

Chapter 8 Creating and Preserving a Beautiful and Healthy Environment

Section 1 Promoting Global Warming Countermeasures

1 Implementing Global Warming Countermeasures

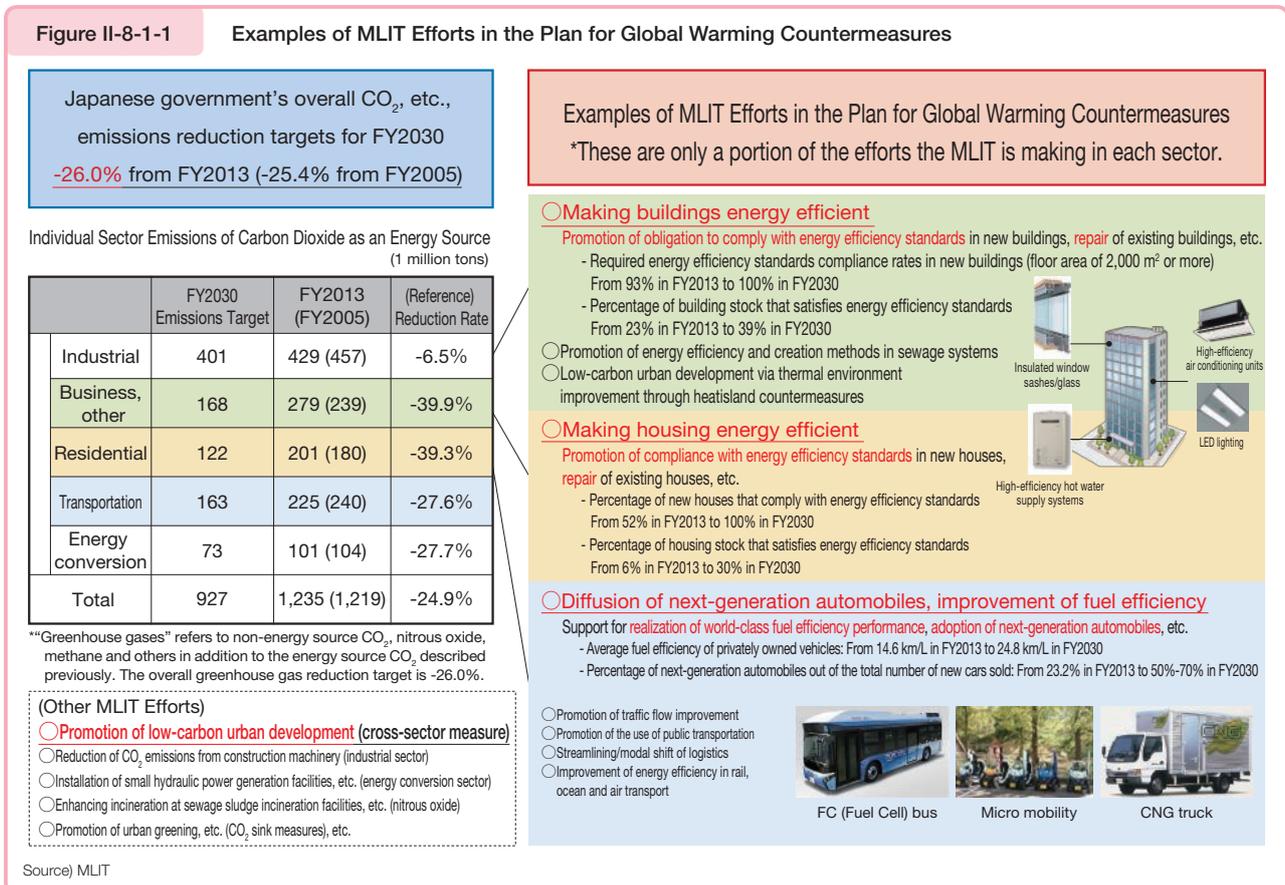
At the 21st session of the Conference of the Parties to the Framework Convention on Climate Change (COP21) held in 2015, the Paris Agreement was adopted as a new international framework for reducing greenhouse gas emissions beginning in 2020, with participation by all countries. The agreement went into effect in November 2016, and Japan is a signatory nation.

Based on the Paris Agreement, Japan adopted the Plan for Global Warming Countermeasures by a Cabinet decision in May 2016, and has committed to efforts toward the achievement of the mid-term objective to achieve a 26.0% decrease in the FY2013 level of greenhouse gases by FY2030, and as a long-term objective aims to reduce emissions 80% by 2050.

The MLIT has committed to a wide array of policy development initiatives for achieving the mid-term objective based on this plan, including making housing and buildings more energy efficient, measures for individual vehicles, and the promotion of low-carbon urban development.

In June 2018, the Bill to Partially Amend the Act on Rationalizing Energy Use, which includes provisions for certifying energy-saving efforts through the collaboration of multiple transport operators and allowing corporations to allocate used energy among themselves and report regularly, was promulgated, and entered into effect in December 2018.

In addition, we are working toward the promotion of adaptation measures based on the Climate Change Adaptation Plan (devised in November 2015), which was partially amended in November 2018, to counter the effects of climate change.



2 Promoting Global Warming Countermeasures (Mitigation Measures)

(1) Promoting Low-carbon City Development

In urban areas with a considerable concentration of human residents and buildings, low-carbon urban development plans produced by municipalities according to the “The Low-Carbon City Act” have been put into place from the standpoint of the desire to advance “low-carbon urban development” in accordance with consolidating urban functions, promoting the use of public transit in connection with this consolidation, and promoting green conservation and greening initiatives. Low-carbon urban development plans based on this law had been created in 24 cities as of the end of FY2018. Low-carbon urban development is being promoted through various special legal measures and tax programs for initiatives under such plans, as well as by other financial measures.

(2) Promoting the Development, Distribution and Optimal Utilization of Environment-friendly Vehicles

(i) Improving mileage of vehicles

Based on the Law Concerning the Rational Use of Energy (Energy Saving Act), we are formulating fuel efficiency standards and the like, and are striving to improve the fuel efficiency performance of automobiles. Fuel efficiency standards for next-generation passenger cars have been studied by the Automobile Fuel Efficiency Standards Subcommittee (a subcommittee of the Transportation Policy Council) since March 2018.

(ii) Framework for promoting improvements in fuel efficiency

To make it easier for consumers to identify and select vehicles that offer exceptional performance in terms of fuel efficiency, we have required automobile manufacturers and others to publish fuel efficiency information in their catalogs, and a program for evaluating and publicizing performance in terms of the fuel efficiency of automobiles is being run.

Stickers are affixed to vehicles to allow consumers to easily understand fuel performance in terms of fuel efficiency.

(iii) Promoting the dissemination of environmentally friendly vehicles

We are implementing tax breaks through tax reductions for eco-cars and the green tax system to promote the spread of automobiles that offer superior environmental performance. In the FY2019 revision to the taxation system, reviews of the reduction rate were performed for eco-car tax reductions, and the application period for such reductions was extended. Special measures to promote green transport were also extended in their current state for two years.

In addition, subsidies are being granted to truck and bus business operators for the acquisition of CNG automobiles^{Note}, hybrid vehicles, and advanced environmental diesel trucks. For ultra-lightweight vehicles, in May 2018, the Working Group for the Harmony of Ultra-Lightweight Vehicles with the Community, comprising specialists, formulated a road-map aimed at the full-scale spread and mass production of such vehicles, and compiled concrete measures for the future.

(iv) Development, application, and creating a usage environment for next generation heavy vehicles

Since FY2015, we have been pursuing scientific research to promote the development and commercialization of technologies related to high-efficiency, next-generation diesel engines and next-generation large-sized vehicles known as large-sized liquefied natural gas automobiles, from the standpoint of reducing carbon footprints and emissions, and have promoted initiatives toward the realization of this, including development of the necessary test methods.

(v) Promoting and disseminating ecological driving

MLIT has promoted holding symposiums and events all over the country in cooperation with the relevant ministries and agencies of the government and the District Transport Bureaus. We also worked on promoting and spreading ecological driving based on the “10 Reasons for Driving Ecologically.”

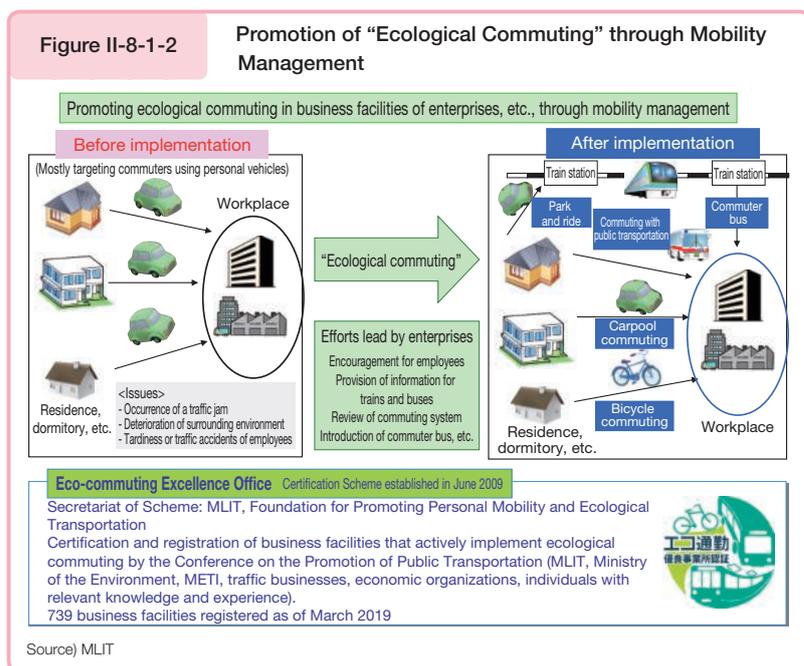
Note Compressed Natural Gas Vehicles (Natural Gas Automobiles)

(3) Promotion of Traffic Flow Improvement

Various traffic flow measures are being tried, since improving the driving speed by smoothing the traffic flow will improve the actual as mileage rate and decrease the carbon dioxide emissions from automobiles. Specifically, we are developing ring roads and other arterial road networks that are effective in reducing through-traffic in the urban center by providing them with alternate routes, working on grade separation of intersections and promoting serial railroad grade-separation projects to eliminate unopened grade crossings. In order to realize smooth, safe transportation services, we are also promoting initiatives for the smart use of roads in which the functions of the entire road network are used optimally, such as improving the maintenance of and making small-scale improvements to existing roads. In addition, we are improving the road environment to encourage the use of bicycles, and introducing LED road lights in order to reduce carbon footprint of road facilities.

(4) Promoting the Use of Public Transportation

The shift from private vehicles to public transportation, which is more energy efficient and emits less CO₂, is a necessary facet of global warming countermeasures. Thus we are helping to make public transportation more convenient by introducing an LRT/BRT system, promoting transitions to universally accessible stations, promoting the introduction of public transit IC cards and other computerization initiatives, and promoting the spread of eco-commuting at the business unit level through the use of an eco-commuting excelling business certification system. Furthermore, information analysis and validation results of past activities for the Environmentally Sustainable Transport (EST) Model Project are being provided.



(5) Optimizing Logistics

Exceeding 50% of the total domestic transportation modes in Japan, trucks account for the majority of the share ratio (ton kilometer basis in transportation). The CO₂ emissions base unit^{Note} of trucks is greater than that of mass transportation such as railroads and domestic shipping, and trucks account for 90% of the CO₂ emissions in logistics. In order to reduce CO₂ emissions while sustaining domestic logistics, we must strive to utilize energy efficient transportation modes such as railroads and domestic shipping in addition to improving energy efficiency and transportation efficiency of trucks. With a view to establishing an efficient system of logistics with a lower environmental impact, we are providing support for initiatives concerning efforts to promote the dissemination of freshness-preserving containers that leverage new technology and large CNG trucks and other environmental vehicles, smaller carbon footprints generated by logistical sites, ports and harbors, and the dissemination of energy-saving natural refrigerant equipment for use in warehouses for frozen and refrigerated goods. In addition, we are providing support for promoting joint transportation and modal shifts and for introducing new container freight cars capable of high speeds and advanced transportation performance, as well as working to revitalize coastal shipping and ferries through such efforts as promoting the construction of energy-saving ships. We are also working to disseminate the Eco Rail Mark (181 products (206 items) and 87 cooperating enterprises certified as of the end of September 2018), and the Eco Ship Mark (146 consignors and 164 logistics businesses enterprises certi-

Note The amount of CO₂ emitted by shipping 1 ton of cargo for a distance of 1km.

fied as of the end of March 2019). In ports and harbors that are a hub for maritime and overland transportation, we are endeavoring to reduce overland transportation distances for cargo by promoting the development of international maritime container terminals, international logistics terminals, and domestic logistics sites compatible with combined multimodal transportation. Furthermore, in ports and harbors, we are engaged in efforts to promote a modal shift and streamlined transportation efficiency through the use of ocean shipping for waste distribution, as well as the use of IoT equipment, the introduction of new systems for the sharing of positional information on chassis traveling within and in the vicinity of ports, and the promotion of the introduction of multi-container chassis, with the objective of reducing CO₂ emissions.

In addition, in cooperation with the relevant ministries and related organizations, we hold the Green Logistics Partnership Conference to give awards to the excellent operations through the collaboration of logistics operators and shipping companies and to raise public awareness.

Figure II-8-1-3 Promotion of Activities through the Green Logistics Partnership Conference

Green Logistics Partnership Conference (Manager: Takehiko Sugiyama, President, Express Highway Research Foundation of Japan)

- This conference was launched as a conference for promoting awareness of the importance of green logistics and stimulating interactions among cargo owners, logistics companies, and other concerned parties in order to advance CO₂ reductions in the logistics sector. Since FY2015, this conference has been promoting not just initiatives to reduce amounts of CO₂ emissions but also initiatives to reduce other burdens on the environment, improve the productivity of logistics, and otherwise contribute to the establishment of sustainable systems of logistics.
- Organized by: Ministry of Land, Infrastructure, Transport and Tourism; Ministry of Economy, Trade and Industry; Japan Federation of Freight Industries, Japan Institute of Logistics Systems
- Supported by: Japan Federation of Economic Organizations
- Established: April 2005
- Membership: 3,411 members (as of March 23, 2018) --- Logistics Companies, Cargo Owners, each of the industry associations, think tanks, research institutes, etc.
- Introduction and commendation of excellent businesses as well as holding discussions regarding Green Logistics aimed towards the expansion of voluntary efforts in the private sector aimed at reducing CO₂ emissions.

