Chapter

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Creating and Preserving a Beautiful and Healthy Environment

Section 1 Promoting Countermeasures against Global Warming

Implementing Global Warming Countermeasures

The 5 year average of Japan's Greenhouse Gas Emission Rate for the Kyoto Protocol First Commitment Period (2008 – 2012) has been 1,278,000,000 (one trillion, two hundred seventy eight million) t- CO_2 , which although is an increase of 1.4% compared to 1990, by taking into consideration the Kyoto Mechanism Credit or sinks such as forests, it is a 8.4% decrease compared to 1990 which means the goal (6% decreased from 1990 rate) set by the Kyoto Protocol has been attained.

Although Japan is not participating in the Second Commitment Period of the Kyoto Protocol, in order to continue promoting an approach at a level higher than thus far, new "Plans for Countermeasures against Global Warming" are to be formulated for the future.

Taking into consideration this governmental movement, The Ministry of Land, Infrastructure, Transport and Tourism with the Environmental Subcommittee of the Panel on Infrastructure Development and the Transportation System Division, Environmental Committee of the Panel on Transportation Policy at the center—is continuing to investigate medium-term global warming countermeasures in order to maximize the promotion of energy-saving measures and implementation of renewable energy.



Promoting Global Warming Countermeasures (Mitigation Measures)

(1) Promoting Low-carbon City Development

For the cities where the population and building are quite concentrated, in December 2012, "The Low-Carbon City Act" was enacted from the standpoint of promoting low-carbon city development through consolidation of urban facilities and the promotion of public transportation use, efficient use of energy such as area energy networks at the district level, conservation and promotion of greenery. 11 municipalities have formulated the "Low-Carbon City Plan" by the end fiscal 2013. Government of Japan has been continually promoting "Low-Carbon City Development" through budgetary and tax measures as well as deregulation.

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

a. Improving Mileage of Vehicles

We are formulating the gas mileage standards and publishing vehicle mileage of the "Top Runner System" Note 1 in accordance with the "Law Concerning Rational Use of Energy (Energy Saving Law)," and in 2007 we established mileage standards with 2015 as the objective year. Furthermore, in 2013, a new mileage standard for passenger cars was enacted with 2020 as the objective year. In 2012, 80% of the gasoline passenger cars shipped had cleared the mileage standards objective for 2015 and the average mileage rate improved approximately 40% compared to 2004. The mileage improvement efforts will continue further.

b. Schemes to stimulate improvements in mileage capabilities and reduction in exhaust gas

In order for consumers to easily identify and select vehicles with high mileage capabilities, we have implemented systems to evaluate and disclose mileage capabilities of vehicles to stimulate their dissemination. Additionally, for vehicles that emit lower amounts of harmful substances than the latest exhaust gas standards, we are implementing the "low emission vehicle recognition system," according to how much less exhaust is emitted by the vehicle. The indication for mileage capabilities are marked by a "2015 Mileage Standard Fulfilling Vehicle" sticker.

c. Promoting the dissemination of environment-friendly vehicles

In promoting the distribution of environment-friendly vehicles, such as putting into place tax incentives such as EcoCar Tax cuts (vehicle weight tax and vehicle excise tax) for vehicles with superior environmental performance (EcoCar) and the special greening provision for fuel reduction (vehicle tax). The number of vehicles sold in 2013 that are subject to the EcoCar tax cuts are approximately 82% (approximately 4,400,000 cars) of all vehicles sold.

From the perspective of countermeasures against global warming and air pollution in large cities, we are enforcing policies to disseminate environment-friendly vehicles such as by supporting the usage of CNG vehicles ^{Note 2}, hybrid vehicles, and electric vehicles by truck, bus and taxi businesses. We are also supporting the implementation of a new category of transportation that contributes to energy conservation and low-carbon emission called "Ultra Lightweight Vehicles".

Note 2 Compressed Natural Gas Vehicles (Natural Gas Automobiles)

Note 1 Identify products such as household appliances and vehicles, set standards based on the examples of the products with the best gas mileage standard or low rate of electricity consumption, and request that the manufacturers and importers that sell these products will meet the standard quota by the target year.

d. Development, application and creating a usage environment for next generation heavy vehicles

In order to promote the development and application of next generation heavy vehicles, we have been developing the technology of high-efficiency hybrid trucks, electric and plug-in hybrid trucks, and high-performance electric buses since FY2011. Demonstration driving tests have also been conducted under actual driving conditions for these prototypes. Efforts to actualize the practical use of these prototypes will continue.

e. Promoting and disseminating ecological driving

By cooperating with related ministries and agencies, we revised the "Eco Drive 10 Recommendations" during the "Eco Drive Promotion Month" in November 2012. We also focused on conducting symposiums and lectures, and worked on educational activities for disseminating ecological driving through press releases. Furthermore, we are working to promote the dissemination of the Ecological Management System (EMS) ^{Note} to motor carrier enterprises.

(3) Promotion of Traffic Flow Measures, etc.

Japanese automobiles have the world's top level of catalog gas mileage but the driving gas mileage is on the same level as the U.S.A. For this reason, we are implementing various measures for traffic flow to increase the speed of driving by facilitating traffic flow to improve mileage and decrease the amount of CO_2 emitted by vehicles. Specifically, in order to alleviate traffic congestion in urban areas, we are arranging the arterial expressway network with belt highways which curbs the inflow of traffic to the inner-city by providing an alternative route for traffic moving through urban areas. Additionally, we are promoting three-dimensional intersections and the continuous grade separation project to eliminate railroad crossings that stop traffic, as well as promoting "Smart Use of Roads" such as utilizing the big data collected by means of ITS technologies, undertaking the most suitable usage of existing road networks in order to realize the smooth and safe traffic services, and advancing the creation of a bicycle friendly environment by redistributing road space. Also, in order to improve the low carbon emission of road infrastructure, actions are being taken such as installing LED road lighting and making use of renewable energy.



Note Approach for the implementation of planned and continuous ecological driving of motor vehicles with the integration of evaluation and guidance.

(4) Promoting the use of public transportation

The shift from private vehicles to public transportation reduces travel with vehicles and is a necessary facet of global warming countermeasures. For this reason, we are automation promoting such as implementing IC cards, and improving the convenience of public transportation through better transit connections. We also encourage ecological commuting in each business establishment through the Ecological Commuting Outstanding Business Certification Scheme, as well as spreading environment-friendly commuting by cooperating with regional promote schemes that ecological information commuting. Furthermore, analysis and validation results of past activities for the "Environmentally Sustainable Transport (EST) Model



Project" were provided nationwide to regions working to realize EST.

(5) Optimizing logistics

Exceeding 50% of the total domestic transportation means in Japan, trucking accounts for the majority of the share ratio (ton to kilometer basis in transportation). The CO_2 discharge rate ^{Note 1} of trucks is greater than that of mass transportation such as railroads and domestic shipping, and accounts for up to 90% of the CO₂ output in logistics. In order to reduce CO₂ emission while sustaining domestic logistics, we must strive to utilize energy efficient transportation means such as railroads and domestic shipping in addition to improving energy efficiency and transportation efficiency of each truck, in combination with transitioning trucking Note 2 from private to commercial means. And, in an effort towards further establishing an efficient logistics system with low environmental impact, assistance is being provided for joint transportation, modal shift, introduction of large CNG trucks, low-carbon logistics centers, and low-carbon emission of the port area. The introduction of 31ft railway containers of similar size to the 10-ton truck, the demonstration experiments of a new style 12ft refrigerated railway container, as well as working to energize the coastal shipping and ferry industry by promoting the building of energy-saving vessels, are all in progress. We also work to disseminate the "Eco Rail Mark" (recognition of 83 cooperating enterprises of 138 products (192 items) as of March 2012), and the "Eco Ship Mark" (Recognition of 82 consignors and 98 logistics businesses as of December 2011). In ports and harbors, which act as nodal points between overland and overseas transportation, we are implementing initiatives to conserve energy within ports and harbors, implementing, facilitating, and applying renewable energies and expanding carbon dioxide sinks. Moreover, we strive to reduce overland transportation distance of international cargo by renovating facilities such as international overseas container terminals.

