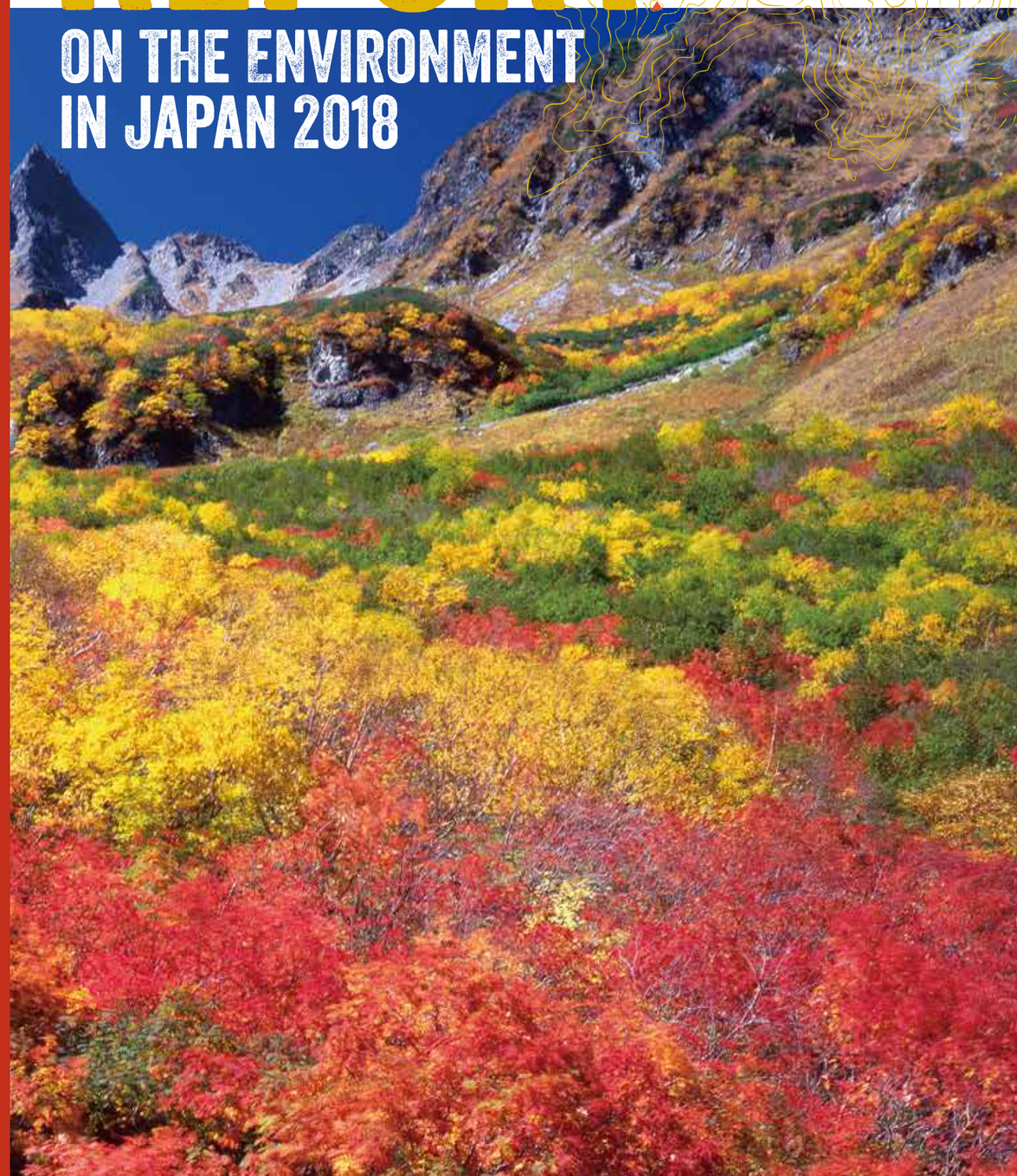
環境省
Ministry of the Environment

ANNUAL REPORT

ON THE ENVIRONMENT IN JAPAN 2018



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This report is an English-language digest of parts of Japan's Annual Report on the Environment, the Sound Material-Cycle Society, and Biodiversity that was approved by the Cabinet on June 5, 2018.

FOREWORD

In 2002 when I was appointed Administrative Vice-Minister of the Environment, Japan signed the Kyoto Protocol and took its first step toward building a sustainable society.