Summary of the awarded enterprises

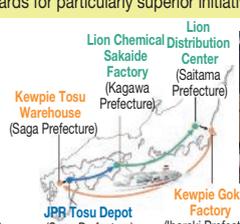
[Purpose] To encourage enterprises to autonomously engage in initiatives and promote the dissemination and growth of the concept of green logistics by recognizing meritorious achievements in connection with initiatives carried out to successfully reduce burdens on the environment in the logistics sector, improve the productivity of logistics, or otherwise establish a sustainable system of logistics.

[Types of Awards] Ministers Award, Director-Generals Award, and a Special Award have been created.

Ministers Award --- Award from Minister of Land, Infrastructure, Transport and Tourism; Award from Ministry of Economy, Trade and Industry
 Director-Generals Award --- Award from Ministry of Logistics Deputy from the Ministry of Land, Infrastructure, Transport and Tourism Secretariat; Award from Ministry of Commerce and Distribution Safety Deputy from the Ministry of Economy, Trade and Industry Secretariat
 Special Award --- Award on the level of the Ministers Award and the Director-General Awards for particularly superior initiatives

MLIT Awards Examples (FY2018)

- ◆ **Award from the Minister of the MLIT**
 Project name: Realization of new logistics in initiatives for round-trip arterial transportation by business operators in three industries
 Business operators: Japan Pallet Rental Corporation, Kewpie Corporation, Lion Corporation, KANKO KISEN Co., Ltd., KRS Corporation, Lion Distribution Services Corporation
- ◆ **Award from the MLIT Minister's Secretariat Deputy Vice-Minister of Logistics**
 Project Name: Maritime Transportation Using 27t Improved Gate-type (with Bellow) Ferry Chassis
 Business Operators: Maruyoshi Transportation Co., Ltd., JFE Shoji Trade Steel Construction Materials Corporation, Nippon Trex Co., Ltd., Kowa Management Consulting Co., Ltd.,
- ◆ **Green Logistics Partnership Conference Special Award (x2)**
 Project Name: "Modal Shift of Courier Cargo Using Dedicated Carriage TOYOTA LONGPASS EXPRESS"
 Business Operators: Sagawa Express Co., Ltd., Toyota Transportation Co., Ltd.
 Project Name: "Combined Passenger / Cargo Carriage and Joint Transportation Project Using Route Buses"
 Business Operators: Miyazaki Kotsu Co., Ltd., Japan Post Co., Ltd., Yamato Transport Co., Ltd.



Award of the Minister of the MLIT Examples
Round-trip arterial transportation by business operators in three industries



Award of the Minister of the MLIT

(Source) MLIT

(6) Promoting Low Carbonization of Railways, Ships, Planes, and Ports

(i) Initiatives contributing to further enhance environmental performance in the railway sector

While rail has a smaller environmental impact than other modes of transportation, we are promoting the adoption of railroad-related facilities tied to the Ministry of the Environment and systems that help railway carriages generate a smaller carbon footprint and save energy and promoting the development of technologies to help improve environmental performance in order to further reduce the impact that rail has on the environment.

(ii) Initiatives for energy conservation and low carbonization in shipping

We are promoting a shift to energy-saving, low-carbon ships in domestic shipping by promoting construction of energy-efficient ships and supporting the pilot projects on innovative energy-saving technologies. In international shipping, in order to accelerate measures to mitigate global warming, in April 2018, the International Maritime Organization (IMO)

adopted “Initial IMO Strategy on Reduction of GHG Emissions from Ships”, which includes the long-term target of phasing out GHG emissions as soon as possible in this century. In order to develop measures to achieve this target, Japan, as a major shipping and shipbuilding country, launched the Industry-Academia-Government collaborated International Shipping GHG Zero Emissions Project in August 2018. The aim of this project is to contribute to measures to mitigate global warming and the sustainable development of marine industries. During FY2019, this project will put together a road map for the development and dissemination of innovative energy saving and decarbonization technologies in order to realize zero GHG emissions as early as possible. In addition, this project will consider a new international measure to improve energy efficiency of existing ships, which will also have an effect to bring forward constructions energy-efficient new ships with a view of reaching an agreement at IMO within five years.

(iii) Initiatives to reduce CO₂ emissions in aviation

We are advancing the implementation of area navigation (RNAV), which enables shortening flight time and distance and the User Preferred Route (UPR)^{Note} method, which allows the flight to have the most efficient altitude desired by the pilot, as well as enhancing aerial traffic systems by implementing the Continuous Descent Operation (CDO) which sustains minimal engine output by continuously descending without leveling out at any point during descent. We also promote the use of ground power units (GPU) for airplanes and ecological cars such as Ground Service Equipment (GSE) vehicles as a part of Eco-Airport (eco friendly airport) activities. In addition, we are leading international discussions on the establishment of a CO₂ emissions trading system in the international aviation sector, which will begin in 2021, and are involved in the construction of an emissions reporting system for aeroplane operators, which will enter into effect in 2019, prior to the introduction of said emissions trading system in Japan. Furthermore, efforts to promote the use of sustainable aviation fuels are being conducted in collaboration with the various stakeholders.

(iv) Promotion of Comprehensive Low Carbonization at Ports

Toward the realization of carbon-free ports ahead of the world, we are engaged in the measures for CO₂ emission, which are the introduction of offshore wind power generation, the low carbonization regarding transport machinery such as ships, cargo handling machinery and trailers, and the introduction of on-shore power supply equipment. We are promoting the measures for CO₂ absorption through use of a blue carbon ecosystem (seaweed beds, etc.) that is created by effectively utilization of industrial by-products such as steel slag.

(7) Enhancing Energy-saving Capabilities in Housing and Buildings

The rise in the amount of energy consumed by the civilian sector is more prominent than in other sectors, which makes improving energy-saving capabilities in housing and buildings an urgent task.

In response to the fact that the basic energy plan will progressively mandate that new dwellings and buildings comply with energy-saving standards by 2020, the Act on the Improvement of Energy Consumption Performance of Buildings, which sets forth regulatory measures such as measures for mandating compliance with energy-saving standards for buildings above a certain size other than dwellings, entered into full effect in April 2017. In addition, with the objective of further improving the energy-saving performance of houses and buildings, the Draft Bill to Partially Amend the Act on the Improvement of Energy Consumption Performance of Buildings, which expands the scope of buildings subject to the requirement to comply with the energy-saving standards, was submitted to an ordinary assembly of the Diet in 2019.

In order to communicate energy-saving performance to consumers in an easy-to-understand manner, efforts are underway to upgrade and disseminate a housing-performance indication system, such as the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) and the Building Energy-efficiency Labeling System (BELS). Aside from this, the MLIT is supporting various efforts, such as the introduction of cutting edge CO₂ emissions-reducing technology and energy-saving renovation, as well as efforts by small and medium-sized contractors to work together to build ZEH (net zero energy housing) and certified low carbon buildings, while also lowering the interest rate by using the Japan Housing Finance Agency’s securitization support business framework. In addition, it is working for the development and dissemination of such things as the design and construction technology of energy-saving houses and buildings by holding workshops for design and construction professionals and providing support for the technological development of leading

Note User Preferred Route

private firms.

Furthermore, in order to stimulate energy-saving measures in preexisting establishments, we are formulating supportive taxation measures for renovation work toward energy conservation in already existing residences and buildings.

(8) Promotion of Energy-saving Methods in Sewage

The reduction of carbon monoxide is being advanced by the implementation of energy-saving measures such as high efficiency equipment for sewage treatment, and with new energy measures such as the processing of raw sewage into solid fuel, and the high temperature incineration of raw sewage.

(9) Promotion of Environmental Measures for Construction Machinery

The MLIT is implementing a system that gives approval for major construction machinery, such as hydraulic shovels and bulldozers, that meet fuel consumption standards for construction machinery, and added small hydraulic excavators to the scope of that application in April 2018. In addition, we are providing support for the purchase of such construction machinery.

(10) Implementation of CO₂ Sink Measures through Urban Greening

Urban greening is considered re-vegetation activities, which is subject to the greenhouse gas sink reports according to the Kyoto Protocol. Based on the basic plans for greening as formulated by the municipalities, we are promoting maintenance of city parks and the greening of communal facilities, such as roads and ports and private land.

MLIT is also working on public awareness regarding the meaning and effect of CO₂ sink measures by making cities more low carbon and green by mitigating the heat island phenomenon through improvement in the thermal environment by things like improving ground covering.

3 Promotion of the Use of Renewable Energy

According to the “Energy Master Plan” which was approved by the Cabinet in July 2018 and based on the fact that that the introduction of renewable energy is being expedited as much as possible, MLIT is promoting use of the energy potential in offshore wind-power at extensive infrastructure spaces like airport facilities, as well as rivers and streams, and the stable yet abundant sewage biomass.

(1) Promotion of the Use of Marine Renewable Energy

Surrounded by the ocean on all sides, Japan is blessed with abundant sources of marine renewable energy, chief among them offshore wind power. The occupation application system created in accordance with the revision of the Port Act in FY2016 was used to hold open applications and select an offshore wind power generation company for Kitakyushu Port and Kashima Port. In addition, we worked together with the METI to establish an Exploratory Committee for Offshore Wind Power Generation Facilities in Ports and Harbors to hold discussions toward streamlining the process of reviewing offshore wind power generation facilities and easing the burden on business operators based on the Electricity Business Act and the Port and Harbor Act. In light of these discussions, we revised technical standards for offshore wind power generation facilities, based on the Ports and Harbor Act, and devised a Uniform Commentary on Technical Standards for Offshore Wind Power Generation Facilities, and Guidelines for Reviews Regarding Construction of Offshore Wind Power Generation Facilities in Ports and Harbors in March 2018, as well as a Uniform Commentary on the Maintenance and Management of Offshore Wind Power Generation Facilities in March 2019.

In addition, since FY2018, in order to reduce the cost of the construction and installation of floating offshore wind turbine, the MLIT are promoting efforts for formulating guidelines on design and safety assessment for realizing simplification of floating structures and installation methods, while also ensuring safety.

With regard to the development of marine renewable energy power generation facilities, the MLIT has prescribed a framework for coordination with stakeholders, and in order to enable long-term private use of the sea, the Act on the Promotion of Use of the Sea for the Development of Marine Renewable Energy Power Generation Facilities was established in November 2018, and promulgated on December 7, 2018.

(2) Promoting Small Hydroelectric Generation

As initiatives toward an introduction promotion of renewable energy, the implementation of small hydroelectric generation by using rivers is being pushed forward. Specifically, MLIT is working on the thorough use of unused energy by the promotion of subsidiary power generating based on a registration system, providing project formation support by field contact points, technical support such as the provision of information in the study of small-scale hydropower facilities as well as support for the introduction of small-scale hydropower facilities at sediment control dams, as well as the proactive introduction of hydroelectric power generation facilities for dam management at dams directly controlled by MLIT.

(3) Promotion of the Use of Sewage Biomass

The MLIT is promoting the use of energy derived from sewage sludge and the use of sewage heat.

In May 2015, the Sewerage Act was amended, thereby allowing heat exchangers to be attached to sewage conduits by private businesses and mandating efforts to be undertaken by sewage administrators to reutilize sewage sludge as a source of energy or fertilizer. Through the use of PPP/PFI, we will promote the energy utilization of sewage sludge by the use of bio-gas and solid fuel, as well as the use of sewage heat as renewable energy heat.

(4) Promotion of Solar Power Generation Using Infrastructure Space

Based on the changes in energy supply and demand triggered by the Great Eastern Japanese Earthquake, and in addition to the effective utilization of the vast spaces of sewage treatment plants, ports and harbors, and airport facilities, steps have been taken to insure the installation and placement of solar power generation facilities by public entities in public infrastructure spaces, such as government buildings, and for private businesses that can install such facilities in roads and urban parks.

(5) Promotion of Contribution Towards the Hydrogen Society

With the need for hydrogen energy expected to expand in the future, such as fuel cells for residential use (introduced to the market in 2009) and fuel-cell cars (introduced to the market in 2014), MLIT is working on realizing a hydrogen energy fueled society by preparing a conducive environment for the manufacturing, storage/transportation and usage of hydrogen. The MLIT also intends to continue its efforts in collaboration with relevant ministries and agencies on the Basic Hydrogen Plan determined at the Cabinet Meeting on Renewable Energy and Hydrogen in December 2017.

(i) Promotion of dissemination of fuel-cell cars

The MLIT will support the fuel-cell vehicle introduction projects of private businesses and others in an effort to work toward the world's fastest diffusion of fuel-cell vehicles, and with the understanding that the diffusion of fuel-cell buses and other vehicles that are expected to create a relatively consistent demand for hydrogen is particularly important in the development of hydrogen supply infrastructure. For fuel-cell buses, introduction support was provided for 5 vehicles up to the end of FY2017 (all within Tokyo), and in FY2018, introduction support was provided for 13 vehicles in partnership with the Ministry of the Environment.

(ii) Initiatives for the commercialization of vessels powered by hydrogen fuel cells

Through a partnership between the MLIT and the Ministry of the Environment, we have promoted efforts towards the formulation of future roadmap for the expanded use of hydrogen on ships, including examining the various technical issues and response measures, as well as calculating the economic rationality.

(iii) Setting up a marine transportation system for liquefied hydrogen

Since FY2015, Kawasaki Heavy Industries and other companies have been producing hydrogen through the use of brown coal, an unutilized energy source in Australia, and implementing a project to establish a supply chain for transporting liquid hydrogen to Japan (METI Project to Demonstrate the Establishment of a Supply Chain for Hydrogen Derived from Unutilized Energy Sources (MLIT partnership project)).