In addition, in cooperation with the relevant ministries and related organizations, a Green Logistics Partnership Conference was held and public awareness and recognition is being given to the excellent businesses through the collaboration of logistics and shipping companies.

Note 1 The amount of CO_2 emitted by shipping 1ton of cargo for a distance of 1km.

Note 2 Change from privately-owned trucks (private truck carrying own cargo) to improving transport efficiency by such methods as combined cargo transport by several shippers and reduce transportation cost by using business truck (trucks transporting cargo of others for a fee).



(6) Promoting low carbonization of railways, ships, and aviation

a. Initiatives contributing to further enhance environmental performance in the railway sector

Although the railway has little environmental burden in comparison to other modes of transport, in order to further reduce environmental burden, we are promoting the technological development of battery powered trains and the implementation of facilities contributing to promoting low carbonization and enhancing energy efficiency for railway facilities and railway vehicle in cooperation with the Ministry of Environment.

b. Initiatives for energy conservation and low carbonization in shipping

Efforts for conserving energy are being promoted in domestic shipping through the "Integrated Measures for Green Shipment," such as the dissemination of super eco ships ^{Note} and by subsidizing the deployment of new technologies and facilities that contribute to energy conservation and low carbonization of ships. In ocean shipping, in order to promote an international framework and an integrated technology development and dissemination, from 2013, we are supporting the world's most advanced marine environmental technology development which targets a 50% reduction of CO_2 emissions from ships. Japan is leading the discussion on creating an international framework on matters such as the fuel consumption reporting system ("visualization" of fuel consumption in a real voyage), being promoted by IMO following the introduction in January 2013 of the regulation on CO_2 emissions in international shipping, as well as the economic regulations. Also, as the environmental preparation for the early commercialization and introduction of natural gas fueled ships, standard Guidelines and Operations Manual that defines the safety measures of natural gas re-fueling procedures was compiled in June 2013.

Note Next generation domestic vessels with excellent environmental capabilities and economic capabilities that utilize electronic propulsion systems that enhance mileage and reduce CO₂ and NO_x emissions.

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c. 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 UPR ^{Note 1} 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 GSE ^{Note 2} vehicles as part of Eco Airport (eco friendly airport) activities. Furthermore, we are strengthening international initiatives, such as participating in the "Asia and Pacific Initiative to Reduce Emissions (ASPIRE)" ^{Note 3} where air traffic control authorities and airline companies cooperate to attain efficiency in flying. We are also leading the discussion to develop a global scheme to reduce CO₂ emissions from international aviation. Furthermore, a new study related to the promotion of alternative fuelsin aviation was started in 2013.

The Promotion and Dissemination of Alternative Fuels in Aviation (Biojet fuels)

There are high expectations worldwide for alternative fuels (biojet fuels) as a CO_2 emissions reduction measure for jet planes. Alternative fuels are made from materials such as algae, plants such as jatropha and camelina, used cooking oil or municipal waste, and compared to fossil fuels, may lead to the reduction of CO_2 emissions over the entire life cycle including the growth process of the raw materials.

At the Assembly of International Civil Aviation Organization (ICAO) in 2010, a resolution was adapted on the global aspirational goals to reduce CO_2 emissions from international aviation and, at the Assembly in 2013, promotion of the use of sustainable alternative fuels was agreed upon as one of the main pillars to achieving the goals.

In Japan, from 2009 through 2012, test flights using alternative fuels have been conducted and the technical demonstration of the flight itself has been done, and we are now in the planning stage on ways to spread the use of alternative fuels. There are already overseas examples of using alternative fuels in fare-paid flights such as regularly scheduled flights, and Japan plans to continue studying this matter including these example cases.

There are a few issues that have been raised in regards to promoting the dissemination of alternative fuels in Japan. First of all, currently the cost of alternative fuels is extremely high. Also, for the time being, it is necessary to import alternative fuels to secure the supply. In addition, issues such as impact on the existing aging facilities and ensuring the transport method need to be considered.

With regard to these points, while working on various cooperative relationships, the related parties will continue to proceed with the initiatives to solve these issues.

As an international effort, consideration is also necessary regarding the establishment of a common calculation and evaluation criteria for the world with regards to the CO₂ emissions reduction effect of alternative fuels, as well as the global supply outlook for alternative fuels to the aviation sector, including the trends in other industries. These challenges are now being studied by ICAO's group of experts, and Japan is going to be actively participating in these activities. Chapter 8 Creating and Preserving a Beautiful and Healthy Environment

Note 1 User Proffered Route

Note 2 Ground Service Equipment

Note 3 Asia and Pacific Initiative to Reduce Emissions



(7) Enhancing energy-saving performance in housing and buildings

Compared to past eras, the rise in the amount of energy consumed by the civilian sector is more prominent than in other sectors, which makes improving energy-saving performance in housing and buildings an urgent task. For this reason, the Energy Efficiency Standards under the Energy Conservation Law introduced the consumption of primary energy which assess building equipment performance and created energy comprehensively, adding to building envelop performance (scheduled to come into effect in 2015). Furthermore, the approval system of the low carbon building which has high energy-saving performance based on the "Act on Law Carbon City Promotion", has taken effect; we now aim for its dissemination.

In other fronts, we are working to develop and disseminate the Housing Performance Indication System and Building Energy-efficiency Labeling System (BELS) those show the energy-saving performance to consumers, in addition to comprehensive Assessment System for Built Environment Efficiency (CASBEE). This CASBEE system integrally evaluates enhancing livability, and reducing environmental strain of housing and buildings as comprehensive environmental performance.

Also, in order to promote energy-saving in housing and buildings, it provides support for small and medium-sized construction firms in building Zero Energy housing and leading projects that introduce cutting edge CO_2 reduction technology and energy-saving remodeling of housing and buildings, as well as implementing an interest rate cut utilizing the framework of the securitization support business of the Japan Housing Finance Agency. In addition, it is working for the development and dissemination of things like the design and construction technology of energy-saving houses and buildings through holding workshops for design and construction professionals and providing support for the leading technological development of the private firms.

Furthermore, we are formulating supportive taxation measures for renovation work towards 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, the use of bio-gas, and the high temperature incineration of raw sewage.

(9) Promotion of environmental measures for construction machinary

In 2010, Japan established a system for certifying construction machinary with exceptional CO_2 reducing capabilities, such as hybrid vehicles, as low-carbon type construction machinary and is providing support through low interest loan systems. Japan also set fuel efficiency standards for the hydraulic excavator, the bulldozer, and the wheel loader, which are major construction machinery, and established a system that certifies construction machinery that meets these standards as fuel efficiency standard achieving construction machinery.

(10) Implementation of CO_2 sink measures through urban greening

Urban greening has been internationally recognized as a "vegetation recovery activity" which is subject to be reported as the amount of greenhouse gas absorption based on the Kyoto Protocol. The Kyoto Protocol Target Achievement Plan also recognizes this activity as creating low carbon cities because of improvements to the thermal environment through mitigating urban heat island effects, as well as the heightening of public awareness to its significance and effects. Based on the "Master Plan for Parks and Open Spaces", devised by municipalities concerning overall greenery, the improvements to urban parks, the greening of roads, ports and harbors and private properties are being actively undertaken.

Promotion of the Use of Renewable Energy

Based on the energy constrains after the Great East Japan Earthquake, while the future utilization of renewable energy has become an important issue in the government, the Ministry of Land, Infrastructure and Transport in particular has been promoting the introduction of ways to utilize the potential of renewable energy of resources such as the vast infrastructure space of facilities like airports, water flowing in rivers, and the abundant and stable sewage biomass.