And, two landmark commitments have been made on a global scale. One was the commitment to "the Sustainable Development Goals (SDGs)" adopted by the UN General Assembly in 2015. The other was "the Paris Agreement" on climate change countermeasures that entered into force in 2016.

In the face of this global shift to a sustainable society, the environmental administration of the Japanese government should be geared toward providing simultaneous solutions for socio-economic challenges, supported by stronger partnerships with multi-stakeholders such as business, local governments, and citizens.

With recognition that we are in the midst of an epoch-making transformation, the Fifth Basic Environment Plan that was approved by the Cabinet in April 2018 points to the importance of such simultaneous resolutions, by stimulating innovations in a wide range of areas including the socio-economic system, lifestyles, and technology.

Key to all these developments is the creation of a "Regional Circular and Ecological Sphere (Regional CES)," which encourages local regions to fulfill their maximum potential by ensuring the sustainable use of local resources. I am pleased to note that this approach is gaining momentum already.

The Annual Report on the Environment in Japan 2018 features many concrete initiatives that are emerging in various parts of the country to create a Regional CES.
It is my earnest hope that this report will help every reader take another step forward to create a sustainable society.

中川雅治

Masaharu Nakagawa

Minister of the Environment

TREND OF SUSTAINABLE SOCIETY THAT HAS LED TO THE FIFTH BASIC ENVIRONMENT PLAN

Internationally, a major turnaround is taking place toward sustainable society, as represented by the adoption of the Sustainable Development Goals (SDGs) and the Paris Agreement. In Japan, debilitation of rural areas is a major reason for the encroaching loss of abundant nature such as Satoyama landscape. With a view to responding appropriately to these circumstances, the Fifth Basic Environment Plan utilizes the concepts of SDGs in promoting the integrated improvements on environment, economy and society (II2ES), which will open up "new avenues for growth" that ensure quality of life is maintained into the future.

1

THE PARADIGM SHIFT TO A SUSTAINABLE SOCIETY

SDGs and the trend they represent

The United Nations General Assembly in September 2015 adopted the 2030 Agenda for Sustainable Development (2030 Agenda) that recognized the challenges caused by human activities as requiring urgent collaborative efforts for their resolution by the international community. The 2030 Agenda was adopted as universal goals that the developed and developing countries together will work to pursue. It has identified 17 goals and 169 targets as SDGs.

Among the 17 goals, there are issues directly or closely linked to global environment such as water and sanitation, energy, sustainable cities, sustainable consumption and production, climate change, terrestrial ecosystems, and marine resources.

Sustainable Development Goals

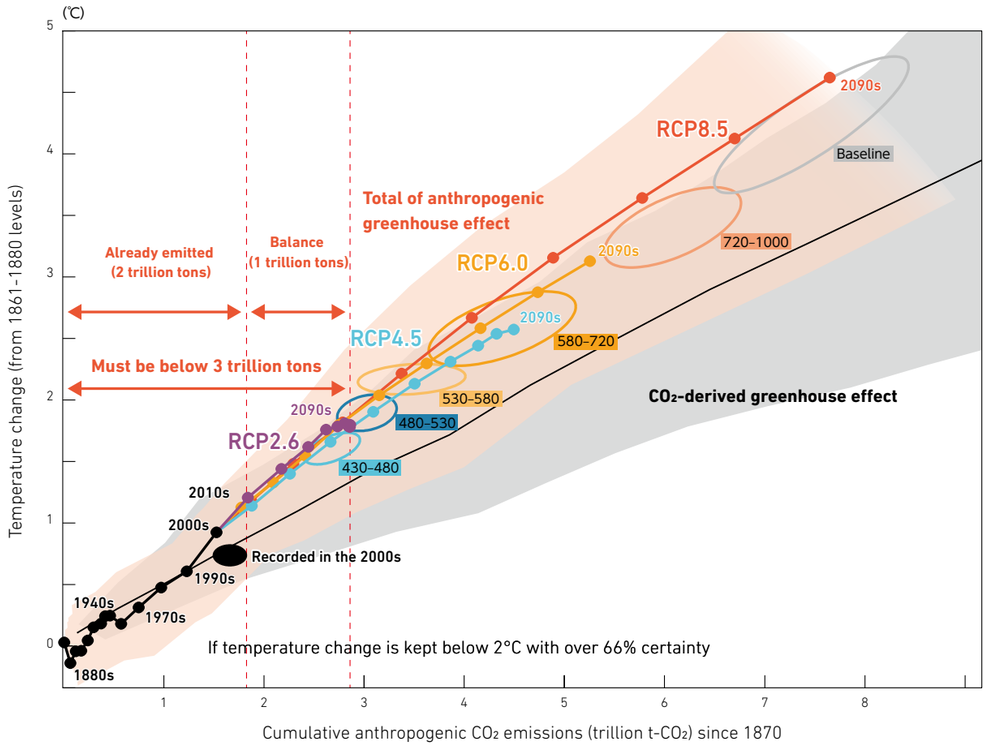
Source : United Nations Information Centre

