest emissions producing countries, such as the U.S., China, and India, participate responsibly. At COP18/CMP8, held in December 2012 in Doha, Qatar, it was announced that negotiations were underway aimed at achieving a consensus in 2015 regarding the establishment of a new legal framework which would apply to all countries from 2020 onwards. These negotiations are currently underway.

The results of the December 2014 COP20/CMP10 are shown below.

The 20<sup>th</sup> Session of the Conference of the Parties to the United Nations Framework  
Convention on Climate Change (COP20)

December 15, 2014

1. Overall Overview and Evaluation

- (1) The 20th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 20) and the 10th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP10) took place from December 1 to 14 in Lima, Peru. Mr. Yoshio Mochizuki, Minister of the Environment, and officials from the Ministry of Foreign Affairs, Ministry of Economy, Trade and Industry, Ministry of the Environment, Ministry of Finance, Ministry of Education, Culture, Sports, Science and Technology, Ministry of Agriculture, Forestry and Fisheries and Ministry of Land, Infrastructure, Transport and Tourism attended from Japan.
- (2) Following working-level negotiations at the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) and two Subsidiary Body sessions, further discussions took place between ministers during the high-level segment from December 9, which ultimately resulted in the adoption of COP and CMP decisions etc., including a decision on intended nationally determined contributions (INDCs) that each Party will communicate toward a post 2020 framework.
- (3) Regarding the post 2020 framework, Parties adopted a COP Decision, the "Lima Call for Climate Action", that sets out the information to be provided by all Parties communicating their intended nationally determined contributions in accordance with the invitation to do so well in advance of the twenty-first session of the Conference of the Parties (by the first quarter of 2015 by those Parties ready to do so). The Decision also contains "elements for a draft negotiating text" in its annex and decides that the ADP will intensify its work with a view to making available a negotiating text for a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties before May 2015.
- (4) A COP20 decision was adopted welcoming with appreciation contributions toward the initial mobilization of the Green Climate Fund that exceeded 10 billion U.S. dollars during the COP20 period.

2. The Government of Japan's activities

- (1) Japan emphasized that mitigation contributions should be put at the center of INDCs, and upfront information and ex-ante consultation should ensure the clarity, transparency, understanding and comparability of the INDCs communicated by the Parties. In addition, Japan emphasized that in the new framework, all Parties are obliged to: 1) submit their quantifiable INDCs; 2) take measures aiming to achieve their NDCs; and 3)

## II. Current status of major environmental problems of the transport sector

be reviewed on the implementation of their NDCs. With regard to adaptation, Japan emphasized that the core agreement should encourage Parties to integrate adaptation into their national strategies and program processes.

- (2) At the high-level segment, Minister Mochizuki gave an address as Japan's representative, and once again advocated the goal to reduce emissions by 50 percent at the global level and by 80 percent in the developed world by 2050, along with noting that Japan will aim to submit its INDC as early as possible, contribute to reducing emissions by utilizing Japanese technologies, and advance support for mitigation actions and adaptation by developing countries in addition to financial assistance. Furthermore, Minister Mochizuki attended the Ministerial Dialogue on the ADP and emphasized that the 2015 agreement must be applicable to all Parties rather than taking a bifurcated approach of differentiating developed and developing countries, and quantifiable mitigation contributions should be put at the center of Parties' INDCs.
  - (3) Additionally, during the conference period Minister Mochizuki met with ministers of seven countries and regions, including Peru (COP20 Presidency), France (COP21 Presidency), the EU, the U.K. and China, and the heads of international organizations, including Mr. Ban Ki-moon, Secretary-General of the United Nations, and confirmed the importance of cooperating to reach an agreement on a new framework. Secretary-General Ban said that he was requesting all countries to communicate their INDCs in the first quarter of next year. The EU indicated its expectation that Japan's INDC will be communicated promptly, and France, the U.K. and other countries indicated their expectation that Japan will take the lead in combating climate change.
  - (4) In addition, the Joint Crediting Mechanism (JCM) High-level Roundtable was held bringing together the 12 signatory countries to the JCM, where a joint statement welcoming the development of the JCM and expressing the shared will to make further progress in its implementation was announced.
  - (5) Japan communicated its pledge to contribute up to 1.5 billion U.S. dollars to the Green Climate Fund (GCF), subject to the approval by the Diet. The Government also proactively introduced Japan's initiatives in the adaptation field, which is of particular importance to developing countries, and assistance for vulnerable nations, including announcing a concrete examples of the "Adaptation Initiative" launched by Prime Minister Abe at the UN Climate Summit last September.
  - (6) The Government of Japan set up an event space, "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, and showcased Japan's contributions to climate change measures.
3. Outcomes of the conference
- (1) a. With regard to the post 2020 framework, previous decisions required that the information that Parties will provide when putting forward their INDCs to the Secretariat well in advance of the COP21 in 2015 be identified at the COP20; and that elements for a draft negotiating text of the new framework be considered in COP20 with a view to making available a negotiating text before May 2015.
    - b. At this conference it was decided that INDCs will be communicated toward achieving the objective of the Convention as set out in its Article 2 (to stabilize greenhouse gas concentrations in the atmosphere) and the content will represent a progression beyond current undertakings; that Parties will consider communicating their undertakings in adaptation planning or consider including an adaptation component in their INDCs; and that the information to be included in INDCs, may include the reference point (a base year etc.) , time frames and/or periods, scope, coverage etc. In addition, it was decided that the Secretariat will publish on the UNFCCC website the INDCs as communicated by Parties, and prepare by November 1, 2015 a synthesis report on the aggregate effect of the INDCs communicated by Parties. Furthermore, with regard to enhancing ambition in the pre-2020 period, it was decided that Technical Expert Meetings (TEMs) will continue in order to continue the technical examination of opportunities with high mitigation potential. (Lima Call for Climate Action)
    - c. Where the elements for a draft negotiating text are concerned, the discussion was based on a non-paper presented by the Co-Chairs providing an overview of each party's arguments on the respective elements of mitigation, adaptation, finance, technology development and transfer, transparency of action and support, and capacity- building mentioned in the COP17 decisions. The "Elements for a draft negotiating text" updating the non-paper was annexed to the above-mentioned COP decision, and it was decided that further discussion of this will be carried out in the future.
  - (2) There was a difference of views over the issue of climate finance, including a request by developing Parties that developed Parties further articulate the path towards the goal of mobilizing 100 billion U.S. dollars by 2020, but as a result of negotiations, a COP decision was adopted to enhance information on the support that developed Parties list in the biennial submissions, and to welcome with appreciation the contributions (10.2 billion U.S. dollars) toward the initial mobilization of the Green Climate Fund.
  - (3) The first Multilateral Assessment (MA) of the progress made by developed country Parties in implementation towards the achievement of emission reduction targets in 2020 was held. 17 Parties, including the EU and the U.S., made presentations, and questions and answers took place within a constructive atmosphere.
  - (4) On market mechanisms, views were exchanged on, among other issues, the prevention of double-counting at the Subsidiary Body sessions, and it was decided that the discussions would continue at the Subsidiary Body sessions in June next year.
  - (5) With regard to technology development and transfer, a decision on the joint annual report of the Technology Executive Committee (TEC) and the Climate Technology and Center Network (CTCN) was adopted that, among other things, welcomed the progress in both entities' activities.
  - (6) Concerning loss and damage associated with climate change impacts, an agreement was reached on the initial two-year work plan as well as the composition of and procedures for the Executive Committee of the 'Warsaw International Mechanism for Loss and Damage' that the COP established at COP19 in 2013.
  - (7) With regard to reducing emissions from deforestation and forest degradation in developing countries (REDD +), it was decided to establish the "Lima Information Hub for REDD +" on the web platform on the UNFCCC website for publishing information based on the "Warsaw Framework for REDD +" that was agreed upon at COP19.
  - (8) COP21 will be held in Paris, France. Additionally, Morocco expressed its interest in relation to hosting COP22

Source: Ministry of Foreign Affairs of Japan website

## ■ Medium-term greenhouse gas reduction targets

At the G8 summit held in Italy in July 2009 participants reaffirmed their commitment a global reduction in emissions of at least 50% by 2050, and for developed countries as a whole to cut their emissions by at least 80% in order to achieve this. The G8 countries also reached a consensus regarding their understanding of scientific findings regarding keeping the global average temperature from rising more than two degrees. The 5th assessment report of the IPCC found that the highest likelihood scenario for keeping the global average temperature from rising more than two degrees above pre-industrial revolution levels would require emissions in 2050 to be reduced by 40 to 70% compared to 2010 levels, and for emissions by 2100 to be roughly zero or even negative. In January 2010 Japan announced its intent to agree to the Copenhagen Consensus, and submitted its emissions reductions target to the UNFCCC secretariat, namely a 25% reduction in comparison to 1990, with the prerequisite that all main participating companies establish a fair and effective international framework and agree to ambitious goals. However, due to the Great East Japan Earthquake of 2011 and the resulting energy problems, and the transfer of power from the Democratic Party of Japan to the coalition government of the Liberal Democratic Party and Komeito, the government reevaluated the 2020 emissions reductions target from the ground up. At COP19, held in November 2013, a tentative post-Kyoto Protocol target of reducing emissions in 2020 by 3.8% in comparison to 2005 was announced.

### (3) Current status of global warming issues in Japan

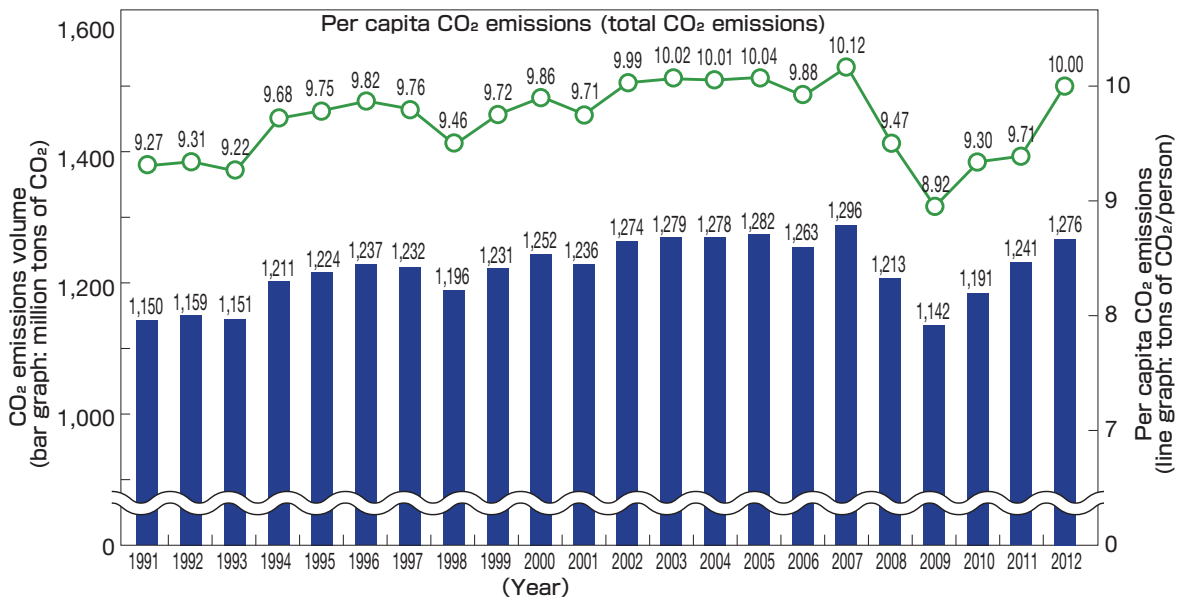
#### ① Current status of carbon dioxide emissions in Japan

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

#### ■ Trends in carbon dioxide emissions in Japan

In 2012 Japan emitted approximately 1.276 billion tons of carbon dioxide, roughly 11.5% more than it did in 1990. The per capita emissions volume in 2012 was approximately 10.00 tons.

##### ● Trends in carbon dioxide emissions in Japan

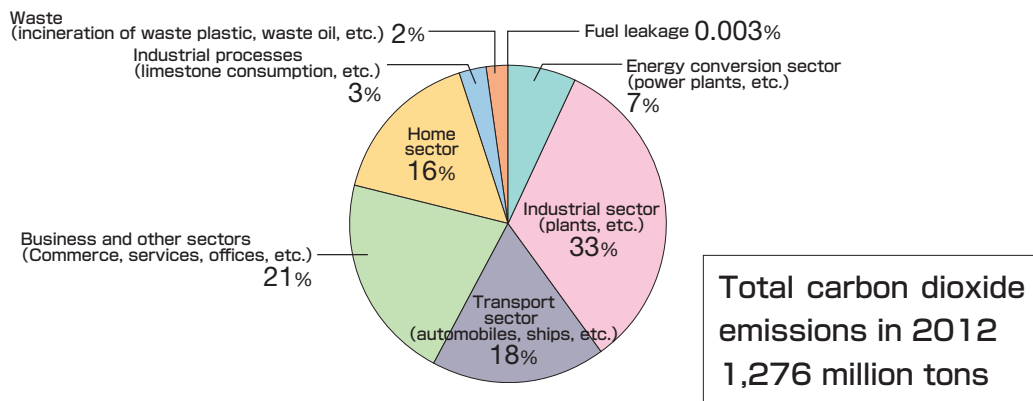


Source: GIO "Greenhouse Gas Inventory"

#### ■ Ratio of carbon dioxide emissions in Japan by sector

The industrial sector accounts for 32.7% of Japan's carbon dioxide emissions, the transport sector for 17.7%, business and other sectors account for 21.3%, and the home sector accounts for 15.9%.

##### ● Amount of carbon dioxide emissions in Japan (by sector) 2012



Source: GIO "Greenhouse Gas Inventory"

## ② Energy consumption in Japan

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

### ■ Final energy consumption in Japan

Japan's energy consumption grew faster than its gross domestic product during the period of rapid economic growth which lasted into the 1970s. However, the two oil crises in the 1970s led to increased efforts to reduce energy consumption by the industrial 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 the rate of increase in energy consumption by the transport sector remained low, but low crude oil prices and the spread of lifestyles focused on comfort and convenience led to an increase in energy consumption by the consumer sector (the home sector and the business sector).

Looking at energy consumption trends by individual sectors, since the oil crises energy consumption by the industrial sector has remained roughly level, while it has roughly doubled for the consumer (home sector and business sector) and transport sectors. As a result, while the industrial, consumer, and transport sectors accounted, respectively, for 65.5%, 18.1%, and 16.4% of total energy consumption in 1973, in 2012 these ratios had changed to 42.6%, 34.3%, and 23.1% respectively. From 1973 to 2012 energy consumption for the industrial sector fell by 20%, but grew 2.4-fold for the consumer sector (2.1-fold for the home sector and 2.8-fold for the business sector) and 1.8-fold for the transport sector.

From 2008 to 2009 the economic decline caused a drop in manufacturing and mining production, which in turn produced a drop in final energy consumption due to major reductions in energy consumption by the industrial sector. 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. Final energy consumption in 2012 was 3.3% more than it was in 1990.

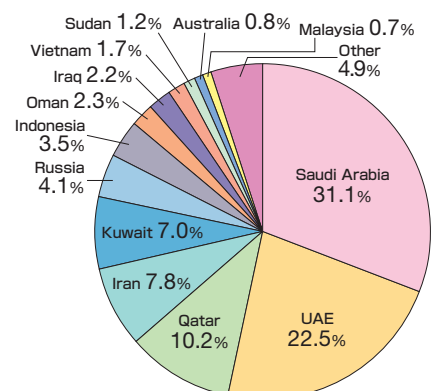
### ■ Dependence on petroleum for energy consumed in Japan

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 2012 Japan supplied 0.4% of the crude oil it used. Japan's major oil fields are located in Niigata Prefecture, Akita Prefecture, and Hokkaido. Because of this low level of self-sufficiency, in 2012 Japan relied on foreign imports for 99.6% 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 2012 the U.S. depended on the Middle East for 25.1% of its crude oil, and European OECD countries depended on the Middle East for 16.7% of their crude oil. In 2012 Saudi Arabia was Japan's largest supplier of crude oil, supplying 30.4%, followed by the UAE (22.1%), Qatar (11.4%), and Kuwait (7.4%).

(Source: Tentative Translated by Eco-Mo Foundation of Ministry of Economy, Trade and Industry (METI) "Energy White Paper 2014")

● Crude oil imports by supplying country (2011)



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

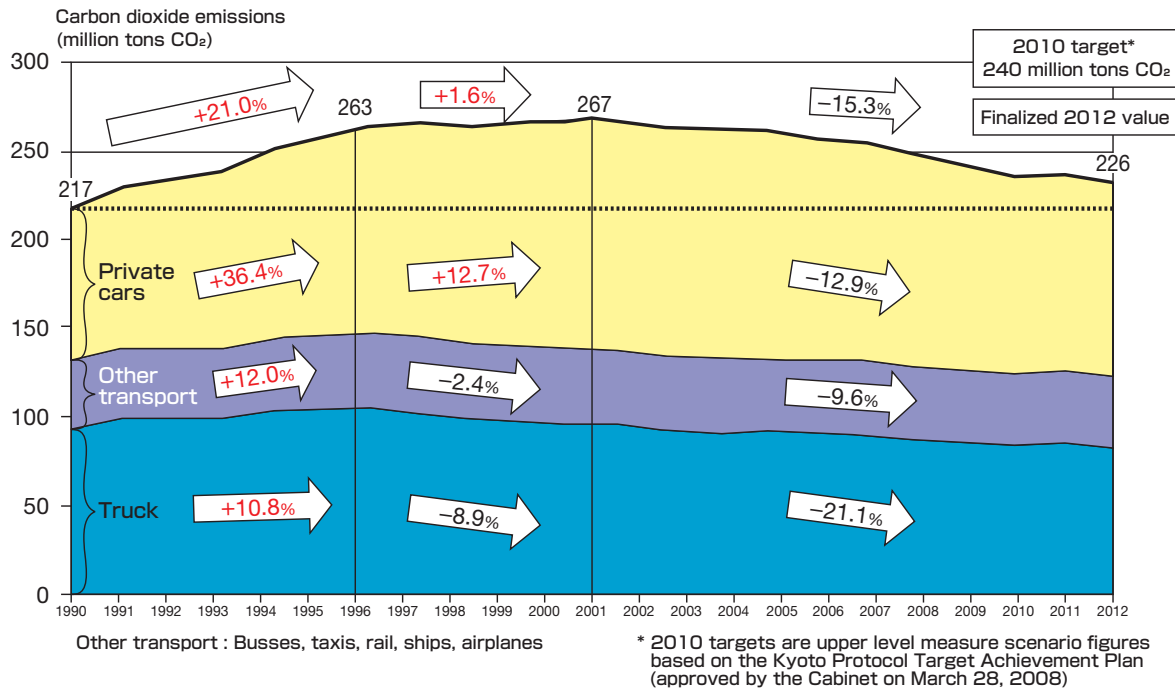
## (4) Current status of global warming issues in the transport sector

### ① Current status of carbon dioxide emissions by the transport sector

#### ■ Trends in carbon dioxide emissions by the transport sector

From 1990 to 1996 the amount of carbon dioxide emitted by the transport sector rose by 21.0%, but the rise in emissions then slowed, and began falling from 2001 onwards. In 2012 the amount of carbon dioxide emissions was approximately 226 million tons, 4.1% more than in 1990.

#### ● Trends in carbon dioxide emissions by the transport sector



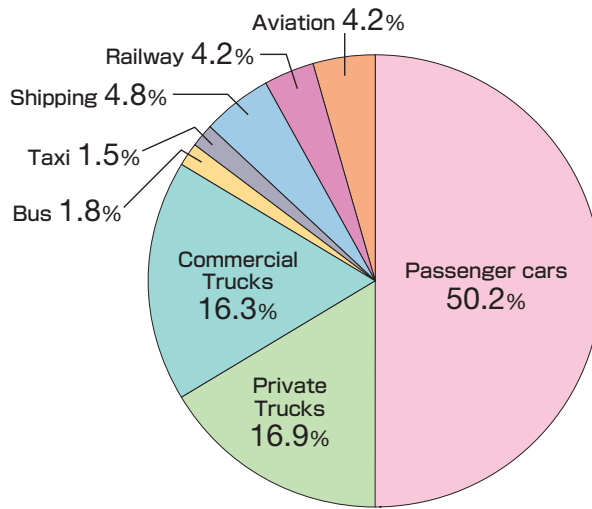
Source: Tentative Translated by Eco-Mo Foundation of MLIT website

Carbon dioxide emissions from automobiles accounts for 86.8% of total carbon dioxide emissions produced by the transport sector. 50.2% of these carbon dioxide emissions are produced by private cars.

#### ■ Carbon dioxide emission basic units by the transport sector

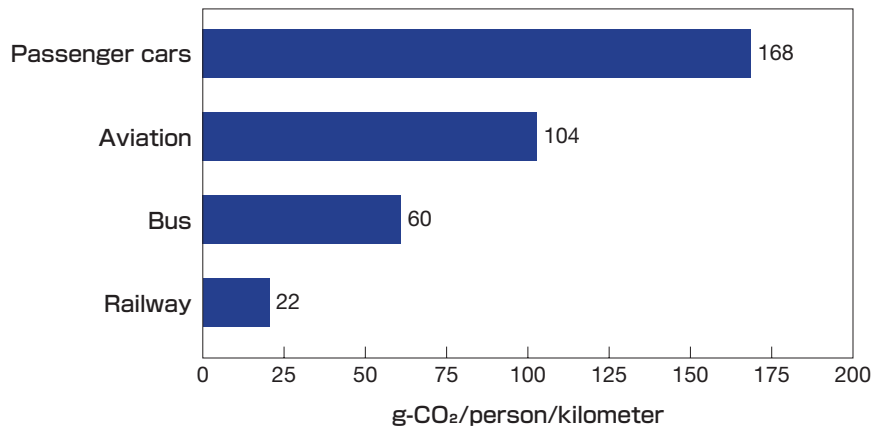
Comparing passenger transport carbon dioxide emission basic units (the amount of carbon dioxide emitted in transporting a person for 1km), private cars emit 7.6 times more carbon dioxide than rail transport. Therefore in order to reduce carbon dioxide emissions, the use of public transportation, which has smaller carbon dioxide emission rates than private vehicles, must be promoted. For freight transport carbon dioxide emission rates (the amount of carbon dioxide emitted in transporting one ton of freight for 1km), private Truck emit 34 times more carbon dioxide than trains, 21 times more than ships, and 4 times more than commercial Truck. There must 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) 2012

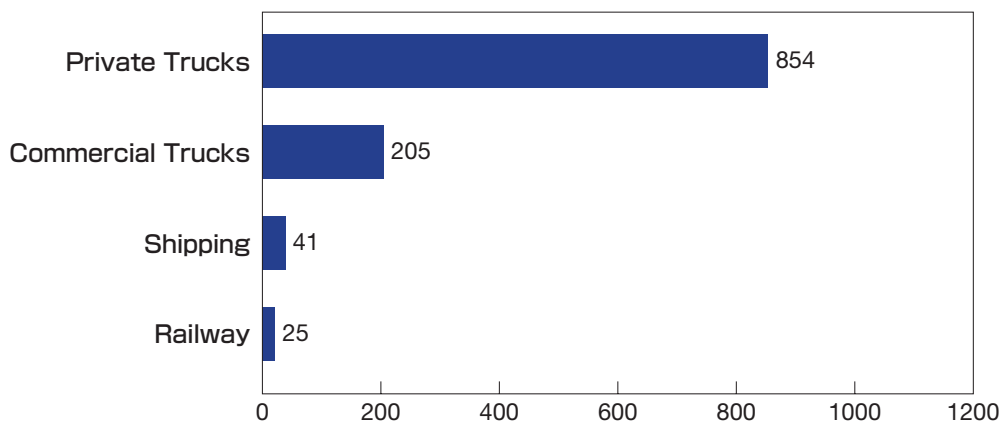


Source: GIO "Greenhouse Gas Inventory"

● Carbon dioxide emission rates by passenger transport mode (2012)



● Carbon dioxide emission rates by freight transport mode (2012)

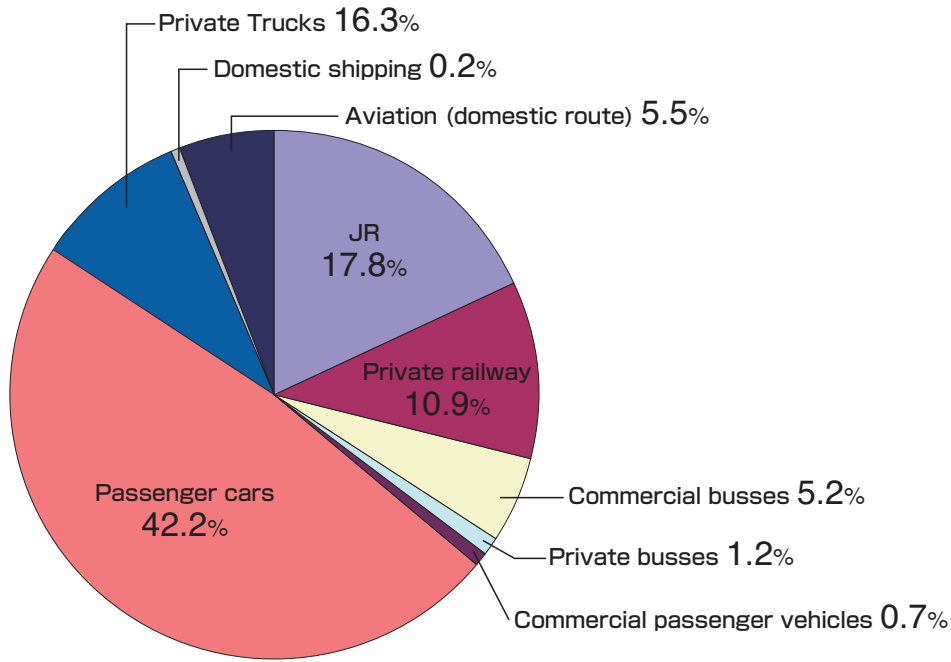


Source: Tentative Translated by Eco-Mo Foundation of MLIT website

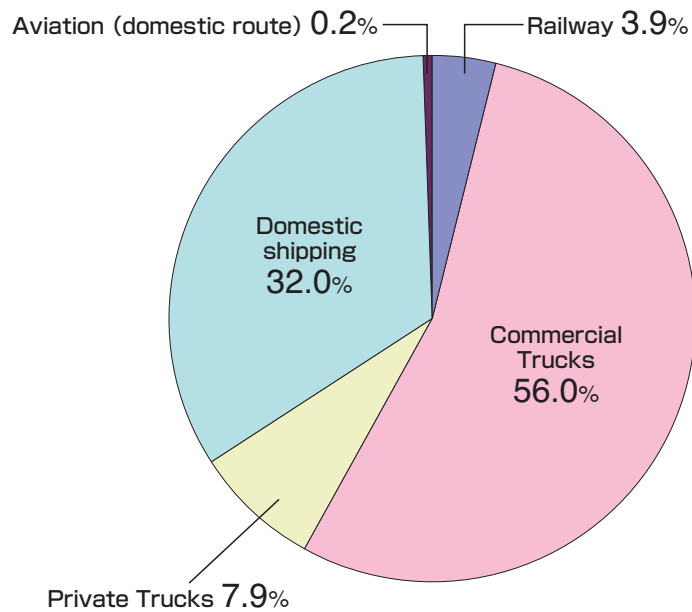


II. Current status of major environmental problems of the transport sector

● Rates by passenger transport mode used for domestic passenger transport (per person per kilometer) 2009



● Rates by freight transport mode used for domestic freight transport (per ton per kilometer) 2009



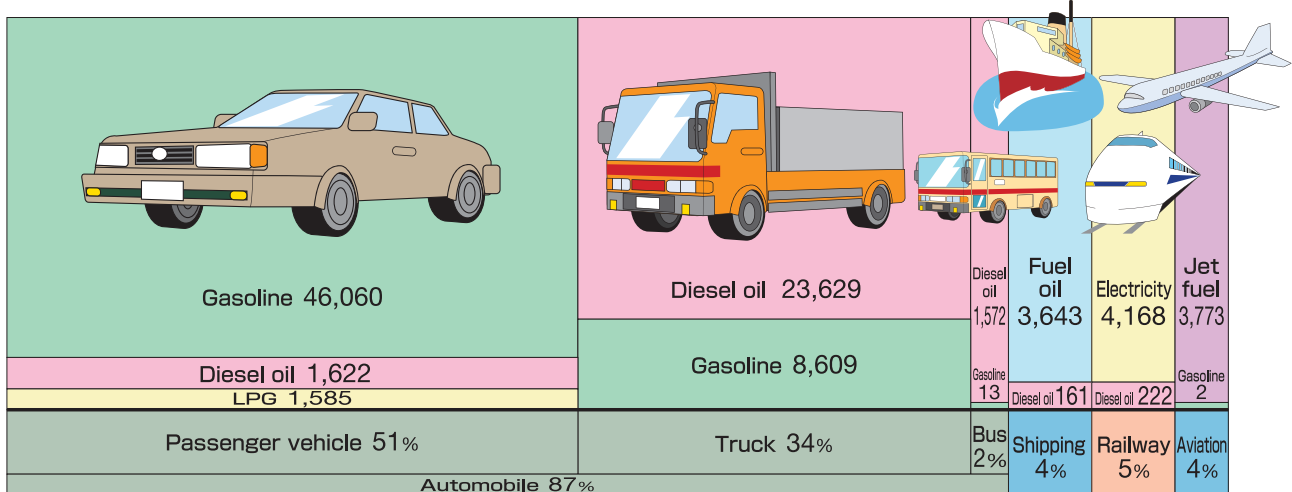
Source: Tentative Translated by Eco-Mo Foundation of MLIT "White Paper on Land, Infrastructure, Transport and Tourism in Japan 2011"

② Energy consumption by the transport sector

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

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

(Unit: 1,000kl)



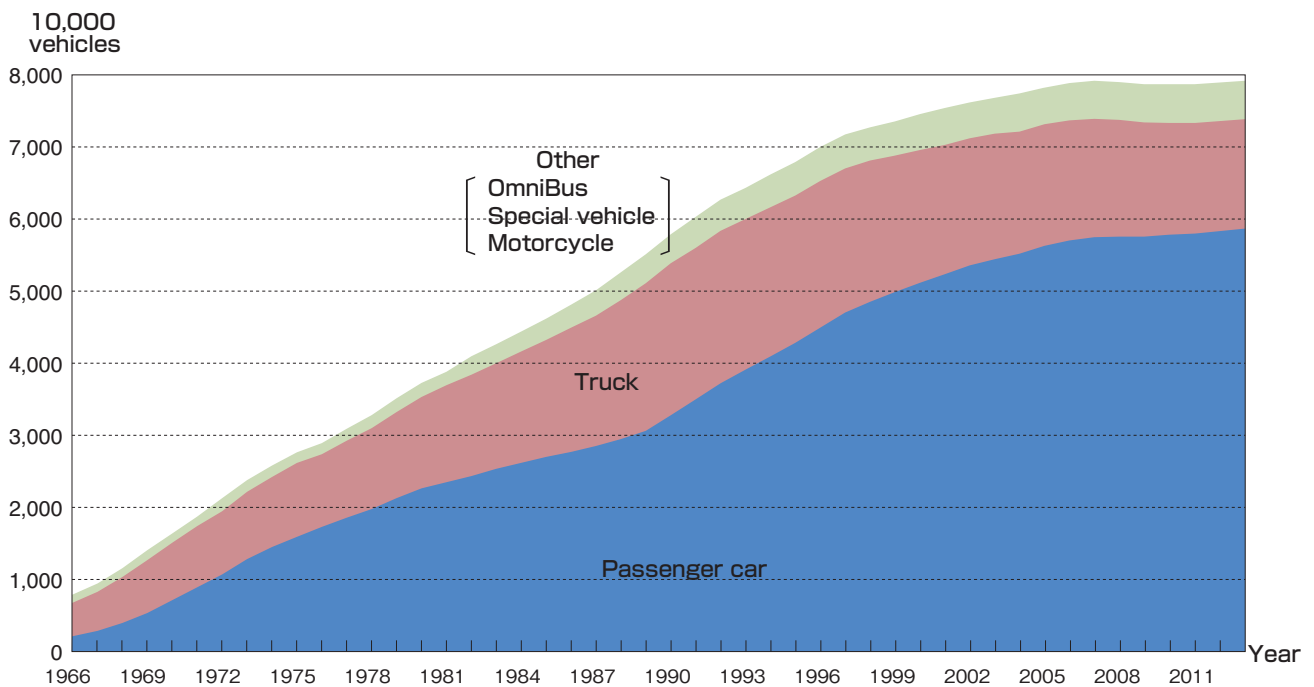
Total: 95,059,000kl crude oil equivalent

Note: Does not include oversea ocean shipping or international aviation

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

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 2012 were 226 million tons, below the 240 to 243 million tons of carbon dioxide emissions specified in the Kyoto Protocol Target Achievement Plan as the target for the transport sector. Efforts must continue to be made to achieve further reductions in the amount of energy consumed by automobiles.