(1) Promotion of the use of marine renewable energy

Japan that is surrounded on all four sides by the sea, and is blessed with abundant marine renewable energy.

Of these, the wind power over the ocean, which is vast compared to land and where a stable, strong wind blows, is expected to be widely used in the future and interest is increasing especially in the port and harbor areas.

Therefore, the Bureau of Port and Harbor has decided to organize the installation procedure to the port and harbor and first published in June 2012 "Regarding Wind Power at Ports and Harbors – The Manual for Coexistence with the Administration and Operation of the Port and Harbor".

This year, the study continues on the technology guidelines, which will become the guidelines for decision-making by the port administrator, to confirm that the original function of the port and harbor will be ensured when wind power is introduced to the port and harbor.

Also, in Japan, where there is very little area of shallow ocean, floating offshore wind power that floats on the ocean has been considered most promising, so in order to assure safe operations in the harsh natural environment of offshore conditions, "Safety Guidelines" was compiled.

Furthermore, in the future, even for ocean energy such as wave power and tidal stream, we have decided to develop a system to ensure the safety of power generating facilities such as float structure power generation facility, etc., and efforts to spread the use of marine renewable energy in cooperation with the relevant ministries and agencies will be ongoing.

(2) Promoting small hydroelectric generation

As initiatives toward a low carbon society, the implementation of small hydroelectric generation by using rivers is being pushed forward. Specifically, for the promotion and dissemination of small hydroelectric power generation, a thorough utilization of unused energy is being conducted through the introduction of a registration system of dependent power generation based on the River Law revisions, a project development support by consultation and survey data provision of the irrigation use application process at the contact desk of the Regional Development Bureau, and support for the placement of a small hydroelectric power facility for erosion control, to introduce aggressive management of the power generation facilities of the dams under the direct control of the Ministry.

(3) Promotion of the use of Sewage Biomass

Through the use of PPP/PFI, we will promote the energy utilization of sewage sludge by the effective use of bio-gas and solid fuel, as well as the use of sewage heat.

(4) Promotion of Solar Power Generation using Infrastructure Space

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

(5) Promotion of contribution towards the hydrogen society

With the expected expansion of hydrogen energy demand in the future, such as household fuel cells (marketed in 2009) and fuel cell vehicles (marketing plan 2015), working to create an environment for the realization of a hydrogen energy utilization society from the concepts of hydrogen production, storage, transportation, and usage.

a. Setting guidelines in regards to fuel cell vehicles

With the goal of achieving the world's fastest distribution of fuel cell vehicles scheduled to be marketed from 2015, the safety standards for fuel cell vehicles were determined.

b. Setting up the marine transportation system for liquefied hydrogen

Early construction of a liquefied hydrogen carrier that allows mass transport of liquefied hydrogen is expected. However, as this carrier will be the world's first, there are no existing safety standards which makes it necessary to determine the safety requirements as soon as possible. Therefore, from 2013, the Ministry has been studying the safety standards for a vessel that is resistant to the characteristics of hydrogen including an ultra-low temperature of -253°C, spread and penetration into material of the hydrogen molecule, a wide explosive range and the high ignition potential.

Promotion of Global Warming Countermeasures (Adaptations)

For the effects of global warming that cannot be avoided even with the most stringent mitigation measures, it is essential to have measures (adaptations) to prevent or reduce the damage to a minimum, or even take advantage of the opportunities for benefits.

As a part of the adaptation measures so far, the Ministry of Land, Infrastructure and Transport has been actively promoting measures against water-related disasters such as floods, landslides, storm surge disaster and drought, but also the government as a whole, established in July 2013 a climate change impact assessment subcommittee under the Central Environmental counsel's Global Environment Committee, which is working on evaluations of the impact of climate change in Japan towards establishment of an adaptation plan by the summer of 2015.

In the future, in accordance with the adaptation plan of the government, global warming predictions making use of the technical capabilities as well as addressing the accuracy of the monitoring system, measures against water-related disasters and wide range consideration will be given to the multifaceted effects of climate change, such as transportation infrastructure and heat island, to work on the study and development of overall adaptation measures from both the hardware and software perspectives.

Section 2 Promoting the creation of a recycling society

Advancing recycling in construction

Construction waste accounts for approximately 20% of all industrial waste, 20% of final disposed amount, and 75% of all illegally discarded waste. Controlling the output of construction waste is a major task in the advancement of recycling. The total amount of construction waste produced in 2011 amounted to 75 million tons. Although the recycling rate for 2012 was 96%, better than the 93.7% of 2008, we must continue these activities in order to achieve high levels of recycling.

Raw sewage also accounts for 20% of all industrial waste, reaching approximately 75 million tons in 2011. We are promoting recycling in order to reduce this amount.



(1) Advancing recycling in construction

Based on the "Construction Material Recycling Act (Construction Recycling Law)", we are working to enforce proper measures through a simultaneous patrol throughout Japan.

In addition, we are conducting investigations and surveys needed for overcoming various challenges, such as the thorough dismantling and separation of plaster boards waste, as pointed out by the "Compilation on the Assessment and Investigation on the State of Enforcement of the Construction Recycling Scheme," and are working to advance recycling in construction.

In addition, because of the development of the new "Construction Recycling Promotion Plan" which incorporates the basic concept and goal of construction recycling, the "Construction Recycling Promotion Plan Study Subcommittee" established under the Social Capital



Source) MLIT

Development Council and the Council of Transport Policy started review in 2014 to find measures to deal with the priority issues such as ensuring high recycling rate and reducing the rate of construction waste, responding to concerns about the development of up-cycling, decrease of soil from construction and construction waste in the future, and challenges related to the regional differences in construction materials recycling.

(2) Reducing sewage sludge and promoting recycling

We are promoting the recycling of sewage sludge (recycling rate of 55% in 2011), utilizing of bio-gas produced by incinerating sewage for generating electricity and for fuel in cars that utilize natural gas, utilizing energy such as the solid fuel processing of sewage sludge, and advancing recovery and utilization of phosphorus from sewage and sewage sludge. 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.

Constructing a resource recycling logistics system

(1) Forming a resource recycling logistics system by utilizing shipping

In order to form the "cycling" of reusable resources for creating a recycling society, we have specified 22 ports throughout Japan as Recycle Ports (Integrated Reverse Logistic Base Port) for wide-spread flows concerning reusable resources. At the Recycle Ports, they undertake activities such as securing coastal facilities like wharfs, aiding in establishing facilities for handling reusable resources, promoting the cooperation between civilian and government sectors, and operations related to handling reusable resources.



(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. Particularly in the Osaka Bay, regional waste disposal sites are being improved through the Osaka Bay Phoenix Project ^{Note 1} to receive waste from the 168 municipalities in the 6 prefectures of the Kinki region. In addition, based on the Super Phoenix Plan ^{Note 2}, surplus soil produced from construction in the Tokyo Metropolitan Area is being shipped to various ports and harbors and being widely used as landfill material.

Note 1 Business to promote the orderly development of the port by properly disposing in the sea landfill the waste generated from the 2 cities, 4 prefectures and 168 municipalities of the Kinki region.

Note 2 Mechanism for adjusting at the national level, the soil from construction in metropolitan areas to use it effectively as resources for port construction in ports that need landfill materials.

3 Recycling vehicles and marine vessels

(1) Recycling vehicles

In accordance with the "Act on Recycling, et. of End-of-Life Vehicles (Act for automobile recycling)", a system for confirming that end-of-life vehicles are scrapped, is being implemented. When deleting vehicle registrations from the "Road Transportation Vehicle Law," the scheme for returns in vehicle weight tax is also conducted, in order to promote the proper disposal of end-of-life vehicles and prevent illegal dumping.