Building a carbon-neutral society in line with the Paris Agreement

The Paris Agreement that was adopted at the 21st Conference of the Parties to the United Nations Convention on Climate Change (COP21) in December 2015 took effect in less than a year in November 2016.

The Paris Agreement aims to hold the increase in the global average temperature to well below 2°C and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. For that purpose, it aims to achieve net zero emissions of anthropogenic greenhouse gas by the second half of this century (balancing out of anthropogenic greenhouse gas emissions and removals). This marked a turnaround to building a carbon-neutral society on a global scale.

Cumulative anthropogenic CO_2 emissions and the temperature change



Source : Prepared by Ministry of the Environment from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment report (synthesis report)

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AN OUTLINE OF THE FIFTH BASIC ENVIRONMENT PLAN

In light of Japan and overseas tides following the SDGs, the Paris Agreement, and others, the Cabinet of the Japanese government approved the Fifth Basic Environment Plan in April 2018. While holding onto the principles and ideals declared in previous Basic Environment Plans, the new Basic Environment Plan reflects the changes in the international and national situations as demonstrated by the SDGs and the Paris Agreement, based upon what should be achieved by 2030 and 2050, introduces the SDGs approach to address multiple challenges in an integrated manner, and thus seeks to promote measures for II2ES.

For their implementation, six priority strategies were set as a cross-cutting framework that accounts for interlinkages, and enables specific environmental measures to help address various economic and social challenges in an integrated manner.

The basic plan also calls for innovation across all perspectives including those concerning socio-economic systems, lifestyles, as well as technologies through the implementation of the policy measures listed in the priority strategies. Furthermore, it aims for the creation of a "Regional Circular and Ecological Sphere (Regional CES)" that complements and supports regional resources by building broader networks, which is composed of natural connections (Connections among forests, the countryside, rivers and the sea) and, economic connections (composed of human resources, funds, and others) in partnership. Each region will demonstrate its strengths by utilizing its unique characteristics, thereby building a self-reliant and decentralized society where different resources are circulated within each region, leading to symbiosis and exchange with neighboring regions according to the unique characteristics of each region.

Six priority strategies of the Fifth Basic Environment Plan

1 Formulation of a Green Economic System for Realizing Sustainable Production and Consumption

+ Expand ESG investment and green bonds
+ Greening of the tax system
+ Servicizing and sharing economy
+ Hydrogen derived from renewable energy, low-carbon hydrogen supply chain
+ Use of urban mine

Photo: Offshore wind power generation facility

2 Improvement of Value of National Land as Stock

+ Resilient society including climate change adaptation
+ Ecosystem-based disaster risk reduction (Eco-DRR)
+ Forest maintenance and conservation including forest environmental tax and forest environmental transfer tax (provisional)
+ Compact cities, small hubs + renewable energy/energy saving
+ Marine litter issues including microplastics

Photo: Forest reserve for landslide prevention

3 Sustainable Community Development Using Local Resources

+ Regional human capital
+ Expanding regional environmental finances
+ Improved balance of payments making use of resources and energy
+ Local revitalization centering on national parks
+ Conservation, regeneration and use of forests, the countryside, rivers and the sea involving cities
+ Coexistence and exchange among mountainous, agricultural and fishing villages, and cities

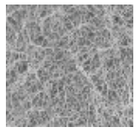
Photo: Biomass power generation

4 Realization of a Healthy and Prosperous Life

+ Switching to a sustainable lifestyle and consumption (ethical consumption, COOL CHOICE)
+ Reduction of food waste, appropriate treatment of waste
+ Low carbon and healthy housing
+ Promotion of rural migration and dual-residence lifestyle + management of forests, the countryside, rivers and the sea
+ Conservation of a good living environment

Photo: Connections among forests, the countryside, rivers and the sea

5 Development and Dissemination of Technologies Supporting Sustainability



+ Fukushima Innovation Coast concept (hydrogen production from renewable energy and floating offshore wind power generation)
+ Logistics Revolution using unmanned autos and drones
+ Production of high-value-added chemical products from biomass (cellulose nanofiber)
+ Productivity optimization with AI, etc.