Therefore, in order for the MLIT to establish a highly efficient and safe method of loading and unloading liquefied hydrogen, energy carriers associated with the Strategic Innovation Promotion Program (SIP) engaged in research and development since FY2014 on loading systems for liquefied hydrogen in collaboration with the Cabinet Office.

(iv) Promotion of the manufacture, use and application of hydrogen derived from sewage sludge

Sewage sludge is stable in terms of both quantity and quality, and is consolidated at sewage treatment plants. The proximity to urban areas and other characteristics of sewage treatment plants create promise for the realization of an efficient, stable hydrogen supply. Toward that end, we support the development and experimentation of hydrogen production technology at sewage treatment facilities to promote the manufacture, use and application of hydrogen derived from sewage sludge, which is a form of renewable energy.

4 Promotion of Global Warming Countermeasures (Adaptation Measures)

In regard to initiatives to prepare for the various impacts of climate change, these are being comprehensively and systematically promoted, based on the government’s Climate Change Adaptation Plan (adopted by a Cabinet decision in November 2018), which was formulated based on the Act on the Climate Change Adaption Act (Act No. 50 of 2018).

The MLIT, which is responsible for the development of safe and secure national land and regions, and oversees various fields, including the preservation of the land, made a partial amendment to the MLIT Climate Change Adaptation Plan (formulated in November 2015) in November 2018 to reflect the latest measures.

Based on the MLIT Climate Change Adaptation Plan, we are engaged in efforts to discuss and develop comprehensive adaptation measures regarding both structural and non-structural aspects in the fields of natural disasters (floods, landslides, storm surges, tidal waves, etc.) and water resources and aquatic environments, as well as efforts regarding measures based on the Outline of the Policy Framework to Reduce Urban Heat Island Effects, which contribute to the continuous monitoring of climate change and the delivery of forecast data and other information, and to adaptation measures in the fields of national and urban lifestyles.

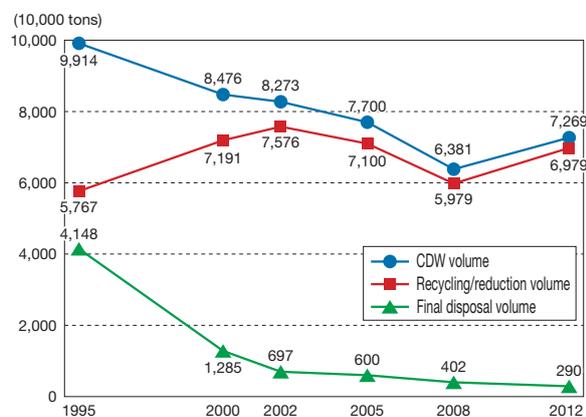
Section 2 Promoting the Creation of a Recycling Society

1 Advancing Recycling in Construction

Construction and demolition waste (CDW) excluding excavated soil accounts for approximately 20% of all industrial waste, and therefore, suppressing its generation and promoting its reuse and recycling are major tasks. In FY2012, the amount of CDW excluding excavated soil generated was reduced to 72.69 million tons, and the recycling/reduction rate was high at 96.0%. The impending era of maintaining and updating of social infrastructure will likely result in changes to the quality and quantity of construction byproducts, and therefore, we must promote further CDW recycling in the future.

Sewage sludge also accounts for 20% of all industrial waste, reaching approximately 78.07 million tons in FY2015. We are working on recycling and reduction of sewage sludge.

Figure II-8-2-1 Trends in CDW Volume, Recycling/Reduction Volume and Final Disposal Volume, and Recycling Rates by Item



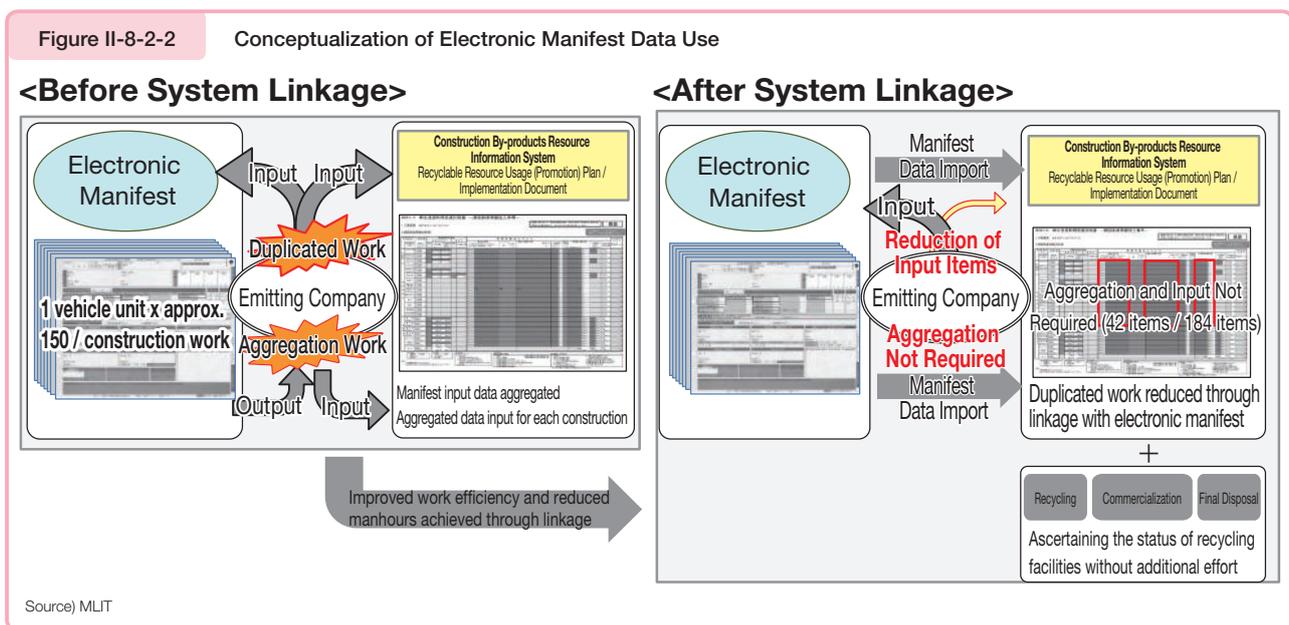
Item		FY2012 Actual	FY2018 Target
Pieces of asphalt concrete	Recycling rate	99.5%	99% or more
Pieces of concrete	Recycling rate	99.3%	99% or more
Woodchips generated by construction	Recycling/reduction rate	94.4%	95% or more
Construction sludge	Recycling/reduction rate	85.0%	90% or more
Construction waste	Generation rate	3.9%	3.5% or less
	Recycling/reduction rate	58.2%	60% or more
Overall CDW volume	Recycling/reduction rate	96.0%	96% or more
Excavated soil	Efficient use rate	—	80% or more

Source) MLIT, Construction Recycling Promotion Plan 2014

(1) Advancing Recycling in Construction

Based on the “Construction Material Recycling Act (Construction Material Recycling Law),” we are working to enforce proper measures through a simultaneous patrol throughout Japan. In September 2014, the MLIT developed the Construction Recycling Promotion Plan 2014, which sets out our basic approach, targets and specific policies for promoting CDW recycling. We have been working on various policies throughout the plan period, which ends in FY 2018.

Specifically, we will work intensively on fortifying the monitoring of construction byproduct logistics, prevention before the start of construction, promoting recycling/reduction by thorough on-site sorting and carrying out to recycling facilities, promoting the use of recycled materials, and promoting the efficient use and appropriate disposal of excavated soil. As a means for the enhanced monitoring of construction by-product logistics in particular, we have been examining the use of electronic manifest notification information since FY2017, have streamlined the work for various notices, based on existing regulations, and have examined mutual cooperation initiatives targeted at the promotion of work reform.



(2) Reducing Sewage Sludge and Promoting Recycling

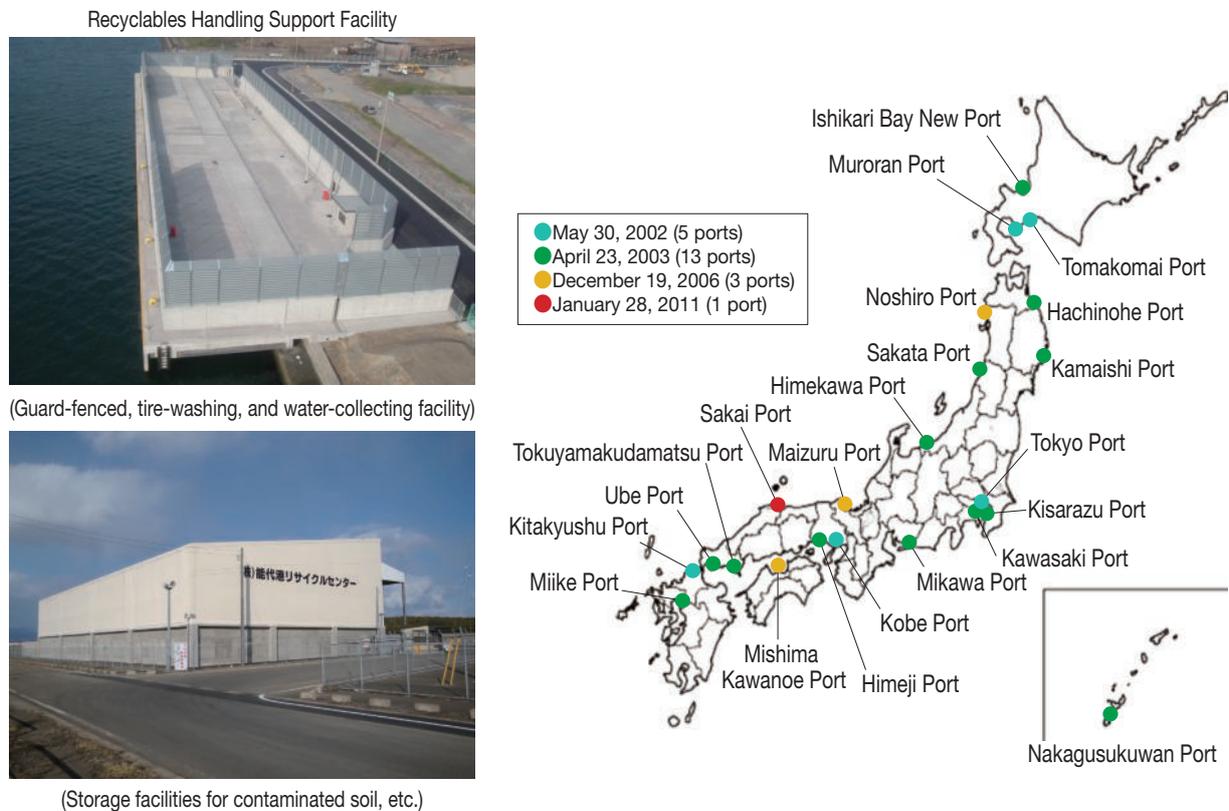
MLIT is promoting the recycling of sewage sludge (FY2017 recycle rate 73%) and moving forward with the use of sewage sludge made into solid fuel for energy. Furthermore, we are proceeding with the Breakthrough by Dynamic Approach in Sewage High Technology Project (B-DASH Project) for proving innovative technology and systems for the effective use of sewage based resources.

2 Constructing a Logistics System for Recyclable Resources

(1) Forming a Logistics System for Recyclable Resources by Sea

In order to form the “loop” of recyclable resources for creating a sound material-cycle society, MLIT have specified 22 ports throughout Japan as Recycle Ports (Integrated Reverse Logistic Base Port) for wide-spread flows concerning recyclable resources. At the Recycle Ports, they undertake activities such as securing coastal facilities like wharfs, aiding in establishing recyclable resources handling support facilities, promoting the public-private partnership, and improvements in operations related to handling recyclable resources. MLIT have partnered with the Ministry of the Environment to engage in efforts to promote modal shifting and lower the carbon footprint and costs of reverse logistics through improvements in transportation efficiency through the “Project to Promote Low-Carbon Type Reverse Logistics by Model Shift / Transport Efficiency.”

Figure II-8-2-3 Specified Recycle Ports



(2) Systematic Acquirement of Bay Area Landfill Sites for Waste

Bay area landfills are being prepared in order to receive dredge soil produced by harbor improvement, or to receive waste materials that have difficulty finding final landfill sites. In the Osaka Bay area in particular, regional waste disposal sites are being developed to receive waste generated around the Osaka Bay area through the Osaka Bay Phoenix Project^{Note 1}. Construction-generated soil generated in the Tokyo Metropolitan Area is transported by sea and used widely for land-reclamation purposes in ports and harbors across the country in accordance with the Super Phoenix Plan^{Note 2}.

Note 1 Business to promote the orderly development of the port by properly disposing in the sea landfill the waste generated from the 6 prefectures and 168 municipalities of the Kinki region.

Note 2 A mechanism for coordinating excavated soil from the Greater Tokyo area on a national level toward effective use as a resource for port construction at ports that require landfill materials

3 Recycling Vehicles and Marine Vessels

(1) Recycling Vehicles

In accordance with the Act on Recycling, etc., of End-of-Life Vehicles (Act for Automobile Recycling), a system for confirming that end-of-life vehicles are properly recycled is being implemented. When a vehicle registration is deleted, as provided for in the Road Transport Vehicle Act, the vehicle weight tax will be subject to a refund program. We are endeavoring to promote the proper disposition of used vehicles and prevent illegal dumping. In FY2016, vehicles confirmed to have been scrapped numbered 1,367,951.

(2) Recycling Marine Vessels

The recycling of large vessels (ship recycling)^{Note 1} has generally been conducted in developing nations such as India and Bangladesh, where industrial accidents, environmental pollution and other problems continue to raise concern. In order to solve these issues internationally, Japan led discussions and convention drafting at the International Maritime Organization (IMO) as a world leader in shipping and shipbuilding, which resulted in the adoption of the 2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (Ship Recycling Convention).