(2) Recycling marine vessels

The recycling of large vessels (ship recycle) Note 1 has generally been conducted in developing nations such as Bangladesh and India, where the frequent occurrence of human casualty accidents and marine pollution in the facilities continue to raise concern. In order to solve these issues, Japan lead discussions with the International Maritime Organization (IMO), which resulted in the adoption of the "2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (tentative name) (Ship Recycling Convention)". This convention mandates the inspection and retention of proof documents for marine vessels and ship recycling facilities respectively, and also bans the use of asbestos or polychlorinated biphenyl (PCB) in newly built vessels. Various guidelines to supplement the implementation of this convention were formulated at the IMO under the initiative of Japan and were all adopted in October 2012.

Japan, ahead of the world, is working towards a developed-country-style ship recycle system with the environment in mind, while carrying out the study of business management schemes based on market characteristics. There is also a study underway for a domestic legalization of a treaty with an eye towards the conclusion of the Ship Recycling Convention.

On other fronts, because privately owned pleasure boats are mostly made of fiber reinforced plastic (FRP), which is difficult to dispose, there has been a demand for a waste processing route for proper disposal. In response, we undertook activities in building a processing route, as well as developing recycling technologies for FRP boats. As a result, approximately 600 FRP vessels are properly recycled yearly under the leadership of the Japan Boating Industry Association throughout Japan since 2005.

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Efforts in Green Procurement Note 2

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 policy, we are actively advancing the procurement of ecology-friendly goods for building materials, construction machinery, method of construction, and objectives in public construction work.

Promoting the use of wooden building 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.

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Based on laws such as "the Act for Promotion of Use of Wood in Public Buildings", in May 2011, the "Plan for Promotion of Use of Wood in Public Buildings" was formulated to work on the use of wood as building materials and for the interior of buildings. In November 2013, the government's implementation status of this Act was published. Also, in cooperation with local government, introduction guidelines for the use of wood to be used in the design stage was published in June of the same year.

In addition, to promote the development of wooden houses and buildings that utilize local materials, the Ministry is working to support building of long-life quality wooden housing that use local materials, and the development of large-scale wooden buildings which will make use of cutting edge design and construction technology, as well as the development of leaders and wooden house production system in the region.



Examples of the Use of Wooden Building Material

Entrance hall of Shinonome National Government Building



Section 3 National land development that revives and preserves the natural environment

Initiatives for preserving biodiversity

As efforts towards the Strategic Plan 2011 to 2020 (objective for the Aichi prefecture), adopted at the COP10 held in Nagoya city in Aichi prefecture in October of 2010, we are currently advancing activities for its achievement. Furthermore, the "National Biodiversity Strategy 2012 to 2020" was formulated in September of 2012, and we have decided to continue the advancement in activities for preserving, reviving and creating animal habitats in rivers, urban green lands, coastal regions and harbors.

In addition, as reference material for drawing up "Master Plan regarding Afforestation, Greening, and the Preservation of Forests and Other Green Spaces" (Master Plan for Parks and Open Spaces"), the master plan formulated by municipalities concerning overall greenery, we established the "Technical Considerations related to Conservation of Biodiversity in regards to the Master Plan for Parks and Open Spaces" in October 2011. Furthermore, in May, 2014, we formulated the "Urban Biodiversity Indices" to evaluate the situation of biodiversity and progress of policies taken by the local governments and now working to promote activities by local public organizations for the conservation of biodiversity in urban areas.

Creating rich and beautiful river environments

(1) Creating and conserving a healthy river environment

a. Creating a rich river environment and stimulating revival

In river development, based on the "Basic Guideline for Rich River Development (established October 2008)", we work for the conservation and restoration of animal habitats and diverse river scenery, while concurrently sustaining safety over flood control.

We are also promoting the restoration of wetlands through nature restoration projects and bettering the environment for fish climbing up or descending down river by improving fish ladders. By advancing these various activities through cooperation, we form an ecological network ^{Note} and promote the conservation and revival of the river basin ecosystem.

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

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.

b. Implementing countermeasures for foreign species in rivers

One of the greatest threats to preserving biodiversity is the presence of foreign species. These species continue to spread their habitat throughout Japan, posing problems to the native ecosystem. As a countermeasure, we have circulated information such as the "Guideline of Countermeasures for Non-native 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 and improve river environment downstream of dams, we are implementing flexible dam operation and tests for flexible operation (conducted in 16 dams throughout Japan as of 2013) to efficiently utilize a portion of the flood control capacity without hindering flood regulation. 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 climate change will accelerate problems such as diminishing sand supplies to the coast, variation in river environments caused by changes in sedimentary flow, and coastal erosion caused by changes in littoral drift, in recent years, relevant institutions are working in cooperation to comprehensively control sediment flowing down from mountains to Specifically, coastal areas. we are strengthening cooperation with relevant institutions, by drawing up policies aimed at project collaboration in order to respond to problems caused by sedimentary flow from mountain streams, dams, rivers, and coast.



(4) Environmental education on rivers

As natural environments close to communities, recently, rivers host a variety of activities such as environmental studies and natural experience activities. In addition, we are promoting projects and disseminating of information so children can safely learn and play by riversides. Because there are hidden dangers and proper knowledge is essential for safe activity, we cooperate with the NPO "River Activities Council (RAC)", a citizens' groups which played a central role in establishment, to promote the cultivation of river administrators. Moreover, to prevent incidents caused by sudden swells in rivers, we are implementing measures by referring to the "Action Plan to Prevent Water Accidents caused by Sudden Flooding" established in 2007, and the reports from the "WG on water accidents prevention in small and medium size rivers" which was established in response to the occurrence of the Toga River flash flood in the Hyogo prefecture in July 2008.

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. 295 locations are registered as of March 2013.

• Riverside Fun School Project

Utilization is encouraged for riversides that are registered as Children's Riversides and undergo riverside improvements required for enhancing experiential activities. 281 locations are registered as of March 2013.

• National Aquatic Organism Study

This activity is conducted to raise interest in rivers by investigating creatures that live in rivers close to communities. In 2012, 61,818 people participated. 59% of the inspection points (2,432 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 high tides, tsunamis, and billows, we are proceeding with maintenance and conservation that balances between "defense," "environment," and "usage."

Due to beached waste originating from foreign countries, in recent years, the diminishing coastal functions and deterioration of the environment, scenery, and ecosystem, and the effects on safe navigation for ships and the fishing industry have become severe. In response, 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 plan to implement effective measures for beached waste in close cooperation with relevant institution in the future.

In addition, we are advancing the "Emergency Large-Scale Disposal Project for Beached Waste related to Disaster", where personnel from "Multiple Beaches" from a wide area work to integrally and efficiently dispose of waste, especially for emergency disposal of large amounts of beached waste, which disrupt the functions of coastal protection facilities.

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.



(2) Actively preserving, reviving, ad creating a healthy 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. After the projects have been started, we will continuously monitor the status after maintenance by implementing adaptable management methods. 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

Because illegally parked boats affect the navigation and anchorage of vessels, coastal recreation, and fishing activities, as well as raising concerns over secondary damages from tsunamis, regulatory measures are being implemented for the specification of parking prohibited zones and the enhancement of mooring capabilities for small vessels.

In May 2013, the Ministry developed the "Promotion Plan for Comprehensive Measures for the Appropriate Management and the Improvement of the Operation Environment of Pleasure Boats" in working towards the elimination of abandoned boats.

Greening roads and promoting natural environmental measures

Greening roads is crucial for providing a comfortable atmosphere for road users, creating favorable scenery, mitigating global warming and heat island effects, and developing favorable urban environment. Due to these reasons, beginning with the green shade road projects for creating bowers in the road atmosphere, we are promoting improvements to roadside trees and cooperating with roadside communities in maintenance and management. In addition, we strive to preserve and revive the environment by avoiding areas that are valuable and natural environments, for road construction from planning stages, or try to minimize the effects or implement alternative measures if it cannot be avoided.