Photo: Cellulose nanofiber

6 Demonstrate Japan's Leadership through International Contributions and Build Strategic Partnerships

+ Exporting environmental infrastructure
+ Adaptation support through Adaptation Platform
+ Greenhouse gas observation satellite "IBUKI" (GOSAT) series
+ Support for building overseas sustainable society as a developed country facing various social and other challenges

Photo: Japan-China Energy Conservation and Environment Forum

Source : Ministry of the Environment

CREATION OF A REGIONAL CIRCULAR AND ECOLOGICAL SPHERE (REGIONAL CES) TO ADDRESS LOCAL CHALLENGES

For the country as a whole to build a sustainable society, it is important to create a Regional CES that complements and supports regional resources. Each region will demonstrate its strengths by utilizing its unique characteristics, thereby building a self-reliant and decentralized society where different resources are circulated within each region, leading to symbiosis and exchange with neighboring regions according to the unique characteristics of each region.

1

REGIONAL CIRCULAR AND ECOLOGICAL SPHERES

Management and quality improvement of local resources

Local socio-economic activities depend on local resources. Local resources are not just limited to locally available energies, natural resources, infrastructure, and industrial conglomerations but also include the indigenous culture, climate, groups, and communities. For a region to be sustainable, its local resources must not be impaired by its socio-economic activities.

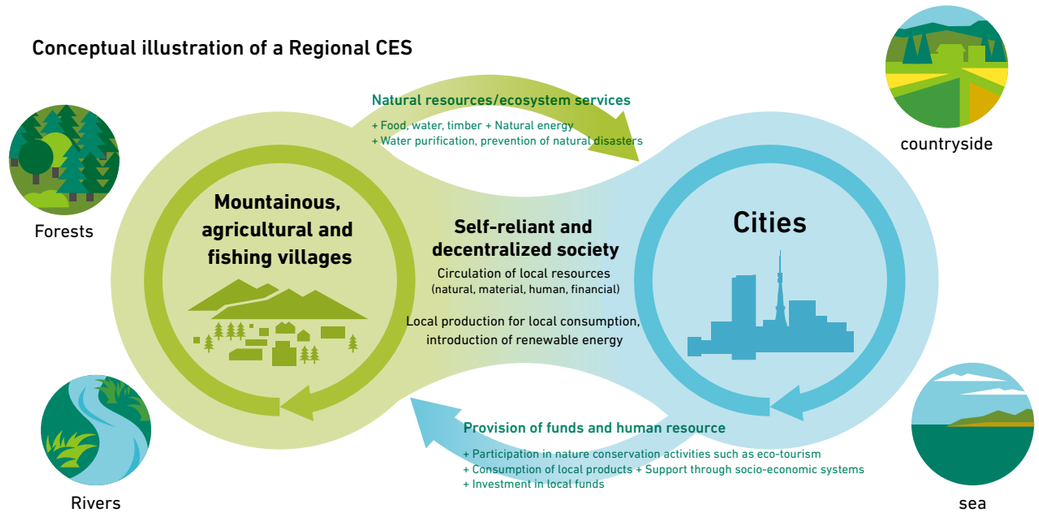
Conversely, improvement of the quality of the resources can lead to enhancement of the socioeconomic activities. Keeping in mind that the distinctive cultures and the additional value arisen from the diversity, uniqueness, and collaboration of regions can be the engine for national growth, we can say that sound management of local resources, which are the source of local diversity, and the improvement of their quality are quite important.

The importance of a Regional CES

While each region is required to pursue efforts toward II2ES, while taking advantage of its own characteristics, it is impossible for any local socio-economic activities to be entirely self-contained in this modern age of extensive socioeconomics. In this context, the creation of a Regional CES that complements and supports regional resources by building broader networks, which is composed of natural connections (connections among forests, the countryside, rivers and the sea) and, economic connections (composed of human resources, funds, and others), thus complementing each other and generating synergy.

Each region demonstrates its strengths by utilizing its unique characteristics, thereby building a self-reliant and decentralized society where different resources are circulated within each region, leading to symbiosis and exchange with neighboring regions according to the unique characteristics of each region is important for a region to achieve II2ES and remain sustainable. The key to creating a regional CES is to re-discover regional resources and make optimum use of them in a sustainable manner. Finding new values in overlooked resources of each region will be the first step moving towards II2ES.