In order to secure its obligations under this convention, Japan promulgated the Act on the Proper Implementation of Ship Recycling and Dismantling in June 2018, and concluded the convention in March 2019. This act will be enforced in line with the convention.

Toward the early entering into effect of the convention, Japan, as an initiative to promote the early conclusion of the convention by India, which is a major recycling country, provided support for the improvement of ship recycling facilities in that country. At the Japan-India Summit Meetings held in 2017 and 2018 as well, Prime Minister Shinzo Abe called on Prime Minister Narendra Modi to sign the convention in the near future, and reconfirmed India's intention to conclude the convention at an early stage.

The requirements for the efficacy of the convention are (i) participation by 15 or more countries, (ii) the total number of merchant vessels in convention companies being 40% or more, and (iii) the total maximum annual recycling volume in the convention countries over the past 10 years being 3% or more of the commercial vessels of the convention country; as of the end of March 2019, the current situation for these three targets was (i) 10 countries, (ii) 23.4%, and (iii) 0.32%^{Note 2}.

Pleasure boats, however, are made of FRP (fiber reinforced plastic), and are very difficult to recycle. Therefore, led by the Japan Marine Industry Association, the FRP Vessel Recycling System, which uses a broad recognition system based on the Waste Disposal Act, was constructed, making it possible for FRP vessels to be recycled as cement-firing materials. At the current time, approximately 500 vessels are being recycled across Japan each year under this system.

4 Efforts in Green Procurement ^{Note 3}

In light of partial revisions to the basic government policies, based on the “Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities (Law on Promoting Green Purchasing),” the “Policy for promoting the procurement of ecologically friendly goods, etc.” was adopted. Based on this, we are actively advancing the procurement of ecologically friendly goods for building materials, construction machinery, method of construction, and objectives in public construction work.

Note 1 Vessels that have reached the end of their operational use are dismantled, and the majority of the parts are reused as steel.

Note 2 Calculated using 40% of global merchant ship volumes in 2017.

Note 3 Here, Green Procurement refers to procuring eco-friendly goods as defined in Article 2 of the Green Purchasing Law.

5 Promoting the Use of Wooden Materials

Because wood is an environment-friendly building material due to reasons such as requiring less energy to process in comparison to other materials, and long-term utilization in various applications contributing to preventing global warming and forming a recycling-oriented society, we strive to encourage the utilization of wooden materials in public construction.

Based on the “Act for Promotion of Use of Wood in Public Buildings”, etc., MAFF and MLIT publish the implementation status of the promotion and usage of wood every year, and MLIT endeavors to use wood for the structure and/or interior of Government buildings, establishes technical standards concerning design and construction methods for wooden Government buildings. Furthermore, MLIT endeavors to disseminate the preceding standards.

In order to advance the construction of wooden dwellings and buildings, various initiatives are being undertaken, such as supporting the construction of long-lasting quality housing built out of local wooden materials as well as other high-quality wooden housing; supporting the construction of medium-sized and large wooden buildings incorporating pioneering design and construction technologies; supporting the construction of wooden dwellings suited to regional climates; developing local programs for the production of wooden housing; and training leaders.

Figure II-8-2-4

Example of a building using wood:
Wakayama Government Office Building



Source) MLIT

Section 3 National Land Development That Revives and Preserves the Natural Environment

1 Initiatives for Biodiversity Conservation

COP 10 was held in Nagoya, Aichi Prefecture of Japan in October 2010, where the Strategic Plan 2011 - 2020 (Aichi Targets) was adopted. In order to achieve these targets, MLIT has promoted various actions in nation-wide level. “The National Biodiversity Strategy 2012 - 2020” was formulated in September 2012, which aims at the conservation, restoration, and creation of wildlife habitats in rivers, urban green areas, coastal areas, and harbors. In addition, the “Technical Guidelines for Biodiversity Conservation in the Basic Green Plan” were formulated in October 2011, as reference material for use in the formulation of a Basic Green Plan for each municipality. A draft of the Urban Biodiversity Index, a metric for evaluating the state of biodiversity and policy progress in local governments, was formulated in May 2013, and a simplified version of the index, which enhances its ability to illuminate and evaluate the state of efforts more easily, was formulated in November 2016. In addition, the “Guidebook on the Formulation of Basic Green Plans in Consideration of Biodiversity” was created in April 2018 in order to promote the formulation of basic green plans to secured urban biodiversity, based on past results. Furthermore, in March 2015, the MLIT, together with Ministry of the Environment and Ministry of Agriculture, Forestry and Fisheries, formulated the Action Plan for Protection from Alien Species, which aims to promote the management of Alien Species comprehensively and effectively, as well as the conservation and sustainable use of rich biodiversity in Japan.

2 Creating Rich and Beautiful River Environments

(1) Creating and Conserving a Healthy River Environment

(i) Creating a rich river environment and stimulating revival

In river development, based on the “Basic Guideline for Rich River Development (established in October 2006),” we work for the conservation and restoration of animal habitats and diverse river scenery, while concurrently sustaining

safety over flood control.

While promoting the restoration of marshland by nature restoration projects and the improvement of the upstream and downstream migration environment for fish by fixing the fish passage ways, we are also promoting the protection and restoration of the watershed ecosystem with the goal of forming an ecosystem network^{Note} by cooperating with various entities, as demonstrated in the project of rehabilitating storks to the wilds in Maruyama River (Toyooka City, Hyogo Prefecture).

Moreover, to effectively proceed with these activities, we are joining efforts with educated experts and various institutions, as well as utilizing research findings of government inspections of river areas and the Aqua Restoration Research Center, which has the largest experimental waterway in the world.

(ii) Countermeasures for non-native species in the waterways

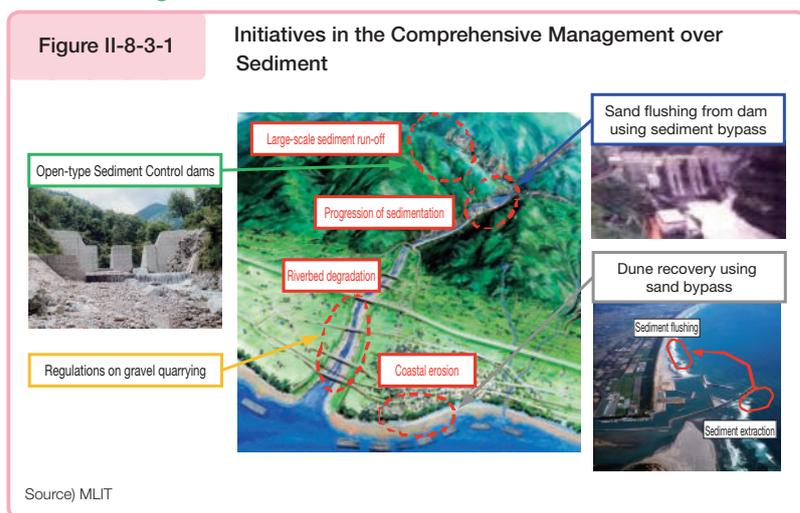
Non-native species, which are one of the threats against biodiversity, have been expanding their habitat in the waterways all over Japan. As a countermeasure, we have circulated information such as the “Guideline for Countermeasures for Nonnative Plants in Rivers” and “Examples of Countermeasures for Non-native Fishes (December 2013)” and are implementing measures against foreign species in various locations.

(2) Initiatives to Recover the Water Supply in Rivers

In order to preserve a healthy river environment, it is essential to sustain a rich supply of water. For this reason, we have specified the required amount of water in the basic policies for river improvement, based on the habitat of plants and animals, scenery, and water quality. In addition to working to sustain the supply, we are proceeding with activities for clean river recovery in recession areas downstream from dams of hydroelectric power plants. Meanwhile, in order to preserve the river environment downstream of dams, flowing water is being retained in flood-control reservoirs to the extent that flood-control functions are not impeded and usable discharge dams are subject to elastic management practices and elastic management testing. (Water was retained using twenty-three dams in total in FY2018, eighteen of which were subject to the usable discharge of water.) Initiatives concerning medium-sized flash discharging to cause changes in river formations are also being undertaken. Furthermore, we are working to restore the water supply of rivers in urban areas, where the average amount of naturally flowing water has diminished, by pumping treated water from sewage plants.

(3) Promoting Activities in the Comprehensive Management of Sediment from Mountains to Coastal Areas

Concerned that water systems will accelerate problems such as variation in river environments caused by changes in sedimentary transport, diminishing sand supplies to the coast, and coastal erosion caused by changes in littoral drift, relevant institutions are working in cooperation to comprehensively control sediment transport from mountains to coastal areas. Specifically, in order to deal with the problem caused by the sediment transport in mountain streams, dams, waterways and the coasts, in cooperation with the relevant organizations, MLIT is working on projects for formulating comprehensive sediment management plans for effective sediment management and building sediment control dams, building open-type sediment control dams so that sediment can be effectively washed downstream, improving existing sediment control dams, creating an effective flow of sediment by sediment bypasses for dams, and recovering of sandy beaches by such methods as appropriate sand and gravel extraction of the waterways, sand bypass and littoral nourishment.



Note Using districts that have excellent natural conditions as core areas and connecting them organically to ensure the appropriate placement and connections between habitat spaces

(4) Environmental Education on Rivers

Rivers, as natural environments close to communities, have been the site of a variety of activities, such as environmental studies and natural experience activities. Because there are hidden dangers, and proper knowledge is essential for children to play and learn safely at rivers, we cooperate with the NPO River Activities Council (RAC), an organization established mainly by citizens' groups, to promote the cultivation of river administrators.

Also, in order to widely disseminate environmental education on rivers in the schools, the MLIT is providing information to textbook publishers to introduce environmental education projects.

○ Children's Riverside Rediscovery Project

With the cooperation of citizens' groups, educators, and river administrators, rivers are registered as Children's Riversides and receive various means of support from the Center for Supporting Children's Riverside Activities. As of the end of March 2018, 302 locations had been registered.

○ Riverside Fun School Project

Waterfront development required for enhancing experiential activities is being conducted at registered Children's Riversides. As of the end of March 2018, 287 locations had been registered.

○ National Aquatic Organism Study

Conducted with the goal to increase interest in rivers through a survey of life forms found in nearby rivers. In FY2017, 54,981 people participated. 63% of the inspection points (2,004 points) were judged to have "clean water."

3 Preserving and Improving Coastal Environments

Because we must preserve animal habitats, care for scenery, and sustain appropriate usage of beaches, while protecting the coast from storm surges, tsunamis, and high waves, we are proceeding with maintenance and conservation that balances between "defense," "environment," and "usage."

In addition, based on the Law for Protecting Beautiful and Rich Nature through the Promotion of Disposing Beached Coastal Waste Contributing to the Preservation of Coastal Scenery and Conservation of the Environment (Coastal Waste Disposal Promotion Act), we are working in close cooperation with relevant organizations to promote effective measures against beached waste and the like.

We are also providing support to administrative agencies for coasts under the "Project for Emergency Measures to Dispose of Large-Scale Driftwood and Other Debris Items that have Washed Ashore in Connection with Disasters" when large quantities of driftwood and other debris are washed ashore and impede the functions of coastal protection facilities.

We are also providing support for the processing of neglected and stranded vessels and the removal of slime that abnormally accumulates in sea areas in order to secure the functions of coastal protection facilities, conserve the coastal environment, and facilitate the proper use of coastal areas.

4 Greening Port and Harbor Administration

(1) Basic Direction of Future Port and Harbor Environment Policies

In order for ports and harbors in Japan to uphold their position as grounds for logistics, industry and living, and sustain continual growth, they must recover as much degraded or lost nature as they can, and incorporate environmental conservation in various port functions. For this reason, we are working towards greening port administration, which involves the two parts of port and harbor development and utilization, and conservation, revival, and creation of environments in to one consolidated subject.

Figure II-8-3-2 Greening Port and Harbor Administration



Source) MLIT

(2) Actively Preserving, Reviving, and Creating a Healthy Sea Environment

We strive to efficiently utilize dredged sediment derived from harbor maintenance, by usage in creating tidal flats, sand capping, filling pits from deep digging, and disseminating port facilities that can coexist with organisms. At the same time, various organizations such as administrative agencies and research institutes will register environmental data and construct a sharable database on the ocean environment; gathering, accumulating and analyzing data. Together, we actively work to preserve, revive and create a rich natural environment in coastal areas.

In addition, the “Seaside Nature School,” which utilizes the areas preserved, revived or created, is being held in various locations throughout Japan as an effort to create opportunities for learning the importance of the natural environment.

(3) Initiatives in Measures for Preventing Illegal Boat Parking

As there is concern that parked boats may mar the scenery, affect the navigation of other vessels, and cause secondary damage in the event of a tsunami, regulatory measures are being implemented, such as by improving the mooring and storage capacity of small vessels and by designating no-parking zones.

Mainly aquatic area administrative agencies and others are promoting efforts toward various measures for preventing illegal boat parking, based on the a promotion plan consisting of comprehensive measures for properly managing pleasure boats and improving their usage environment, which was formulated in May 2013.

5 Greening Roads and Promoting Natural Environmental Measures

Greening roads is crucial for providing a comfortable atmosphere for those who use them, creating favorable scenery that matches the surrounding scenery, and as a countermeasure against heat island effects. To this end, we are promoting the favorable greening of roads and the appropriate management of this process in accordance with technical standards pertaining to the greening of roads. Based on recommendations provided in October 2016 by the Commission for Athlete-/Spectator-Friendly Road Development, whose membership included scholars and experts in athletic competition, we are also endeavoring to green roads and initiatives for comprehensive measures to keep road surface temperature from rising in preparation for the Tokyo Olympic and Paralympic games in 2020.

Figure II-8-3-3

Example of Greening Roads
(Chiyoda-ku, Tokyo)



(Source) MLIT

Section 4 Maintenance and Restoration of Sound Water Cycles

1 Aiming to Maintain a Society in which the Benefits of Water Can Be Savored for a Long Time to Come

In recent years, water resources in Japan have been exposed to new risks and issues, including serious water shortages, large-scale disasters including earthquakes, and the aging of the water infrastructure.