Figure II-8-3-3

Example of Greening Roads (Chiyoda-ku, Tokyo)



Figure II-8-3-4

Example of Lawn Square (Tottori-shi, Tottori Prefecture)



Source) MLIT

Section 4 Building a healthy water circulation system

Becoming a society that can enjoy the blessings of water

Thus far, the development of water resources development facilities were promoted because of the priority placed on ensuring the balance of water supply and demand in response to the rapid increase in water demand in the post-war high-growth period. On the other hand, there is pressure to respond to the various challenges that have emerged such as the vulnerability of water infrastructure like the occurrence of long-term, wide-area suspension of water supply resulting from large-scale disasters and aging facilities, the risk of climate change due to global warming, societal demands of securing a healthy water circulation system as well as strengthening Japan's presence in contribution on an international level.

Against this background, on October 22, 2013, the Minister of Land, Infrastructure and Transport held an inquiry on the "Role of Water Resources Policy of the Future" and held a deliberation session in the National Land Council Water Development Subcommittee's Investigation Planning Committee which was then organized into the "The Role of Water Resources Policy in the Future (Interim Report)".

Aiming for the fundamental philosophy of "A Society that can enjoy the blessing of water", the "Interim Report" indicated that as the "First Year of Next Generation Water Policy", now is the time to address the construction of a "Social System with Width" that can respond in a flexible and comprehensive manner in any situation which may arise, the

strengthening and maintaining of measures already implemented along with a "multi-tiered deployment" of new measures, the inflection point indicating the basic, long-term direction, and specific measures are being considered in the work of finalizing the Policy.

Measures in building a healthy water circulation system in cooperation with ministries and agencies involving water

The liaison conferences for ministries and agencies involved in building water circulation systems has published the "Initiatives for Planning a Healthy Water Circulation System," and these ministries and agencies are working together to provide various means of support to promote activities in communities.



Establishment of the Basic Law of Water Circulation and the law concerning the promotion of rainwater use

By promoting integral and comprehensive measures for water circulation, the "Basic Law of Water Circulation" with the purpose of the sound development of the economy and society and improving the stability of citizen's lives by restoring and maintaining healthy water circulation, as well as the "Law regarding the promotion of rainwater use" with the purpose of achieving effective use of water resources along with contributing to suppression of the intensive outflow of rainwater into sewers and rivers, were established in March 2014.

Initiatives in improving the water environment

(1) Proceeding with water purification

For bodies of water with serious deterioration in water quality, we are striving to acquire clean river water through water purification measures such as clean water transmission, dredging sediment, and purification by vegetation in places such as Kasumigaura Lake (Ibaraki prefecture), Shinji Lake and Nakaumi Lake (Shimane and Tottori prefectures).

In addition, local municipalities, river administrators, and sewage works administrators are striving to improve the river environment of 34 rivers with seriously



deteriorated water environments. They are working together to formulate and implement the "The Second Urgent Action Strategy for Water Environment Improvement (Clear Stream Renaissance II)" (34 locations selected).

(2) Surveys on water quality and response to water quality hazards

Water quality surveys of rivers, lakes, and water reservoirs are crucial for activities in conserving or reviving healthy water environments. In 2012, 1,077 locations in 109 water systems were surveyed.

In addition, we are creating a map of water quality surveys and conducting studies on aquatic organisms in cooperation with local citizens. Furthermore, based on a new water quality index, which comprehensively evaluates bodies of water from various standpoints, the results for the survey conducted in cooperation with citizens showed that approximately 25% (76 locations out of 305) class A rivers were judged as "clean rivers desirable for swimming" in 2012.

However, 1,244 cases of water quality hazards involving the leakage of oils or chemicals occurred in class A water systems in 2012. As for water pollution control, the Liaison Council for Prevention of Water Pollution, consisting of river administrators and relevant administrative authorities, was set up in all 109 water systems in Japan to quickly communicate information on the occurrence of water quality hazards, and for the containment of hazards, such as installing oil fences.

- On the national level, in 2012 the proportion of survey sites that met the environmental standards for BOD (biochemical oxygen demand) value (or COD chemical oxygen demand) was 90%.
- Of surveyed locations in the rivers, 94% of the locations had good water of 3.0mg/L of BOD, in which salmon and sweetfish can thrive.
- 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 99%, with most sites meeting the standards.



(3) Improving the water environment of enclosed coastal seas

Regarding the enclosed coastal seas of the Tokyo Bay, Ise Bay, Osaka Bay, and the Inland Sea of Japan, because of the large amounts of organic pollutants and chemicals such as nitrogen and phosphate draining from land, and the loss of tidal flats and seaweed forests, the fishing industry has suffered damages from the occurrence of red and blue tides. In addition, problems such as environmental degradation and barriers to ship navigation have been occurring due to drifting garbage.

To resolve the current state, we advance activities to revive beautiful 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 spilled oil by using sea clean up boats, and (4) reducing the amount of pollutants released into the ocean by improving sewage treatment facilities.

(4) Stimulating sewage maintenance to improve the water environment

We will appropriately formulate and review the comprehensive basin-wide planning of sewage systems, and promote high temperature incineration to remove nitrogen and phosphates which contribute to the eutrophication of enclosed bodies of water. In addition, we are working for early advancement in improving water quality and stratified advanced water treatment by partially renovating equipment and facilities in treatment plants that have not yet reached their scheduled renewal period.

As for the combined sewerage system, we plan to complete implementation of measures by 2022 through controlling the amount of water and the frequency at which untreated water is released in to streams during heavy rains.



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 various policies corresponding to the situation of communities from both standpoints of supply and demand. Specifically, in the facet of demand, we must enhance the recovery and reuse of water, and increase awareness for conserving water. In supply, we must build and improve water resource development facilities such as dams, implement countermeasures for aging facilities related to water resources, develop crisis management measures, and increase the number of water resources by utilizing rainwater and recycled water. In addition to the conservation and use of groundwater, in order to conserve and activate the water source area, based on the "Special Measures for Water Source Area Act", work is being done to establish the living environment of the water source area and the industrial base, along with prevention of water pollution of the dam reservoirs.

In addition, climate change due to global warming has been pointed out, and as a response to the effects of climate change, such as an increase in the range of rainfall variation in the recent and future years and the early melting as well as reduction in snowfall, work is being done towards risk management of drought, building a water-saving society through demand management, implementing measures for aging and maintenance, earthquake resistance, avoidance of draught risk by promoting the public understanding of the conditions, as well as measures for water resources.

(2) Efficient use of water resources

a. 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 1.4% 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.

b. Promoting the utilization of rain water

In order to efficiently utilize water resources, initiatives are being promoted to treat and use rainwater and waste water from facilities for sanitation of toilets and sprinklers. There are approximately 1,900 facilities utilizing treated water as of 2010, and they use over 65 million m3 a year. In order to continue promoting the utilization of rainwater, we are gaining understanding regarding actual conditions, including examples of facilities using rainwater and the considerations for using rainwater, and share this information with users.

(3) Securing safe and delicious water

Water service has become popular in Japan, and in recent years, the public's need for safe and delicious water continues to increase. For this reason, improvement measures such as water conservation measures for dam reservoirs, promotion of the sewer system, the introduction of advanced water treatment and combined sewer systems have been implemented.

(4) Promoting measures concerning the permeation of rainwater

Due to the spread of impervious areas in recent years by urban development of drainage 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, improvement to rainwater storage penetration facilities are being promoted through tax measures, for cultivating groundwater, contributing to the revival of springs, and building a healthy water cycle system.

(5) Promoting measures concerning groundwater

As a result of excessive utilization of groundwater for industrial purposes during the period of high economic growth, adverse affects emerged in various locations such as land depression and salination of water supplies. In the Noubi plain, Chikugo and Saga plains, and the Northern parts of the Kanto plain, where land depressions have occurred, activities for preserving groundwater and promoting proper usage are being conducted, based on the Guideline on Measures for Prevention of Ground Subsidence.