Conceptual illustration of a Regional CES



Source : Ministry of the Environment

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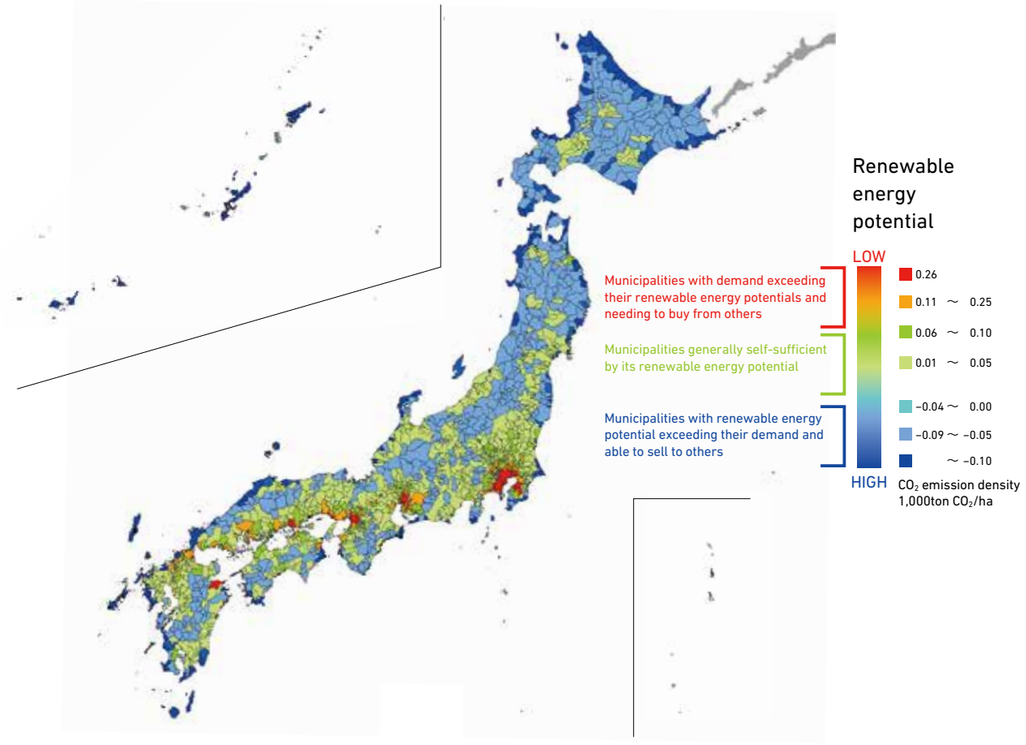
MAKING A LOW-CARBON COMMUNITY TO CREATE A REGIONAL CES

Community revitalization through introduction of renewable energies

Potential renewable energy resources of some kind are found in all communities in Japan.

The potential supply capacity nationwide is estimated to be about 1.8 times as large as the total energy demand. At present, however, about 90% of municipalities have an energy deficit, causing capital to flow out of the community. Redirecting funds to the introduction of, or investment in, renewable energy will return the energy balance to equilibrium and help build a resilient local economy. One estimate suggests that investments in renewable energies and energy efficiency projects required to meet Japan's 2030 greenhouse gas emission reduction target will generate some 3.4 trillion yen worth of impact on the Japanese economy.

Renewable energy introduction potential (by municipalities)



Source : Ministry of the Environment

Local production of energy for local consumption

Efforts are already underway through the collaboration among local firms, citizens, and financial institutions to develop and use local renewable energy to satisfy the local energy demand as much as possible, and thus achieve decarbonization and self-sufficiency in energy (also in the sense of disaster risk reduction), and create new opportunities for employment and income.

Local energy potential fully utilized by direct supply management

The city of Yonago, Tottori Prefecture promotes the concept of "local production for local consumption" to generate new flows of funds within the region by setting up a power and heat distribution company named Local Energy Corporation in 2015 in a joint venture with five local private firms.

Waste-to-energy, solar energy and geothermal energy sources account for about 60% of the electric power that Local Energy distributes. The company has the capacity to manage its power supply to match the fluctuating local demand and can adjust optimum energy balance according to the local demand characteristics. It has also created new employment opportunities in the area.