● Automobile ownership trends



1: Passenger vehicles include mini-vehicles.

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

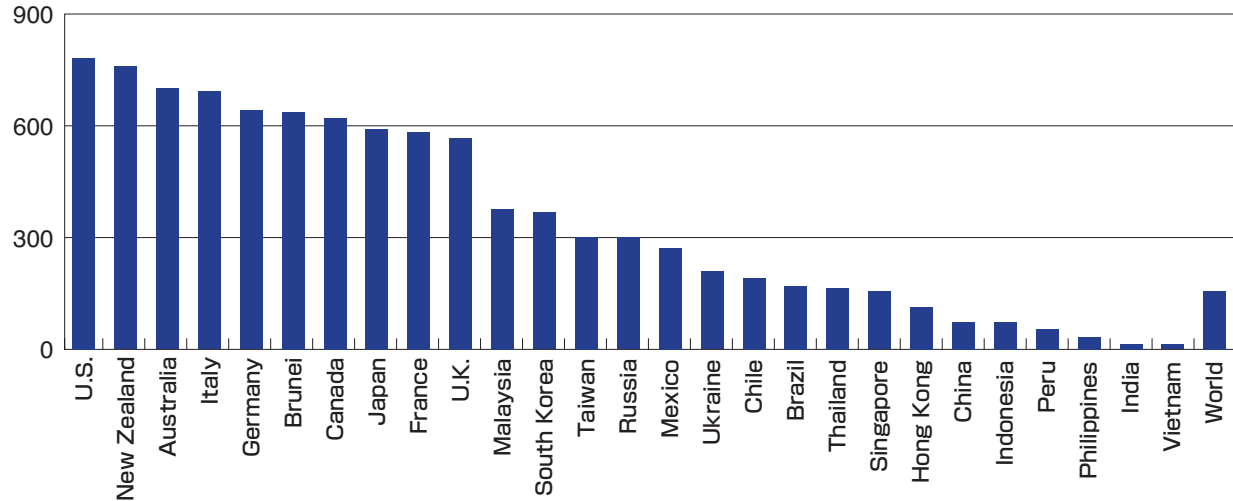
Source: Tentative Translated by Eco-Mo Foundation of Automobile Inspection & Registration Information Association website

### Automobile ownership Rates Around the World

In terms of automobile ownership per thousand people, the U.S. has the world's largest automobiles ownership rate, at 786 automobiles per thousand people. Automobile ownership rates are low for developing countries. In recent years developing countries such as China and India have experienced dramatic upswells in automobile ownership led by their rapid economic growth. The number of cars owned per thousand people grew by 3.3% globally in 2011, but in China it grew by 19.4%, and in India by 4.4%. Automobiles ownership in these countries, with their enormous populations, is expected to have some impact on global warming, and is an area where attention is being increasingly focused.

● Automobile ownership rates in individual countries 2011

(automobiles ownership per 1,000 persons)



Source: EDMC "Handbook of Energy & Economic Statistics in Japan 2014"

## 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 (NO<sub>x</sub>) such as nitrogen dioxide (NO<sub>2</sub>) emitted from automobiles. NO<sub>x</sub> 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 2012 environmental standard achievement rates for NO<sub>2</sub>, with 100% achievement rates for seven consecutive years since 2006. Automobile exhaust gas monitoring stations have seen a slight decline in target achievement, at 99.3% compared to 2011. For automobile exhaust gas monitoring stations in areas implementing Automobile NO<sub>x</sub>/PM Act measures the achievement rate was 98.6%. For SPMs, nationwide environmental standard achievement rates were 99.7% for air pollution monitoring stations and 99.7% for automobile exhaust gas monitoring stations. These are major improvements, for both types of stations, in comparison to 2011 (air pollution monitoring station: 69.2%, automobile exhaust gas monitoring station: 72.9%).

SPM 2012 environmental standard achievement rates for areas implementing Automobile NO<sub>x</sub>/PM Act measures were 100% for both air pollution monitoring stations and automobile exhaust gas monitoring stations, dramatic improvements.

※ 1 Air pollution monitoring station:

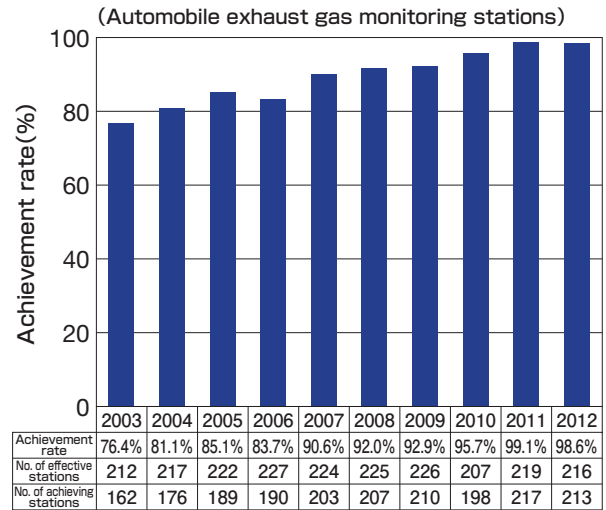
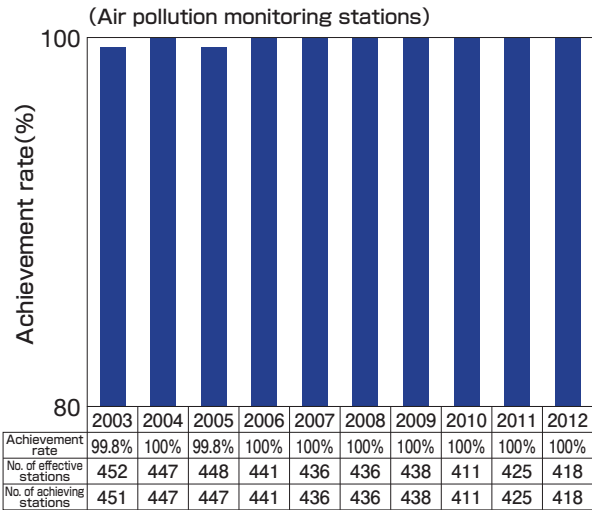
Monitoring stations performing regular monitoring of general atmospheric pollution conditions.  
(Nationwide: 1,889 stations)

※ 2 Automobile exhaust gas monitoring station:

Monitoring stations performing regular monitoring of atmospheric pollution conditions near intersections, roads, and the nearby areas in which emissions from automobiles are believed to be sources of air pollution. (Nationwide: 421 stations)

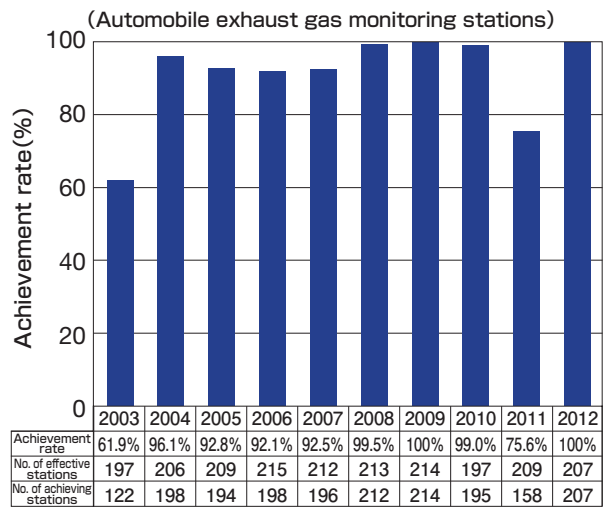
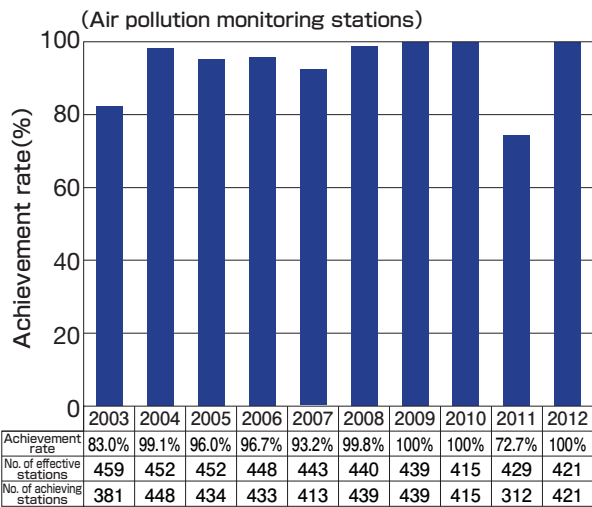
II. Current status of major environmental problems of the transport sector

● NO2 environmental standard achievement rates in regions implementing Automobile NOx/PM Act measures (2003 to 2012)



Source: Tentative Translated by Eco-Mo Foundation of MOE website

● SPM environmental standard achievement rates in regions implementing Automobile NOx/PM Act measures (2003 to 2012)



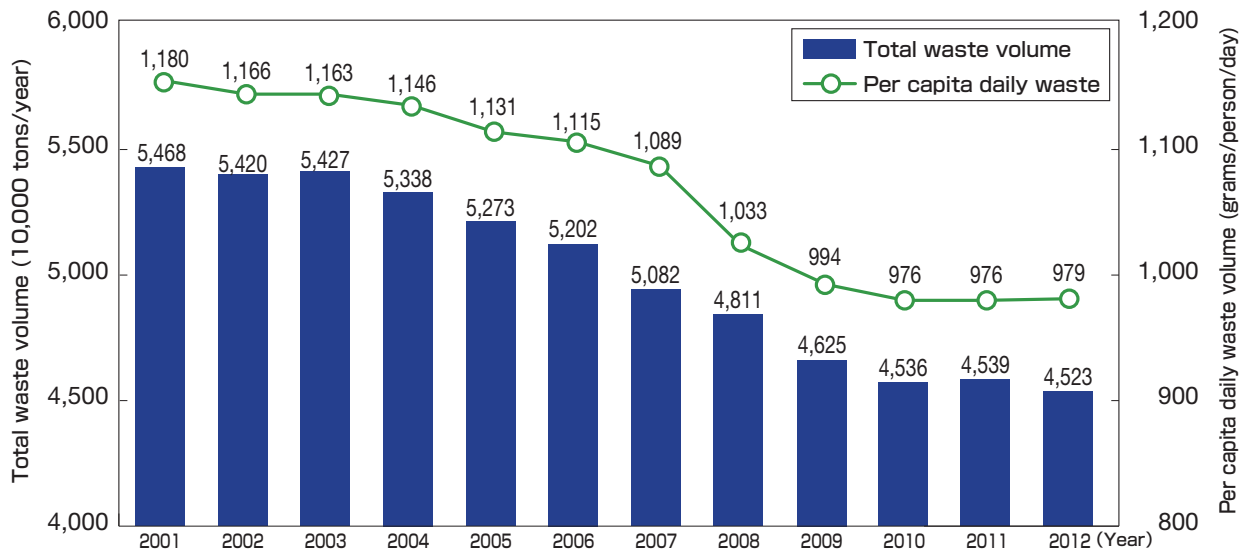
Source: Tentative Translated by Eco-Mo Foundation of MOE website

### 3 Current status of waste and recycling

#### ① Trends in general waste volume

Total waste volume and per capita daily waste volume fell slightly after the second oil crisis in 1979, but began rising rapidly from roughly 1985. From 1990 they leveled off or increased slightly, but began falling from 2001. In 2012 the total amount of waste was 45.23 million tons. The total amount of recycled waste in 2012 was 9.26 million tons. The ratio of total waste which was recycled has grown tremendously, from 5.3% in 1990 to 20.5% in 2012 (an increase of 0.1% over the previous year).

#### ● Total waste volume and per capita daily waste volume

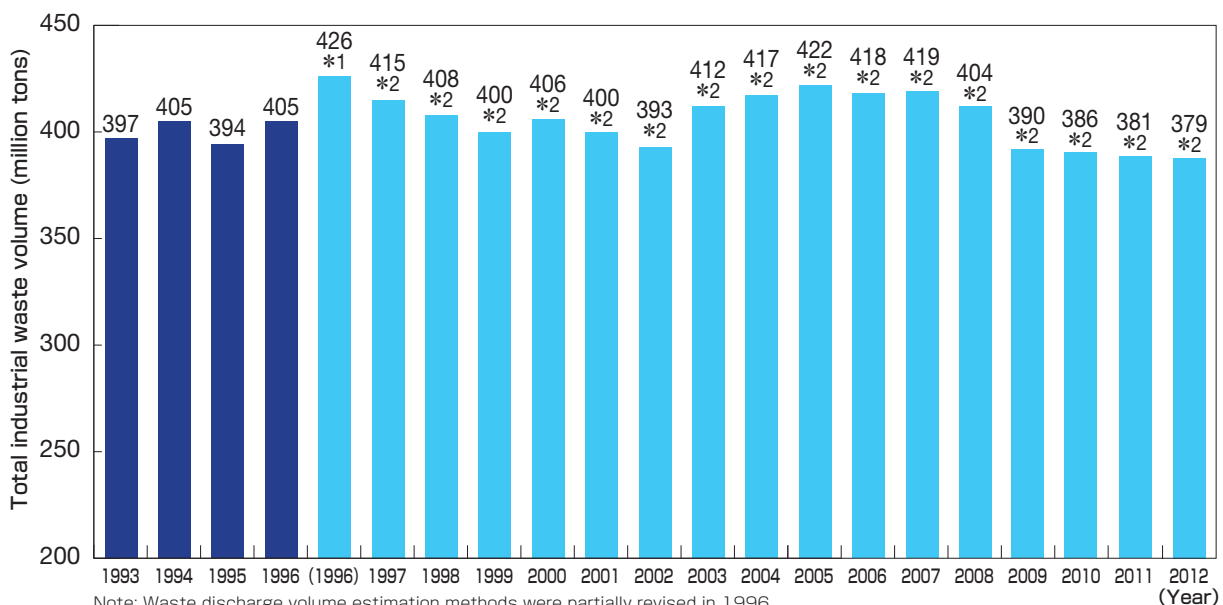


Source: Tentative Translated by Eco-Mo Foundation of MOE website

#### ② Trends 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.  
 \*1: Indicates 1996 waste disposal volume for the waste reduction target volume (established in September 2009) set by the government as the target for 2010, based on the dioxin countermeasures basic policy (Ministerial Conference on Dioxin Policy decision).  
 \*2: Waste volume from 1997 onwards is calculated based on the same conditions used in calculating the waste volume for \*1.

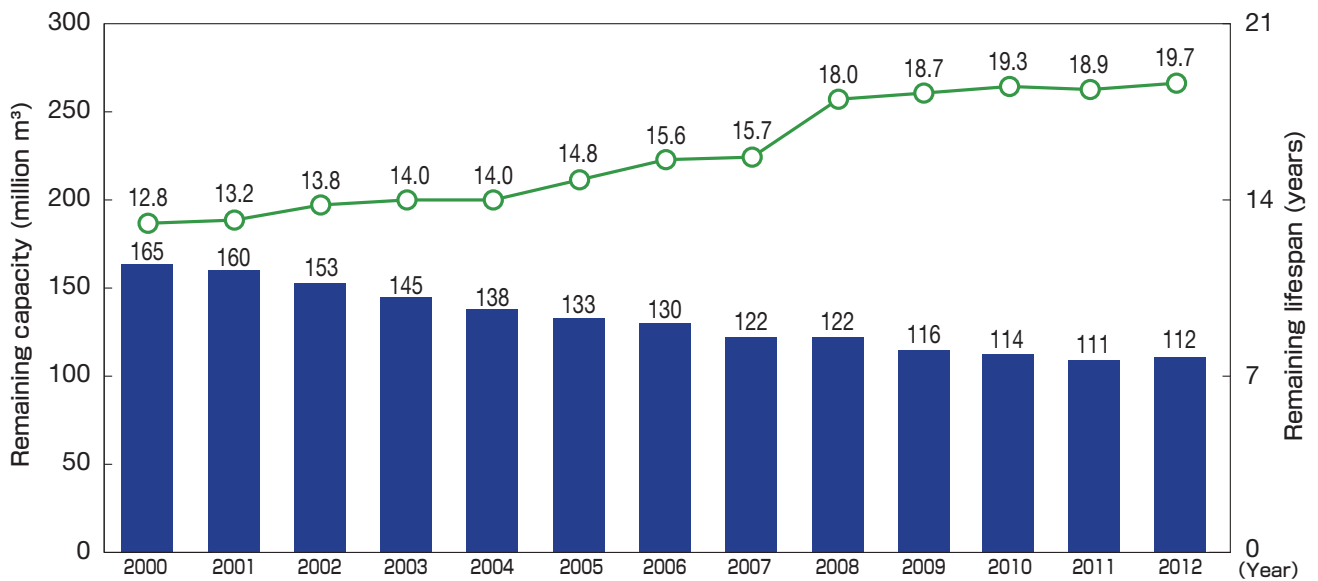
Source: Tentative Translated by Eco-Mo Foundation of MOE website

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

As of the end of 2012 there were 1,742 general waste final disposal sites in Japan with a remaining capacity of 122.55 million m<sup>3</sup>. The average remaining lifespan was 19.7 years. The remaining capacity is shrinking, while the remaining lifespan is increasing.

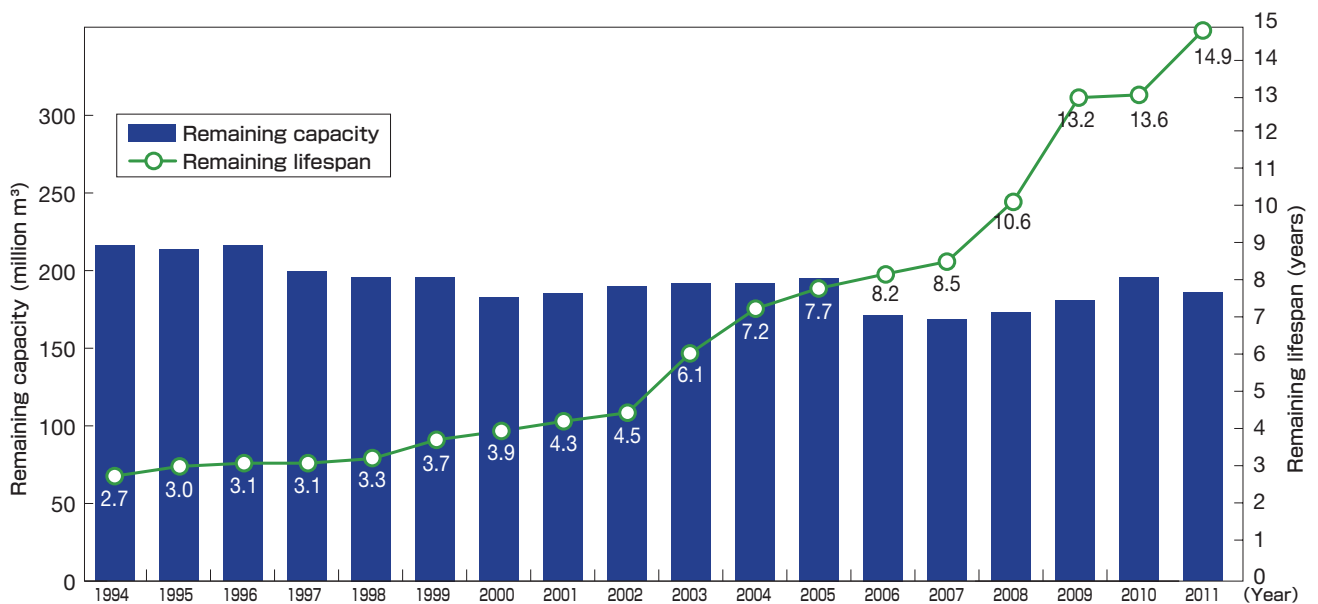
The remaining capacity of industrial waste final disposal sites as of the end of 2011 was 186.06 million m<sup>3</sup>, 8.46 million m<sup>3</sup> less than the previous year. The average nationwide remaining lifespan is 14.9 years. Slight improvements are being made, but the remaining lifespan in the Tokyo area is 5.3 years, and remaining capacities are particularly low for major metropolitan areas.

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



Source: Tentative Translated by Eco-Mo Foundation of MOE website

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

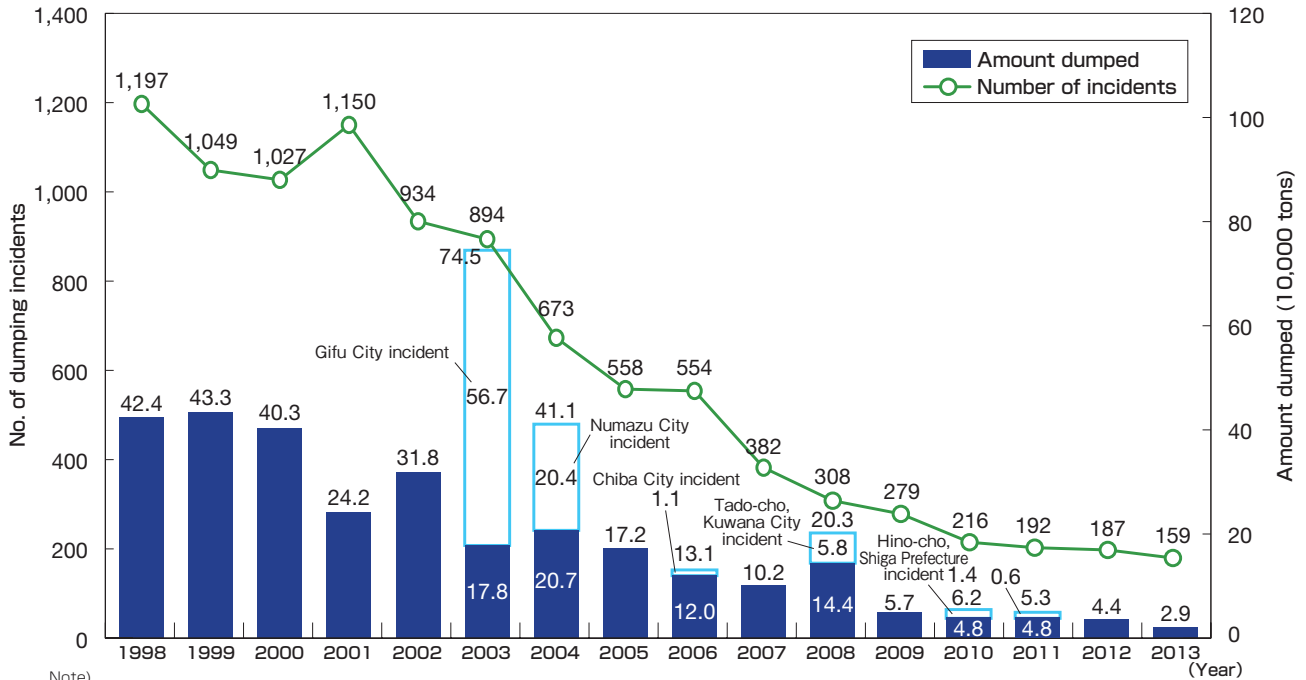


Source: Tentative Translated by Eco-Mo Foundation of MOE website

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

159 incidents of illegal dumping of industrial waste, a total of 29,000 tons of waste, were discovered in 2013, along with 90 incidents of improper disposal (63,000 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)

- The number of incidents of illegal dumping and the amount of illegally dumped waste were calculated based on incidents of illegal dumping of 10t or more of industrial waste per incident identified by the governments of prefectures and designated cities (as well as all incidents of illegal dumping of special controlled industrial waste).
- With regards to the white areas of the bar graph, the incidents discovered in Gifu City in 2003 and in Numazu City in 2004 took place over multiple preceding years, resulting in the discoveries of major volumes of illegally dumped waste in the respective years. The white area of the bar graph corresponding to the 2006 Chiba City incident indicates an incident which was discovered in 1998 but was reported in 2006. The white area of the bar graph corresponding to the 2008 Tado-cho, Kuwana City incident indicates an incident which was discovered in 2006 but was reported in 2008. The white area of the bar graph corresponding to the 2010 Hino-cho, Shiga Prefecture incident indicates an incident which was discovered in 2009 but was reported in 2010.
- The sulfate acid pitch and Ferosilt dumping incidents were not included in this study, and are covered separately. 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 42 of these locations (as of February 15, 2010).

\* Amounts are rounded, so totals may not match.