In light of these circumstances, we have promoted a transition in water resource policy, from the demand-driven promotion of water resource development to a risk management-oriented stable water supply. Based on the May 2017 report of the National Land Development Council, we decided to drastically revise the Master Plans for Water Resource Development at seven major river systems, which cover roughly half of the Japanese population. We started advance deliberations on drastic plan changes in February 2018 in regard to the Yoshino River System, which is in particular need of a swift transition to risk management-oriented policy, as it is facing the most frequent water shortages of the seven river systems. In FY2018, the National Land Development Council Water Resource Development Subcommittee and the Yoshino River Association held multiple discussions, resulting in improvements being made to water demand forecasting methods in consideration of uncertainties that arise in the social economic situation and water supply process; inspections being conducted on balancing supply and demand of water at times of critical water shortages; and a draft basic plan including measures for such matters being formulated. The new plan was decided on by the Minister of Land, Infrastructure, Transport and Tourism upon being passed by a Cabinet decision in April 2019.

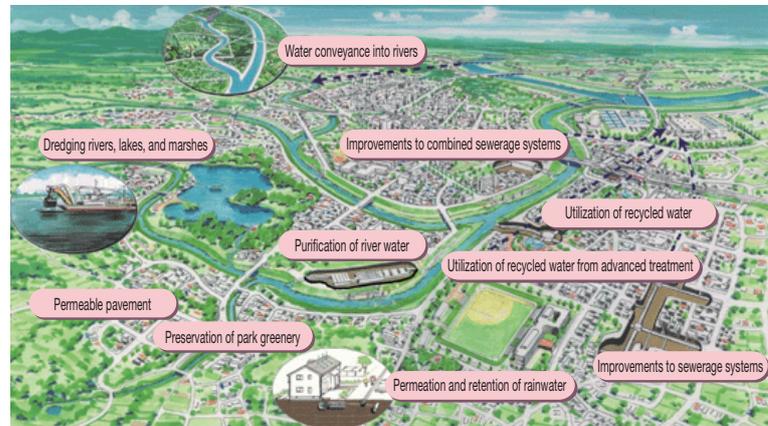
These revisions are expected to ensure the minimum required water quantity during crises through the integrated promotion of necessary non-structural measures and structural measures involving the rigorous utilization of existing water infrastructure.

2 Initiatives in Improving the Water Environment

(1) Promoting Water Purification

The MLIT is implementing purification of contaminated water in rivers with seriously deteriorated water environments and water purification of dredged bottom mud. In addition, the local municipalities that are proactively working on the water environment improvement and related institutions, such as river administrators and sewage work administrators are working together to formulate the “Second Water Environment Improvement Urgent Action Plan (Clear Stream Renaissance II)” and implementing the plan (formulated in 32 locations).

Figure II-8-4-1 Clear Stream Renaissance II



Source) MLIT

(2) Water Quality Survey and Water Quality Accident Response

Water quality surveys are vital in conserving and maintaining a favorable water environment. In 2017, surveys were done at 1,080 locations on 109 water systems of Class A rivers.

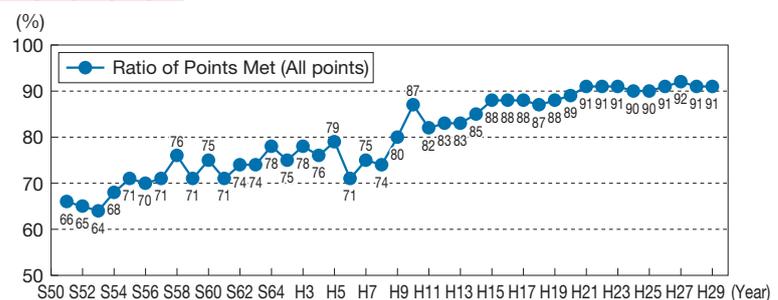
The MLIT is creating water quality survey maps and conducting surveys of aquatic organisms in cooperation with citizens. As a result of surveys being conducted on Class A rivers in cooperation with the local residents — which were based on indices such as the amount of garbage and on odor — in 2017 approximately 20% (59 locations/299 locations) were judged to be “rivers that look clean enough for swimming.”

In 2017, there were 865 water quality accidents in Class A rivers due to spillage of oil and chemical substances, a decline of 104 from the previous year. In terms of water pollution prevention, Water Pollution Prevention Liaison Councils composed of river administrators and related institutions have been put in place for all 109 waterways, and they are working on prompt information communication for incidents of water quality accidents as well as damage prevention by building oil fences.

- For Class A Rivers (including lakes and coastal areas), the proportion of survey sites that met the environmental standards for BOD (biochemical oxygen demand) or COD (chemical oxygen demand) value was approximately 91% in 2017.

- For environmental standard items relating to the protection of human health (27 items such as arsenic), the proportion of survey sites that met the environmental standards was approximately 100%, with most sites meeting the standards.

Figure II-8-4-2 Ratio of Survey Locations on Class A Rivers (Including Lakes and Coastal Areas) where BOD (or COD) Value Met Environmental Standards



Source) MLIT

(3) Improving the Water Environment of Enclosed Coastal Seas

Although the pollution load from land has decreased in the enclosed coastal seas of Tokyo Bay, Ise Bay, Osaka Bay, and the Seto Inland Sea, the fishing industry continues to suffer damage from the occurrence of red and blue tides because the loss of tidal flats and seaweed forests and other problems have caused purification capacity in ocean areas to decline. In addition to this, there have been occurrences of environmental deterioration, as well as navigational obstacles to vessels, due to drifting debris and oil.

Therefore, we advance activities to revive clean, abundant oceans by (1) sediment dredging, sand capping, and back-filling pits from mining to improve the substratum, (2) creating habitats for organisms by reviving tidal flats and seaweed forests and disseminating buildings that can coexist with nature, (3) removing floating waste and oils by using sea environment maintenance ships, (4) reducing the amount of pollutants by improving sewage treatment facilities, and (5) developing a system to get diverse entities to improve the environment in collaboration with one another.

In the case of heavy rain in July 2018, since a large volume of driftwoods flooded into the Setonaikai Sea, and these driftwoods caused prevention of ship navigation as well as a deterioration in the water environment, we worked closely with related organization such as port managers, related authorities, and related private organizations and we gathered these driftwoods quickly through the use of multiple marine environment maintenance vessels. We are going to improve the system of gathering marine pollution materials by marine environment maintenance vessels.

(4) Stimulating Sewage Maintenance to Improve the Water Environment

We appropriately formulate and review comprehensive basin-wide planning of sewage systems, and promote advanced treatment including incremental initiatives through such efforts as improving portions of facilities as a measure against the eutrophication of enclosed water systems. We also promote active water environment management and water systems where the goal is to revive abundant oceans through such efforts as implementing seasonal operation management of nitrogen and phosphates at sewage treatment plants.

As for the combined sewerage system, we plan to complete implementation of measures by the end of FY2023 through controlling the amount of water and the frequency at which untreated water is released in to streams during heavy rains.

3 Cultivating Water and Using It Efficiently

(1) Stable Supply of Water Resources

In order to secure stability in the utilization of water, there must be a variety of policies to meet the differing situations in communities, from the standpoints of both supply and demand. Specifically, in the case of demand, we are promoting measures to strengthen the recovery and reuse of water and increase awareness about conserving water. For supply, we are promoting measures to build and maintain facilities to supply water, including water resource development facilities such as dams, implementing countermeasures for aging facilities, and developing crisis management measures, etc. In addition to promoting sustainable conservation and use of groundwater, as well as the use of rainwater and recycled water, based on the “Special Measures for Water Source Area Act,” work is being done to develop the living environment of water source areas and industrial infrastructures, along with prevention of water pollution of the dam reservoirs.

Furthermore, there is concern that climate change such as global warming will lead to more frequent, severe water shortages that last longer and give rise to more drought-related damage. For this reason, the MLIT will promote measures to prevent/mitigate the damage caused by drought, such as strategies to minimize damage at the time of critical droughts.

Column Enhancement of Water Shortage Response during the Tokyo 2020 Olympic and Paralympic Games

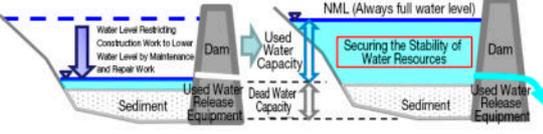
The Tokyo 2020 Olympic and Paralympic Games, which are international events, will see a total of more than 10 million tourists alone visit Japan, and are being held during the midsummer season, when demand for urban water (tap water and industrial water) and agricultural water is high. When the 1964 Tokyo Olympics were held, there was a serious shortage of water to the extent that it was named the Tokyo Desert, but by taking emergency measures, such as the temporary flow of water from the Tone River channel, which connects the Tone River and the Arakawa River, no serious impact was felt during the Games.

Water shortages accompanied by restrictions on water intake occurred in the Tokyo metropolitan area in two consecutive years, 2016 and 2017, and there is a concern that such shortages will also occur during the Olympic and Paralympic Games. In addition, there are concerns that future climate changes, such as global warming, will cause frequent, prolonged, and more serious water shortages, resulting in further drought damage occurring.

In order to minimize the impact in the event of a water shortage occurring during the Olympic and Paralympic Games, the Tokyo 2020 Olympic and Paralympic Games Water Shortage Countermeasures Committee was established on December 20, 2018, with the cooperation of the national government as well as metropolitan and six prefectural government organizations.

We will compile a draft action plan in March 2019 or thereabouts, and trial measures to be implemented will be selected in advance. In autumn 2019, we will create a Water Shortage Action Plan, and will implement the necessary measures based on the action plan, with the cooperation of related organizations. We will promote the more effective use of limited water resources, and will make every effort to ensure a stable supply of water even if a water shortage is forecast.

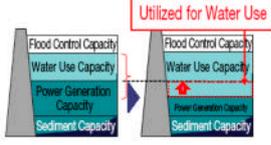
1. Measures Prior to the Event (Examples)

- Restrictions on Construction Work to Lower the Dam Reservoir Level
 

Use of dam used water capacity for Hosoda utilization through the adjusting of the timing of the implementation of the maintenance and repair construction work required to lower the reservoir level (Image)
- Further Use of Existing Waterways
 

Use of Kita Chiba Waterway, which directs water from the Tone River to the Edogawa River

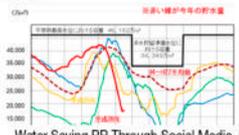
2. Measures at the Stage Water Shortages are Forecast During the Event Period (Example)

- Verification of Use of Capacity not Used for Dam
 

Power generation companies requested to discharge power in an emergency, dam power generation capacity used (image)
- Water Saving at Public Facilities (Utilization of Rainwater, Etc.)
 

Watering Plants with Rainwater
- Early Call for Water Saving
 

Water Conservation PR Through Information Boards, Etc.



Water Saving PR Through Social Media, Etc.

(2) Efficient Use of Water Resources

(i) Initiatives towards expanding the utilization of recycled water derived from sewage

Stable amounts of recycled water can be secured and is a valuable water resource in urban areas. Of all the treated sewage, approximately 1.3% undergoes treatment according to purpose, and recycled water is used in streams, sustaining water levels of rivers and the sanitation of toilets. We aim to further expand the utilization of recycled water.

(ii) Promoting the utilization of rain water

In order to efficiently utilize water resources, initiatives are being promoted to treat and use rainwater and wastewater from facilities for sanitation of toilets and sprinklers. There are approximately 3,529 facilities utilizing treated water as of the end of FY2017, and they use over 11.20 million m³ a year. The “Law for Promoting the Use of Rainwater (2014 Laws, Issue 17)” was enacted on May 1, 2014, and in March 2015 the “Basic Policy for the Promotion of Rainwater Use” and the “Goal for Establishing a Facility for the Use of One’s Own Rainwater in Cases Where the Building is Equipped by the National Government or an Independent Administrative Agency” were established in order to promote the use of rainwater and thereby facilitate the effective use of water resources. Additionally, the government will formulate and enact comprehensive measures for the purpose of contributing to the containment of concentrated drain of rainwater to the sewers and waterways.

(3) Securing Safe and High Quality Water

In an effort to provide safe and high-quality tap water, we have worked to preserve water quality in public water areas, which serve as our source for tap water, by ensuring river flow rates required for river environments and for water use by relevant river users, by enhancing monitoring systems through coordination of river administrators, waterworks operators and other relevant organizations to prepare for unforeseeable incidents such as water quality degradation, and by implementing household wastewater measures based on the appropriate division of burdens between sewage systems, community wastewater facilities and septic tanks.

(4) Promoting Measures Concerning the Permeation of Rainwater

Due to the spread of impervious areas in recent years by urban development in basins, more rainwater flows into rivers in short periods of time instead of being absorbed into the ground. In addition to reducing flood damage from heavy rains by absorbing as much rainwater as possible into the ground, we are promoting and encouraging the installation of infiltration facilities for storage of rainwater that contribute to the establishment of sound water cycles by recharging groundwater, reviving springs and more.