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, new demands are being made of sanitary drainage, including forming a low carbon, recycling society and a healthy water circulation system.

(1) Dissemination of sewage processing with sanitary drainage

Although the dissemination of sewage treatment plants reached around 88% (dissemination of sanitary drainage systems of around 76%) of Japan as of 2012 (total of 46 prefectures, excluding Fukushima due to effects from the Great Eastern Japan Earthquake), there is a large gap between regions. In particular, the dissemination 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 74% (dissemination of sewage systems approximately 48%). Focusing on improvement in areas with high population density, the advancement of efficient development in accordance to condition of communities are seen as being of the utmost importance for developing sewage systems in the future.



a. Cooperation between businesses for efficient maintenance of sewage treatment facilities

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, each prefecture has established a "Prefectural Plan", a compiled maintenance plan over sewerage treatment which reflects considerations over regional characteristics such as the economic efficiency and importance of protecting water quality. Based also on the declining population trend, a rapid review of State initiatives has been promoted in order to develop more efficient sewage treatment facilities. In addition, efficient means of maintenance are also being actively promoted through the implementation of cooperative schemes between other



waste water treatment facilities such as cross-jurisdictional waste water treatment.

Example of Implementing the Sewer-

b. Sewage quick project

In light of the declining population and the strained state of public finances, this project aims for the widespread implementation of new methods for swift and mobile maintenance, not constrained by past technological standards, low in cost, and corresponding to circumstances of regions with the cooperation of local citizens, while a committee composed of experts inspect them for aspects such as capability, etc. Manuals are being drafted to assist in the utilization of six technologies, such as the "plant manufactured small-scale waste-water treatment facilities (catalytic oxidation method)", which were acknowledged for their effectiveness in field tests that took place in 14 municipalities up to 2012. Other technologies are also under inspection and evaluation for their utilization throughout Japan.

(2) Attaining durability in sewerage projects

a. Proper stock management

With the progress of sewage systems, at year-end of 2012, there is a vast stock of approximately 450,000km of sewer line extension facilities as well as approximately 2,200 sewage treatment plants.

Because these sewerage facilities were built rapidly starting around the high economic growth period, the number of aging facilities is expected to increase rapidly from now on. Although in 2012, mainly small scale issues were arising, road collapses have occurred in 3,900 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 work consignment to private sector and efficient pipe inspection methods.

b. Reinforcement of business infrastructure

In the operation of sewerage projects, although it is a fundamental rule to cover costs (excluding portions covered by public expense) for treating waste water with money acquired from usage fees, the initial establishment requires a lump sum of funds. Due to the business characteristic in which income begins to stabilize as sewerage systems develop, there are cases where funds fall short during construction. Therefore, with the "Guide for restoring financial health in sewage management" we are pushing initiatives in each municipality for the restoration of financial health in sewage business management.

c. Consigning facility management to private sector and acquiring technical capabilities

In regards to the operation and maintenance of waste water treatment facilities, initiatives such as environmental improvements are being conducted to facilitate furthering the comprehensive work consignment to private sector Note. 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 cultivating technical experts at local public organizations, while developing new technology.

Note

A method of facility management that reflects original ideas of private contractors by consigning details of operation methods in order to optimize operation while charging the responsibility to secure a specified level of capabilities such as sustaining the quality of released water to optimize operation.





(3) Revitalizing communities through sewage

The proper treatment of waste-water through improvements in sewage, and the preservation or creation of healthy water environments, stimulates regional settlement and promotion of tourism and industry. In addition, by creating river fronts using recycled water from advanced waste water treatment, stimulating regional activities through the operation and management of water amenity spaces by citizens, utilizing space above waste water treatment facilities, transferring sewage heat to be used as district heating, utilizing bio-gas as energy and efficiently using recycled resources derived from sewage, sewage contributes to regional vitalization in numerous facets.

(4) Promoting environmental education in the field of sewage

Working groups, consisting of elementary school teachers and sewage administrator representatives, created teacher edition textbooks that were well-suited for classroom use for sewage education. In order for teachers to freely make use of these teaching materials regarding sewers, they are being offered through the "Sewer Systems, the Path of Circulation Environmental Education Portal Site." Note Additionally, subsidies are granted to each elementary and middle school for

 Figure II-8-4-7
 Environmental Education in the Field of Sewer Systems

Efforts of Sewer Environmental Education by Osaka Minoo-shi Saito-no-Oka Elementary School



Source) MLIT

supporting environmental education on sewage.

Section 5 Protecting the marine environment

(1) Control policies over large scale oil pollution

In order to eliminate the substandard vessels (a major factor for large scale oil pollution), Japan actively participates in international initiatives, such as the formulation of the international shipping database (EQUASIS), while also strengthening Port State Control (PSC), which checks if vessels meet standards, by conducting on-site inspection of vessels that enter Japanese ports. As for systems for inspecting if flag state governments are fulfilling their duties in monitoring and supervising ships from their own country, an arbitrary system proposed by Japan was authorized for establishment by the IMO Convention in 2005. However, in light of progress in initiatives, the system is now scheduled to be mandatory by January, FY2016. In order to enhance the effectiveness of inspections, Japan will participate in discussions in reviewing the manner of operation.

In addition, as countermeasures for occurrences of large scale oil and HNS pollution in and around the Sea of Japan, Japan works to strengthen international cooperation and collaborative systems by establishing the "NOWPAP Regional Oil and HNS Spill Contingency Plan" through the "Northwest Pacific Action Plan (NOWPAP)", the framework for joint efforts among Japan, China, Korea and Russia for protecting the marine environment. As for large scale oil spillages that occur in the sea areas surrounding Japan, measures have been established for prompt and reliable response through the utilization of large sized dredging and oil skimming vessel.

Note http://www.jswa.jp/kankyo-kyoiku/index.html

Moreover, the amount of allowable oil and waste discharge from ships is regulated by the MARPOL Convention ^{Note 1}. The regulation on waste discharge from ships was become more stringent in January 2013 through the amendments on annexes of the convention. In order to ensure proper disposal measures in ports and harbors, Japan provides support for improving reception facilities for waste oil generated in ships by means of tax policies and the formulation of the "Guideline for Reception Facilities of Ship Generated Waste for Ports and Harbors (Plan)".

(2) Control measures on air pollution from ships

As nitrogen oxides (NOx) would cause acid rain and provide adverse impacts on human health, the International Maritime Organization (IMO) regulates the NOx emissions from ships based on the MARPOL Convention. Currently, NOx Tier II limits are in effect, which reduce the NOx emissions by 20% compared to NOx Tier I limits. Further, the MARPOL Convention provides Nox Tier III limits which redude NOx emissions by 80% compared to the Nox Tier I limits for future. The NOx Tier III limits, Japanese engine manufactureres conducted developments of a exhaust gas after-treatment device (SCR equipment) which significantly reduces NOx emissions from ships as well as in-engine combustion technologies and demonstrated availability of those technologies through onboard tests. As the results of the technological developments, it was shown that reduction of NOx emissions for Tier III limits could be achieved.

The NOx Tier III limits will enter into force on January 1 2016. The MLIT has contributed to the discussion of the reduction of air pollutant from international shipping through the technological development of NOx Tier III, development of verification guidelines for SCR denitration equipment, and providing information which shows NOx Tier III limits could be achieved by such technologies.

(3) Control measures on invasive aquatic species carried by ships

It is pointed out that the transfer of aquatic species via ships' ballast water ^{Note 2} and ships' biofouling would threat marine ecosystem in waters where these ships navigate in. In order to prevent the transfer of invasive species, "International Convention for the Control and Management of Ships' Ballast Water and Sediments in 2004" and "the 2011 Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species in 2011" were adopted at the IMO. The MLIT has actively participated in the discussion on development of the guidelines at the IMO with an aim of early entry into force of the Convention. In 2013, an IMO Assembly Resolution, lead by Japan, was adopted at the 28th session to relax the schedule for the installation of ballast water management systems. Futhermore, since the Convention is to enter into force near future, the implementation law of the Convention was proposed to the 186th ordinary session of the Diet ^{Note 3}.