Source: Tentative Translated by Eco-Mo Foundation of MOE website



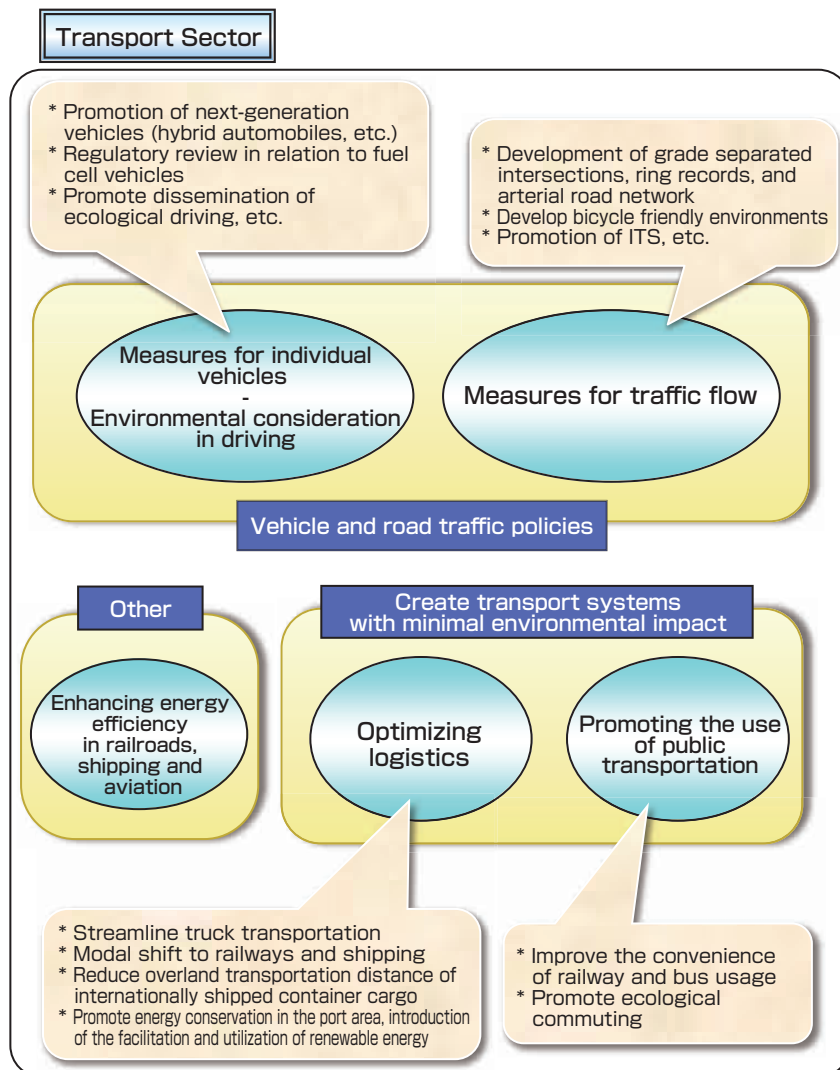
# III. Measures in Response to Major Environmental Problems of the Transport Sector

## 1 Promotion of global warming countermeasures

### (1) Transport sector countermeasures

The amount of carbon dioxide emitted by the transport sector in 2012 was 4.1% greater than the amount emitted in 1990, but emissions volume has been decreasing in recent years. In order to ensure that this decrease continues steadily, the MLIT is promoting comprehensive measures such as automobile and road traffic measures, distribution efficiency improvements, and promoting the use of public transportation.

● Global warming countermeasures of MLIT



Source: Tentative Translated by Eco-Mo Foundation of MLIT "White Paper on Land, Infrastructure, Transport and Tourism in Japan 2013"

The Kyoto Protocol Target Achievement Plan was completely revised on March 28, 2008, and includes the following transport sector related measures. The MLIT implemented transport sector measures based on this plan, but the plan period ended in March 2013.

measures	Carbon dioxide emissions reductions expected under reduction plan (Unit: 10,000 t-CO <sub>2</sub> )	Specific measures
Provisions for individual vehicles and environmentally friendly forms of driving	2760 to 2960	<ul style="list-style-type: none"> <li>• Automobile fuel efficiency improvement through Top Runner Standards</li> <li>• Promoting clean energy vehicles</li> <li>• Promoting “eco-driving” (building and promoting EMS, etc.)</li> <li>• Large truck drive speed restrictions</li> <li>• Biomass fuels, etc.</li> </ul>
Traffic flow management (including the social infrastructure and traffic regulation fields, etc.)	Over 550	<ul style="list-style-type: none"> <li>• Diverse and flexible pricing measures for expressway</li> <li>• Vehicle traffic demand adjustment</li> <li>• ITS promotion</li> <li>• Reduction of road works</li> <li>• Countermeasures for bottleneck rail crossings, etc.</li> </ul>
Improvement of distribution efficiency	1750 to 1860	<ul style="list-style-type: none"> <li>• Promotion of rail and sea transport use</li> <li>• Improvement of vehicle transport efficiency (Increased vehicle sizes, shift from in-house to commercial operation, load efficiency improvement)</li> <li>• Reduction in land transport distances for international sea container cargo</li> </ul>
Promotion of usage of public transportation	270 to 380	<ul style="list-style-type: none"> <li>• Development of new rail, etc. lines and promotion of usage of existing rail lines and busses</li> <li>• Commuter traffic management, etc.</li> </ul>
Other	280	<ul style="list-style-type: none"> <li>• Improvement of train energy efficiency</li> <li>• Improvement of airplane energy efficiency</li> <li>• Promotion of telecommuting*</li> </ul>

\* Asterisks indicate areas addressed by the Ministry of Internal Affairs and Communications

Source: Tentative Translated by Eco-Mo Foundation of MLIT

#### ① Promotion of individual automobile measures

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

#### ■ Fuel efficiency improvements through Top Runner Standards

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

Improving automobile fuel efficiency is extremely important to reduce automobile CO<sub>2</sub> 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 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 specific items regarding fuel efficiency values so that automobile users can select automobiles with superior fuel efficiency, and that fuel efficiency figures be 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 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 2011 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.

##### ○ 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. 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.

### ● Heavy vehicle (truck, etc.) fuel efficiency standards

(2015 targets)

Category	Total vehicle weight range (t)	Maximum carrying capacity range (t)	Fuel efficiency standard (km/L)
1	3.5 to 7.5	up to 1.5	10.83
2		1.5 to 2	10.35
3		2 to 3	9.51
4		3 and over	8.12
5	7.5 to 8		7.24
6	8 to 10		6.52
7	10 to 12		6.00
8	12 to 14		5.69
9	14 to 16		4.97
10	16 to 20		4.15
11	20 and over		4.04

### ● New passenger vehicle (gasoline and diesel vehicle) fuel efficiency standards

(2015 targets)

Category	Total vehicle weight range (kg)	Fuel efficiency standard (km/L)
1	up to 600	22.5
2	601 to 740	21.8
3	741 to 855	21.0
4	856 to 970	20.8
5	971 to 1,080	20.5
6	1,081 to 1,195	18.7
7	1,196 to 1,310	17.2
8	1,311 to 1,420	15.8
9	1,421 to 1,530	14.4
10	1,531 to 1,650	13.2
11	1,651 to 1,760	12.2
12	1,761 to 1,870	11.1
13	1,871 to 1,990	10.2
14	1,991 to 2,100	9.4
15	2,101 to 2,270	8.7
16	2,271 to over	7.4

### ● New passenger vehicle fuel efficiency standards

(2020 targets)

Vehicle type	Actual 2009 value <sup>1</sup>	Estimated 2020 value <sup>2</sup>	Amt. of improvement from actual 2009 value
Passenger vehicle	16.3 (km/L)	20.3 (km/L)	24.1%

\*1: JC08 mode fuel efficiency value

\*2: Calculated assuming shipment composition of vehicle weights in target year (2020) is comparable to that of 2009.

Source: Tentative Translated by Eco-Mo Foundation of MLIT

## ■ Measures for developing and popularizing energy-saving vehicles and low-emission vehicles

The increasingly severe global warming situation, together with the rise of CO<sub>2</sub> 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 contactless 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 attachment 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.

● Contactless charging hybrid bus



● Large electrical full flat-floored bus

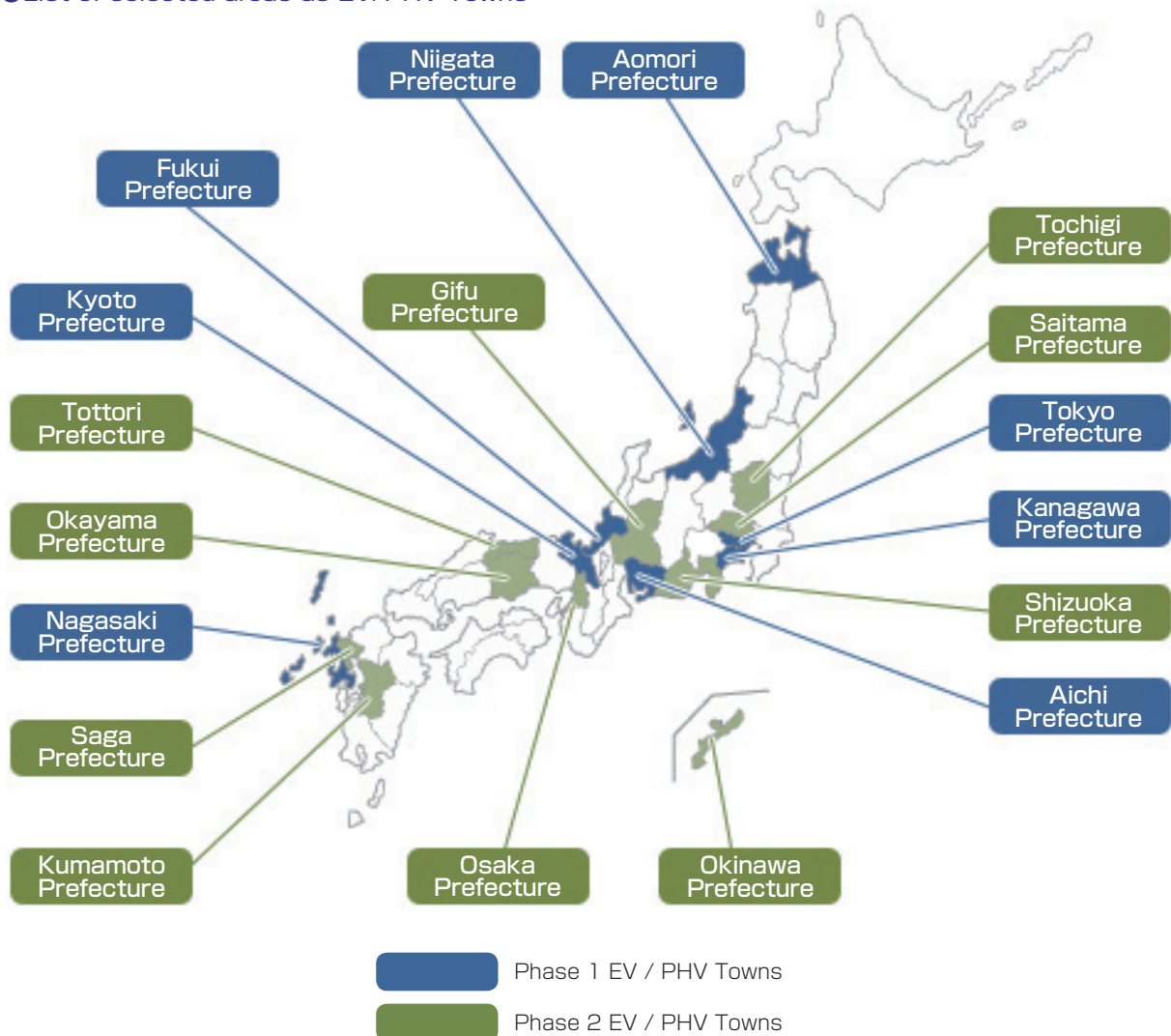


## EV / PHV Town Concept

The METI has selected areas to serve as models for the popularization of next generation vehicles through their local governments and companies working together to deploy next generation vehicles, establish charging infrastructures, and take on the challenge of increasing awareness and adoption of these vehicles. These model regions have been designated as "EV/PHV Towns".

The local governments of the regions selected as "EV/PHV Towns" have created plans and incentives for increasing EV/PHV adoption. For example, some local governments and commercial vehicle operators have introduced these vehicles as taxis, rental cars, car sharing vehicles, etc. in order to create the initial demand. The preparation of a charging infrastructure is also important, and power companies and local companies are collaborating in the installation of infrastructure such as quick charging devices.

### ●List of selected areas as EV/PHV Towns



Source: Tentative Translated by Eco-Mo Foundation of METI website

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 created the "10 Recommendations for Eco-driving", which outlined specific eco-driving efforts. These recommendations were revised in 2012.

●10 Recommendations for Eco-driving

**地球と走ろう**  
**環境にやさしいエコドライブで**

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

**2 車間距離にゆとりをもって、加速・減速の少ない運転**  
走行中は、一定の速度で走ることを心がけましょう。車間距離が短くなると、ムダな加速・減速の機会が多くなり、市街地では2%程度、郊外では6%程度も燃費が悪化します。交通状況に応じて速度変化の少ない運転を心がけましょう。

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

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

**5 ムダなアイドリングはやめよう**  
待ち合わせや荷物の積み下ろしなどによる駐車の際は、アイドリングはやめましょう<sup>※1</sup>。10分間のアイドリング（エアコンOFFの場合）で、130cc程度の燃料を消費します。また、現在の乗用車では基本的に暖機運転は不要です<sup>※2</sup>。エンジンをかけたらすぐに出発しましょう。

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

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

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

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

**10 自分の燃費を把握しよう**  
自分の車の燃費を把握することを習慣にしましょう。日々の燃費を把握すると、自分のエコドライブ効果が実感できます。車に装備されている燃費計・エコドライブナビゲーション・インターネットでの燃費管理などのエコドライブ支援機能を使うと便利です。

**エコドライブ普及推進協議会**  
環境省・国土交通省・警察庁  
事務局 交通エコロジー・モビリティ財団

**エコドライブ普及連絡会策定**  
(警察庁、経済産業省、国土交通省、環境省)

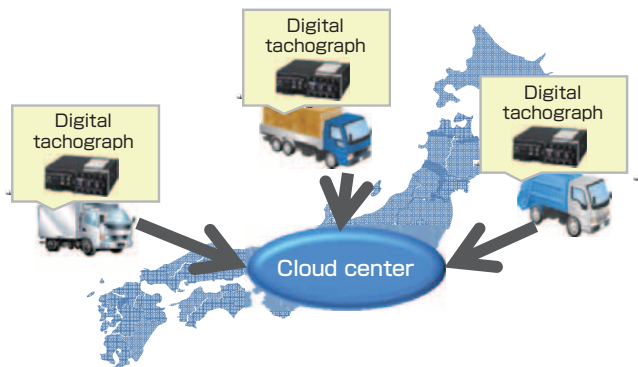
データ出典：(一財) 省エネルギーセンターなどの策定結果

※1 交差点で自らエンジンを止める手動アイドリングストップは、以下の点で安全性に問題があるため注意しましょう。（自動アイドリングストップ機能搭載車は別項を参照）  
・手動アイドリングストップ中に再度ブレーキを踏みとブレーキの効きが悪くなります。  
・慣れないと車操作や発進遅れが生じます。またバッテリーなどの部品寿命の低下によりエンジンが再始動しない場合があります。  
・エアバッグなどの安全装置や方向指示器などが作動しないため、先駆車や近郊や坂道での手動アイドリングストップは避けましょう。  
※2 20℃程度の乗用車など特別な状況を除き、走りながら暖めるウォームアップ走行で充分です。

## 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 tachometers, have produced services which improve fuel efficiency by approximately 15%. In addition to their environmental benefits, they also promote safer driving, contributing to reductions in the number of traffic accidents.

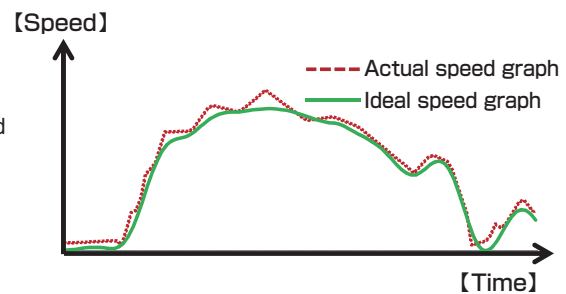
### ●Service example (TRIAS-TR-Saas Eco & Safety Benchmark Service)



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 to 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.)

Benchmarkランキング(会社)		対象企業数: 5社								
出力期間: 9999/01 - 9999/01		抽出条件: 全参加企業								
カテゴリ/抽出項目:		E&S指数ランキング対象: 全体								
出力順: ベスト順		ページ 1 / 1								
順位	会社CD	会社名	運行回数	E&S指数 ランキング対象	全体	E&S指数				
						0-40 km/h	40-60 km/h	60-80 km/h	80-km/h	
1	*****	*****	*	5,517	5,517	12,444	6,989	12,802	3,420	
2	*****	*****	*	5,548	5,548	6,700	5,570	5,878	4,690	
3	*****	*****	*	5,827	5,827	9,189	6,904	12,152	4,190	
4	*****	*****	*	5,939	5,939	6,605	6,020	6,387	6,370	
5	4000	富士通		4,791	7,034	7,034	11,118	7,239	7,340	8,830
		平均		5,933	5,933	9,211	6,544	8,914	5,500	

Ranking by company

Company names can be configured to be shown or hidden

This produces 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.



### 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 which fall within the following range are considered high fuel efficient tires.

#### Tire grading system

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

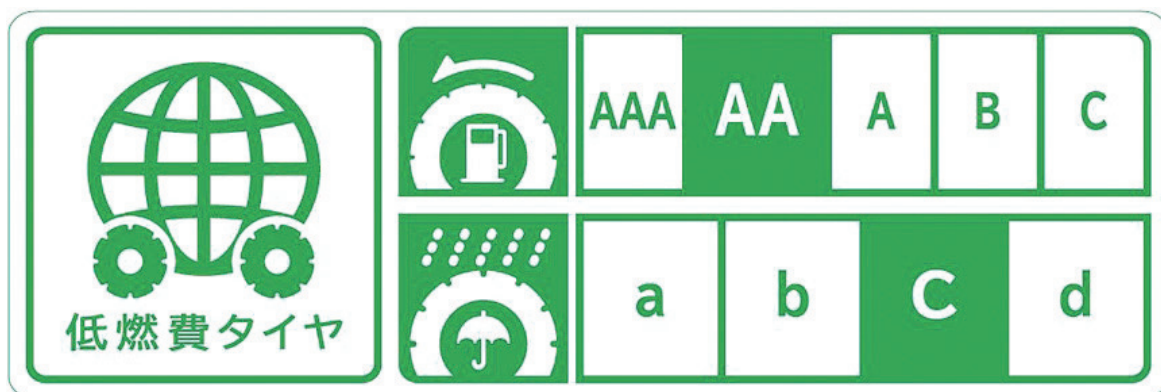
#### High fuel efficient tire performance requirements

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

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

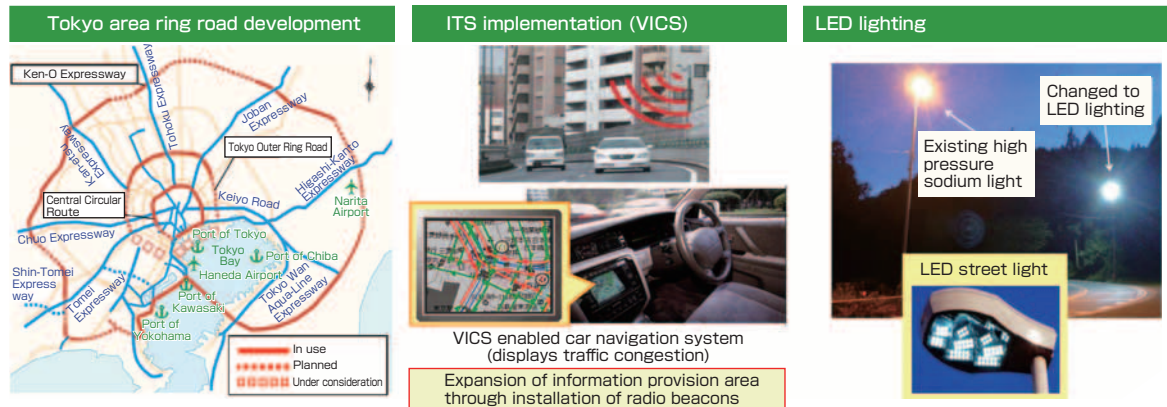
#### ● Service example

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.



### ③ Promotion 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. In order to smooth traffic flow, MLIT is engaging in efforts such as maintaining major road networks, such as ring road networks, developing environments conducive to bicycle usage, implementing Intelligent Transport Systems (ITS), relieving bottlenecks, and installing LED lighting.



Source: Tentative Translated by Eco-Mo Foundation of MLIT

### ■ Using ITS technology to achieve smoother traffic and safer, more secure road traffic

In addition to producing more advanced vehicle control technologies, the government is also using coordination with road-side support, such as systems for communicating road structure data and road-to-vehicle communications, in order to eventually achieve automated driving on expressway. Consideration is currently being given to using ITS spots, primarily concentrated on expressway, to collect drive route data from vehicles, using it to create new pricing systems which produce more effective use of ring roads and provide driving support for large vehicles. Positioning data obtained from the GPS functions of smartphones and other devices can be used to confirm the movement of people and goods with greater precision and a greater level of efficiency. This makes it possible to assess road usage patterns and means of transportation from overall traffic. Consideration is also being given to systems capable of using ITS technologies such as ETC in facilities other than highways, such as parking lots.

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

Bicycles play an important role as familiar and easy to use means of transportation, but bicycle accidents are accounting for a growing share of overall traffic accidents. As health and environmental awareness grows, usage needs for bicycles are on the rise. In 2007 the MLIT collaborated with the NPA on efforts for creating bicycle usage environments, designating 98 areas across Japan as "bicycle traffic environment model areas in order to further develop and maintain bicycle paths and dedicated bicycle lanes. In 2011 the MLIT collaborated with the NPA, holding exploratory committee meetings led by experts. In April 2012 the committee issued a recommendation for the prompt creation of guidelines across Japan focusing on both physical infrastructure and policies. Based on this recommendation, in November 2012 the Japanese government formulated guidelines to assist road management authorities and prefectural police departments in creating and implementing bicycle network plans and thoroughly enforcing bicycle traffic rules.

④ Improvement of freight distribution efficiency

■ Reducing CO2 emissions 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 global warming countermeasures.

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 bring about modal shifts and improve truck transport efficiency.

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

**Green Logistics Partnership Conference**  
(Facilitator: Professor Sugiyama, Seijo University) Established April 2005

**Organizers:** JILS, Japan Federation of Freight Industries, METI, MLIT

**Collaboration:** Nippon Keidanren

**Members:** Logistics operators, freight owners, industry organizations, think-tanks, research organizations, local agencies of the central government, municipalities, individuals, others

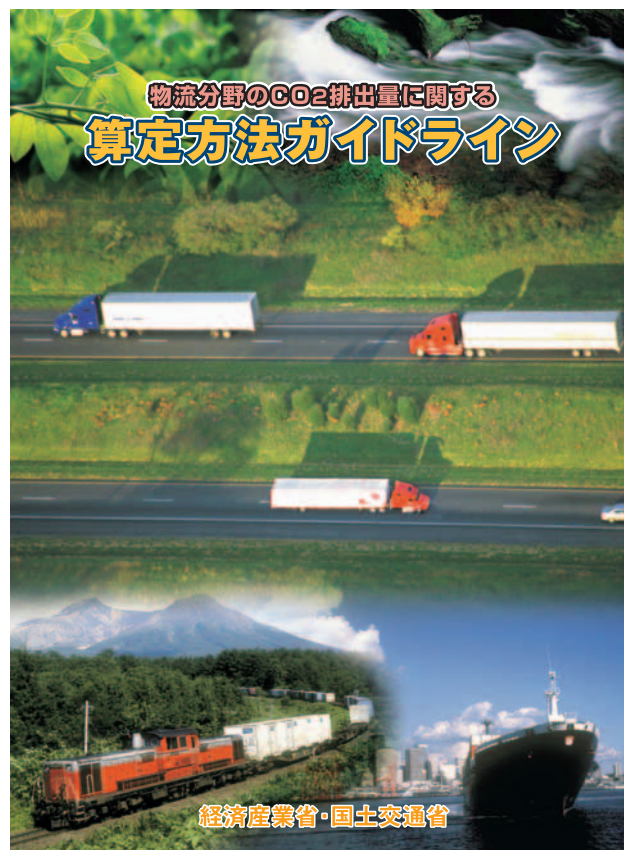
**Policy Planning Committee**

- \* Overall Green Logistics Partnership Conference management
- \* Planning and proposal of policies related to corporate awareness building and PR strategy, etc.

**Business Promotion Committee**

- \* Selection of good practice examples
- \* Policy recommendations through follow-up on projects selected for implementation

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



## ■Promotion of modal shift and increased efficiency of freight distribution

○Increased 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 the end of 2014, 206 companies (94 cargo owners and 112 logistics operators) have received Eco-Ship Mark certification. Eco-Ship Mark certified companies are also selected to receive MLIT Maritime Bureau Chief awards.

平成26年度  
エコシップ・モーダルシフト事業  
優良事業者の募集

平成20年、モーダルシフトの推進を目的にスタートした「エコシップマーク認定制度」は今年で7年目を迎えます。この間、170を超える事業者が「エコシップマーク」の認定を受け、環境にやさしい企業としてイメージアップに役立っています。  
平成26年度も引き続きモーダルシフトに貢献する荷主企業および物流事業者を募集いたします。詳細は裏面をご覧ください。

平成26年度募集期間  
2014年7月1日～9月30日

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

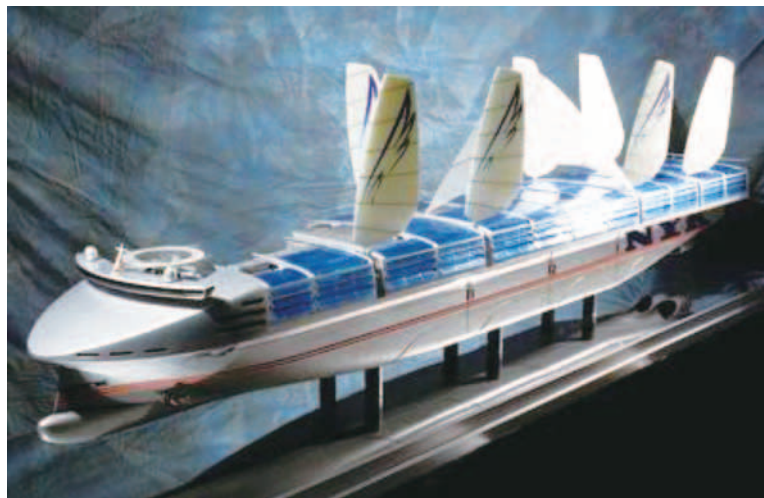
Source: Tentative Translated by Eco-Mo Foundation of Committee for Implementation of Eco-Ship Modal Shift Operations

### Near future eco-ship concept

The MLIT is developing and promoting next-generation Super Eco-Ships (SES) for domestic sea routes. At the same time, Japanese marine transport companies are deploying ocean-going eco-ships for use in international sea transportation, employing cutting edge energy saving technologies such as solar power generation and designs which reduce wind and water resistance. Near-future eco-ship concepts, which dramatically reduce energy consumption or emit no carbon dioxide, have also been announced. Below are some examples.

The "NYK Super Eco-Ship 2030" will reduce the amount of propulsive force it needs through its lightweight design and reduced friction resistance. It will use fuel cells powered by LNG, solar power, and wind power, with the aim of cutting CO2 emissions per container by 69% compared to current levels.

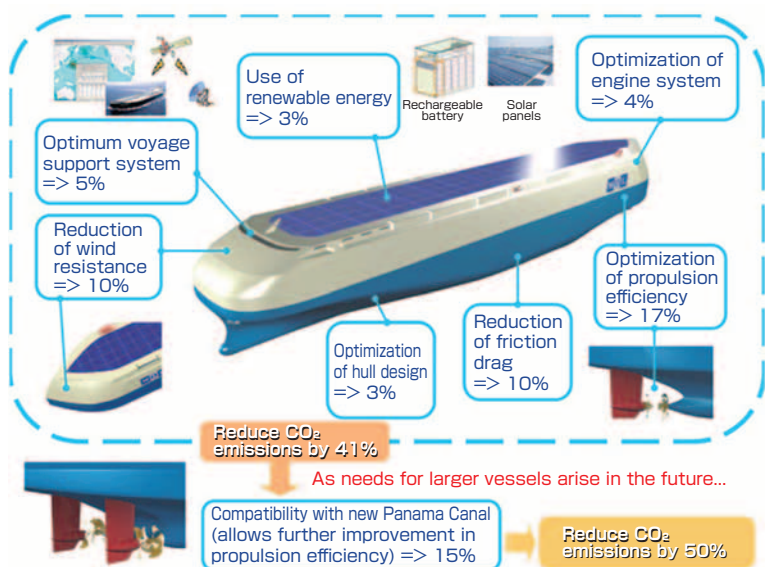
#### ●NYK Super Eco-Ship 2030



Source: NYK

The "ISHIN-I" car carrier will further develop the natural energy usage technologies used in existing car carriers, employing large-capacity solar power panels and rechargeable batteries to achieve zero-emissions during in-port navigation, loading, and unloading. It also aims to cut CO2 emissions during open sea navigation by 50%, combining multiple new technologies to dramatically reduce its environmental impact.