(5) Advancing the Conservation and Use of Sustainable Groundwater

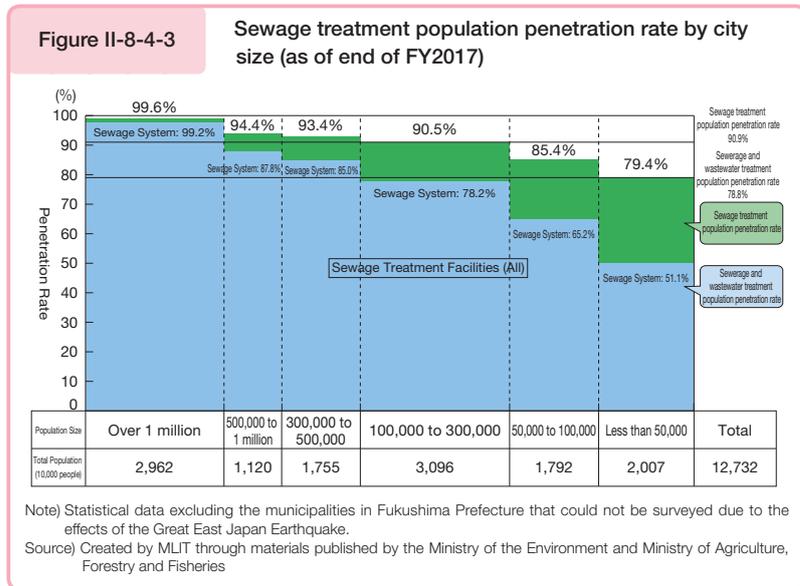
It takes an extremely long time to recover from damage caused to groundwater, such as in the form of groundwater pollution or saline contamination. In particular, ground subsidence is an irreversible phenomenon. For this reason, we will engage in groundwater management in accordance with local conditions in order to prevent groundwater damage, conserve the ecosystem, protect local groundwater sources, and advance the conservation and use of sustainable groundwater to be used as a water resource.

4 Realizing Amenity by Promoting Improvements to Sanitary Drainage

Sewage is the indispensable social infrastructure for the development of healthy cities, treating waste, and preventing floods. In recent years, sewage systems have been asked to take on new roles in helping to form a low-carbon, recycling-oriented society and in maintaining or restoring a healthy water cycle.

(1) Dissemination of Sewage Processing with Sanitary Drainage

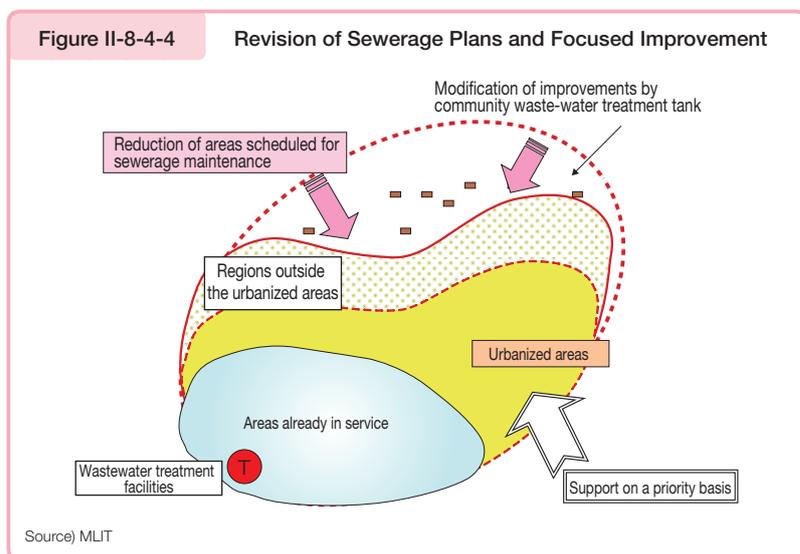
Although the dissemination of sewage treatment plants reached 90.9% of Japan (with the dissemination of sewage systems at 78.8%) as of the end of FY2017 (statistical data, excluding some municipalities in Fukushima due to the effects from the Great Eastern Japan Earthquake), there are large gaps among regions. In particular, the dissemination rate of sewage treatment plants in small to medium communities with populations of less than 50,000 people remain low, only reaching a ratio of approximately 79.4% (dissemination rate of sewage systems approximately 51.1%). Focusing on improvement in areas with high population density, the advancement of efficient development in accordance to condition of communities and the rectification of the gap between communities are seen as being of the utmost importance for developing sewage systems in the future.



(i) Initiatives towards the septic system overview in roughly 10 years

In regards to the maintenance of sewage treatment facilities, individual disposal by using septic tanks are economical in areas where households are widely distributed throughout a region, while the collective disposal with sewerage systems and drainage facilities for agricultural communities become more economical as the population density rises. For this reason, for the promotion of such maintenance, each prefecture has established a Prefectural Plan, a comprehensive maintenance plan for sewerage treatment, which reflects considerations over regional characteristics such as the economic efficiency and of its importance for protecting water quality, and prescribes the appropriate sharing of roles.

Maintenance will be promoted under a policy generalizing sewage treatment facilities by the end of 2026, and thorough reviews of sewage treatment methods will be promoted based on changes in social circumstances, such as the declining population. In addition, in order to enable prompt and low-priced maintenance, we will promote efforts to eliminate areas where this has not been disseminated by devising maintenance methods and ordering methods, including the introduction of quick projects that introduce new maintenance technique in accordance with the local situation, and the introduction



of public-private partnerships for maintenance through the use of the vitality of the private sector.

(2) Attaining Durability in Sewage Projects

(i) Proper stock management

Sewage systems possess enormous amounts of stock consisting of approximately 470,000 kilometers of pipes and conduits and approximately 2,200 terminal treatment stations (as of the end of FY2016).

As these systems were rapidly developed during and after the period of high economic growth, aging facilities are expected to rapidly increase in number in the future. Although mainly small scale issues were arising, road collapses have occurred in approximately 3,000 places due to corrosion caused by hydrogen sulfide and aging of the conduit facilities. Because the sewage system is an important social infrastructure which supports the safe and secure social and economic activities of urban living and provides a lifeline that is difficult to replace with alternative means, there is a necessity to sustain the required functions by conducting efficient, planned measures to deal with aging facilities through the introduction of stock management that practices preventative maintenance, while at the same time considering the introduction of comprehensive private consignment and efficient pipe inspection methods.

In May 2015, the Sewerage Act was amended and standards for maintaining and repairing sewage systems were established. In response, it was decided that drainage facilities at significant risk of corrosion would be inspected at an appropriate frequency of at least once every five years and initiatives to ensure sustainable sewage functions are being undertaken. Under these amendments, a council meeting program for engaging in necessary discussions on widening the geographic scope of sewage works and forming partnerships among the administrators of sewage works shall be established and the provision of support to local governments will otherwise be reinforced to ensure the durability of sewerage projects.

(ii) Efforts to expand sewage systems

For the sustainable management of sewage systems, we have established a goal to develop expansion/merging plans in all prefectures by FY2022, and had each prefectural government complete their verification and system development of these plans during FY2018. We also intend to continue providing both financial and technical support; we created a General Project for Promoting Sewage System Expansion in FY2018, and provide support for the horizontal development of the results from the examination of model cases at prefectural governments that have worked on devising plans ahead of others.

(iii) Promoting financial health

In the operation of sewerage projects, it is a fundamental rule to cover costs (excluding portions covered by public expense) for treating waste water with money acquired from usage fees, and although financial health has been improving overall in recent years, the business environment is expected to grow more stringent in the future due to the impending decrease in income from user fees due to the reduced population and other factors, the increase of repair and update expenses due to deterioration of facilities, and other factors. For this reason, upon ascertaining (visualizing) the sewage management situation, we will promote initiatives toward the improved financial robustness of sewage management, such as thorough promotion of spending reductions and the securing of stable income, through the formulation of management plans based on medium- to long-term income and expenditure forecasts.

(iv) Consigning facility management to private sectors and acquiring technical capabilities

In the sewerage sector, we are introducing and examining concession systems and other methods of PPP/PFI, and working toward the increased use of comprehensive private sector consignment^{Note} for the maintenance of sewage treatment plants and elsewhere. Regarding the concession method in the sewerage sector, Hamamatsu City began a project in April 2018 in which maintenance and management will be conducted at treatment and pump areas in the Seien Treatment Area, which is the largest treatment area in the city, and in which machinery and electrical equipment will be renovated and updated by the holders of operating rights over the next 20 years. The proposal from the operation rights holder included goals to work toward cooperation with the community and provide new technology, in addition to a 14.4% cost reduction (VFM); the project is expected to streamline business through private-sector ingenuity and introduce private-sector vitality.

Regarding the securement of technical capacity, based on demands from local public organizations, the Japan Sewage Works Agency provides technical support for constructing sewage facilities, as well as for optimizing their operation and maintenance, and for cultivating technical experts at local public organizations while developing new technology.

(3) Revitalizing Communities through Sewage

Sewage systems contribute to regional revitalization in a variety of ways: the proper treatment of wastewater through improvements in sewage systems preserves and creates healthy water environments and stimulates industry and tourism, and sewage system resources can be used effectively by creating waterfront areas using recycled water from advanced wastewater treatment, stimulating regional activities through the operation and management of harmonized water spaces by citizens and others, utilizing space above wastewater treatment facilities, using sewage heat for heating, cooling, melting snow and as biogas energy throughout communities, and using sewage sludge as fertilizer.

(4) Promoting Public Relations in the Field of Sewage

Since FY2008, we have been attempting to disseminate positive examples across the country of contributions to society by fulfilling the mission of sewage by commending and honoring such contributions through the Ministry of Land, Infrastructure, Transport and Tourism Awards (Circulation Path and Sewerage Award), and through the broad publicizing of these. Furthermore, we are sharing examples of advanced sewerage public relations activities with various local government organizations, aiming for the development of such across the country, and in addition, are promoting sewerage environment system education with the objective of cultivating human resources to work in the sewerage industry in the future, and to advance understanding of the diverse functions of the sewerage system.

Figure II-8-4-5 Promotion of public relations in the sewerage field



FY2018 Awards of the Minister of the MLIT (Circulation Path and Sewerage Award)

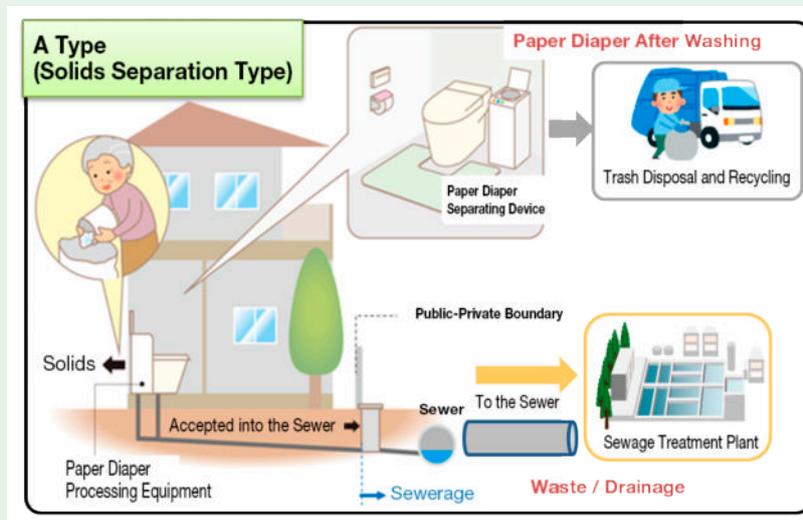
Source) MLIT

Note A method of ordering in pursuit of streamlined operations that reflects the original ideas of private contractors by entrusting operation methods and other details to them, while the ordering entity sets out conditions to ensure a level of performance in terms of facility management, such as observance of effluent quality standards

Column

Toward Accepting Disposable Diapers in Sewers

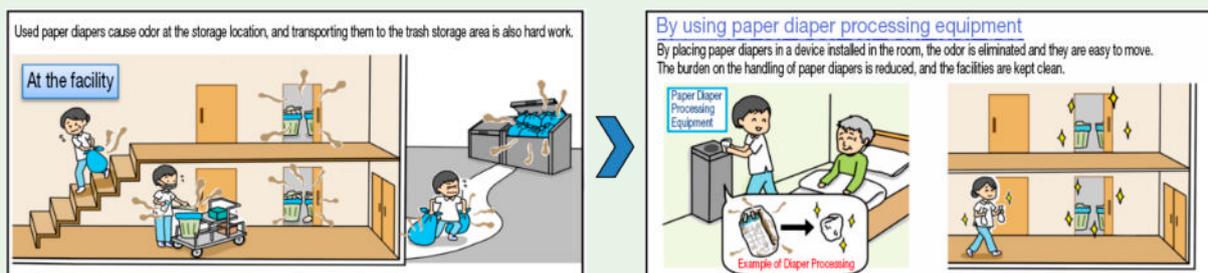
In the current era, the declining population, declining birthrate and aging population are social issues. Although the storage, treatment, and disposal of disposable diapers used in the care of elderly people is a major burden, there is also a need to create an environment friendly to raising children that will contribute to an improvement in the declining birth rates. In the sewerage sector as well, the environment surrounding management resources, such as people (weakening execution system), things (aging facilities), and money (decrease in usage volume and revenue), is becoming increasingly severe, and in order to develop a more effective and efficient sewerage business, it will be necessary to improve the added value of sewerage through the establishment of a new mission as social infrastructure and improving convenience for residents. As one of the solutions to these issues, we are aiming to contribute to the reduction in the burden on nursing care and childcare, and to the securing of a healthy life, by examining ways to handle soiled disposable diapers in the sewers.



Three options are being considered as methods to accept soiled disposable diapers in the sewers, taking into consideration the local characteristics and the condition of the sewer facilities:

- (i) Disposable diapers being separated from excrement and flushed into the sewer, where the solid materials of the disposable diaper, including the water absorption agent, will be collected as garbage (Option A)
- (ii) Disposable diapers being crushed, then collected in a separation and collection device outside of the building, excrement being separated and drained to the sewer, and the solid materials of the disposable diaper being collected as garbage (Option B)
- (iii) Disposable diapers being crushed, and both the excrement and disposable diapers flowing into the sewer (Option C)

In FY2018, we proceeded with an examination of Option A, and drafted basic concepts for the implementation of practical experiments in the form of (draft) guidelines. In FY2019, we plan to implement practical experiments for Option A based on these guidelines.



Source) MLIT

Section 5 Protecting the Marine Environment

(1) Control Measures on Air Pollution from Ships

Sulfur oxide (SO_x) in the exhaust gas from ships can cause respiratory illnesses and otherwise negatively affect the human body. The International Maritime Organization (IMO), through MARPOL Convention, regulates sulfur content of fuel oil used on board ships. Presently, the Convention stipulates the maximum sulfur content of 0.1% in designated strictly controlled sea areas (emission control areas) and the maximum content of 3.5%, which will be 0.5% from January 1, 2020, in all other sea areas.