Section 6 Improving living environments by preventing atmospheric and noise pollution

Policies for environmental issues related to road traffic

(1) Measures for individual vehicles

a. Reinforcing exhaust gas regulations

For exhaust gas measures of new vehicles, seeking to further reduce nitrogen oxides and particulate matter emitted by vehicles, Japan established the most stringent regulations among global standards (post-new long-term regulation) in 2008, and began its consequent enforcement beginning in October 2009. In addition, test methods based on uniform domestic standards for special and two-wheeled vehicles were implemented in 2010. As for the diesel special car, tighter regulations of particle matter were set in 2010 for which the mandatory application was carried out sequentially from October 2011, along with the revision in January 2014 of relevant laws and regulations regarding further reduction of nitrogen oxides and blow-by gas measures for which the mandatory application is to be carried out sequentially starting in October 2014.

Note 1 International Convention for the prevention of pollution from ships.

Note 2 Sea water loaded as weight to balance the ship when it carries no cargo.

Note 3 Also, a proposal to obtain the approval for accession to the Convention was submitted to the 186th ordinary session of the Diet.

Meanwhile, exhaust gas measures for in-use vehicles (vehicles already in usage) such as those based on the "Amendment Act on Reduction of Total Amount of Nitrogen Dioxide and Particulate Matters Originating from Automobiles in Designated Areas (Automobile NOx PM Law)" are being implemented; Japan is working to bolster exhaust gas measures.

b. Development and practical application of next generation heavy vehicles

In order to stimulate the development and practical use of next generation vehicles, Japan is preparing environments for their dissemination. The government, industry, and academia are collaborating in their efforts for conducting demonstrative driving tests and vehicle development regarding high efficiency trucks, next generation bio-diesel engines, electric or plug-in hybrid trucks, and high performance electric buses, also formulating technical policies on safety and environmental conservation.

(2) Promotion of Traffic Flow Measures, etc.

a. Countermeasures for Air Pollution

As the emission of particulate matter (PM) and nitrogen oxides (NOx) from automobiles is increased by the number of starting and stopping times as well as the decrease of running speed, traffic flow improvement measures are being promoted from the viewpoint of improving roadside environment, such as setting up trunk road networks, countermeasures to bottlenecks, and transportation demand management (TDM) measures.



b. Countermeasures for noise pollution

We are proceeding with the lamination of low-noise pavement, installation of noise barriers, and maintenance of environmental roadside facilities along with the measures for traffic flow. 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.

Environmental measures for airports and surrounding areas

The most effective means of curbing aircraft noise is the implementation of low-noise equipment. In comparison to the past DC8, the current B767 only produces $80dB (A)^{Note}$ of noise which has an approximately 90% smaller range of noise impact. However, even if low noise equipment is implemented, areas that are affected by noise impact require measures such as noise insulation work and relocation compensation projects. Most of the sound insulation work for housing, excluding continued maintenance, has been completed. Although the issues related to aircraft noise are progressing towards improvement and noise control zones in each airport are being sequentially reviewed, further measures are needed to reduce noise pollution in the future in order to promote harmonious development around airports and surrounding areas.

Note The noise (sound pressure) level weighed by A-frequency (frequency adjustments to evaluate sounds close to that of human senses, because the sensitivity of human ears differ depending on frequency).



Countermeasures for Railway Noise

In policies to control noise generated by Shinkansen bullet trains, to satisfy environmental standards, Japan implemented sound source control measures such as installing and heightening noise barriers, installing pantograph covers, and conducting corrective railway grinding to eliminate the cause of noise itself. As for the construction of new railways for Shinkansen bullet trains, for regions where the measures mentioned are difficult to implement, Japan is providing financial aid for sound insulation work in already existence housing.

As for noise control measures for existing lines, each railway company is instructed to lower noise levels below a fixed value when constructing new railways and renovating already existing railways, more than previously in large-scale improvement projects, based on the "Guidelines for Noise Abatement Measures in the Construction of New Lines and Large-scale Improvement of Conventional Railways."

Countermeasures for urban heat islands

Heat island effect refers to the phenomenon where a metropolitan area is significantly warmer than its surrounding rural areas. Though the global temperature has only elevated around 0.7oC in the last century, Japanese metropolitan areas have seen elevations of around 2 to 3oC, indicating the significant progression in heat island phenomena compared to the global warming trends. The main cause of this phenomenon is said to be increases in artificial heat from air-conditioning, the reduction of greenery and water surface, and the modification of land surface by urban development.

In order to promote comprehensive and effective countermeasures against urban heat islands, Japan is administering improvements to the "Heat Island Monitoring Network", a collection of specific measures systematically compiled in 2004 by relevant ministries and agencies. Improvements included the addition of the four objectives for promoting policies to alleviate health effects on people: reducing artificial heat emission, improving land surfaces, urban morphology, and lifestyle. The MLIT focuses on promoting policies for the swift acquirement of greenery and open spaces.

Countermeasures for sick building syndrome and soil contamination

(1) Countermeasures for sick building syndrome

Sick building syndrome 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 Law".

In the construction 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 FY2012, the sediment of all locations and the water quality of 97% (208 locations out of 215) of the locations satisfied environmental standards.

For rivers and harbors where sludge containing dioxin levels exceeding environmental standards were found, basic concepts over measures for rivers and harbors were integrated, and measures are being implemented based on the "Manual for countermeasures against contaminated sediment with dioxins encountered in harbors. (revised edition)" and the

"Manual for countermeasures against sediment with dioxins encountered in rivers and lakes", which were revised in April 2008. In addition, Japan is supporting pollution prevention projects in rivers and lakes with dioxins levels detected to be exceeding standards. In addition, support is being provided for pollution prevention enterprises for harbors and rivers for which dioxins exceeding the standards have been detected in the bottom sediment.

(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 2013, in order to efficiently and accurately grasp the actual use of asbestos building materials, the system for investigators of structures containing asbestos building materials was created.

Also, based on the "Building Standards Law," the removal of sprayed asbestos when renovating a building is required, auxiliary system 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.

Furthermore, Japan is promoting the dissemination of information in efforts such as compiling data bases on referential cost estimates for removal work of spray-applied asbestos insulation, documents useful for identifying building materials containing asbestos (Visually identifiable building materials containing asbestos) and information on such materials, as well as pamphlets for measures related to asbestos in buildings.

6 Environmental measures in construction

The regulations for use under the "Law on the Control of Specified Special Automobile Exhaust Gas" have been implemented for the purpose of reducing the damage to atmospheric environment caused by construction machinery, not travelling on public roads and, in January 2014, the Ordinance Notice (sequential application from October 2014) was amended to strengthen the regulation value for NOx to approximately 1/10. In addition, the dissemination of the use of construction machinery specified as the type with measures for exhaust gas, low noise and low vibration will be promoted along with the promotion for use in direct-control businesses.

Section 7 Observing, monitoring, and forecasting changes in the global environment

Observing and monitoring the global environment

(1) Observing and monitoring climate change

In order to grasp the status of greenhouse gases (GHGs), the Japan Meteorological Agency (JMA) is observing CO_2 trends in the atmosphere at three stations in Japan. CO_2 concentrations in the marine atmosphere, as well as those in the sea surface water are being observed in the northwest Pacific by ocean station vessel. GHGs in the upper troposphere in the northwest Pacific is also being observed. Furthermore, JMA is not only monitoring climate changes but also observing solar and infrared radiation at domestic five stations in order to reduce an uncertainty of 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.