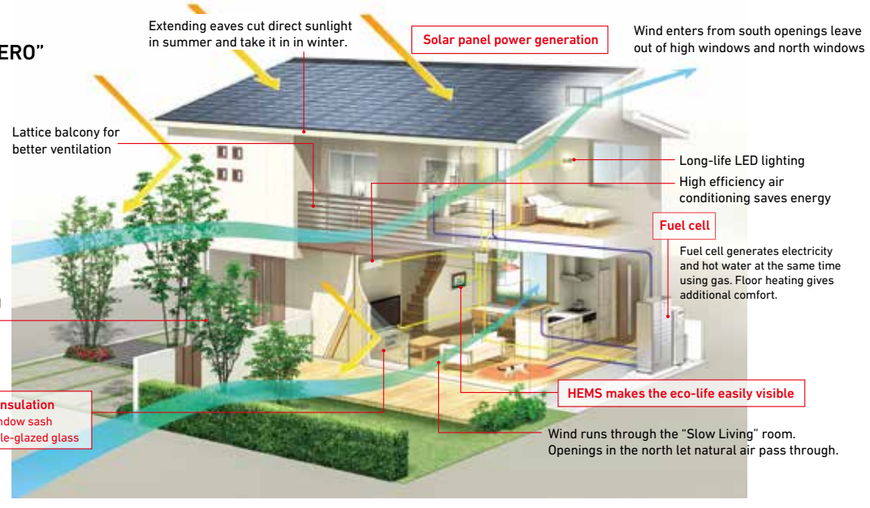
SoftBank Tottori Yonago Solar Park (solar power generation)
Source: Sharp Corporation

Yonago City Clean Center (waste-to-energy power generation)
Source: The city of Yonago, Tottori Prefecture

Making houses and office buildings low-carbon

Net Zero Energy Buildings (ZEB) and Net Zero Energy Houses (ZEH) are being built to make office buildings and family houses energy neutral. The final energy consumption by civilian sector is about 30% and is increasing faster than other sectors. Energy conservation in this sector is an urgent challenge for Japan. In this context, ZEB is a focus of attention. The Plan for Global Warming Countermeasures calls for net zero energy in all new public facilities by 2020 and the average of all new construction by 2030. In addition, the plan calls for ZEH in a majority of custom-built single-family houses that home-building companies construct by 2020 and provides for measures to encourage such construction. Sekisui House Ltd. reports that over 70% of the new single-family houses they build by order are already ZEH.

A "Green First ZERO" house model



Source : Sekisui House Ltd.

USE OF NATURAL RESOURCES TO CREATE A REGIONAL CES

Revitalization of local industries by the use of natural resources

Utilization of blessings from nature, a kind of local resources, has the potential to enrich the locality in its own way consistent with its distinctive culture and climate. In agriculture, forestry and fisheries as well as in tourism, local industries and the locality itself can be turned into brands and can enjoy economic benefits.

Project to Fully Enjoy National Parks

Japan has put up the targets of increasing the inbound visitors to 40 million a year by 2020 and 60 million by 2030. In line with this and in pursuit of bringing Japan's national parks to a world-class level, a target has been set to increase national park visitors from outside Japan to 10 million by 2020, more than double the numbers in 2015. The Ministry of the Environment has selected eight national parks as pilot projects for focused efforts to provide high quality and value-added tourism in accordance with "National Park Step-up Program 2020."

Overview of the Step-Up Programs of the eight selected national parks

1 Akan-Mashu National Park

Rebirth as an attractive recreational location offering novel nature conservation activities, comfortable, high quality accommodation, participatory Ainu culture workshops and other activities

2 Towada-Hachimantai National Park

Enjoyment of native wilderness on a variety of mountain paths, along with the traditional hot spring culture. Improvement of scenery based on removal of abandoned buildings and other eyesores to create attractive facilities

3 Nikko National Park

Opening up of public facilities to attract quality hotels and enable visitors to enjoy examples of Japan's culture and history such as the World Heritage site of Shrines and Temples of Nikko, former embassy villas, and Royal Resort Nasukogen

4 Ise-Shima National Park

Installation of a private-sector café in the lookout offering panoramic views of the ria coastline dotted with fishing and farming villages

5 Daisen-Oki National Park

Opening public facilities to and otherwise working with private sector initiatives to develop integrated facilities for the enjoyment of various ready-made recreational activities including hiking and hands-on nature/cultural experiences