#### ●"ISHIN-I" first next-generation car carrier

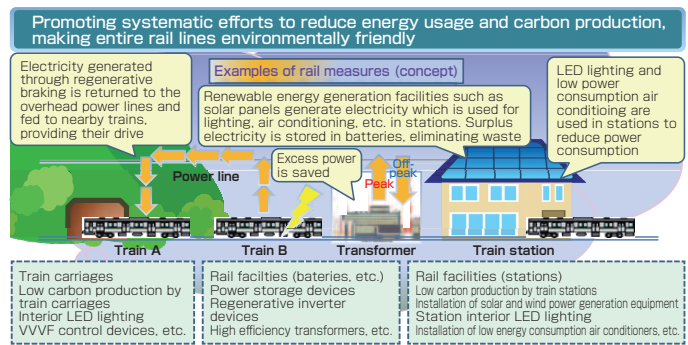


Source: Tentative Translated by Eco-Mo Foundation of MOL

○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 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 by 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 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: Tentative Translated by Eco-Mo Foundation of MLIT

○"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. Supporting companies and products certified with the "Eco Rail Mark" increases awareness among cargo owner companies such as manufacturers, as well as consumers, of environmental impact reduction efforts, 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 February 2015 there are 150 "Eco Rail Mark" product certifications for 190 products, 87 certified companies, and 23 certified supporting companies.

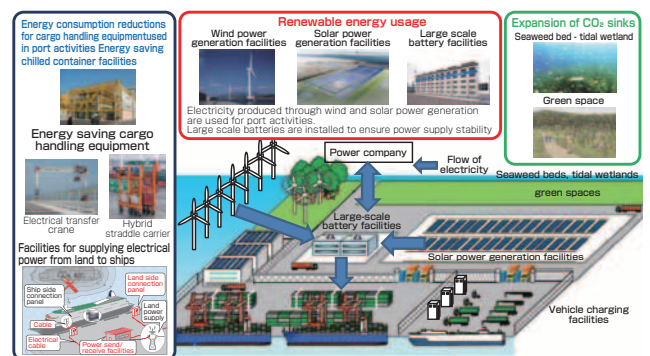


Source: Tentative Translated by Eco-Mo Foundation of Railway Freight Association

○Promotion of zero emission port measures

In order to reduce the greenhouse gas emissions produced by port activities, zero emission port activities, such as reducing energy usage by cargo handling equipment and other equipment, using renewable energy, and expanding CO2 sinks, are being implemented.

Specifically, these include promoting the greater usage of land power supply facilities for providing energy to docked ships, promoting the greater usage of energy-saving cargo handling equipment, promoting the greater usage of energy-saving refrigerated container facilities, promoting the utilization of renewable energy such as solar and wind power in oceanic and coastal areas, and promoting the further development of green spaces and seaweed beds.

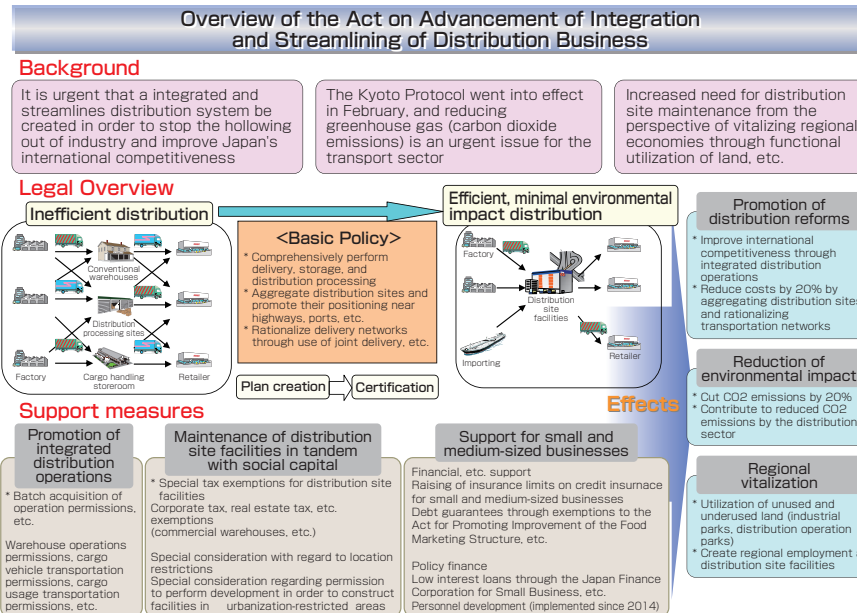


Source: Tentative Translated by Eco-Mo Foundation of MLIT

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

#### ○The Act on Advancement of Integration and Streamlining of Distribution Business

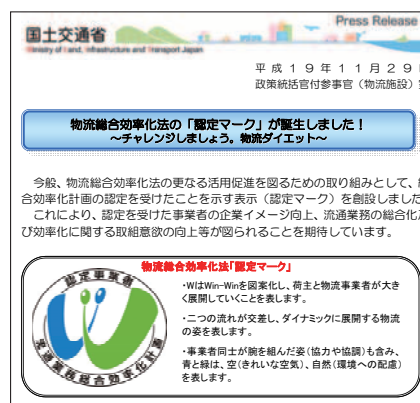
For freight distribution, which is the backbone of economic activity, it is becoming increasingly important to achieve greater international competitiveness through cost reductions, to provide services which meet the needs of increasingly diverse customers, and to create environmentally conscious distribution systems which help prevent global warming. Distribution must appropriately respond to changing social and economic conditions.



Source: Tentative Translated by Eco-Mo Foundation of MLIT

To promote the integration and streamlining of distribution operations, the Act on Advancement of Integration and Streamlining of Distribution Business was enacted in 2005. This act defines support measures and business plan certification procedures in order to promote the creation of distribution operation streamlining and integration businesses which perform comprehensive, efficient distribution operations such as transportation, storage, handling, and distribution processing, and the creation of distribution facilities which serve as the core of these business activities.

In order to promote the utilization of this act, a system of indicating companies which have received integration and streamlining plan certification (a certification mark system) was established. Of the end of December 2014 244 said plans had been certified. An "Act on Advancement of Integration and Streamlining of Distribution Business / Distribution Business Integration and Streamlining Plan Certification Application Guide" was released, containing explanations of the law, describing the benefits of certification, and providing information on subjects such as certification application procedures, for use by businesses engaged in operation integration and streamlining.



Source: Tentative Translated by Eco-Mo Foundation of MLIT



## 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 green management promotion manuals 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 autonomous, 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 motivation, as well as fostering understanding of and cooperation with certified businesses by other companies and users, with the ultimate objective of reducing the environmental impact of the transportation industry.



**グリーン経営  
認証**  
エコモ財団

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

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

**運輸部門のグリーン経営認証**

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

エコドライブや自動車の点検整備などの具体的な環境活動が評価され、7,000事業者以上が認証を取得しています。

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

●登録事業者(トラック、バス、タクシー)の保有している車両台数は、2010年度を基としています。

●認証取得後2年間で燃費が1.5～4.9%向上しています。

●トラックの認証取得事業者の平均燃費は全業平均より29.7%高い水準です。

「認証基準」、「取組事例」、「講習会開催予定」など詳細は「グリーン経営」で検索▼

**グリーン購入法に適合する  
グリーン経営認証が  
選ばれています。**

公益財団法人  
**交通エコロジー・モビリティ財団**

〒102-0076 東京都千代田区五番町10番地五番町KUIビル3階  
Tel: 03-3221-7936 http://www.ecomo.or.jp

**トラック運送事業における  
グリーン経営推進マニュアル**



2012年4月

公益財団法人  
**交通エコロジー・モビリティ財団**



### ⑤ Promotion 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 CO2 emissions, so various measures are being implemented in order to achieve this shift.

## ■ Establishment of the Basic Act on Transport Policy

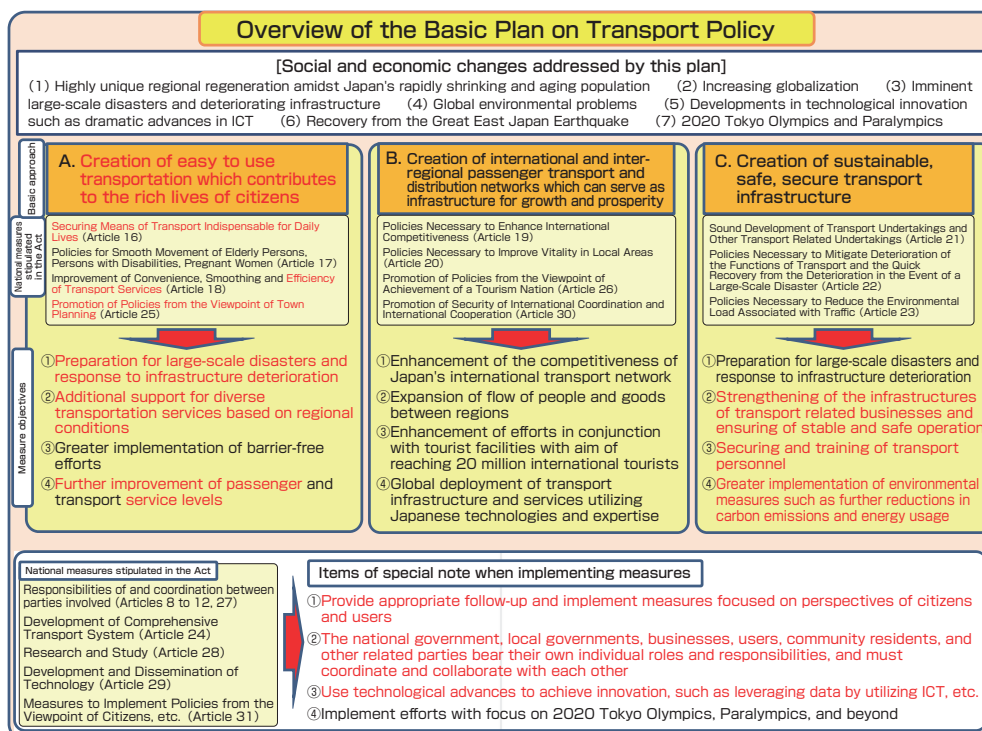
The Basic Act on Transport Policy was enacted on December 4, 2013. This act defines the basic philosophy underpinning transport related measures in order to promote measures necessary for the national government to coordinate closely with local governments and transport companies in implementing comprehensive 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, core 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.

### ● Overview of the Basic Act on Transport Policy



Source: Tentative Translated by Eco-Mo Foundation of MLIT

### ● Overview of the Basic Plan on Transport Policy



Source: Tentative Translated by Eco-Mo Foundation of MLIT

## 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, implement barrier-free measures in railway stations, etc.

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

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

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

### Service and convenience

- ◆ **Arterial railroad, etc. vitalization projects**
  - Conversion of cargo rail lines to passenger rail lines, Osaka outer loop line (Shin-Osaka to Hanate)
- ◆ **Rail station comprehensive improvement projects**
  - Keikyu Corporation Keikyu Kamata Station, Seibu Railway Shiinamachi Station, Hanshin Electric Railway Koshien Station, JR East Kannai 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



Source: Tentative Translated by Eco-Mo Foundation of MLIT

## Overview of LRT systems

### Overview of LRT systems

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

**Features**

- **High speeds and punctuality levels**
  - \* LRT offers high speeds and high levels of punctuality through rail carriage performance advances, the use of dedicated tracks, partial grade separation, signal prioritization, fare payment system improvements, and more.
- **Town planning efforts**
  - \* Installation of LRT as a town symbol to create lively center
  - \* Can be installed in conjunction with other town planning measures such as development of station plaza and conversion of adjacent streets into transit malls, creation of park & ride parking lots, development of public facilities along the line, etc.
- **Sufficient transport capacity**
  - \* High frequency and articulated bus are combined appropriately to ensure sufficient transport capacity
- **Environmentally-friendly**
  - \* In addition to providing the environmentally friendly streetcar feature of producing CO<sub>2</sub> emissions less than automobiles, LRT systems also reduce noise and vibration through the use of resilient wheels and vibration control tracks
- **People-friendly**
  - \* Low carriage floors, boarding and disboarding slopes, etc., eliminate height differences and ensure ease in transferring to other means of transportation

**Driving area**

Automobiles can physically enter the track area → Tracks and road are separated

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

**Unified appearance**

Conventional design → Train designed to match local scenery

**Train transport capacity (maximum capacity)**

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

**Track structure**

Normal track → Vibration control track

87dB → 76dB

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

Fukuji Ekimae area  
Uses embedded tracks to reduce noise and vibration

**Floor height**

780mm → 330mm

Height difference makes steps necessary → Train can be boarded directly from platform, with no height difference

**CO<sub>2</sub> emissions**

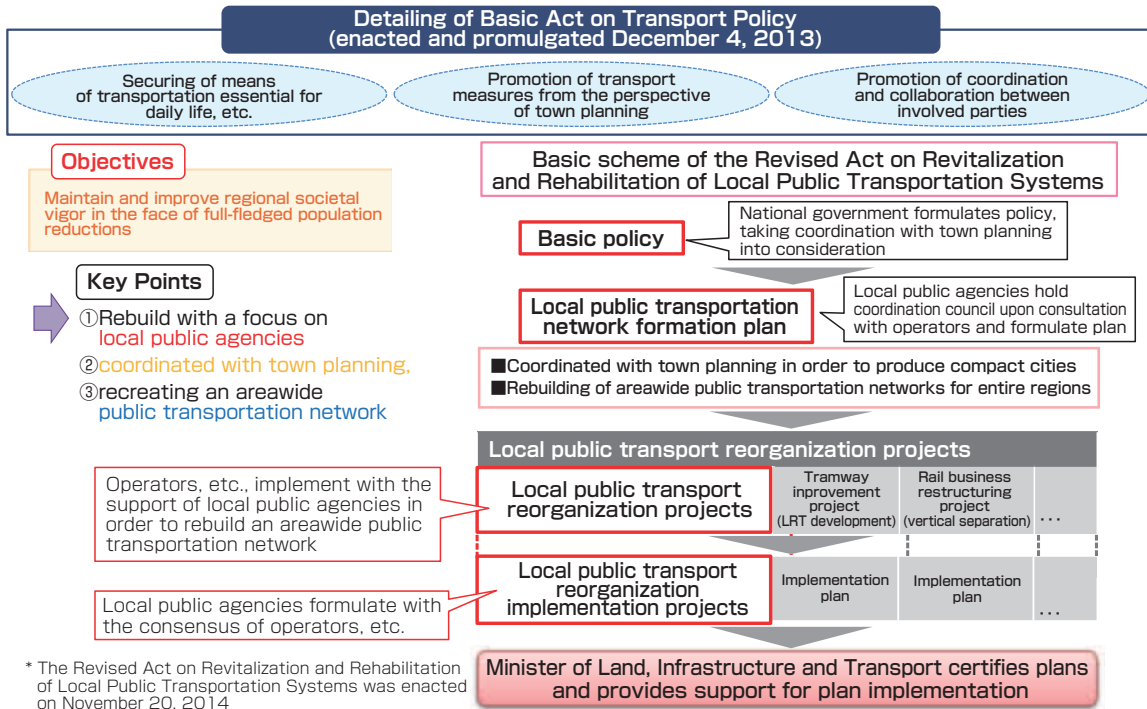
Mode	CO <sub>2</sub> emissions per person per kilometer transported (g)
Privately owned car	182
Minibus	94
LRT streetcar	86

Source: Tentative Translated by Eco-Mo Foundation of MLIT

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

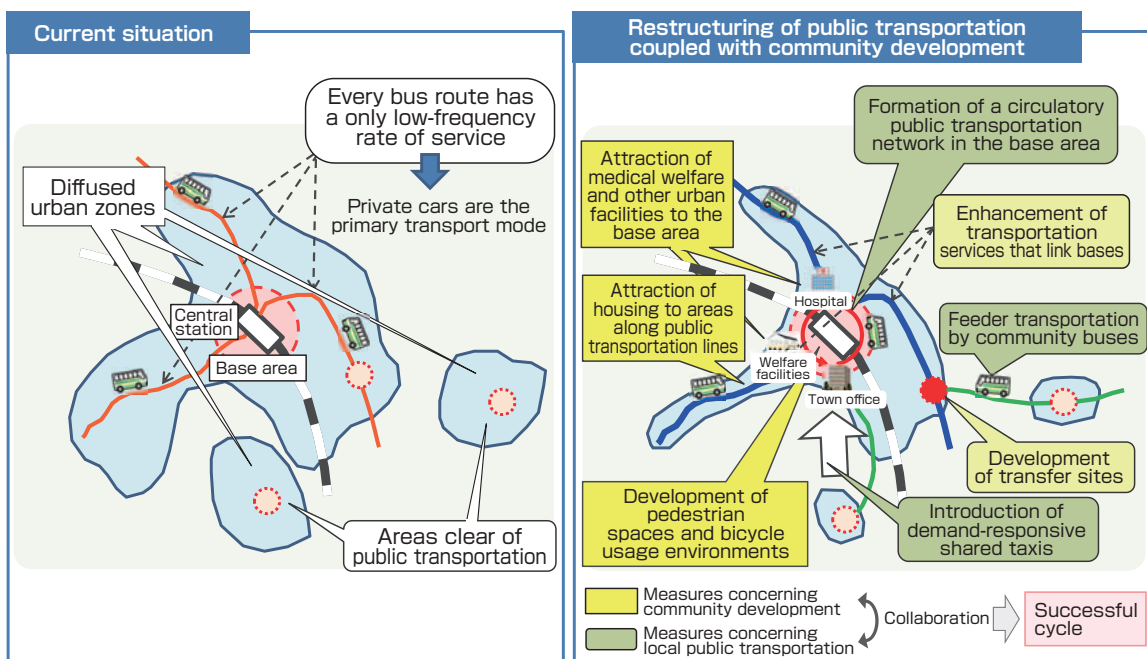
In May 2014 a revision to the Basic Act on Transport Policy was drafted, and enacted in November of the same year.

### Overview of the Revised Act on Vitalization and Rehabilitation of Local Public Transportation Systems



Source: Tentative Translated by Eco-Mo Foundation of MLIT

### Conceptual image of reconstruction of public transportation integrated with compact town planning



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

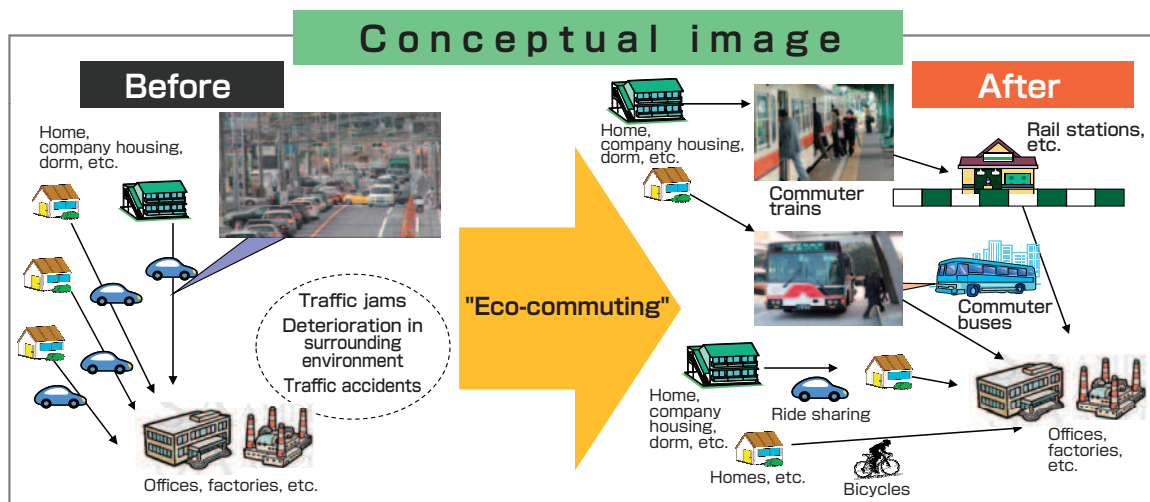
Source: Tentative Translated by Eco-Mo Foundation of MLIT

## 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 emissions public transportations, by promoting the use of public transportation. In order to promote highly effective measures which match both user side 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 Pilot 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 2014, 645 business sites have been registered.

## What is "Eco-commuting"?

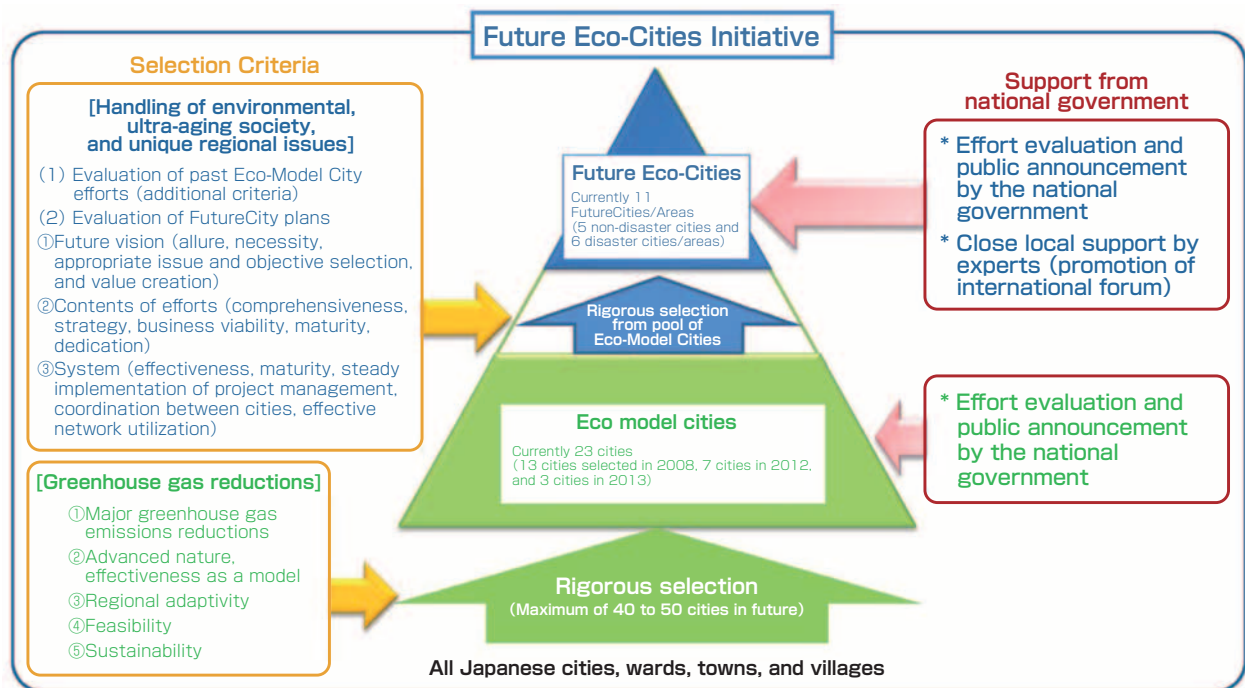
"Eco-commuting" is an approach that encourage company workers to change their means of commuting from private cars to public transportation, bicycles and on foot



Source: Tentative Translated by Eco-Mo Foundation of MLIT

## Eco-Model Cities and Future Eco-Cities

The Future Eco-Cities initiative being implemented by the government has selected 11 cities and areas in 2011 led by the basic concept of human-focused cities creating new value in order to respond to environmental needs and the needs of the aging society, with the goal of promoting highly sustainable cities with excellent environmental, social, and economic value. The Eco-Model City initiative being advanced by the government sets high goals for the creation of low carbon societies, such as dramatic greenhouse gas emissions reductions, as low carbon cities which form the foundation of the Future Eco-Cities concept. The government selected 13 Eco-Model Cities in 2008, 7 in 2012, and 3 in 2013, for a total of 23 cities.



Source: Tentative Translated by Eco-Mo Foundation of Office for Promotion of Overcoming Population Decline and Vitalizing Local Economy in Japan, Cabinet Office, Government of Japan

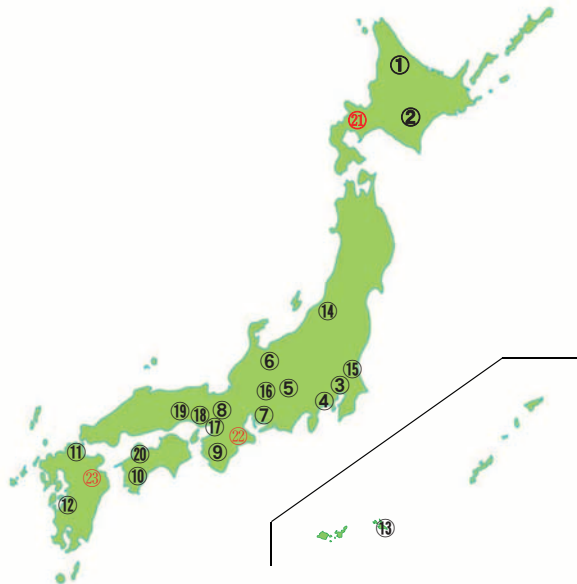
## Cities selected as Eco-Model Cities

### [Cities selected in 2008]

No.	City/Town	Population	Project Name
①	Shimokawa Town (Hokkaido)	3,600	A low-carbon model society in symbiosis with the northern forest, Shimokawa
②	Obihiro City (Hokkaido)	168,000	Countryside environmental model city, Obihiro
③	Chiyoda Ward (Tokyo)	50,000	Energy-efficient urban development, better energy efficiency
④	Yokohama City (Kanagawa Prefecture)	3,690,000	Yokohama Smart City Project
⑤	Iida City (Nagano Prefecture)	103,000	Natural energy through citizen participation and low-carbon urban development
⑥	Toyama City (Toyama Prefecture)	420,000	A CO2 reduction plan - part of Toyama's "Compact City Strategy"
⑦	Toyota City (Aichi Prefecture)	420,000	Low-carbon urban development utilizing mobility and next-generation energy
⑧	Kyoto City (Kyoto Prefecture)	1,470,000	An attractive, people-friendly city. Planning low-carbon activities through "regional power"
⑨	Sakai City (Osaka Prefecture)	840,000	A low-carbon city where "urban vitality" and "comfortable lifestyles" permeate side-by-side
⑩	Yusuhara Town (Kochi Prefecture)	3,800	Woody biomass regional circulation model project
⑪	Kitakyushu City (Fukuoka Prefecture)	970,000	Environmental frontier city of Asia, Kitakyushu
⑫	Minamata City (Kumamoto Prefecture)	27,000	Building a sustainable small-scale local government model in harmony with both environment and economy
⑬	Miyakojima City (Okinawa Prefecture)	52,000	Island-type low-carbon society system, "Eco-Island Miyakojima"

### [Cities selected in 2013]

No.	City/Town	Population	Project Name
⑳	Niseko Town (Hokkaido)	4,800	International environmental resort city Niseko Smart Challenge B6
㉑	Ikoma City (Nara Prefecture)	121,000	The most livable and eco-friendly town in Japan, Ikoma
㉒	Oguni Town (Kumamoto Prefecture)	7,900	A town design incorporating agriculture & forestry, biomass, and geothermal energy