Stable supply of low cost oil meeting the requirements of sulfur content and having sufficient quality that enable ships to operate safely will be required in order to smoothly implement these regulations. Therefore, we are arranging meetings for direct discussions between the shipping and oil industries. In addition, we are coordinating the understanding of compliant fuel oil quality, through investigating the effects of changes in fuel oil properties and providing those information to both industries.

In addition, in order to prevent concentrated demand for the such oil, and to stabilize supply and demand and the price of fuel oil, we will provide support for the construction of Class A heavy oil fueled ships, and will proceed with initiatives, including promotion of the installation of scrubbers (equipment for desulfurizing emissions) that allow ships to use conventional inexpensive high-sulfur Class C heavy oil, as well as promotion of the introduction of LNG-fueled ships.

(2) Control Policies over Large Scale Oil Pollution

As countermeasures for occurrences of large scale oil pollution, Japan has strengthened international cooperation under marine environment protection frameworks. As an example of the framework, “Northwest Pacific Action Plan (NOWPAP)” which is composed of four countries around Japan Sea (China, Japan, ROK and Russia) was established in 1994 and developed “NOWPAP Regional Oil and HNS Spill Contingency Plan.” In addition, we have developed measures dealing with large-scale oil spillages promptly and reliably, which include the establishment of the “Plan for Prevention and Control Discharge Accident of Oils” and development of large trailing suction hopper dredgers.

The MARPOL Convention^{Note 1} imposes controls on the discharge of harmful materials for marine environment such as oil or garbage from vessels. In Japan, supporting activities such as taxation management are being provided for development of facilities which receive waste oil or garbage generated from vessel, and also the “Guidelines for Reception Facilities of Ship-generated Garbage in Ports and Harbors” have been drafted to ensure that oil and garbage are appropriately received in ports and harbors.

(3) Responding to Issues of Invasive Aquatic Species Carried by Ships

In order to address the issue of the transfer of aquatic species due to adhesion to hull of ships, contamination in ships’ ballast water^{Note 2} etc., and the effects to the ecosystem of the destination sea area, “International Convention for the Control and Management of Ships’ Ballast Water and Sediments in 2004” and “2011 Guidelines for the Control and Management of Ships’ biofouling to minimize the transfer of invasive aquatic species” were adopted at the IMO. The convention entered into force on September 8, 2017. It is worth noting that the convention provides an experience building phase (EBP) for gathering and analyzing data toward future revisions of the convention. Japan is proactively contributing to the gathering and analyzing of data during EBP while also faithfully fulfilling the duties set out in the convention.

(4) Establishment of Convention Implementation System

In order to eliminate substandard ships, which are a major cause of marine pollution, we have been actively participating in international initiatives, such as the construction of the international ship database (EQUASIS), and in addition, have strengthened Port State Control (PSC) to include conducting on-site inspections on ships calling at Japanese ports, and to confirm that standards are being met. Furthermore, in regard to the system that calls for governments to supervise and monitor ships bearing their flags, which was audited by the IMO Audit Team, its establishment was approved as a voluntary system as proposed by Japan at the IMO General Assembly held in 2005, and auditing has been mandatory since January 2016. In Japan as well, a quality control system has been introduced based on ISO9001, and an interna-

Note 1 International Convention for the Prevention of Pollution from Ships

Note 2 Seawater loaded as weight to balance the ship.

tional grade treaty implementation system has been established. It should be noted that Japan plans to undergo an IMO Member Country Audit in October 2020.

Column

Marine Environment Conservation Promotion Activities

The slogan of the Japan Coast Guard (“Preserving Blue Seas for the Future”) is the basis for its efforts to provide instruction and education about marine environment conservation through efforts such as holding seminars on the topic aimed at raising awareness among key people in the marine and fishing industries of compliance with laws and ordinances, and hosting coastal clean-up activities and lessons about the environment for the general public. Here, we introduce two of their main activities.

(1) “Preserving Blue Seas for the Future/Japan Coast Guard Drawing Contest”

The Japan Coast Guard hosts the annual “Preserving Blue Seas for the Future/Japan Coast Guard Drawing Contest” with the aim of spreading the concept of marine environmental conservation to children.

For the 19th annual contest in 2018, 31,800 entries were submitted by elementary and junior high school students throughout Japan.

The entries were strictly judged to determine prize winners – among them one special prize (the MLIT Minister’s Award) and three Japan Coast Guard Commandant’s Awards.

This year, to commemorate the 70th anniversary of the establishment of the coast guard system, a decision was made to establish the Coast Guard System 70th Anniversary Commemorative Award and to issue an award to one recipient.

The works are displayed in various places, and are also used in various public relations in an effort to spread the concept of marine environmental conservation far and wide.

(2) Beach clean-up activities, etc., in collaboration with the Umi-to-Nippon Project (Ocean and Japan Project)

The Japan Coast Guard continues to participate in the Umi-to-Nippon Project held by the Japan Foundation and other organizations. Part of the efforts includes beach clean-up activities throughout Japan, using standard-design garbage bags. In 2018, 31,417 people in 108 locations throughout the nation collected and sorted roughly 37,000 bags of waste. Through this project, the Japan Coast Guard has promoted understanding of the impact of everyday waste on the marine environment.

The Japan Coast Guard intends to promote activities and intensify collaboration with this project to increase opportunities for people to participate and further spread the concept of marine environmental conservation.

Special Award (Minister of the MLIT Award) Winners



Source) MLIT

Coast Guard System 70th Anniversary Commemorative Award



Source) MLIT

Marine conservation program for the general public



Source) MLIT

Section 6

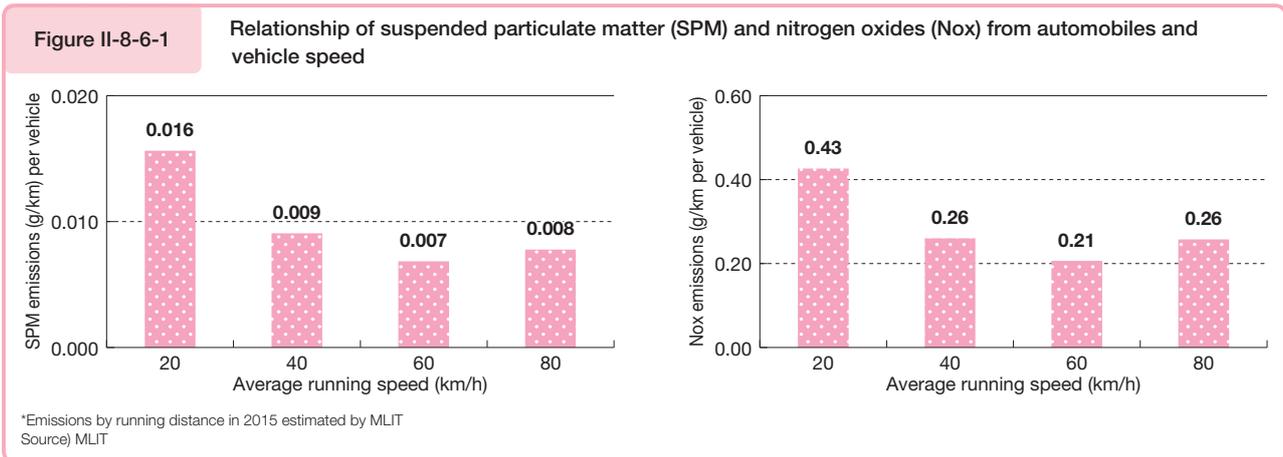
Improving Living Environments by Preventing Atmospheric and Noise Pollution

1 Policies for Environmental Issues Related to Road Traffic

(1) Measures for Individual Vehicles

(i) Exhaust gas reduction measures

Regarding measures for emissions of new passenger vehicles, trucks, buses and two-wheeled motor vehicles, we have introduced the Worldwide Harmonized Heavy-Duty Certification, and are applying global top level emission regulations.



In addition, in response to the Volkswagen exhaust gas fraud case that came to light in September 2015, we will be introducing a road running inspection at the time of specification of model, such as diesel passenger car, and will begin applying this in stages from 2022.

We are also implementing a program to certify low-exhaust gas vehicles that emit harmful substances from their exhaust pipes at levels far below regulatory values. These vehicles will be certified according to the level of their reduction of exhaust gas in an effort to help consumers identify and select vehicles that perform exceptionally well in terms of reducing emissions.

Exhaust gas measures are being implemented in Tokyo, Nagoya, Osaka and other major cities. One example is countermeasures based on the Act Concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matter from Automobiles in Specified Areas (Automobile NOx/PM Law).

(ii) Reinforcing noise regulations

Regarding measures for automobile noise, we have introduced international standards for regulating noise created by tires as a measure to reduce the levels of tire noise generated by four-wheeled vehicles, which have a high contribution rate when being driven, and began applying the measures progressively in April 2018.

(2) Promotion of Traffic Flow Measures

(i) Countermeasures for air pollution

The volume of particulate matter (PM) and nitrogen oxide (NOx) emissions from automobiles is increasing because of the increasing frequency of stop-and-go traffic and the reduced travel speed. For this reason, we are advancing the shift through traffic in urban areas to bypasses as a way to improve the roadside environment.

(ii) Countermeasures for noise pollution

Japan is proceeding with the lamination of low-noise pavement, installation of noise barriers, and maintenance of environmental roadside facilities. Based on the “Law for the Improvement of Areas along Trunk Roads,” in addition to preventative measures for issues caused by traffic noise, financial assistance is being provided for buffer buildings and noise insulation work for housing in construction projects in areas alongside roads.

2 Environmental Measures for Airports and Surrounding Areas

In Japan, we have been steadily implementing various measures to deal with aircraft noise through improvements in materials made possible by the introduction of low-noise aircraft, restrictions on departures and arrivals imposed via regulations governing night-time flights, improvements in flight methods based on noise-abatement operations, upgraded airport structures, and measures concerning the peripheral environment, including sound-insulation work and the provision of compensation for relocation. In recent years, the growing popularity of low-noise aircraft accounts for a reduced impact that aircraft noise is having on areas surrounding airports even as the number of departures and arrivals by aircraft is rising.

We will need to strive to accommodate the growth of areas surrounding airports and the desire to conserve the local environment by continuing to take comprehensive measures to deal with aircraft noise while gaining the understanding and cooperation of local residents in accordance with changes in such conditions as the demand for air travel.

3 Countermeasures for Railway Noise

We are installing noise barriers, raising embankment heights and implementing other measures for noise generated by Shinkansen trains to enable the achievement of environmental standards based on the Environmental Quality Standards for Shinkansen Superexpress Railway Noise announced by the then-Environment Agency in 1975.

As for local railway lines, we are switching to continuous welded rails and implementing other measures to satisfy guidelines based on Noise Countermeasure Guidelines for the New Construction and Large-Scale Improvement of Local Railways, announced by the then-Environment Agency in 1995.

4 Countermeasures for Urban Heat Islands

The heat island effect refers to the phenomenon in which the temperature in the central area of a metropolis is significantly higher than the areas that surround it. Due to the effects of global warming, the global annual mean temperature is rising at a rate of around 0.7°C per century, while that of Japan is rising at a rate of around 1.2°C per century. In contrast, the temperature is rising roughly 2°C to 3°C in Japan's major cities; the addition of the effects of urbanization to the trend of global warming is producing these remarkable increases in temperature.

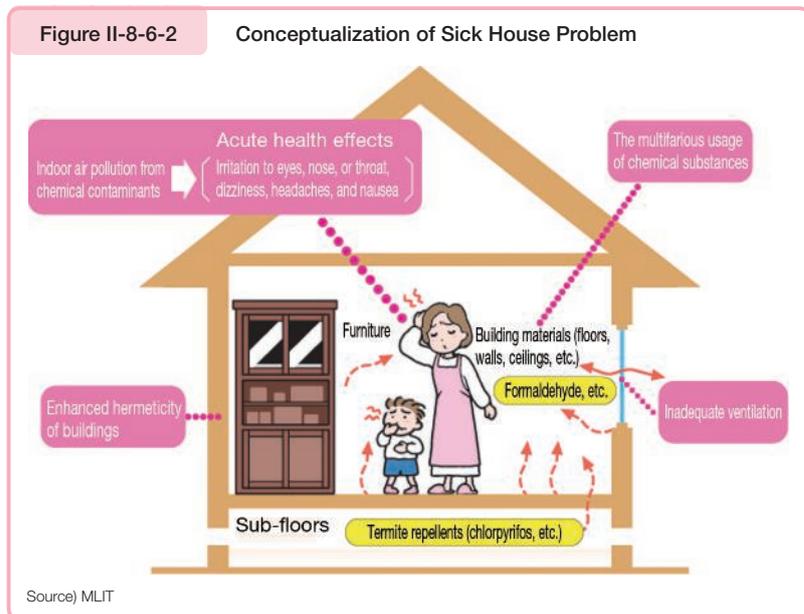
In order to advance comprehensive and effective measures for dealing with the urban heat island effect, we are engaged in various initiatives according to the Outline of Measures for Dealing with the Heat Island Effect (formulated in 2004, revised in 2013), which systematically summarizes specific measures put forth by relevant ministries and agencies. These initiatives include the following: Initiatives that reduce artificial heat emitted by air-conditioning systems and automobiles, initiatives that improve ground surfaces based on the greening of public spaces and the use of water, initiatives that consist of urban development projects that take wind channels into account, and initiatives for which observations, monitoring, and surveys are conducted with respect to the heat island phenomenon.

5 Countermeasures for Sick Building Issue and Soil Contamination

(1) Countermeasures for Sick Building Issue

Sick building issue describes a situation where materials used in the interior of a building disperses chemical substances which are hazardous to health. Japan is taking measures such as regulations on building materials and ventilation in the “Building Standard Act,” and formulating performance labelling systems based on the “Housing Quality Assurance Act.”

In the maintenance of government facilities, Japan has implemented restrictions over the usage of building materials containing chemical substances, as well as measuring the indoor concentration of airborne chemical contaminants after completing construction.