6 Aso-Kuju National Park

Implementation of a field museum concept with the historical man-made grasslands at its core, offering activities focused on enjoyment of the majestic grassland and volcano scenery, and also possibly entrance fee-funded grassland egeneration

7 Kirishima-Kinkowan National Park

Promoting multi-day tourism of park destinations through attracting quality hotels, together with development of a diversified tour program enabling visitors to experience a volcanic landscape steeped in history and mythology, and possible refurbishment of the wide variety of hot springs for enjoyment by foreign visitors

8 Keramashoto National Park

Enhancing value through offering opportunities to participate in conservation activities and utilizing environmental cooperation tax levied on park entry

Common initiatives

- Cooperating with private enterprise and relevant agencies to promote the attractions of Japan's national parks both in Japan and overseas
- Integration of park use in visitor centers
- Clear communication of park boundaries through establishing conspicuous entrances as standard fixtures
- Implementation of universal design, including installation of Western-style toilets

Source : Ministry of the Environment

Cafe Terrace in the Sky in collaboration with private sector

Ise-Shima National Park is working to increase the number of foreign visitors to the area under the concept of "Ise Jingu, a site where a long, splendid, multifaceted history unfolds. Satoyama and Satoumi, a land of enrichment interweaved with the workings of people and nature." A part of such efforts is the opening of a cafe and the renovation of Yokoyama Observatory located in the hill north of Ago Bay with a commanding view. In parallel, English and other foreign languages are added to the signs and exhibits of Yokoyama Visitor Center to pursue synergy. The renovation of observation deck was completed in March 2018 and the cafe terrace in the sky (Mirador Shima) opened in August of the same year. The visitors can enjoy the local delicacies of Ise-Shima while being marveled by the panoramic views of Ago Bay.

Panoramic view of Yokoyama Tenku Café Terrace

Source : Ministry of the Environment

Conceptual drawing of rest area in Yokoyama Tenku Café Terrace

Source : Ministry of the Environment

Eco-tourism

In addition to natural resources, local culture, custom and traditional lifestyle, which are closely linked to the natural environment, can be understood as resources. An effort to make use of such resources in a sustainable manner is eco-tourism, which serves to protect the natural environment, promote tourism business, stimulate the local economy, and offer environmental education.

Hida Satoyama Cycling to journey through the life of Hida

Chura-boshi Company of the town of Furukawa, the city of Hida, Gifu Prefecture, capitalizes on the rich local resources to offer eco-tours for visitors to journey through the good old traditions and culture of the area. The most popular eco-tour is the Hida Satoyama Cycling to enjoy satoyama landscape on a mountain bike with a guide. The tour offers the opportunities to feel and touch the ecosystem of satoyama and the people there, an experience an ordinary tourist would never be able to have. This cycling tour garners high praise since its start in 2010 and continues to receive new visitors and repeaters.

Picture of Satoyama Cycling

Source : Chura-boshi Company

Hot springs (Onsen)

Recent technological advancement has made it possible to make use of the thermal energy of hot springs (onsen) as long as the water is above a certain temperature, making multistage utilization of onsen heat feasible. The Ministry of the Environment is advocating a new style of spa bathing coined “ONSEN Stay,” which encourages the visitors to enjoy a variety of programs making full use of the surrounding nature, history, culture, food in addition to bathing in hot springs and interacting with local people and other visitors so that they are rejuvenated both physically and mentally.

Joint use of onsen heat

Yunohama Onsen in the city of Tsuruoka, Yamagata Prefecture, has joined hands to utilize the untapped thermal energy of the onsen and has reduced CO_2 emissions. In April 2017, the association installed a central hot water distribution system with heat exchanger to adjust the high temperature of the raw onsen stream and distribute hot water to 12 facilities for use for warm shower and other purposes. By replacing the fossil fuels previously used for privately owned boilers, some 15% reduction (879 tons) in CO_2 emission is expected annually. In addition to the CO_2 reduction, the project will have a branding effect on Yunohama Onsen as an environment-friendly resort and thus revitalize the area.

Panoramic view of Yunohama Onsen

Heat recovery type heat pump

Exterior of central hot water distribution system

Source : Yunohama Gensen Facility Co., Ltd.

Utilization of wood biomass resources

Following the 2012 start of the Feed-in Tariff (FIT) system, wood biomass power generation has surged. Use of timber from forest thinning and other unutilized wood materials for energy purposes increased to 4.33 million m^3 in 2016, more than five times as large as in 2012. Use of such unutilized wood materials helps achieve low-carbon and resource saving and at the same time contributes to better management and maintenance of forests. In this way, it helps preserve and enhance ecosystem services and also contributes to increased economic benefits and job opportunities in the area.