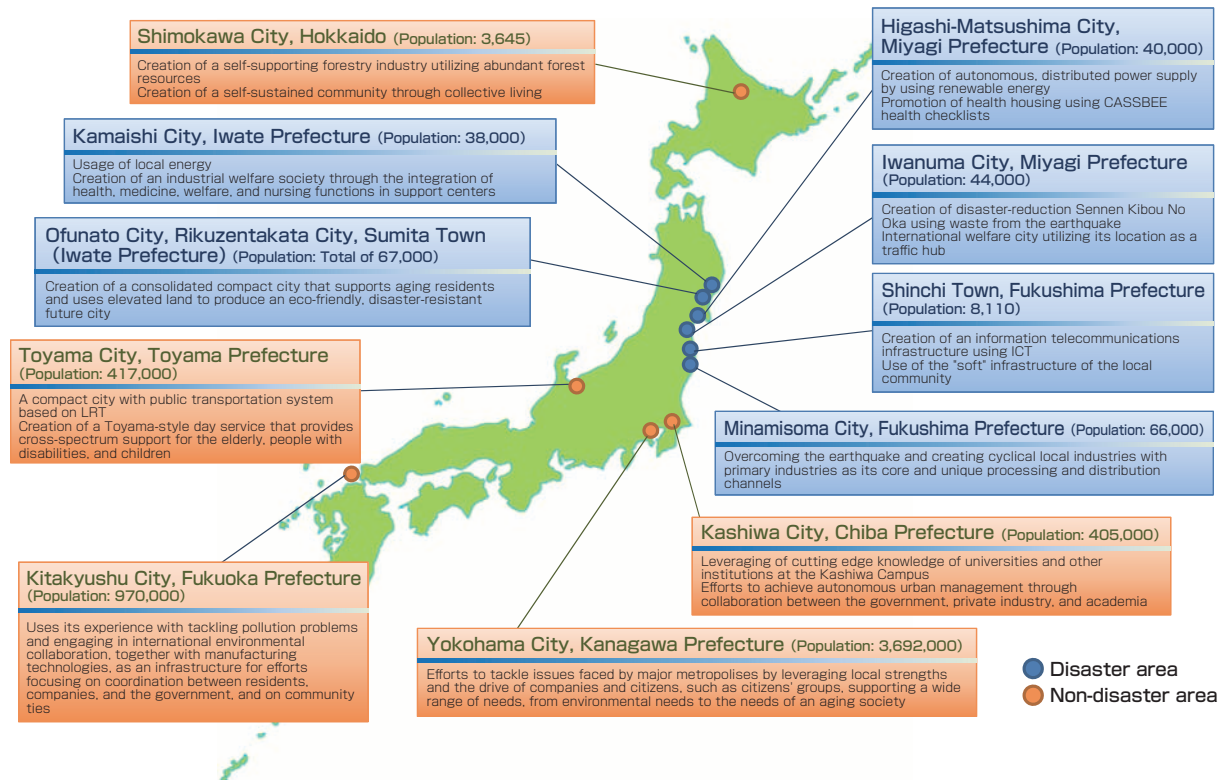


### [Cities selected in 2012]

No.	City/Town	Population	Project Name
⑭	Niigata City (Niigata Prefecture)	808,000	Niigata - a city with a "countryside-type environment" ~Circulating Rich value nurtured by the region ~
⑮	Tsukuba City (Ibaraki Prefecture)	217,000	Tsukuba Environmental Style "SMILE" ~Evoking smiles through technology and local wisdom~
⑯	Mitake Town (Gifu Prefecture)	19,000	Mitake, a low-carbon community achieved by using local resources - forests, public transport, renewable energy, etc.
⑰	Amagasaki City (Hyogo Prefecture)	451,000	Challenge to the "Future EDO city Amagasaki"
⑱	Kobe City (Hyogo Prefecture)	1,542,000	Kobe environmental model city
⑲	Nishiwajiri Village (Okayama Prefecture)	1,600	Creating a low-carbon model for high-quality country life
⑳	Matsuyama City (Aichi Prefecture)	513,000	Matsuyama - a city to be proud of, striving to be a model for both environment and economy

Source: Tentative Translated by Eco-Mo Foundation of Office for Promotion of Overcoming Population Decline and Vitalizing Local Economy in Japan, Cabinet Office, Government of Japan

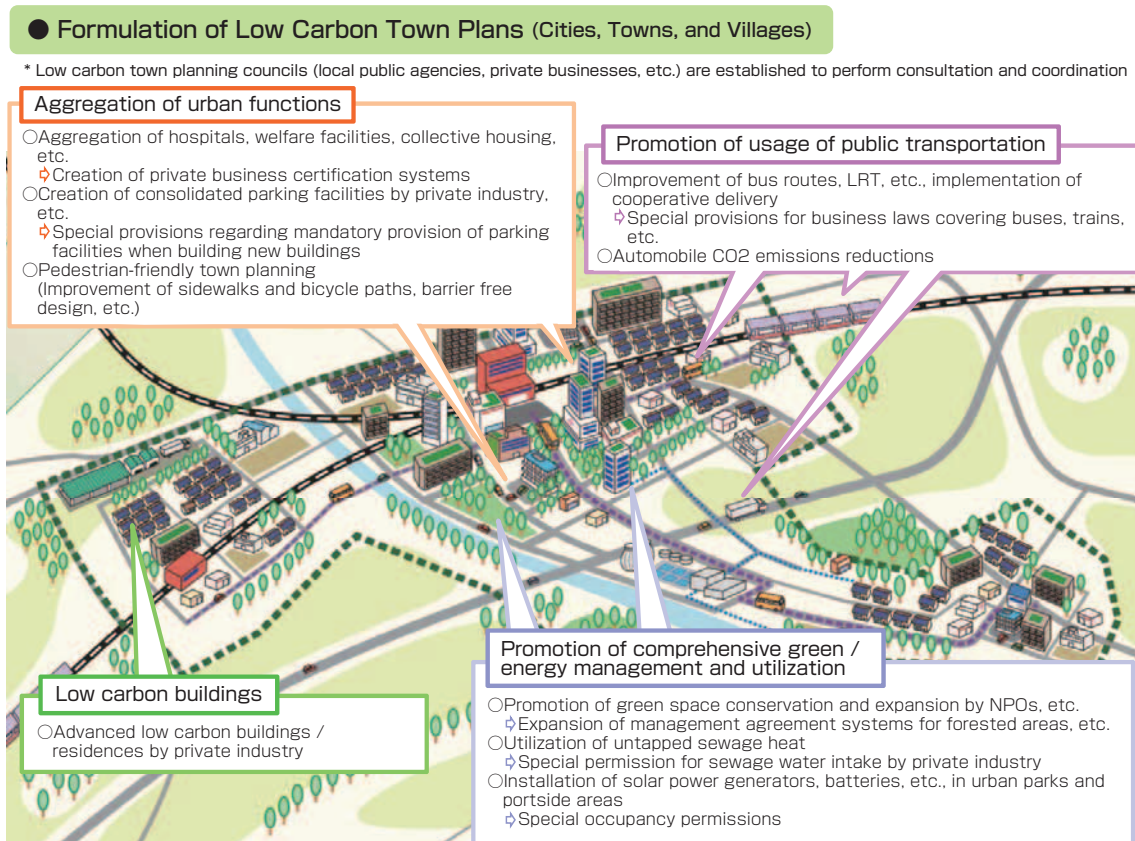
## Cities selected as Future Eco-City



Source: Tentative Translated by Eco-Mo Foundation of Office for Promotion of Overcoming Population Decline and Vitalizing Local Economy in Japan, Cabinet Office, Government of Japan

## Low Carbon City Act

It is important to build up a collection of success cases of rationalization of energy usage and urban and transportation carbon emissions reductions, promoting greater adoption and vitalizing 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 Act was passed by the Diet in September 2012 and went into effect in 2012 of the same year. As of November 2014, 16 cities have created low carbon town plans. These plans are listed on the MLIT website.



Source: Tentative Translated by Eco-Mo Foundation of MLIT

## ⑥ Promotion of Environmentally Sustainable Transport (EST)

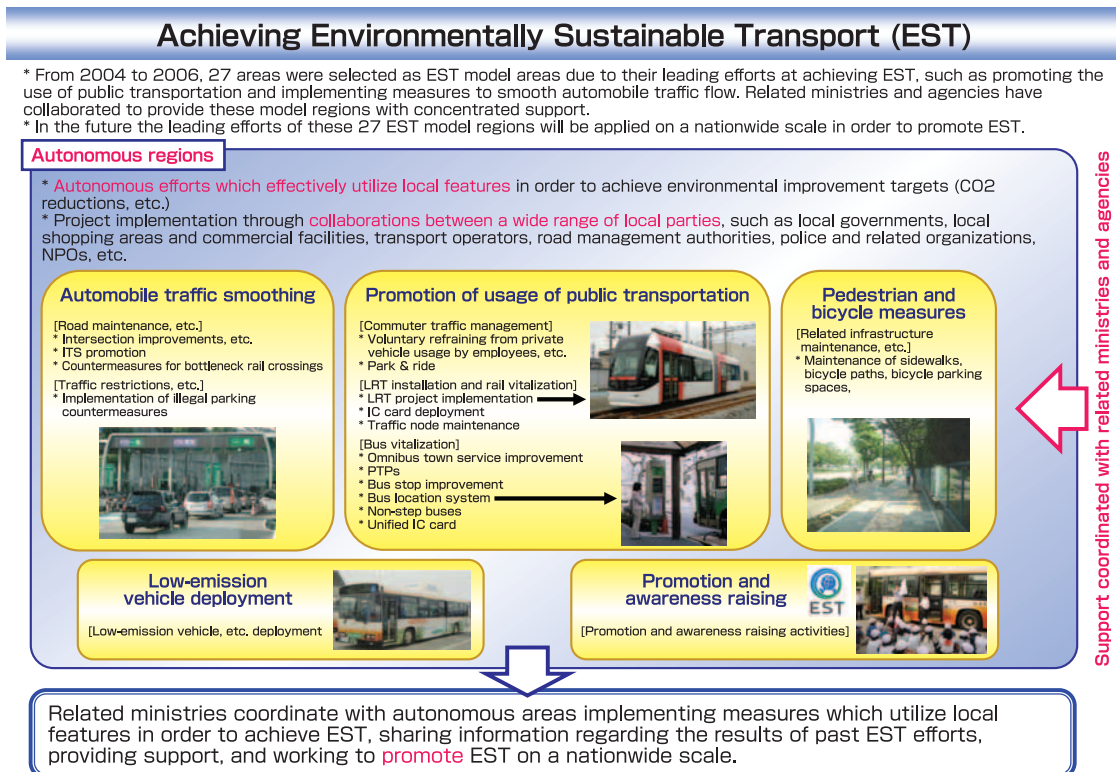
In order to reduce carbon dioxide emissions by the passenger transport sector, it is important to implement measures to reduce the excess reliance on private vehicles, which account for the majority of the sector's emissions, and promote the use of public transportation, etc. It is essential, when doing 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", in which areas which are implementing leading efforts at achieving Environmentally Sustainable Transport (EST) are selected, 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 promotion and 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: Tentative Translated by Eco-Mo Foundation of MLIT website

## ● Promotion of Environmentally Sustainable Transport (EST)



Source: Tentative Translated by Eco-Mo Foundation of white Paper on Land, Infrastructure, Transport and Tourism in Japan



#### Regional EST Forum in Asia

The Regional EST Forum in Asia is a high level governmental policy discussion forum, jointly created by the MOE and the United Nations Centre for Regional Development (UNCRD) with the aim of achieving Environmentally Sustainable Transport (EST) in the Asian region. Members include government officials in charge of environmental and transport issues from Japan and other like-minded countries in Asia, as well as environmental and transport experts. The first Forum was held in Nagoya in August 2005. It was attended by 13 countries — 10 ASEAN countries, China, Japan, and Mongolia, and resulted in the adoption of the Aichi Statement. The Aichi Statement specifies that the Forum is to be held as a regular event, outlines the basic approach to EST in Asia, and states that the UNCRD will play a central role, assisting with the formulation and implementation of strategic plans and action plans for individual countries. In April 2013 the 7th Forum was held in Bali, Republic of Indonesia. Representatives from 23 Asian countries and regions participated, sharing information regarding EST policies and success cases. The Bali Declaration was adopted, affirming further promotion of EST and complementing the Bangkok Declaration for 2020, formulated at the 5th Forum, held in 2010, specifying EST targets. At the 8th Forum, held in November 2014, the Colombo Statement was adopted aiming to promote low-carbon transportation in Asia. The Special Session for city mayors in Asia was convened, reviving interest in the Kyoto Statement adopted in 2007 to promote environmentally sustainable transport in Asia, and issuing a supplementary note to strengthen such actions in this regard.

● 8th Forum opening ceremony



● 8th Forum plenary meeting 8



## ■ 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 leveraging local strengths, 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

2012

Region	Sponsor (Representative Organization)	Cosponsor	Title
Hakodate City, Hokkaido	TO Ogasawara Co., Ltd.	Mitsubishi Heavy Industries, Ltd. Mitsubishi Motors Corporation JTB Corporate Sales Inc. Hakodate Jikoh	Hakodate excursion network concept based on new energy and EV mobility - Striving to create a self-sufficient region by leveraging diverse forms of energy
Hirosaki City, Aomori Prefecture	Hirosaki City		Town planning concept for local energy production and consumption using Hirosaki's local resources - "Creating", "Moving", and "Storing" by converting to green hydrogen energy
Tsukuba City, Ibaraki Prefecture	Daiwa House Industry Co., Ltd. Tsukuba Branch	NTT Urban Development Corporation Placemaking Institute Inc..	Realizing the Tsukuba Environment Style "SMILe" Citizen-led sustainable community model concept
Kurashiki City, Okayama Prefecture	JFE Shoji Corporation, Okayama Branch	Sumitomo Mitsui Auto Service Co., Ltd. Kurashikijisho Co., Ltd. Mitsubishi Motors Corporation Nishinohon Mitsubishi Motors Corporation Marugo Rubber Industries, Ltd. Kurashiki Machidukuri Co. Kurashiki Seibou Co., Ltd. Inoue Kamoi Kakoshi Co., Ltd. Kurashiki Ivy Square Marubun Corporation Hagihara Industries, Inc. Kurashiki chamber of commerce	EV / PV-centered corporate community-led Kurashiki vitalization and greening concept - Implementing a regionally-based energy creation, storage, and saving model
Satsumasendai City, Kagoshima Prefecture	Satsumasendai City		Striving to create a town led by the model concept of promoting tourism and exchange between residents by using Satsumasendai's local diversity - A city, supported by energy, where people want to go, share, and live

Source: Tentative Translated by Eco-Mo Foundation of MLIT

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

2013

Region	Sponsor (Representative Organization)	Cosponsor	Title
Urayasu City, Chiba Prefecture	Urayasu City		Urayasu City urban waste heat utilization model concept - Highly sustainable heat utilization system that leverages existing urban sewer infrastructure
Osaka City, Osaka Prefecture	TAIKA logistics Solution LLC	Sakishima-Asia Smart Community Alliance	Limited lease low carbon industrial and logistics park concept for the Osaka Bay Yumeshima District - Model for creating a low carbon, low cost port district using infrastructure for mutual sharing of electricity and heat and a joint freight distribution system
Anjo City, Aichi Prefecture	Denso Corporation	Anjo City Anjo Style Company Toyota Tsusho Corporation	Concept for city vitalization through the deployment of low carbon mobility and creation of an "Anjo Model" through harmonious coexistence with industry - Striving to turn Anjo into an environmental capital that grows with its residents
Takaoka City, Toyama Prefecture	Takaoka City		Concept for achieving low carbon mobility by leveraging Takaoka's trams - Striving for local public transport intimately tied to residents' activities and awareness
Yanagawa City, F u k u o k a Prefecture	Nishitetsu Information System Co., Ltd.	Hewlett-Packard Development Company, L.P. Nishimu Electronics Industries Co., Ltd. KCS Corporation	Yanagawa area tourism promotion concept - Creating a dynamic tourist town of interaction and interchange of people and goods by leveraging energy creation, storage, and saving

Source: Tentative Translated by Eco-Mo Foundation of MLIT

2014

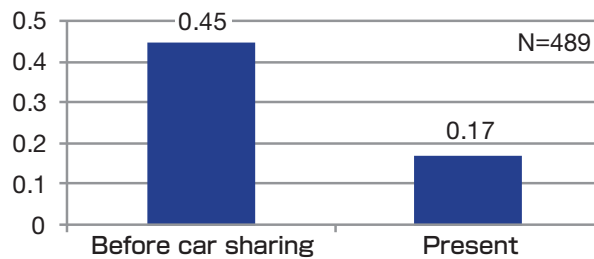
Implementing Region	Sponsor (Representative Organization)
Odawara - Nakazato district (Kanagawa Prefecture)	Odawara City
Matsumoto City - Shiga district (Nagano Prefecture)	Matsumoto City
Osaka City - Umekita Phase 2 district (Osaka Prefecture)	Osaka City
Kobe City - Chuo-ku Sannomiya district (Hyogo Prefecture)	Kobe City
Yakushima Town (Kagoshima Prefecture)	Energy Efficient Construction Institute

Source: Tentative Translated by Eco-Mo Foundation of MLIT

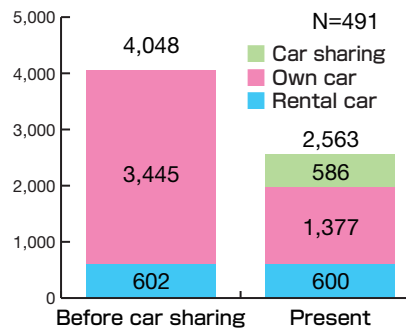
## Effectiveness of car sharing in reducing environmental impact

Car sharing, in which people can use cars when they need them, without owning the cars, is growing in popularity worldwide. Over 460,000 people in Japan engage in car sharing (according to January 2014 research 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<sub>2</sub> 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.

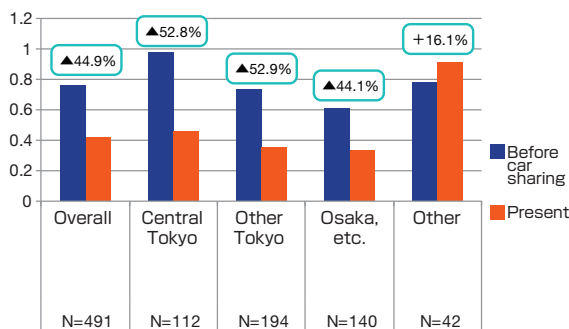
### ● Change in average number of automobiles owned per household



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



### ● Change in annual CO<sub>2</sub> emissions from automobile use (t-CO<sub>2</sub>/year/household)



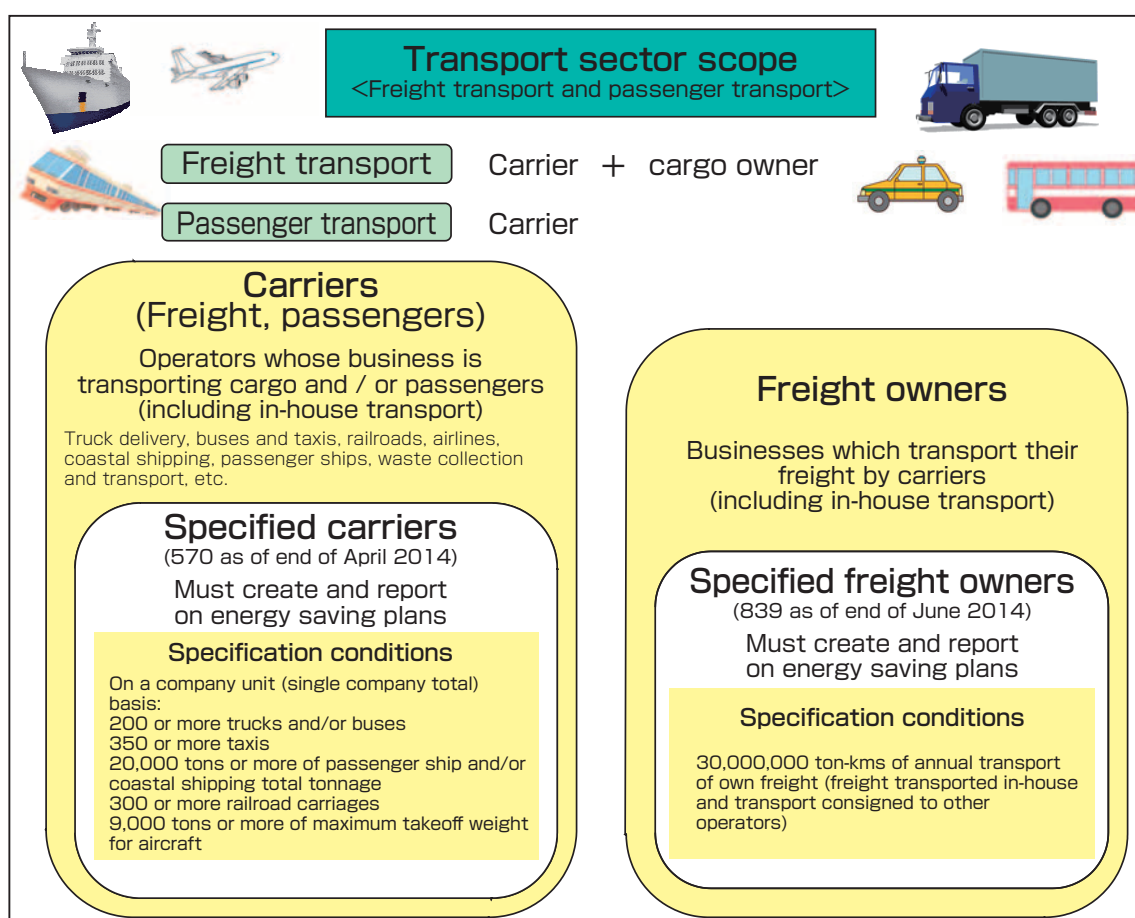
Note 1) Central Tokyo: Chiyoda ward, Minato ward, Chuo ward, Shibuya ward, Shinjuku ward, Bunkyo ward, Toshima ward

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 determination 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 570 companies as of end of April 2014)

	Freight				Passengers				Aviation	Total
	Railway	Commercial tracks	Private tracks	Shipping	Railway	Buses	Taxis	Shipping		
No. of carriers	1	283	90	33	26	94	29	12	2	570

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

	Measures to be Taken
Shared	<ul style="list-style-type: none"> <li>· Enhance collaboration with freight owners and other carriers</li> </ul>
Rail	<ul style="list-style-type: none"> <li>· Introduce energy saving trains</li> <li>· Introduce freight trains capable of carrying large containers</li> <li>· Secure a transport capacity which accurately matches transport demand by adjusting the number of trains operated, etc.</li> <li>· Perform appropriate train inspections and maintenance</li> </ul>
Automobiles	<ul style="list-style-type: none"> <li>· Introduce low-emission vehicles</li> <li>· Promote eco-driving through driver education and use of digital drive records, etc.</li> <li>· Promote increases in truck and trailer sizes in accordance with freight volume</li> <li>· Perform cooperative delivery and improve loading rates through use of return cargo, etc.</li> </ul>
Ships	<ul style="list-style-type: none"> <li>· Introduce high fuel efficiency ships</li> <li>· Implement reduced energy consumption operation, such as economical speed operation</li> <li>· Promote increases in ship sizes in accordance with freight volume</li> <li>· Perform cooperative delivery to improve loading rates</li> </ul>
Airplanes	<ul style="list-style-type: none"> <li>· Introduce airplanes with superior energy usage efficiency</li> <li>· Rationalize ground operation energy usage</li> <li>· Promote appropriate equipment selection in accordance with freight volume</li> <li>· Coordinate aircraft operation, such as by reducing ferry flight distances</li> </ul>

#### 【Freight owner 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 tracks
  - Performing cooperative delivery with other companies
- etc.

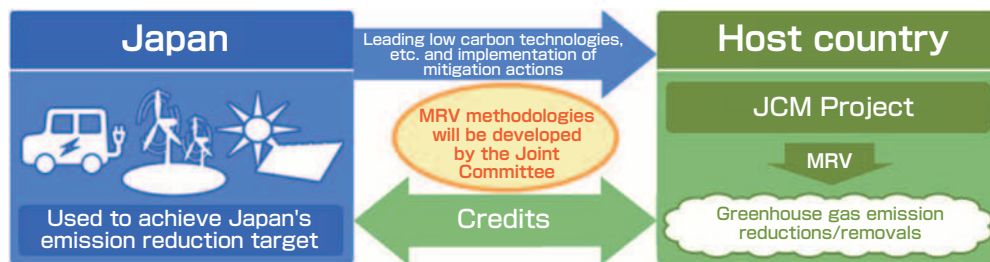
### (3) Emissions trading system measures

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 (starting from mid-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.

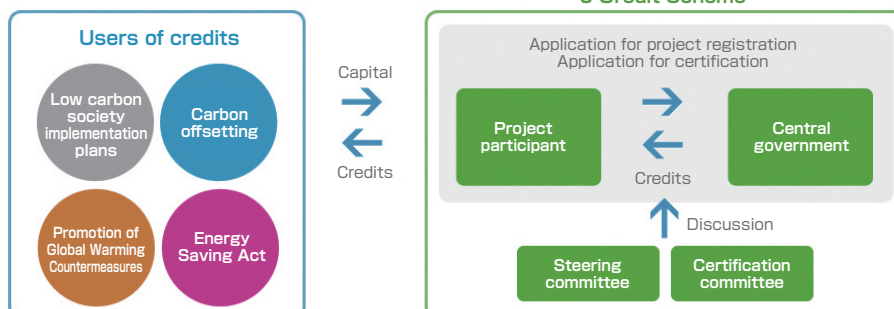


Source: Tentative Translated by Eco-Mo Foundation of New Mechanisms Information Platform

#### ■ J-Credit Scheme

The J-Credit Scheme is system in which reductions and absorption of greenhouse gasses such as CO<sub>2</sub> 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 low carbon society implementation plan targets and for use as carbon offsets.

#### ● Outline of the J-Credit Scheme



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

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

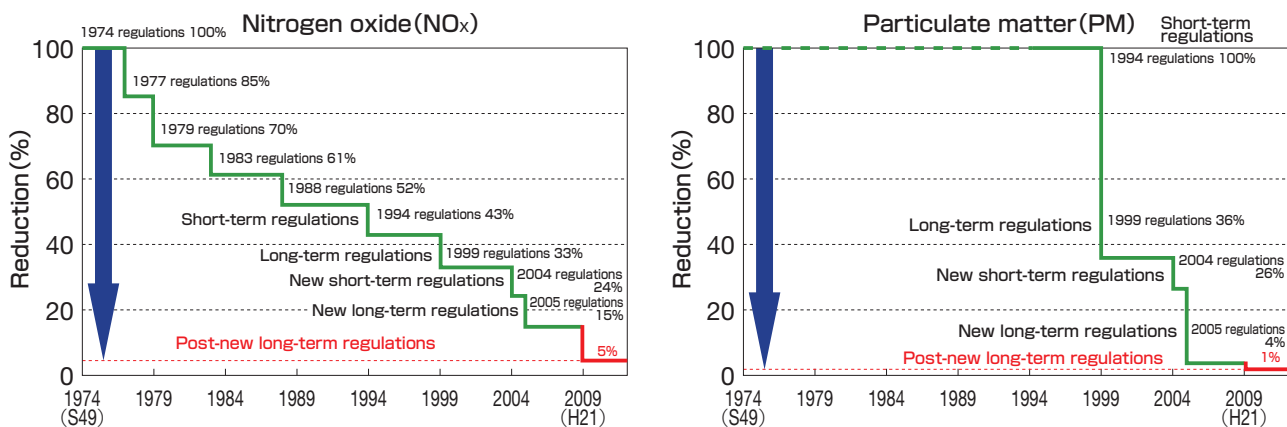
The problem of vehicle exhaust gas became a serious social problem with the rapid urbanization which began in the mid-1960s and the increase in vehicle traffic. The government strengthened exhaust gas regulations by enacting vehicle composition regulations and repeatedly revising road vehicle safety standards. In 1992 the Automobile NOx Reduction Law (now the Automobile NOx PM Control Law) was enacted. In urban areas which have difficulty achieving environmental standard targets, local governments, starting with Tokyo's local government, have implemented operation restrictions, primarily on diesel vehicles, which produce a great deal of PM emissions.

### (1) Promotion of emissions gas measures for diesel vehicles

#### ① Restrictions on manufacturers

Post-new long term regulations, some of the strictest regulations in the world, went into effect in 2009. These regulations almost completely prohibit the emission of particulate matter (PM), carcinogenic matter which is a cause of respiratory disorders. They also greatly reduce emissions of photochemical smog, also a cause of respiratory disorders, and of nitrogen oxides (NO<sub>2</sub>, etc.), which are air pollutants which cause acid rain. These regulations have almost completely solved the long-standing problem of particulate matter emissions by diesel vehicles, with older diesel vehicles being gradually replaced by clean diesel vehicles with dramatically improved exhaust gas performance.

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



Source: Tentative Translated by Eco-Mo Foundation of MLIT



## ②Restrictions on users

In urban areas where Automobile NOx/PM Law environmental targets standard 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 atmospheric environmental 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 regulations) and mandate the submission of exhaust gas regulation plans by specified operators. Tokyo, Saitama Prefecture, Chiba Prefecture, Kanagawa Prefecture, Hyogo Prefecture, and Osaka Prefecture have also defined ordinances restricting the inflow of non-conformant vehicles from other regions, for further reducing nitrogen oxide and particulate matter emissions. In order to differentiate between vehicles which do and do not meet these standards, conformant vehicles are issued with stickers, preventing the influx of illegal vehicles. Despite the leveraging of restrictions affecting users in areas implementing these measures, non-conformant vehicles from other areas pass through high-traffic intersections, resulting in areas not meeting atmospheric environmental 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 atmospheric environmental standard targets in urban areas by 2020.