(2) Countermeasures against Issues Related to Dioxins

Studies over the water and earth quality of class A river systems throughout Japan are being conducted for dioxins specified in the “Act on Special Measures concerning Countermeasures against Dioxins.” In FY2017, the sediment of all locations and the water quality of 99% (210 locations out of 212) of the locations satisfied environmental standards.

For rivers, ports, and harbors, we have implemented dioxin countermeasures as required according to the Manual on Measures to Deal with Dioxins at the Bottom of Lakes (proposed), which was revised in April 2008, and the Technical Guide on Measures to Deal with Dioxins at the Bottom of Ports and Harbors (revised edition). Support for programs involving pollution-prevention measures is being provided for rivers, ports, and harbors where dioxins exceeding standards have been detected in samples taken from the bottom of these locations.

(3) Measures against Asbestos

Issues concerning asbestos are life-threatening. As buildings that were built in the 1970s — when mass amounts of asbestos was imported to Japan — each their dismantling period, it is important to implement pre-emptive measures to prevent injuries from occurring.

In order to accurately and efficiently determine the actual use of asbestos building materials, investigators are being trained based on the course for investigators of structures containing asbestos building materials, which was created in FY2013. In FY2018, in order to make further enhancements, we began co-administering the system with the Ministry of Health, Labor and Welfare and the Ministry of the Environment.

Also, based on the “Building Standards Law,” the removal of sprayed asbestos when renovating a building is required, and subsidy of comprehensive grants for social capital development is in place to promote the asbestos removal in existing buildings and follow ups are being done for the situation of the removal and anti-scattering of asbestos in the existing facilities under the jurisdiction of national ministries and agencies.

We are also promoting the dissemination of information, including disseminating documents useful for identifying building materials containing asbestos (visually identifiable building materials containing asbestos), converting information on materials containing asbestos, into database form, and disseminating pamphlets spreading awareness of measures related to asbestos in buildings.

6 Environmental Measures in Construction

Gas emissions measures (NO_x, PM) for construction machinery that is not driven on public roads are being handled based on the Act on Regulation, Etc. of Emissions from Non-road Special Motor Vehicles. In addition, support is being provided, such as in the form of a low-interest loan system, in order to provide assistance for purchasing environmentally friendly construction machinery that meets the latest emissions standards, etc.

Section 7 Observing, Monitoring, and Forecasting Changes in the Global Environment

1 Observing and Monitoring Climate Change

(1) Observing and Monitoring Climate Change

In order to grasp the status of greenhouse gases (GHGs), the Japan Meteorological Agency (JMA) is observing GHG concentrations in the atmosphere at three stations in Japan. CO₂ concentrations in the marine atmosphere, as well as those in the sea surface water are being observed in the western North Pacific by research vessels. GHGs in the middle-troposphere in the western North Pacific is also being observed. Furthermore, JMA conducts observation of solar and infrared radiation at five stations in Japan in order to monitor climate changes and reduce uncertainty in global warming projections.

In addition, JMA observes sea level rise accompanied by global warming, and publish information on the long-term change in sea levels around Japanese coasts.

JMA also produced the Japanese 55-year Reanalysis (JRA-55), a historical global atmospheric data with homogeneity in space and time, and is using it to monitor climate change and improve the accuracy of seasonal forecasting.

Moreover, the “Climate Change Monitoring Reports” and the “Report on Climate Change and Extreme Weather” (in Japanese) are being compiled based on the results of observation, and future projections of climate change, extreme weather events and global warming are being disclosed to the public. Serving as the World Data Centre for Greenhouse Gases (WDCGG) of the World Meteorological Organization (WMO), JMA also archives and provides observation data on greenhouse gases around the world.

(2) Observing and Monitoring Extreme Weather Events

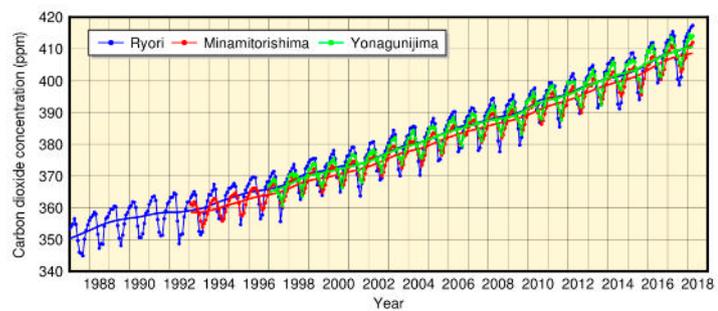
JMA monitors unusual weather events occurring in Japan and elsewhere in the world and summarizes and releases periodic and extraordinary information concerning weather disasters and areas where extreme high/low temperatures and precipitation, and other such events have been observed. Also, when extreme weather conditions are occurring that significantly affect the public, summary reports are given covering the information regarding features, factors and the outlook.

Furthermore, as a Regional Climate Centre of the World Meteorological Organization (WMO), JMA provides information such as monitoring and analysis of extreme weather as well as technical assistance through training and dispatch of experts to National Meteorological and Hydrological Services in Asian countries to support the climate service in the Asia-Pacific region.

(3) Observing and Monitoring using Geostationary Meteorological Satellites

JMA continues to operate the geostationary meteorological satellites Himawari-8 and Himawari-9. The two-satellite system was established to ensure consistent observation over the long term, and provides constant, 24-hour observation of wide areas of East Asia and the Western Pacific region. By using these satellites, in addition to improving the disas-

Figure II-8-7-1 Temporal Variations of Atmospheric Carbon Dioxide Concentration in Japan



Source) Japan Meteorological Agency

ter prevention function against such things like tropical cyclones and torrential rainfalls, Japan is leading the world in strengthening its monitoring function of the Earth's environment, including global warming.

(4) Observing and Monitoring the Ocean

The ocean is greatly impacting the earth's climate by storing a much larger amount of heat than the atmosphere, and it is also easing the progression of global warming by absorbing CO₂ emitted by human economic activity. In order to monitor global warming, an accurate grasp of oceanic conditions is essential.

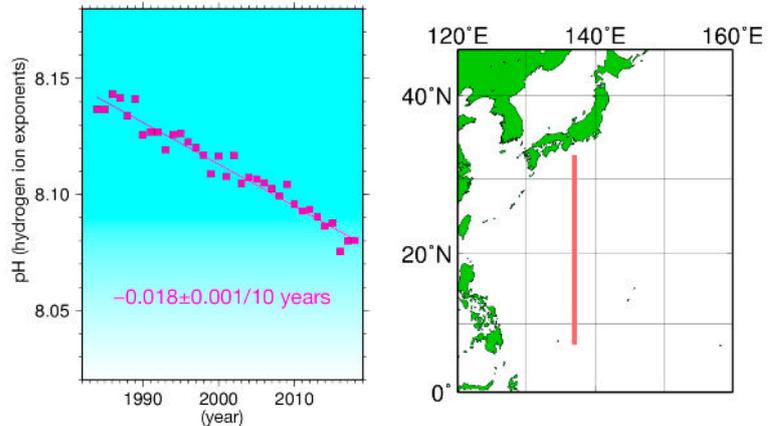
The Japan Meteorological Agency (JMA), under the international cooperative structure, monitors oceanic conditions by carrying out ocean observation with high accuracy from research vessels in the western North Pacific along with using data from satellites and Argo floats, or profiling floats to automatically observe the ocean interior.

JMA website "Marine Diagnosis Report" provides general information on the ocean such as sea surface temperatures, ocean currents, sea level, sea ice, as well as the present status and the prospect for the future.

The Japan Coast Guard uses autonomous ocean vehicle (AOV), drift buoys and High Frequency radar to constantly monitor and fully understand the state of ocean around Japan, and publishes their observation results. In addition, the Japan Oceanographic Data Center collects and manages data obtained by Japanese marine research organizations, and discloses it to relevant institutions and to the public.

Figure II-8-7-2

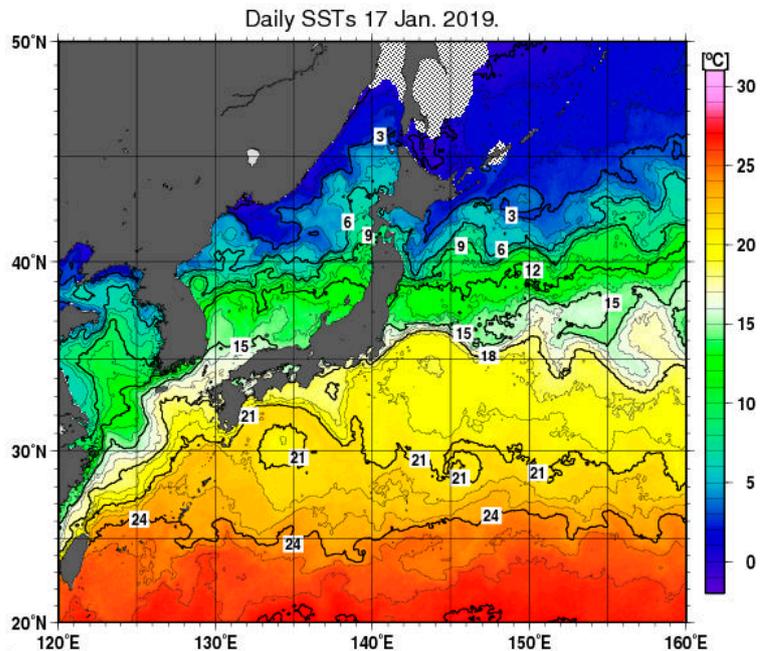
Monitoring the Global Environment Using Research Vessels



This diagram shows long-term changes in the hydrogen ion exponents on the surface of the ocean during the winter along 137° E (average from 7° N to 33° N). The 0.018 decrease in pH over the last decade indicates that the acidification of the oceans is progressing. (Source) Japan Meteorological Agency

Figure II-8-7-3

Example of a "Marine Diagnosis Report" Published on the Japan Meteorological Agency Website



[Daily Sea Surface Temperature Distribution Map]
 • Sea surface temperature distribution map analyzed through the use of observation values from satellites, buoys, and ships is published on the website and updated every day.
 • The sea surface temperature is color coded by the scale shown on the right of the map. Ocean areas for which there is no sea surface temperature due to ocean ice are indicated with gray shading.
 (Sea Surface Temperature Distribution Map for January 17, 2019)
 The sea surface temperature near to Japan has complex distribution due to the effect of ocean currents, including the Kuroshio, which flows north in the East China Sea, passes through Tokara Strait, and flows east to the south of Japan up to the east of Kanto, as well as the Oyashio, which flows south along the Kuril Islands to the east of Japan. (Source) Japan Meteorological Agency

(5) Observing and Monitoring the Ozone Layer

The Japan Meteorological Agency (JMA) annually publishes the outcome of observations on ozone and ultraviolet radiation. According to these studies, the global amount of ozone has increased slightly since 2000, but continues to be lower than it was in the 1970s. JMA also provides hourly updates of the current intensity of ultraviolet rays (UV analytical values) and daily updates of the projected intensity of ultraviolet rays for the current and following day (UV projected values) on its website to contribute to Japanese residents' measures against harmful ultraviolet rays^{Note}. To describe the intensity of ultraviolet rays, the agency uses the UV index, a metric that indicates the effects of harmful ultraviolet rays on the human body.

(6) Promoting Routine Operational Observation in the Antarctic

The Geospatial Information Authority of Japan facilitates activities carried out by Antarctic research expeditions. At the same time, it makes geodetic observations, produces and updates topographic maps, and develops satellite image maps on the Antarctic region in order to contribute to international activities relating to research on global environmental changes and geodetic surveys.

The Japan Meteorological Agency continues to conduct observation of ozone, solar and infrared radiation, surface and upper-air at the Syowa Station (Antarctica). Accumulated meteorological data contribute to monitor and research the global environment, such as the changes in Antarctic ozone hole and global climate, and are utilized for the formulation of international policies.

The Japan Coast Guard is conducting bathymetric survey. The observation data is being used for compiling nautical charts and as the basis for research related to past environmental conditions such as glacial erosion and sedimentary environments. In addition, they conduct tidal observations and contribute to monitoring the fluctuations in sea levels, which are closely tied to global warming.

2 Research of and Predictions of the Global Environment

The Japan Meteorological Agency and its Meteorological Research Institute are developing numerical models climate change projection over and around Japan and the world, and actively participate in international research programs such as the World Climate Research Programme (WCRP). In addition, they are developing earth system models that include the carbon cycle process and regional climate models with high resolution, and are conducting research on global warming projection. JMA has published "Global Warming Projection Volume 9" in March 2017, which shows detailed climate projection for the end of the 21st century in Japan based on a highly advanced regional climate mode, and in addition, climate projection information for each prefecture has been published (FY2017 to 2018). Through such initiatives, proactive contributions have been made to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (released in 2013-2014), the Plan for Global Warming Countermeasures (adopted by a Cabinet decision in May 2016), the Climate Change Adaptation Plan (adopted by a Cabinet decision in November 2018), and efforts toward the development of adaptation measures by local governments and others.

The National Institute for Land and Infrastructure Management released the results of research into climate change adaptation in terms of flood control, water utilization, and the environment in the Report on Research into Climate Change Adaptation (2017) and other documents. These results have been incorporated into various materials, including a report issued in August 2015 by the Social Development Council entitled Adapting to Climate Change in the Area of Water Disasters, and a plan for adapting to climate change drafted by the MLIT in November 2015.

Note JMA UV Information website: <https://www.jma.go.jp/en/uv/>

3 Promoting Global Geodetic Observation

Japan contributes to the determination of the shape and variation of the Earth by participating in the Global Geodetic Observing System (GGOS) through activities such as international observations using Very Long Baseline Interferometry (VLBI, a method of observation using radio waves from quasars) and Satellite Laser Ranging (SLR, a method of measure the distances to artificial satellites using lasers), tide observations, absolute gravity measurements, and continuous GNSS observations using GNSS CORSs, and through this, is promoting the establishment of a Global Geodetic Reference Frame (GGRF).