In addition, in order to improve the accuracy of seasonal weather forecasting and monitoring of climate change, JMA produced the Japanese 55-year reanalysis (JRA-55), a historical global atmospheric data with homogeneity in space and time.

Moreover, "Climate Change Monitoring Reports" and "Report on Climate Change and Extreme Weather" (in Japanese) are compiled based on results from observation, and future projection of climate changes, extreme weather events and global warming is disclosed to the public. Serving as the World Data Center 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

The Japan Meteorological Agency (JMA) monitors extreme weather that occurs in Japan and many parts of the world to compile and then report on a regular basis their observations regarding areas with extreme high and low temperatures or rainfall as well as weather disasters. Also, when extreme weather conditions are occurring that significantly affect the public, progressive reports are given summarizing the information regarding features, factors and the outlook.

Furthermore, as a Regional Climate Center 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 services in the Asia-Pacific region.

(3) Initiatives aimed to improve next generation geostationary meteorological satellite

The manufacture of the next geostationary meteorological satellites Himawari-8/9 was started in 2009 and the launch plans are for Himawari-8 in 2014 and Himawari-9 in 2016. In addition to the improvement of disaster mitigation function against such weather as typhoons and torrential rain, these satellites lead the world in their powerful monitoring functions for the global environment such as 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 CO_2 discharged 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 Ocean along with using data from satellites and Argo floats, or profiling floats to automatically observe the ocean interior.

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

In order to supplement data obtained from Argo floats, the Japan Coast Guard constantly monitors fluctuations in the Kuroshio Current in waters surrounding the Izu Islands, using high-frequency radar, and publishes the observation data. 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.



Monitoring the Global Environment by research vessels

The long-term changes in hydrogen ion exponents (pH) in 10, 20, 30 degrees latitude north along the 137th longitude line (left) and the analysis results (right). The numbers in the graph indicate the variation ratio per 10 years. The progression of "oceanic acidification" is indicated by how much the pH decreases.



Figure II-8-7-3

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

[August 2013 High SST around Japan]

- SST around Japan was much higher than normal in August 2013.
- The average SST for August was 29.2°C (+1.2°C compared to average). Sea off Shikoku and Tokai and 29.0°C (+1.5°C compared to average) in the East China Sea, making it the highest average for August since 1985 (Note).
- Note: Statistics based on data for the 29 years since 1985 when observational data by satellite became available.



(5) Observing and monitoring the ozone layer

The Japan Meteorological Agency annually publishes the outcome of observations on ozone and ultraviolet radiation. According to these studies, the global amount of ozone continues to be low from a long-term perspective. Additionally, in order to prevent adverse effects to the human body by ultraviolet radiation, information on the topic is published daily using a numerical index (UV index) for easy comprehension of the intensity of ultraviolet radiation.

(6) Promoting routine operational observation in the Antarctic

Geospatial Information Authority of Japan is conducting geodetic observation of the Antarctic regions, creating and updating topographic maps, and managing digital altitude data. The achieved results contribute to the smooth and safe activities of Antarctic research expeditions, and contribute to the research of global environmental changes etc. as well as international activities related to geodetic survey and geospatial information.

The Japan Meteorological Agency continues to conduct observation of the ozone and solar radiation as well as 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 Coastguard is conducting topological studies on the sea floor. The observation data is being used for creating hydrographic charts and also as the basis for research related to past environmental conditions such as glacial erosion and sedimentary environments. In addition, they conduct tidal observations , which contribute to monitor the fluctuations in sea levels, which are closely tied to global warming.

Guiding Committee for GEBCO" Coast Guard Marine Information Director elected Chairman

Shin Tani, the Coast Guard Marine Information Director was elected to be Chairman of "GEBCO Note 1 Guiding Committee for GEBCO Note 2 " which promotes the bathymetric chart creation project for oceans world-wide. This election is recognition of Japan's deep involvement with the GEBCO project and rich scientific knowledge. Sir Laughton, scientific advisor to Queen Elizabeth, also served as chairman in the past and Director Tani will be the sixth chairman.

Japan, which has one of the most complex undersea features world-wide with 4 global plates clashing as well as a 9,000 meter deep undersea trench in the immediate vicinity of an urban area with a population of 10,000,000, has focused on creating a bathymetric chart and investigating the undersea features from ancient times in order to clarify this undersea phenomenon and elucidate the mechanisms of earthquakes and volcanic eruptions. Even in the continental shelf that spans 310,000

square kilometers corresponding to 80% of the area of Japan which received recognition in 2012, the information of the elaborate undersea terrain features played an important role. Japan is recognized as the world's most advanced country in terms of undersea features investigations and creation of the bathymetric chart.

It has been pointed out that information on undersea features is essential for the scientific clarification and response to natural disasters originating from the sea such as tsunami, earthquakes and volcanic eruptions as well as providing important information in considering climate change on a global scale. Also, information on undersea features is valuable for fisheries and in the development of marine resources (energy and mineral resources of the seabed, renewable energy such as offshore wind and tidal power). These things are leading to the internationally growing interest in precise bathymetric charts.

On the other hand, the sea area for which precise undersea features data is shared is still limited to 10% of all world seas. The promotion of terrain studies for sea areas not yet surveyed and finding data that has been recorded but has yet to be shared are important issues. From now on, the Ministry will be tackling the difficult challenges of enhancing current data, preparing topographical information and topographic maps that meet the needs of the undersea features information and the development of the next generation to continue this work, with the cooperation of various countries, organizations and experts.





About GEBCO (General Bathymetric Chart of the Ocean) Note 1

This is the only official enterprise to create a bathymetric chart of the whole word and the International Hydrographic Organization (IHO) and UNESCO's Intergovernmental Oceanographic Commission (IOC) are promoting it together. It was started with a proposal by Archduke Albert of Monaco in 1903.

Note 2 About Guiding Committee for GEBCO

It handles the overall coordination of the GEBCO project and is composed of 5 members each selected from IHO and IOC for a total of 10 committee members.

Research and Prediction of the Global Environment

The Japan Meteorological Agency (JMA) and the Meteorological Research Institute (MRI) are developing prognostic models on changes in climate around Japan and the world, and actively participate in international research programs such as the World Climate Research Program (WCRP). MRI conducts research on global warming predictions as well as development of Earth System Models including the carbon cycle processes, and actively contributed to the Fifth Assessment Report (published 2013 – 2014) of the Intergovernmental Panel on Climate Change (IPCC). In addition, JMA published the Global Warming Projection Volume 8 in 2012, which showed a warming prediction around Japan more detailed than any in the past by using a sophisticated regional climate model.

In 2013, the National Institute for Land and Infrastructure Management published the results of research conducted thus far as the "Research on Climate Change Adaptation Policy (Interim Report)" that presented the technical infrastructure that is required in order to consider and establish measures, from a multi-faceted standpoint of irrigation and flood control as well as the environment, which can respond to future climate change.

Promoting Global Mapping Project and the world geodetic network

Japan serves as the secretariat for the International Steering Committee for Global Mapping, collaborating with national geospatial information authorities around the world to develop and release the Global Map Version 2 (digital geospatial information covering whole land area), leading Global Mapping Project (182 participating nations and regions as of December 2013), and advancing the utilization for understanding and analysis of the global environment through United Nations Committee of Experts on Global Geospatial Information Management (UNCE-GGIM) and others. In addition, by participating in international observation utilizing VLBI (Very Long Baseline Interferometry, which is a survey technique using radio waves from quasars) and SLR (Satellite Laser Ranging is a method for measuring the range of an orbit by deflecting laser off of retro-reflectors on an artificial satellite), tide observation, absolute gravity measurement, and International GNSS Service (IGS), Japan is conducting observations and research on global crustal deformations. Moreover, Japan conducts the "Environmental Monitoring of Japan", which produces vegetation index related to the activity of plants by analyzing of satellite data.

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