	Automobile NOx/PM Law	Tokyo, Saitama Prefecture, Chiba Prefecture, Kanagawa Prefecture	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 mini vehicles, 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 Control Law (for buses, buses with capacities of 30 people or more)	All trucks, buses, and special vehicles other than passenger vehicles covered by the Automobile NOx/PM Law

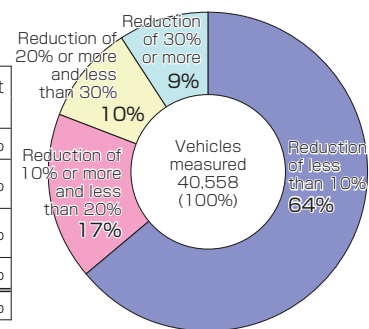
## (2) Appropriately maintained vehicle usage and appropriate fuel usage guidance

### ① Appropriately maintained vehicle usage

In order to reduce the environmental impact of vehicles, it is essential that they 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 before and after maintenance on diesel vehicles brought in for maintenance found that black smoke concentration was reduced by 10% or more for 36% of all the vehicles studied. 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 2011  
(According to study by the Japan Automobile Service Promotion Association)

	Vehicles Measured	Percent age
Reduction of less than 10%	25,924	64%
Reduction of 10% or more and less than 20%	6,703	17%
Reduction of 20% or more and less than 30%	4,142	10%
Reduction of 30% or more	3,789	9%
Total	40,558	100%



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

### ② Appropriate fuel usage guidance

Since 2005 the MLIT has conducted street inspections to study fuel sulfur content. When incidents of use of illegal diesel oil 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 oil.

<Illegal diesel oil>

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

An illegal diesel fuel mix of equal parts diesel oil and A-type fuel oil increases diesel vehicle exhaust gas PM levels by 14 to 17% and NOx levels by 7 to 8%.

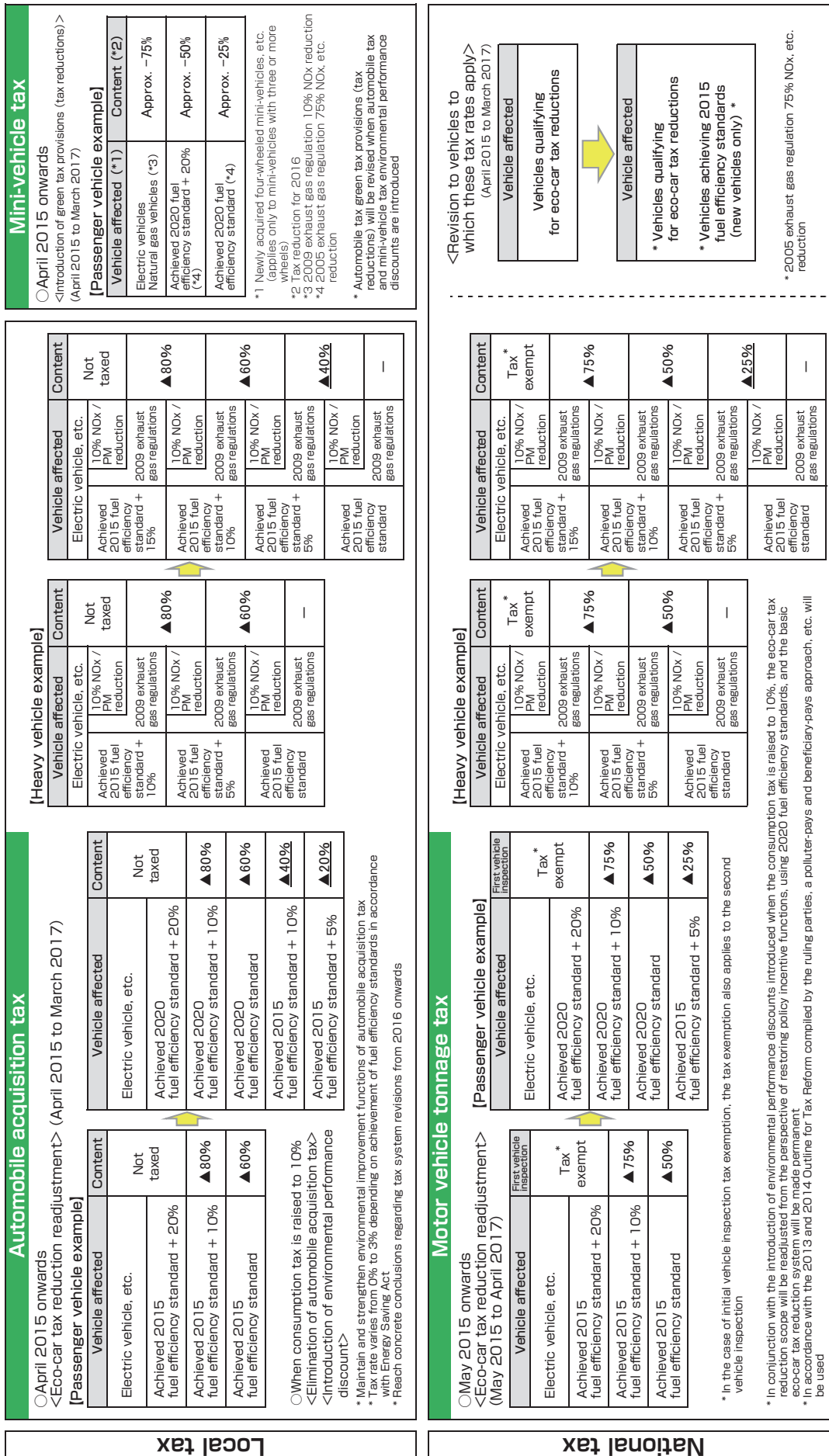
- Illegally dumped sulfate pitch which has leaked out of its containers



## 3 Environmentally friendly vehicle promotion measures (vehicle taxation reevaluation)

In the area of car body taxation, automobile acquisition tax and motor vehicle tonnage tax eco-car tax reductions are being revised and extended, and special mini-vehicle tax, green tax provisions (tax reductions) are being initiated.

<Automobile acquisition tax, mini-vehicle tax, motor vehicle tonnage tax, etc.>



Source: Tentative Translated by Eco-Mo Foundation of MLIT

## 4 Creation of a recycling-oriented society

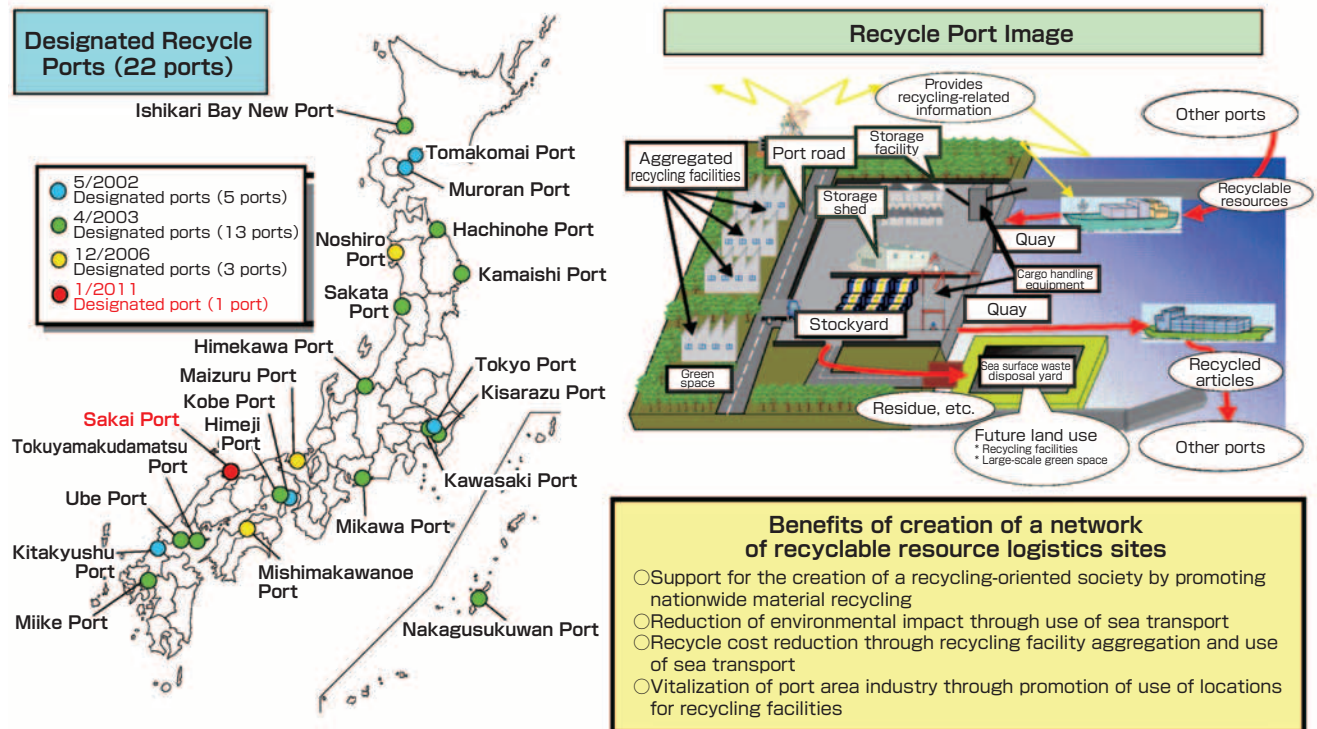
### (1) Creation of recyclable resource distribution systems

#### ① Formation of a recyclable resource distribution system using sea transport

The Basic Plan for Establishing a Recycling-Based Society puts forth the concept of building a port-centered comprehensive reverse logistics system in order to create a recyclable resource environment for achieving a recycling-oriented society. Based on this plan, Recycle Ports, recyclable resource distribution ports which support wide-area recycling sites, are being established. 22 of these ports have been designated as of January 2011. In conjunction with this, additional measures have been implemented such as securing quays specifically for handling recyclable resources, maintaining recyclable resource distribution support facilities such as enhancing the functionality of drainage ditches and protective fences, promoting collaboration between government and private industry through the Recycle Ports Promotion Council, and formulating the Guidelines on the Handling of Recyclable Resources by Ports (2004) for smooth recycling distribution and the Policy on the Handling of Recyclable Resources by Ports (2010) for efficient port operation and recyclable resource handling. These efforts have advanced the formation of a domestic recyclable resource distribution network which utilizes sea transport.

#### ● Recycle Port locations and Recycle Port concept

- Ports are specified as Recycle Ports to serve as centers of wide-area circulation of recyclable resources.
- The following efforts have been implemented as part of Recycle Port measure implementation.
  - (1) Securing port facilities such as quays, (2) Providing support for the maintenance of shipment transfer and storage facilities, etc. (subsidized with subsidy rate of 1/3)
  - (3) Improvement of operations related to recyclable resource handling, (4) Promotion of coordination between the government and private industry (use of the Recycle Ports Promotion Council, etc.)

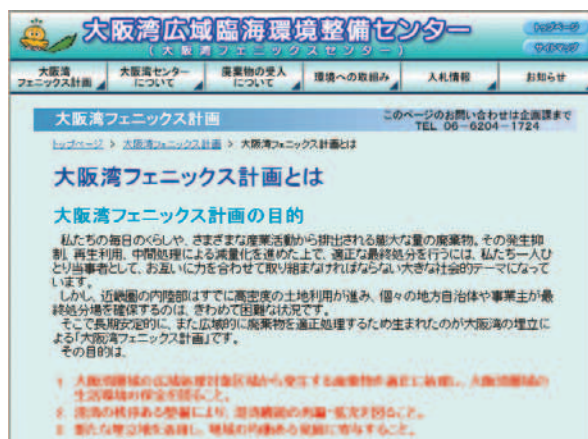


Source: Tentative Translated by Eco-Mo Foundation of MLIT

## ② Systematic 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.

### ● Osaka Bay Phoenix Plan

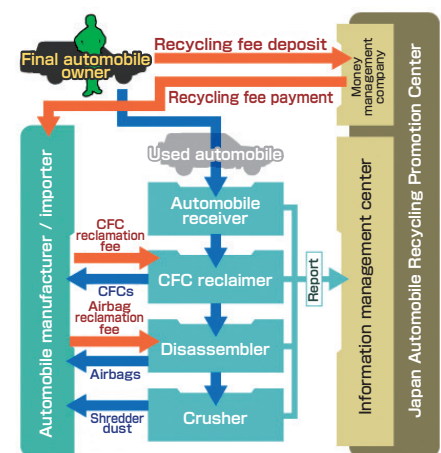


Source: Osaka Bay Regional Offshore Environmental Improvement Center

## (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 6,742 at the end of 2010 (a decrease of 96.6% versus the number in 2004), and the number of illegally dumped

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



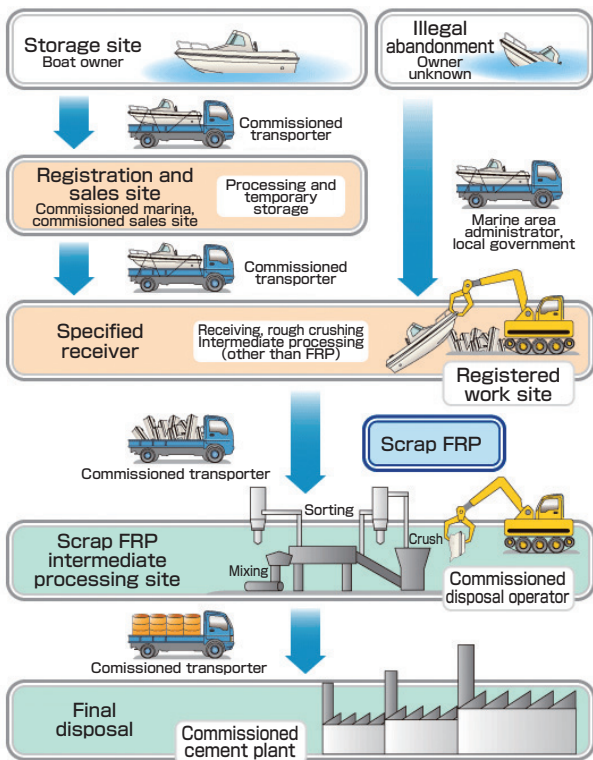
Source: Tentative Translated by Eco-Mo Foundation of MLIT

vehicles was 2,893 (a decrease of 87.1% versus the number in 2004), both dramatic reductions

### (3) FRP ship recycling

Fiber-reinforced plastic (FRP) boats and ships are distributed widely across Japan. They are sturdy, with lifespans of over 30 years. This makes them difficult to dispose of, and this, together with the lack of appropriate disposal routes, is one of the reasons that they are illegally dumped. Ship and boat manufacturers, led by the MLIT, have collaborated together to create procedures for appropriately disposing of FRP ships, promoting the establishment of a recycling-oriented society, by establishing appropriate and efficient recycling technologies. Based on these technologies the Japan Marine Industry Association FRP Ship Recycling Center has led the way in using the recycling and reuse operator wide area accreditation system (a system which exempts manufacturers from requiring waste processing permits to reclaim and recycle used products, etc.) of the Wastes Disposal and Public Cleansing Act to promote FRP ships recycling, starting in 2005 with a limited number of areas, and extending nationwide from 2007.

#### ●FRP ship recycling system



Source: Tentative Translated by Eco-Mo Foundation of Japan Marine Industry Association FRP Ship Recycling Center

Source: MLIT Chugoku District Transport Bureau

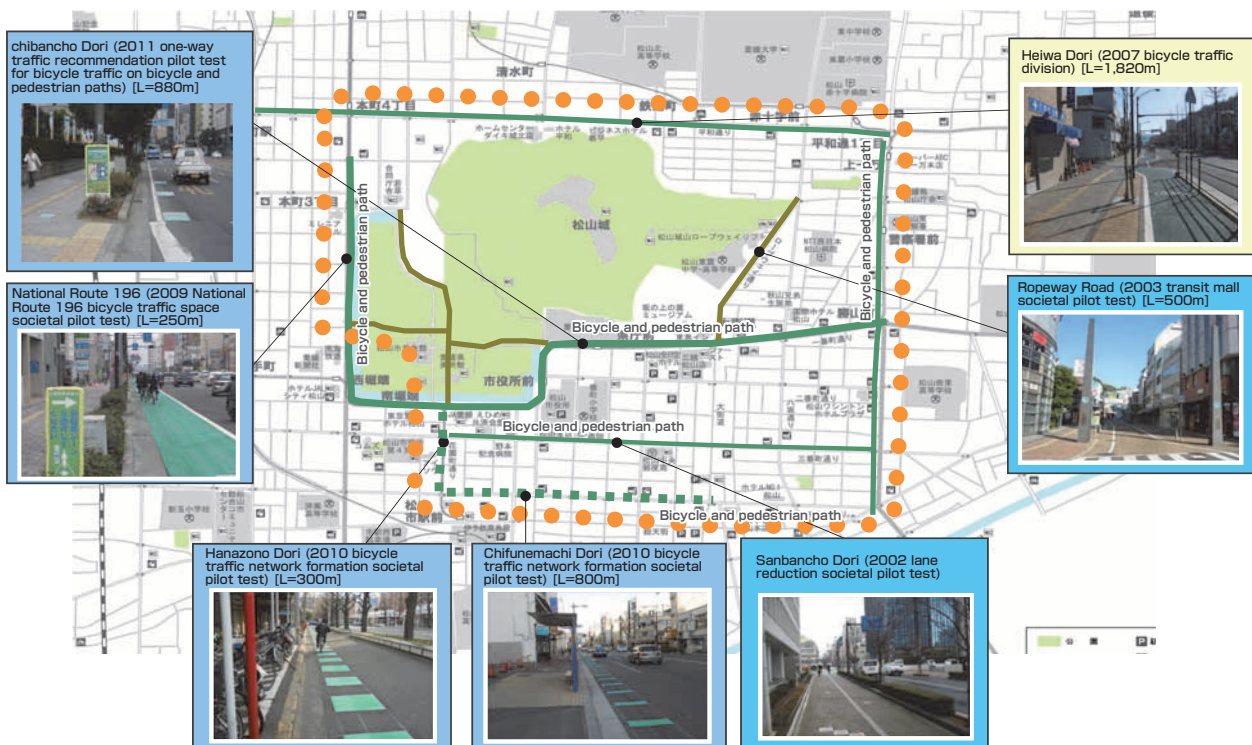
## 5 Measures by local governments, companies, citizens' groups, etc.

### (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 Matsuyama City (population: 520,000), Gifu City (population: 410,000), and Toyama City (population: 420,000).

#### ■ Matsuyama City - Pedestrian-friendly town planning -

In order to create a sustainable city with convenient transport that is people-friendly, community-friendly, and environmentally-friendly, Matsuyama City has formulated a comprehensive transport strategy whose goal is to shift from the current automobile-centric transport system to one which offers convenient access via public transportation and bicycles. Efforts have included promoting the use of public transportation through an omnibus town plan, etc., and promoting the use of bicycles through the formation of a bicycle path network, etc., as well as soft measures implemented through mobility management and social field tests of the Dogo Mobility Center, which enables residents to choose from a diverse range of means of mobility.



**Social field tests have been carried out using various methods to study bicycle path networks**

Source: Tentative Translated by Eco-Mo Foundation of Shikoku EST Emergence Seminar Matsuyama City materials

Source: Dogo Mobility Center website

## ■Gifu City - Public transportation-centered town planning -

Gifu City is striving to develop a bus network which combines central lines, branch lines, and community buses in order to create a healthy city of healthy people. In particular, it is implementing the Gifu City BRT to provide greater convenience by enhancing central bus routes.

### ■The concepts of BRT development in Gifu City

【Basic policy of urban transport measures】

Create a transport environment which provides everyone with freedom of mobility in order to create a consolidated city structure

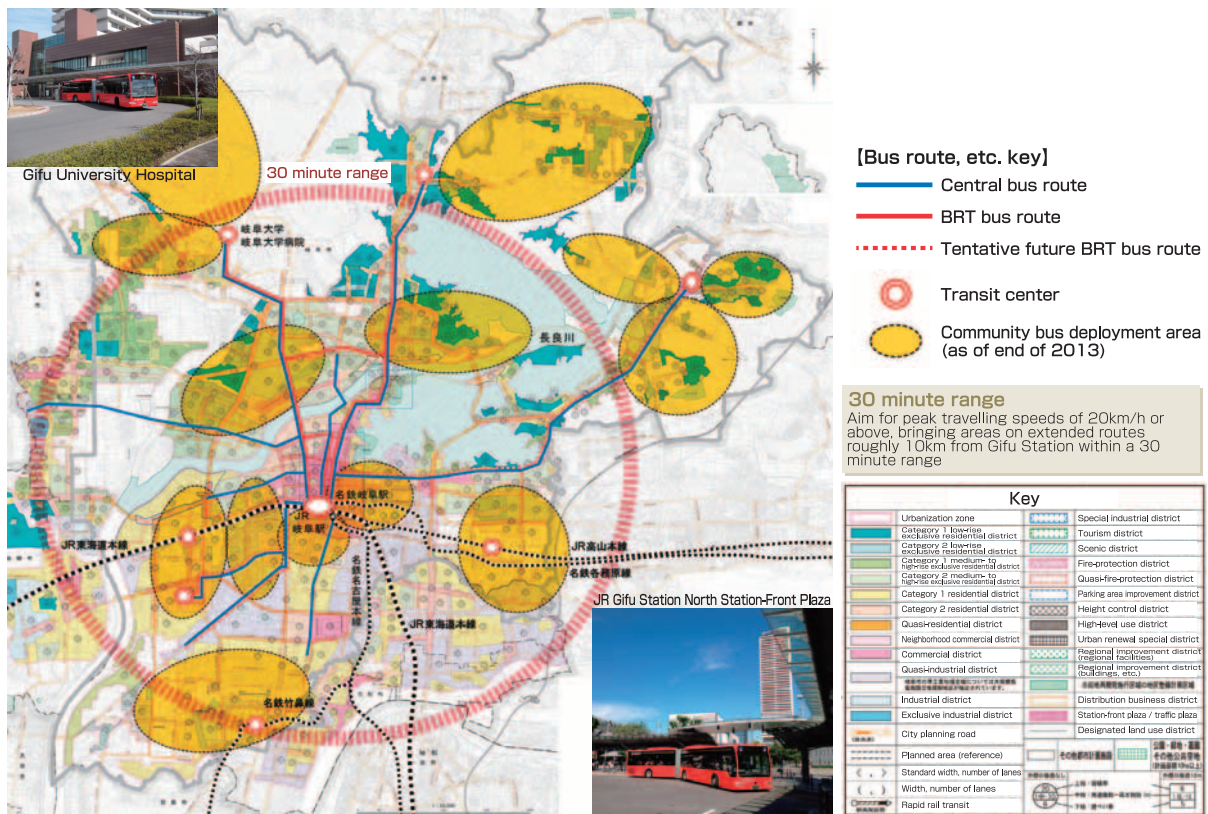
【Public transportation service targets】

1. Establish a bus network which combines central lines, branch lines, and community buses
2. Improve central bus route service, making it possible to reach areas up to roughly 10km away from Gifu Station within 30 minutes via extended bus routes

【Gifu City BRT implementation policy】

1. Implement BRT for central bus routes to reorganize bus routes
2. Flexibly select routes when implementing BRT, taking demand and road maintenance conditions into consideration
3. Fully leverage the features of BRT, taking a phased approach to introducing bus lanes, improving bus stops and bus transfer sites, and introducing articulated buses

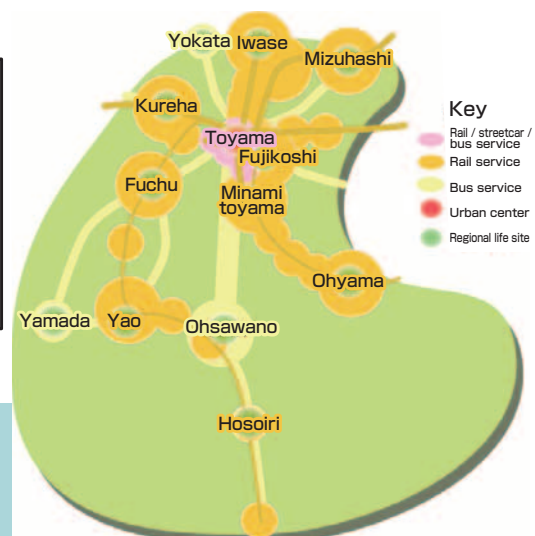
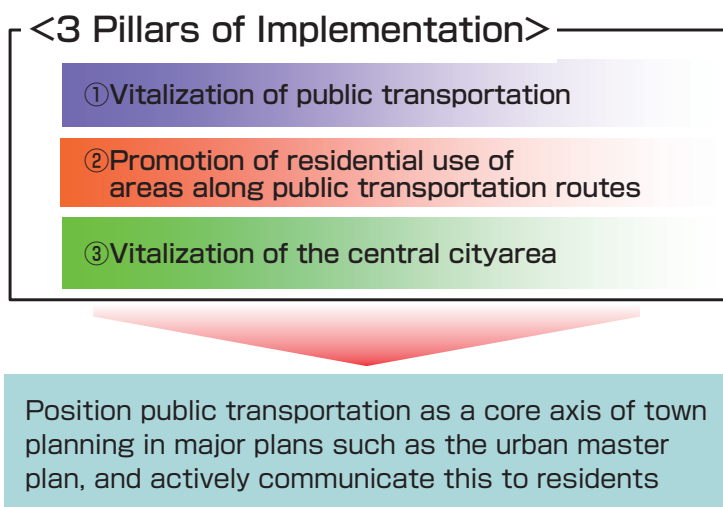




Source: Tentative Translated by Eco-Mo Foundation of Gifu City

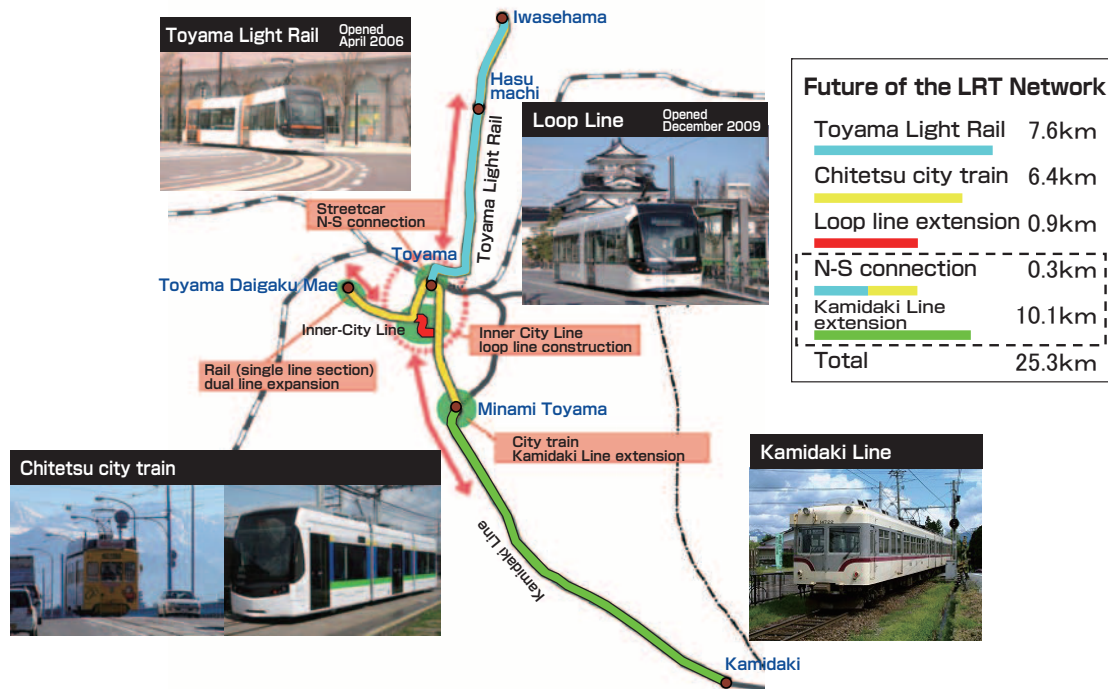
### Toyama City - Low carbon traffic town planning based on Toyama City LRT -

Toyama City has identified population shrinkage, the super-graying of society, excessive dependence on automobiles, hollowing out and stagnation of central city areas, excessive urban management administration costs, and increasing CO2 emissions as challenges the city must face. In order to resolve these problems, it is striving to revitalize public transportation, such as its rail routes, and consolidate residential, commercial, industrial, and cultural city functions along public transportation routes, thereby producing a compact, centralized city with public transportation as its core.



Source: Tentative Translated by Eco-Mo Foundation of Hokuriku Shinetsu EST Emergence Seminar Toyama City materials

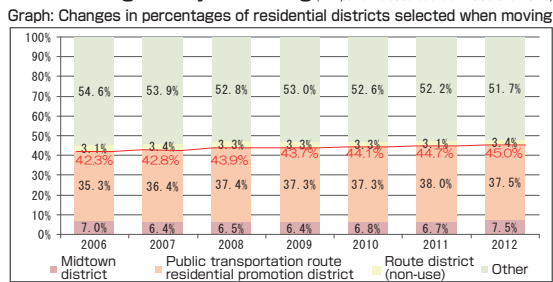
In Toyama City the Toyama Light Rail was opened in 2006, and the city loop line was opened in 2009. The city's creation of the LRT network has contributed to increased rail usage and greater opportunities for elderly residents to venture out of their homes. These efforts are causing people to reexamine lifestyles which depend excessively on automobiles, creating a city which is highly livable for pedestrians.



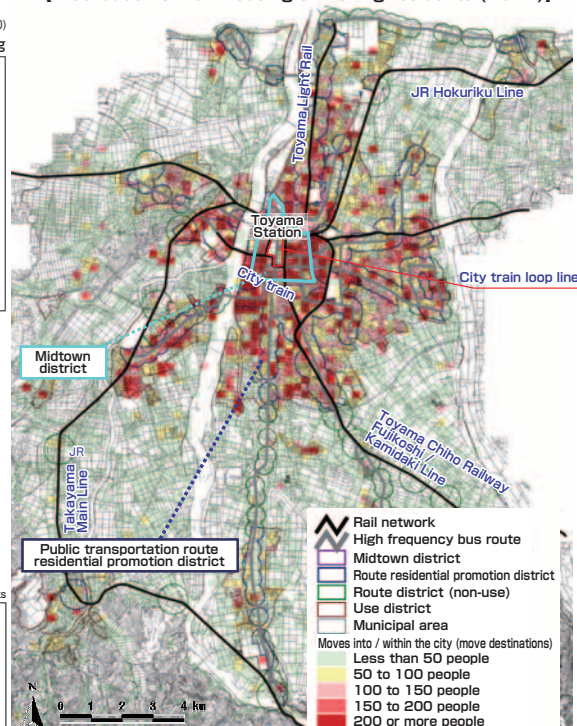
Source: Tentative Translated by Eco-Mo Foundation of Hokuriku Shinetsu EST Emergence Seminar Toyama City materials

Toyama City is promoting living along public transportation routes, and the share of the city's population choosing to live in midtown districts or public transportation route residential promotion districts is steadily rising.

The number of people selecting "midtown districts" and "public transportation route residential promotion districts" is gradually increasing (2.7 point increase between 2005 and 2010)

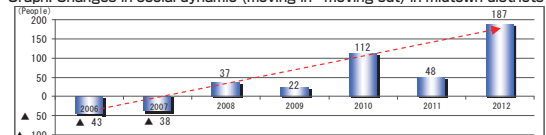


[Distribution of new housing of moving residents (2011)]



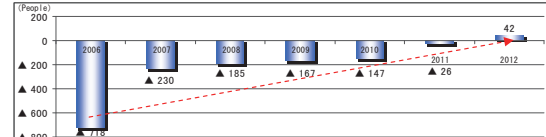
Changes in social dynamic by district Since 2008 there has been net growth in the number of people moving into midtown districts

Graph: Changes in social dynamic (moving in - moving out) in midtown districts



Since 2012 there has been net growth in the number of people moving into public transportation route residential promotion districts

Graph: Changes in social dynamic (moving in - moving out) in public transportation route residential promotion districts



Source: Tentative Translated by Eco-Mo Foundation of Hokuriku Shinetsu EST Emergence Seminar Toyama City materials

## (2) Measures by companies in the transport sector

### ① Aviation companies

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

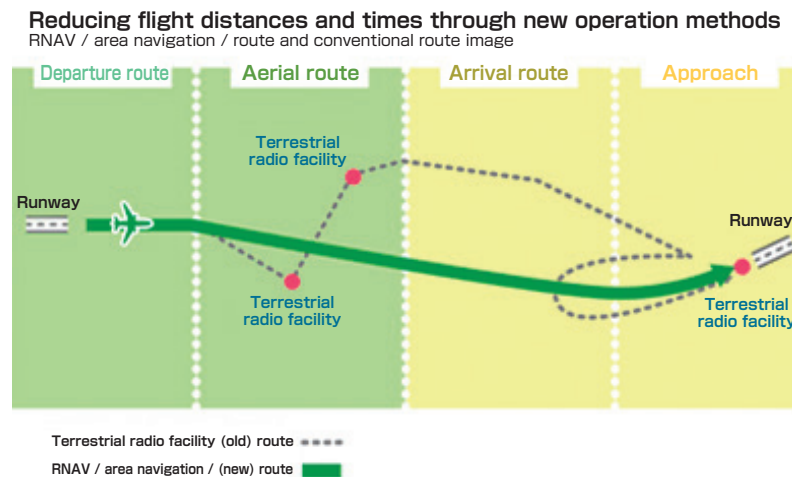
○Global warming prevention targets:

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

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

Contents of measures:

- Introduce new high fuel efficiency airplanes (consuming approximately 20 to 40% less fuel than conventional airplanes)
- Using new area navigation, a high-precision navigation method, to reduce flight distances and times
- Select optimal flight altitudes, speeds, and routes which require the least amount of fuel by factoring in meteorological conditions and air traffic control
- 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
- Prioritize use of ground power units with low CO2 emissions for electricity, air conditioning, and engine startup when parked at airports



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

○Support for the creation of a recycling-oriented society

Target: Lower industrial waste final disposal rate to 3.6% or below for 2015

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 CO2 emissions)
- Offer eco-tours, teaching tour participants about the environment

## ② Railway companies

The Association of Japanese Private Railways, a Japanese association of railway operators, has formulated a low carbon society implementation plan 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

Contents of primary measures:

### ○Introduction of energy saving cars

Energy saving trains such as VVVF controlled trains, which consume little 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, 2014)

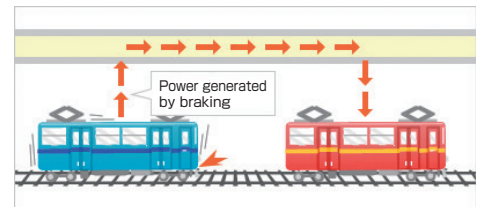
	Control Method	No. of cars Owned	
			Number of Reduced Weight cars
cars with regenerative brakes	VVVF control	10,456 trains*	8,657 trains
	Chopper control	3,097 trains*	1,649 trains
	Resistance control, other	631 trains*	237 trains
cars without regenerative brakes	Resistance control, other	2,960 trains	330 trains*
Total number of cars owned		17,144 trains (A)	10,873 trains
Number of energy saving cars (trains with regenerative brakes or reduced weight cars)		14,514 trains (B) (total of trains indicated with a *)	
Share of energy saving cars		84.7% (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.

### ○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.



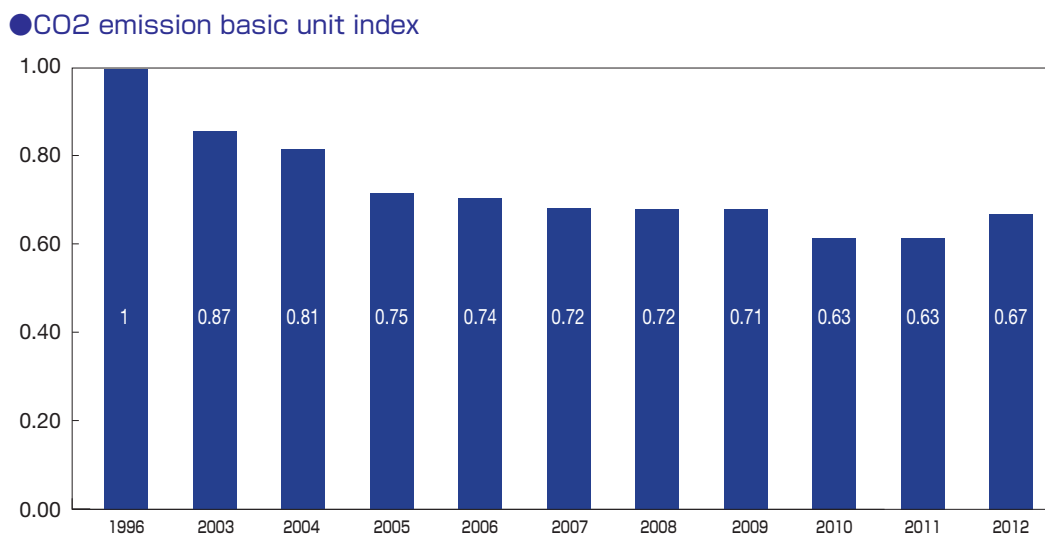
Source: Tentative Translated by Eco-Mo Foundation of The Association of Japanese Private Railways

## ② Truck, bus, and taxi companies

As operators which transport freight and passengers via automobiles, truck, bus, and taxi industry associations have formulated voluntary action plans as environmental measures, striving to popularize green management certification and promote eco-driving, etc.

### ■ Japan Trucking Association

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



Source: Tentative Translated by Eco-Mo Foundation of Japan Trucking Association

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 said sessions
  - ◇ Create and distribute energy saving driving manuals, energy saving driving recommendations, eco-driving promotion notebooks, eco-driving promotion manuals, "I practice eco-driving" stickers, and "Safe eco-driving" videos and DVDs
  - ◇ Promote eco-driving management systems, etc.
    - Provide aid for the introduction of vehicles with eco-driving management systems and/or drive recorders, which are effective at ensuring eco-driving
    - ◇ Provide aid for the introduction of devices which support the shutting off of engines when parked
      - Provide aid 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.

## ■ Measures by companies: Tamura, Ltd.

Tamura is engaging in comprehensive environmental management, such as implementing management systems which make it easy for drivers to create daily reports and perform vehicle maintenance, introducing aluminum wheels and high fuel efficiency tires, and introducing various systems and devices such as nitrogen filling devices.

(Comments from the company)

<Ensuring activity continuity by creating easy to use management systems>

In 2004 the company installed digital tachographs in all vehicles and switched to digital daily reports. Drive data (loading and unloading, driving, breaks, idling, rapid acceleration, rapid braking, etc.) is printed on a single page daily report making it possible to assess driving conditions, as well as reducing the driver workload involved in filling out daily reports and the office workload involved in carrying out office management work. The management system can be used to input vehicle inspection records and announce vehicle inspection timing, reducing workloads while helping to prevent missed inspections.

<Fuel efficiency improvement>

We manage highly granular timeline data for individual vehicles. This detailed management data shows the effects of the various measures we have implemented, and serves as important information for use in future activities. Managed fuel efficiency data is graphed and posted each month, helping improve awareness among drivers and other employees.

<Introduction of nitrogen filling devices and high fuel efficiency tires>

In 2006 we introduced nitrogen filling devices which stabilize tire air pressure. This was followed up by the introduction of high performance compressors, which reduce air filling time, and of automatic air filling devices and safety frames to automate and ensure the safety of tire filling. These efforts have contributed to improved tire lifespans, reduced incidence of tire bursting, and improved tire retreading quality. We have also introduced high fuel efficiency tires. While they provide some degree of fuel efficiency improvement, they also have drawbacks, such as being somewhat expensive and having poor abrasion resistance. Recently a large number of new products have been launched, and performance appears to be improving. These high fuel efficiency tires are being reused through regrooving and retreading, which also reduces resource usage and costs. We have also begun using caps with valve capabilities, manufactured in Germany, for our valve caps, reducing the workload involved in performing monthly air inspections.

<Vehicle weight reduction>

We have introduced aluminum wheels to reduce vehicle weights and improve fuel efficiency. Tightening torque management is easy for ISO compliant wheels, and their nuts remain tight, improving safety performance. We are also using air suspension and wide single tires to reduce the weights of trailers.



The introduction of these systems and devices is improving our fuel efficiency figures.

<Workshops and meetings>

Hands-on training sessions led by drivers and workshops using projectors are held at regular Friday

meetings each week in order to share information on a variety of topics  
Regular workshops led by outside lecturers, such as representatives from tire manufacturers, are also held, so that our personnel can learn new information. Other environmental activities include replacing workplace lighting with LED lights, conserving electricity, and carrying out annual cleaning of nearby roads. Our cleaning of nearby roads, which is in a sense one of our workplaces, is an expression of our gratitude to members of the local community.

#### **Nihon Bus Association**

- Bus business low carbon society implementation plan -

Objectives

- (1) Cut CO2 emission rates in 2020 by 6% in comparison to 2010.
- (2) Promote shift from use of private vehicles to buses.

Specific activity contents

- (1) CO2 emission rates reduction measures

- ① 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 sudden acceleration and sudden 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.

- ② 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.

- ③ 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 components which affect fuel efficiency (tires, air cleaners, air conditioners, etc.).

- (2) Measures for promoting shifting from use of private vehicles to buses

- ① 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 bus park and rides and omnibus town systems
- Maintenance and expansion of high grade bus stops, clear bus route information, etc.

- ② 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 maintain 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 implements 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.

## ■ Japan Federation of Hire-Taxi Associations

- Hire-taxi industry low carbon society implementation plan (voluntary action plan) -

Objectives

2020 target (cumulative target)

Reduce CO2 emissions by 20% in comparison to 2010. Specific plans

(1) Global warming countermeasures

① Switchover to environmentally friendly taxi vehicles

- By 2020 30% of taxis will consist of HVs, EVs, or other environmentally friendly vehicles, and the federation will encourage automobile manufacturers to speedily launch HV vehicles which use LP gas.

② 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 association is promoting the elimination and suspension of vehicles in order to eliminate excess supply.

③ Taxi usage promotion

- The association is promoting universal driver training and cultivating high quality drivers.
- The association 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 association is working to expand shared taxi use and reduce the amount of private vehicle usage.

④ Enrichment of and PR for sightseeing taxis

- The association 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, alleviate traffic congestion and parking space shortages, and reduce the number of traffic accidents.
- 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.

⑤ Improvement of operation efficiency

- The association 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.

⑥ Eco-driving

- The association is working to ensure thorough stopping of engines when vehicles are stopped, prevention of excess vehicle cooling and heating, and prevention of sudden acceleration and braking.
- Engines are to be stopped when taking breaks, naps, and when washing vehicles.
- Green management is being promoted through measures such as expanding the number of operators with green management accreditation.
- The association is promoting the stopping of engines when vehicles are stopped and the deployment of EMS (digital tachographs) in order to support eco-driving.

⑦ 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.
- ⑧Improvement 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.
- ⑨PR regarding global warming countermeasures
  - The association will use websites, posters, stickers applied to taxis, and other means to publicize the taxi industry's efforts to reduce CO2 emissions and increase awareness among the general public regarding the prevention of global warming.
- (2) Creation of a recycling-oriented economic society
  - ①ELVs will be processed appropriately in accordance with the Act on Recycling, etc. of End-of-Life Vehicles.
  - ②End-of-life tires, etc. will be appropriately processed as industrial waste.
  - ③Recycling 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 CO2 emissions and energy usage in 2014 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 CO2 emissions reductions, and ③ promoting the acquisition of green management certifications (subsidizing part of the cost of acquiring new green management certifications).

### (3) Measures by citizens' group

The expansion of lifestyles which are dependent on the use of personal vehicles 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, citizens' groups are creating and publishing bus maps and other materials. In the past, these were created by individual citizens' groups, but in recent years they have been created through collaboration with local governments, or on consignment from local governments, due to their high quality and strong reputation. They are also used as mobility management tools for promoting the use of public transportation.

#### ●List of bus maps

City	Map Name	Creator
Sapporo City, Hokkaido	Super Convenient Bus Map	Yuran
Niigata City, Niigata Prefecture	Niigata City Transportation Map	Niigata Environment and Transportation Research Society
Fukui Prefecture (entire prefecture)	Fukui Norinori Map	Railway, Omnibus, Bicycle & wAlk machizukuri association (ROBA)
Gifu City, Gifu Prefecture	Gifu City Bus Map	Public Transportation Usage Promotion Network
Hyogo Prefecture (Amagasaki City, Nishinomiya City, Ashiya City, Itami City, Takarazuka City, Kawanishi City, Inagawa Town, Mita City)	Hanshin Area Station Bus Map	Hanshin Urban Area Public Transportation Usage Promotion Council
Wakayama City, Wakayama Prefecture (and surrounding cities and towns)	wap (Wakayama Urban Area Public Transportation Route Map)	Wakayama City Planning Council - Wakayama Komachi
Matsue City, Shimane Prefecture	Doko Demo Bus Book	Project Yuai
Hiroshima City, Hiroshima Prefecture	Bus Supermap	Hiroshima BRT Research Society
Okinawa Prefecture (entire prefecture)	Bus Map Okinawa	Bus Map Okinawa

Every year over 200 cities around the world take part in Mobility Week (September 16 to September 22) & Car-Free Day (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. In 2014 11 cities in Japan participated. (Sendai City, Saitama City, Yokohama City, Zushi City, Matsumoto City, Fukui City, Toyohashi City, Osaka City, Kyoto City, Takamatsu City, Naha City)

During Mobility Week & Car-Free Day 2014, 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 2014" (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.

#### ●2014 Mobility Week & Car-Free Day Japan Awards main award results

Award	Recipient
Town Planning Contribution Award	Saitama Car-Free Day Planning Committee
	Naha Mobility Week & Car-Free Day Planning Committee
Event Project Award	Matsumoto City No Private Vehicle Day Promotion Residents' Council
	Kyoto Car-Free Day Planning Committee
Citizens' Appeal Award	Naha Mobility Week & Car-Free Day Planning Committee

## (4) Measures by the Eco-Mo Foundation

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

The Green Management Certification System, which objectively certifies the efforts of companies to make environmental improvements, strives to encourage companies to engage in environmental efforts, and contributes to reductions in the environmental impact of industry by fostering understanding and cooperation between certified companies, society, and users. The system, with the Eco-Mo Foundation as its certifying body, certifies 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 2014 there are 3,715 certified businesses and 7,286 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 12.6% 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, 2014	Companies Nationwide	Percentage Owned by Certified Companies	Notes
Trucks	152,794	1,213,315 (Note 1)	12.6%	(Note 1): Number of vehicles owned as of end of March 2012. 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 Ministry of Land, Infrastructure, Transport and Tourism). It does not include the number of registered light trucks.
Buses	15,278	108,544 (Note 2)	14.1%	(Note 2): Number of vehicles owned as of end of March 2012. Based on the "Transportation Statistics Collection" (from the Ministry of Land, Infrastructure, Transport and Tourism).
Taxis	33,137	205,683 (Note 3)	16.1%	(Note 3): Number of corporate taxis owned as of end of March 2012. 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.

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

One of the energy saving measures required of cargo owners under the Energy Saving Act (enacted in April 2006) is the selection of environmentally-friendly cargo 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". Generally speaking, 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 "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.

### ○ 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".

### ○ 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 green management certification.

○Certification acquisition subsidy systems

Local governments:

8 organizations (Chuo-ku, Tokyo; Katsushika-ku, Tokyo; Sumida-ku, Tokyo; Shinjuku-ku, Tokyo; Matsudo City, Chiba Prefecture; Yokohama City, Kanagawa Prefecture; Kameyama City, Mie Prefecture; Fukuyama City, Hiroshima Prefecture)

Industry groups:

Japan Association of Refrigerated Warehouses and 36 prefectural Trucking Association (Hokkaido, Aomori Prefecture, Iwate Prefecture, Akita Prefecture, Fukushima Prefecture, Ibaraki Prefecture, Tochigi Prefecture, Gunma Prefecture, Saitama Prefecture, Chiba Prefecture, Tokyo Prefecture, Kanagawa Prefecture, Niigata Prefecture, Yamanashi Prefecture, Nagano Prefecture, Gifu Prefecture, Shizuoka Prefecture, Aichi Prefecture, Mie Prefecture, Shiga Prefecture, Osaka Prefecture, Hyogo Prefecture, Nara Prefecture, Tottori Prefecture, Okayama Prefecture, Hiroshima Prefecture, Tokushima Prefecture, Kagawa Prefecture, Ehime Prefecture, Kochi Prefecture, Fukushima Prefecture, Nagasaki Prefecture, Kumamoto Prefecture, Oita Prefecture, Miyazaki Prefecture, Kagoshima Prefecture)

## ② Implementation of the Excellent Eco-Commuting Business Site Certification System

The Excellent Eco-Commuting Business Site Certification System has been implemented since June 2009 to certify business sites 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 2014 645 business sites have been certified. Certified business sites implementing Best measures may also be recommended for MLIT awards. In 2014 Toyohashi City was selected as the winner of the "2014 Minister's Award for Excellent Business Implementing Traffic-Related Environmental Conservation Efforts"

### ● Measures implemented by Toyohashi City, Aichi Prefecture

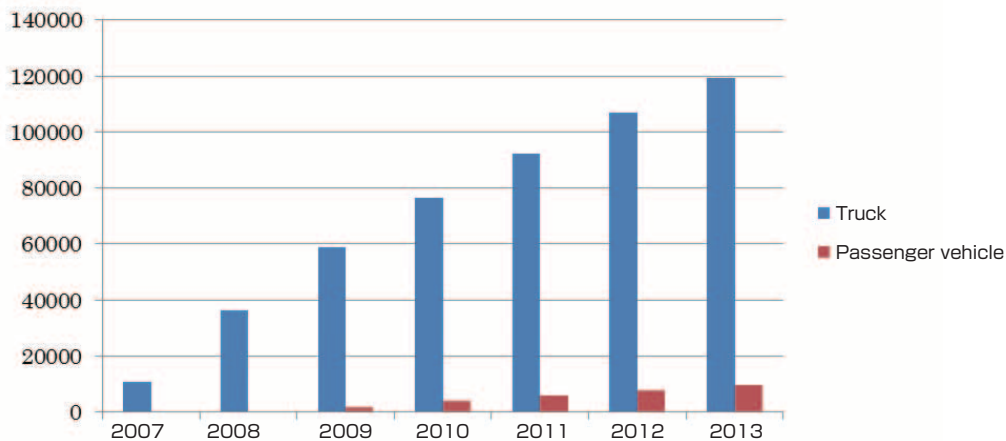


### ③Promotion of eco-driving

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 "3rd Conference of Parties 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 MLIT Award (transportation business category) and MOE Award (general category) have been conferred, and the award ceremony for top winners was held as part of the "2014 Eco-Drive Symposium" on November 19.

#### ●Accumulated number of completed certificates issued



#### ●2014 Eco-Drive Activity Contest award ceremony



#### ●Contest leaflet



#### ④ Promotion of Environmentally Sustainable Transport (EST)

The OECD has proposed Environmentally Sustainable Transport (EST) (see page 43), 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 2014 the Eco-Mo Foundation collaborated with the Regional Transport Bureau in holding workshops for local governments and transport operators (EST Emergence Seminars) in Takamatsu City, Utsunomiya City, Okayama City, and Sendai City. In addition to these workshops, tours and review sessions were also held as part of a three day personnel development training session (the 4th such session) in Toyama City. The 6th EST transport Environment Awards, recognizing exceptional regional transport environment efforts, were also held. In 2014 Tokyo Metro Co., Ltd. received the MLIT Award, and Fujisawa City received the MOE Award. Isuzu Motors Ltd., Enoshima Electric Railway Co., Ltd., and Kanagawa Chuo Kotsu Co., Ltd. also received awards. An awards ceremony was held as part of the 8th 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>).

#### ● 6th EST Transport Environment Award results

Award	Recipient	Name of Main Project
Grand Prize 【MLIT Award】	○Tokyo Metro Co., Ltd.	Everybody ECO.
Grand Prize 【MOE Award】	○Fujisawa City, Isuzu Motors Ltd., Enoshima Electric Railway Co., Ltd, Kanagawa Chuo Kotsu Co., Ltd.	Fujisawa City traffic system implementation program for achieving a low carbon society
Outstanding Performance Award	○Tobetsu Town	Tobetsu Town community bus project
Incentive Award	○Michinori Holdings, Inc.	Michinori Group efforts for creating and maintaining a sustainable public transportation network
Incentive Award	○Akita EV Bus Trial Consortium	Trial Operation of Akita's Own Original "Elemo-Akita" EV Bus

#### ● Award-winners Tokyo Metro's Ginza 1000 series train and Fujisawa City articulated bus (Twin Liner / Kanagawa Chuo Kotsu)



## ⑤ Promotion of mobility management education (transport environment education)

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

Since 2014 educational support has been offered to the local governments of Obihiro City, Hokkaido and Fujisawa City, Kanagawa prefecture.

<Measures by supported local governments>

Obihiro City:

The prior educational program is being reviewed, the program's position within the school curriculum guidelines is being clarified, and the program is being overhauled to make it easier for educators to implement and more closely tied to coursework. The local government is also considering how to tailor the program to Obihiro City, such as reflecting actual traffic conditions in Obihiro City itself and covering the use of biodiesel fuel.

Fujisawa City:

Transport environment education is being performed in model schools, a Fujisawa City-tailored transport environment education program is being created, and deliberations are underway regarding sustainable implementation and promotion methods, materials, and the like in order to firmly establish the educational program.

Furthermore, the local governments supported in the years leading up to 2013 have reached the stage where educational efforts are being extended throughout their areas, so seminars have been held in Sapporo City, Hokkaido and Toyama City, Toyama prefecture.

Obihiro City



Fujisawa City



In 2014 support has also been provided to the following two elementary schools.

### ● Names of supported schools and educational themes

Supported school	Educational Theme	Subject	Classes	Year
Fukuyama City Municipal Ekinishi Elementary School	Elementary school TFP	Integrated studies	5 classes	5th graders
Fukuyama City Municipal Asahigaoka Elementary School	Elementary school TFP	Integrated studies	5 classes	5th graders



### ⑥ Eco-Products 2014 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 2014 data: Exhibitors: 747 companies and organizations. Visitors: Approx. 160,000. Eco-Mo Foundation booth visitors: Approx. 4,500)



## ⑦ 11th 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 reduced environmental load.

In 2014 Mazda Motor Corporation won the product category MLIT Award for its "SKYACTIV-D1.5 small Displacement Clean Diesel Engine," and Central Japan Railway Company won the service category MLIT Award for its "Development and Deployment of the Energy Saving N700A Shinkansen Train, Offering High Levels of Environmental Performance." The winners were presented with their awards at the Eco-Products 2014 Exhibition, held in December.

- 11<sup>th</sup> MLIT Award (product category)  
SKYACTIV-D1.5 small Displacement Clean Diesel Engine



- 11<sup>th</sup> MLIT Award (service category)  
Development and Deployment of the Energy Saving N700A Shinkansen Train,  
Offering High Levels of Environmental Performance



⑧ Promotion 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.

Not only to carbon offsets highlight the efforts being made by the companies which use them to combat 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 CO2 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 support systems

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



Taxi stand



Leaflet

## IV. Measures in Response to Other Environmental Issues

### 1 Noise related measures

#### (1) Automobile noise countermeasures

A study of motor vehicle noise environmental standard attainment status conducted in 2012 found that of the 6,645,000 homes studied, 494,000 (7%) had motor vehicle noise levels which exceeded environmental standards either during the day (6:00 a.m. to 10 p.m.), at night (10:00 p.m. to 6:00 a.m.), or both. 238,000 of the homes (4%) exceeded environmental noise standards both during the day and at night.

Of the 2,784,000 homes in areas along major arterial road, 344,000 (12%) exceeded environmental noise standards during the day, at night, or both. Of those, 162,000 (6%) exceeded environmental noise standards both during the day and at night.

Changes in the attainment of environmental noise standards must take into consideration changes in the homes studied 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 52,000 homes located in these areas, 7,000 homes (14%) 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: Tentative Translated by Eco-Mo Foundation of 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 homes.

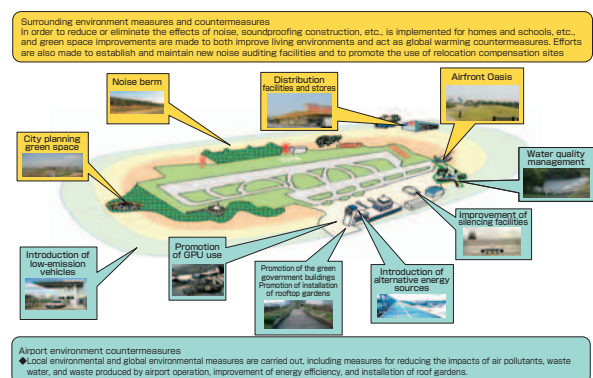
In the case of conventional railway line noise countermeasures, in accordance with the "Noise Countermeasure Guidelines Regarding the New Installation or Large Scale Modification of Conventional Railway Lines", railway operators are instructed to implement measures to ensure that noise levels do not 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, etc. is being performed on homes. 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.

In 2003 the Eco-Airport Guidelines were established in order to assist with environmental preservation and creation for airports and their surrounding communities. Based on these guidelines, eco-airport design is being implemented in airports through measures such as the creation of environmental plans for airports and their surrounding areas, and through support for the installation of Ground Power Units (GPUS).

### ●Eco-airport conceptual diagram



Source: Tentative Translated by Eco-Mo Foundation of MLIT

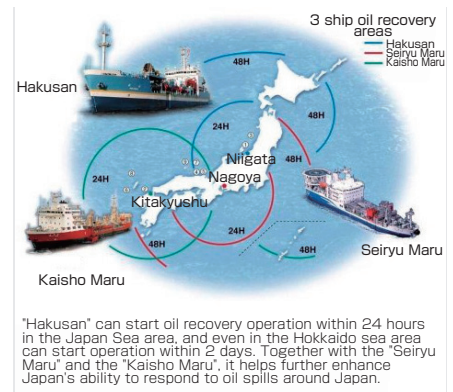
## 2 Sea pollution countermeasures

### (1) Large scale oil spill countermeasures

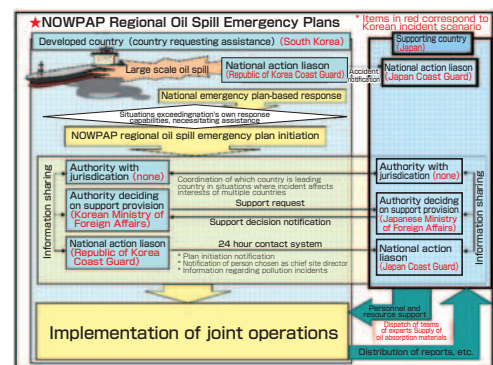
One of the major factors behind the large scale oil spills of recent years is the existence of ships which do not meet the standards set forth in marine safety and sea environmental conservation treaties (sub-standard ships). In order to eliminate these ships, Japan is participating in international 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.

Japan maintains three large dredging and oil reclamation ships to quickly reach and clean up oil spills in the seas around Japan. Furthermore, Japan, China, the Republic of Korea, and Russia have established a collaborative rapid response 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).

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



Source: Tentative Translated by Eco-Mo Foundation of MLIT



Source: Tentative Translated by Eco-Mo Foundation of Japan Coast Guard

### (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.

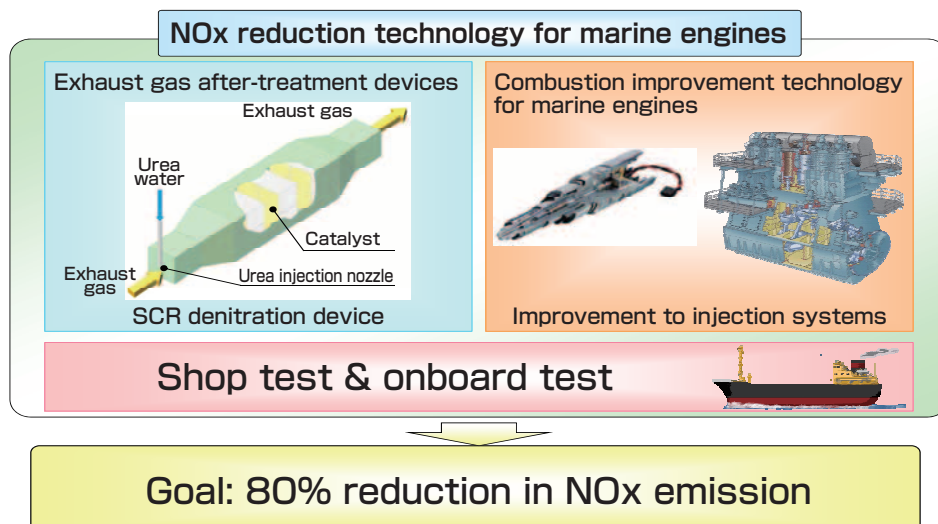
As of November 2013 nine ballast water management systems have been approved. The first unit of the "JFE Ballast Ace", a ballast water processing system developed by JFE Engineering Corporation and commercially released after being the first system to receive model approval by the MLIT, was installed in August 2010 in the Emerald Leader, a vehicle carrier owned by Nippon Yusen Kabushiki Kaisha. 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 countermeasures

Ships offer superior energy consumption efficiency, but they account for a large share of Japan's total nitrogen oxide (NOx) emissions. In order to respond to this problem and maintain compliance with regulations stipulated in international marine pollution prevention conventions Japan is developing technologies for use in ship emissions gas aftertreatment devices capable of significantly reducing the amount of NOx in exhaust gas, and researching and developing environmentally friendly diesel engines for ships, including methods for improving the combustion of engines themselves. For example, the compact high speed auxiliary engine SCR denitrification device, an aftertreatment device whose development began in 2007, was installed in a bulk carrier (95,000D/W) in 2010 and has successfully reduced NOx emissions. In March 2011 pilot testing began using an actual ship in order to meet NOx Tier 3 regulations (80% reduction from Tier 1) which the International Maritime Organization (IMO) plans to put into effect from 2016. A ship SCR denitrification device was installed in the main engine (1,491kW output) of an in-service cargo ship, and as a result the ship has achieved conformance with Tier 3 regulation standards. Also, to reduce the amount of emissions of gasses such as CO2, NOx, and SOx from berthing ships, efforts are also underway to have ships shut down their engines while berthed and use electrical power supplied from the land instead of power generated onboard the ship.

Furthermore, development is underway of an index (a 10 mode index for ships) for evaluating energy saving performance during the design phase of ship construction, with the aim of promoting the development and use of high fuel efficiency ships. Some of the results of this development have been used since July 2009 by the Nippon Kaiji Kyokai to provide environmental performance appraisal services for container ships. Expectations are high for the contributions of these services to the development and greater usage of high performance ships. Ships travel between countries, so ensuring the effectiveness of exhaust gas countermeasures requires the application of regulations arrived at by international consensus. Japan has revised laws such as the Act on Prevention of Marine Pollution and Maritime Disaster in response to revisions to the MARPOL Convention. Since July 2010 restrictions on the emissions of NOx from engines have been strengthened, and based on these new restrictions engine NOx emissions are being confirmed and regular ship inspections are being performed. Japan is also actively participating in IMO discussions on further exhaust gas restrictions.

● The development of environmentally friendly marine diesel engines



Source: Tentative Translated by Eco-Mo Foundation of MLIT

## Promoting the turning off of ships' engines when stopped!

### - Program launched in Hokkaido -

The turning off of ship engines when stopped is being promoted to improve the air environment by cutting emissions of gasses such as carbon dioxide (CO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), and sulfur oxide (SO<sub>x</sub>) in port areas. Instead of generating power on-board when berthed, ships use power supplied by facilities on land.

According to calculations by the MLIT Ports and Harbours Bureau, if all domestic vessels in Japan turned off their engines when stopped, it could reduce carbon dioxide emissions by 1 million tons per year, enough to fill the Tokyo Dome roughly 400 times.

The MLIT has worked together with the MOE on projects such as local power supply pilot tests at sites such as Takeshiba Pier since October 2006, and has confirmed their usability, electrical stability, and safety.

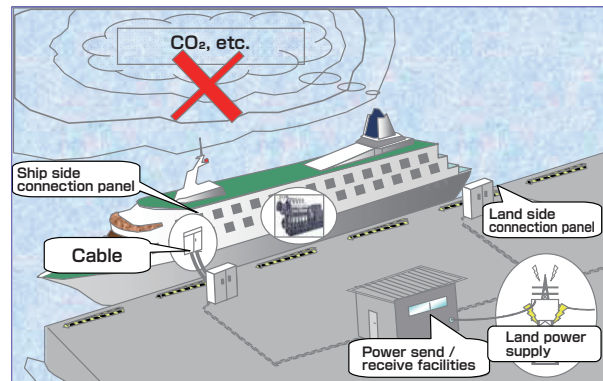
Engine shutdown experiments were carried out in 2009 at five ports across Japan, including Kushiro Port. Based on the results of these experiments, a project aimed at having ships shut down their engines when stopped has been implemented in Kushiro Port (Kushiro City) since May 2010.

This makes it the first public port in Japan to do this. This approach will be gradually extended to other ports in the future.

In December 2010 and February 2011 testing was performed at the Tomakomai West Port Ferry Terminal of loading power receiving equipment mounted in containers onto large ferries in cold and snowy areas, making it possible to supply the ferries with power without requiring large scale modifications of the ships themselves. This testing went extremely well, confirming the stability and operability of this approach.

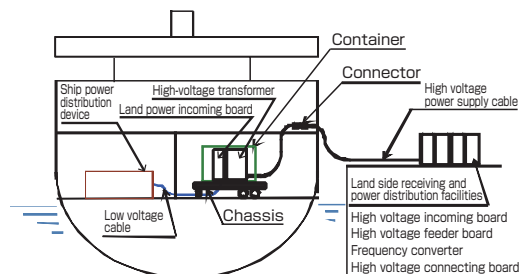
The West Port Ferry Terminal is used by over 40 voyages per week, so according to the Tomakomai Ports Office, if all of these ferries were to turn off their engines while stopped, carbon dioxide emissions could be reduced by 2,000 tons per year.

#### ●Ship idling reduction image



Source: Tentative Translated by Eco-Mo Foundation of MLIT

#### ●Supplying of power to large ferries in snowy and cold regions



#### ●Highly versatile power supplies using chassis (A chassis containing power incoming boards and transformers is placed in a container (tow trailer), loaded onto the ferry, and installed)



Source: Tentative Translated by Eco-Mo Foundation of The Tomakomaimimpo Co., Ltd.

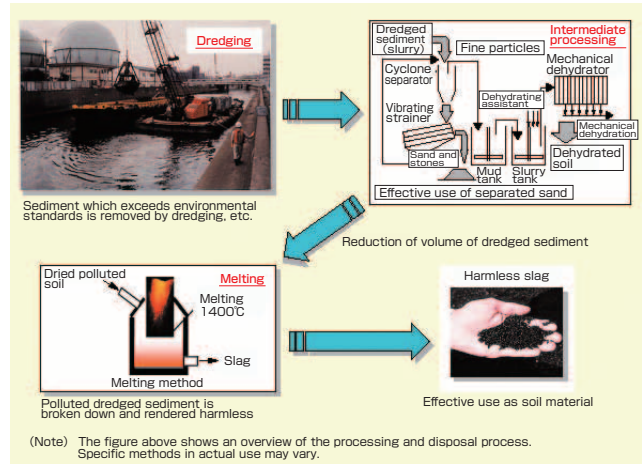


## 4 Chemical matters countermeasures

### (1) Dioxin, etc. countermeasures

Dioxins are produced when garbage and other matter is incinerated. 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: Tentative Translated by Eco-Mo Foundation of MLIT

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

### (3) Asbestos countermeasures

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

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

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

#### ● Asbestos countermeasure pamphlet



Source: Tentative Translated by Eco-Mo Foundation of MLIT

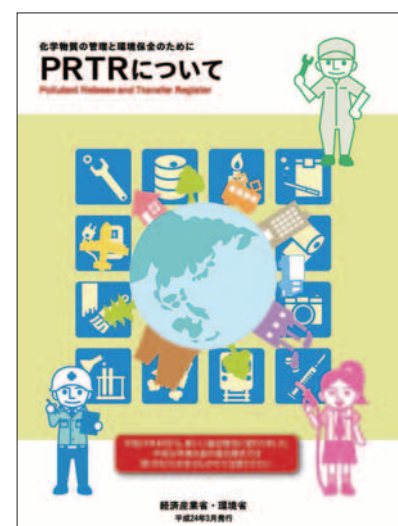
### (4) PRTR (Pollutant Release and Transfer Register) system

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

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

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

#### ● PRTR pamphlet



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

## 5 Ozone layer destruction prevention

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

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

The Act 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 reclamation of fluorocarbons from industrial air conditioning and refrigeration equipment and vehicle air conditioners.

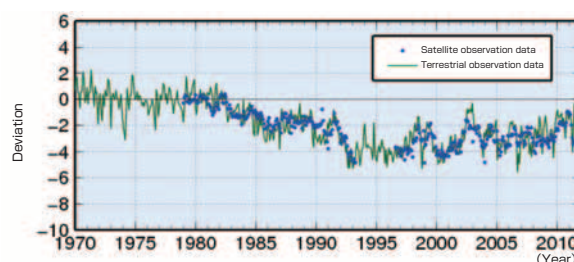
With regard to the reclamation of fluorocarbons from vehicle air conditioners and subsequent destruction, due to the fact that vehicle air conditioners are constituent components of automobiles, in January 2005 they were excluded from the scope of the Fluorocarbon Recovery and Destruction Act, and regulated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

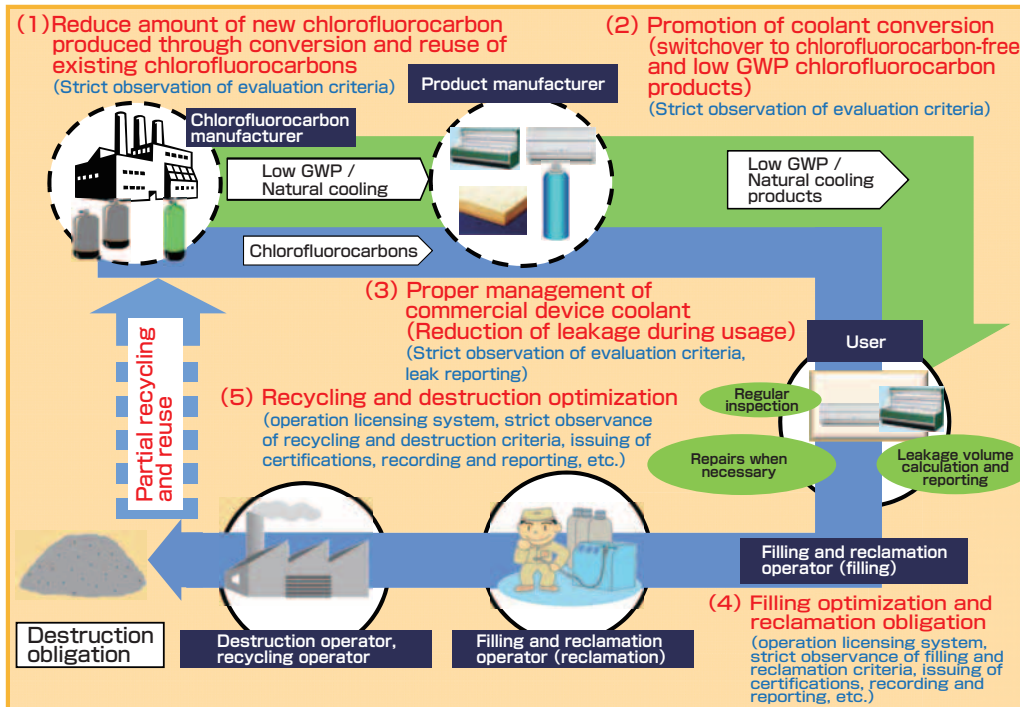
#### Amount of ozone worldwide

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 1970 to 1980 period. These value changes have been adjusted to eliminate the influence of seasonal variation, solar activity, and quasi-biennial oscillation (QBO) (cyclical stratospheric circulation changes which occur in a roughly two year period). 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 TOMS and OMI data supplied by the US National Aeronautics and Space Administration (NASA).

● Overview of the Fluorocarbon Discharge Prevention Act



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

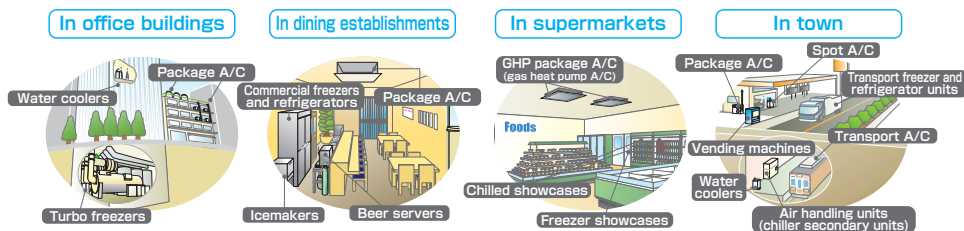
● Fluorocarbon Discharge Prevention Act pamphlet

## Fluorocarbons must be reclaimed whenever performing disassembly work!

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

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

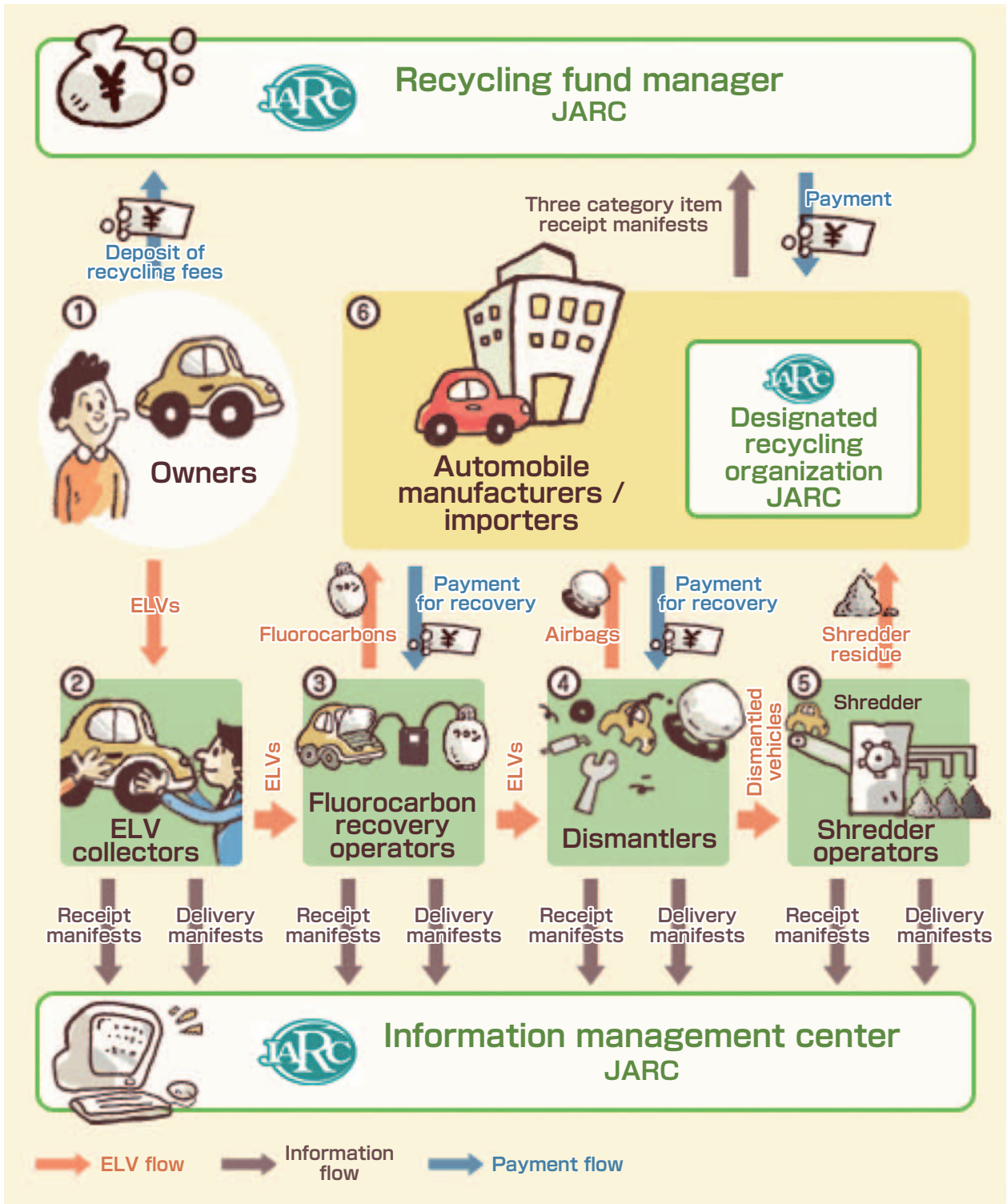
**Examples of devices which use fluorocarbons (commercial refrigerators, freezers, and air conditioners)**



The penalty for reckless releasing of fluorocarbons is incarceration for up to 1 year or a fine of up to 500,000 yen.

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

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



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

## 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 intensified. In addition to its previous ongoing efforts, the JMA is implementing the following measures in accordance with the "Strategic Policy Regarding Future Global Environmental Operations", formulated and announced in 2008.

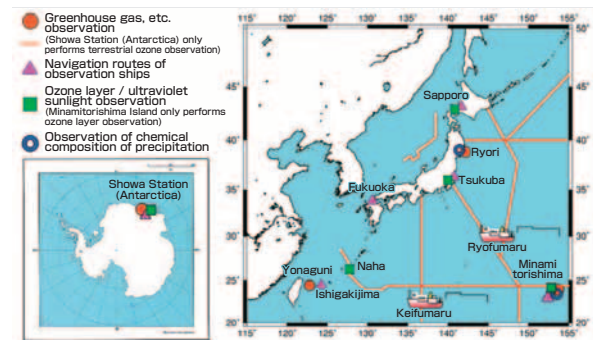
In order to assess greenhouse gas conditions, the amount of CO<sub>2</sub> in the atmosphere is being measured at three locations in Japan and the amount of CO<sub>2</sub> in the surface sea water and the air above the northwest Pacific Ocean is being measured by marine weather observation vessels. Furthermore, since 2009 precise sunlight and infrared radiation measurements have been performed at five locations in Japan.

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

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

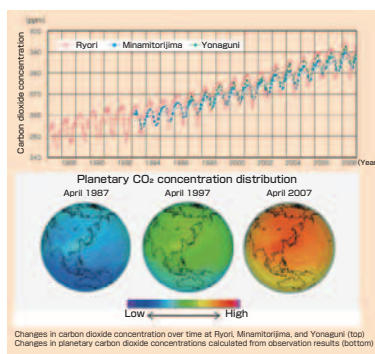
Climate change monitoring reports and anomalous weather reports are created based on observation results, and views on annual climate changes, anomalous weather, and global warming conditions and changes are also released.

#### ● Atmospheric environment monitoring network



Source: Tentative Translated by Eco-Mo Foundation of JMA

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



Source: Tentative Translated by Eco-Mo Foundation of MLIT

#### ● Climate change monitoring report

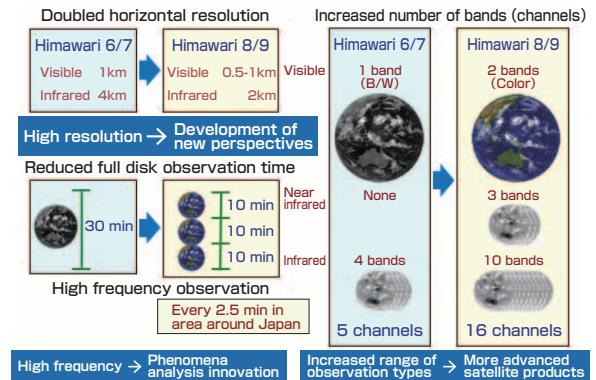


Source: JMA

## (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 2014, and after performing confirmation testing of its functionality while it orbit, it is scheduled to be put into operation in 2015. 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

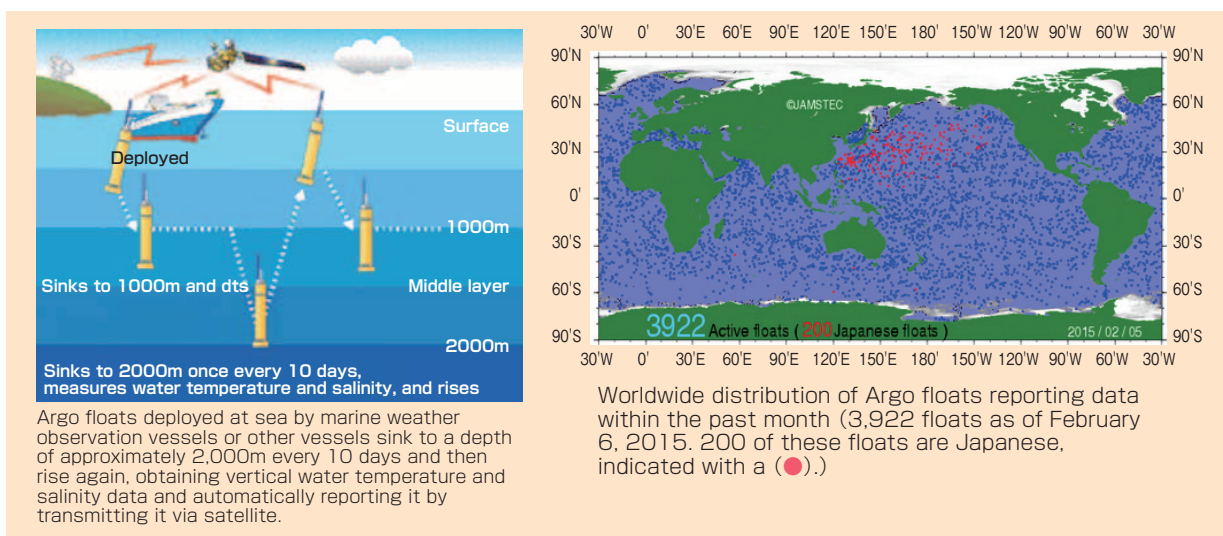


## (3) Sea observation and monitoring

The sea absorbs CO<sub>2</sub>, a greenhouse gas, and retains heat, moderating global warming. Sea changes are intrinsically linked to typhoons and anomalous weather conditions, so accurately assessing sea conditions is an important part of responding to global environmental problems.

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

### Overview of Argo project monitoring and Argo float distribution

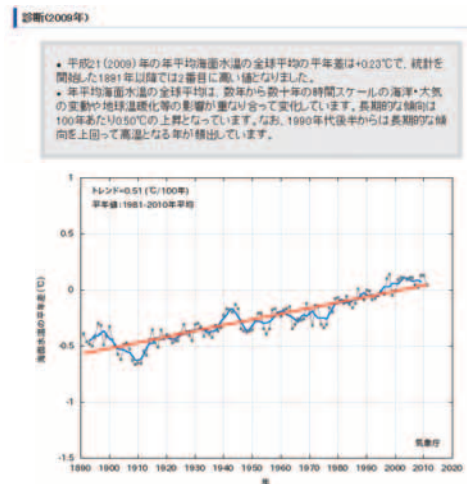


Source: Tentative Translated by Eco-Mo Foundation of MLIT and Japan Agency for Marine-Earth Science and Technology

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



Source: JMA

### (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.

### (5) Promotion of steady observation at the south pole

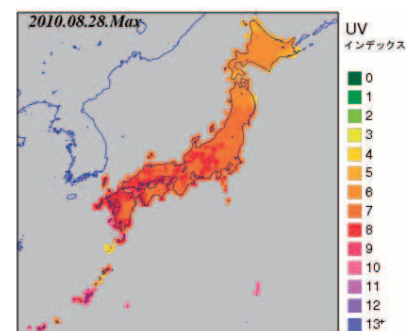
The Geospatial Information Authority creates topographical and other maps based on reference point measurements, gravitic measurements, continuous GPS observation, exposed rock area change measurements, and photographic measurements. The results contribute to research regarding global environmental changes 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 Station 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 intricately tied to global warming.

#### ● UV index (peak daily values)

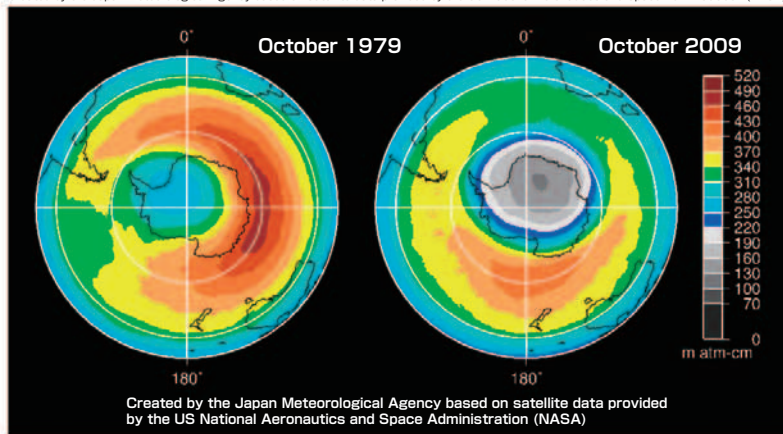


Source: JMA



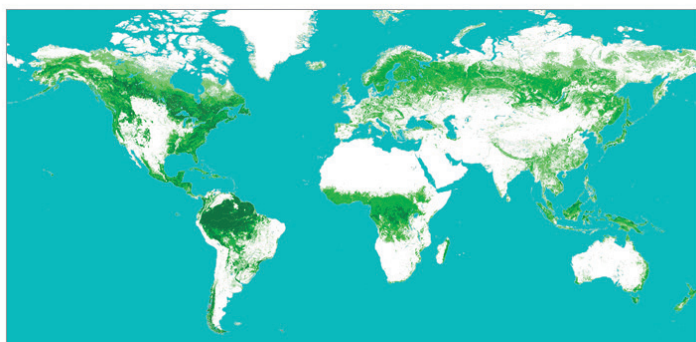
●Changes in the Antarctica ozone hole (1979 to 2009)

Distribution of average ozone levels in October in the southern hemisphere in 1979, before the southern hemisphere ozone hole appeared, and in 2009. The region with a concentration of 220m atm-cm or less is the ozone hole. Created by the Japan Meteorological Agency based on satellite data provided by the US National Aeronautics and Space Administration (NASA)



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

●World map (woodland coverage layer)



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Source: "Global Map Project" Website Management Committee

●World map

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