Sustainable community development based on the forest of 100 years

The village of Nishiawakura, Okayama Prefecture, launched the “Initiative with a 100-year Vision of Forests” in 2008 and has been working to achieve 100% renewable energy self-sufficiency by the use of forest biomass and other sources. More specifically, wood-fired boilers were installed at the village’s three hot spring facilities to heat up the raw spa water. The expected benefits include 20% saving in fuel cost, 13 million yen in annual retained earnings, and 379 tons in CO_2 emission reduction. Through this initiative, 30 local venture businesses mostly in forest-related fields were established, creating over 140 new employment.

Central facilities for forest progressed by the “Initiative with a 100-year Vision of Forests”

Wood-fired boiler for hot spring facilities

Source : The village of Nishiawakura, Okayama Prefecture

SHIFT TO A SUSTAINABLE LIFESTYLE

Our life is supported by the blessings from nature (ecosystem services), and our values and the way of living leave heavy footprints on the global environment through our consumption pattern, energy and resources use. So a shift to a sustainable lifestyle is needed.

This chapter describes the changes in the mindset of Japanese people about "richness" and "goods," and the spreading new lifestyles and work styles such as the sharing economy and telework that also serve to help reduce environmental load.

3

1

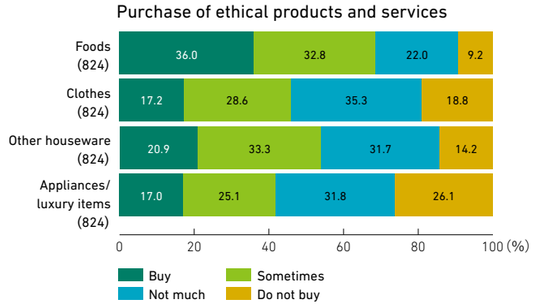
ETHICAL CONSUMPTION

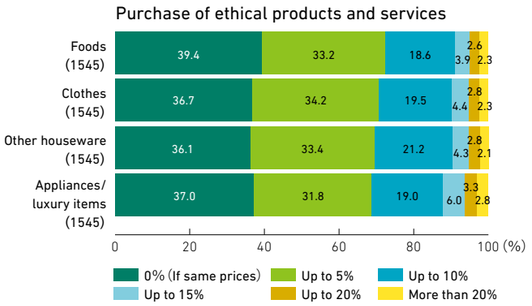
"SDG Goal 12: Ensure sustainable consumption and production patterns" calls for minimization in use of natural resources and toxic substances and discharge of waste and pollutants throughout the product life cycle from production to consumption. Sustainable consumption embodies diverse concepts, and one which is drawing particular attention in Japan is the concept of ethical consumption.

Household sector in Japan emits about 15% of total CO_2 emission and discharges nearly one-half of food wastes. To address these problems, shift in both consumer mindset and household efforts are required.

About 70% of Japanese people believe that ethical products and services improve the corporate image, and about 60% want to purchase such products and services. The interest is quite strong. About 30% of the people have bought some ethical products in the categories of foods, houseware, clothes and appliances/luxury items in descending order.

Consumer awareness for ethical consumption





Source: Consumer Affairs Agency: "Consumer awareness survey for ethical consumption"

Supply consumers with sustainable agricultural, forestry and fishery products

Aeon Co., Ltd. launched its private brand "TOPVALU Green eye" series in 1993 that are characterized by the health-conscious and eco-friendly products. In 2002, the company introduced a set of original quality control standards based on the EUREPGAP (now GLOBALG.A.P), the international certification system for agricultural products. In this way, Aeon is actively promoting supply of sustainable agricultural products.

For fishery products, Aeon launched MSC-certified products to the market in 2006. In 2014, it became the first Asian retailer to sell ASC-certified products, a guarantee that the products came from environmentally and socially conscious fish farms. Aeon has been taking those initiatives to conserve limited resources.

In April 2017, in addition, Aeon decided its own procurement policies and targets for agricultural products, livestock, fishery products, paper/pulp/timber, and palm oil. It has put up targets for the amount of sustainability-certified products it will be handling by 2020.

Tomatoes grown in a GLOBALG.A.P-certified farm in Japan

MSC-certified Shisyamo fish

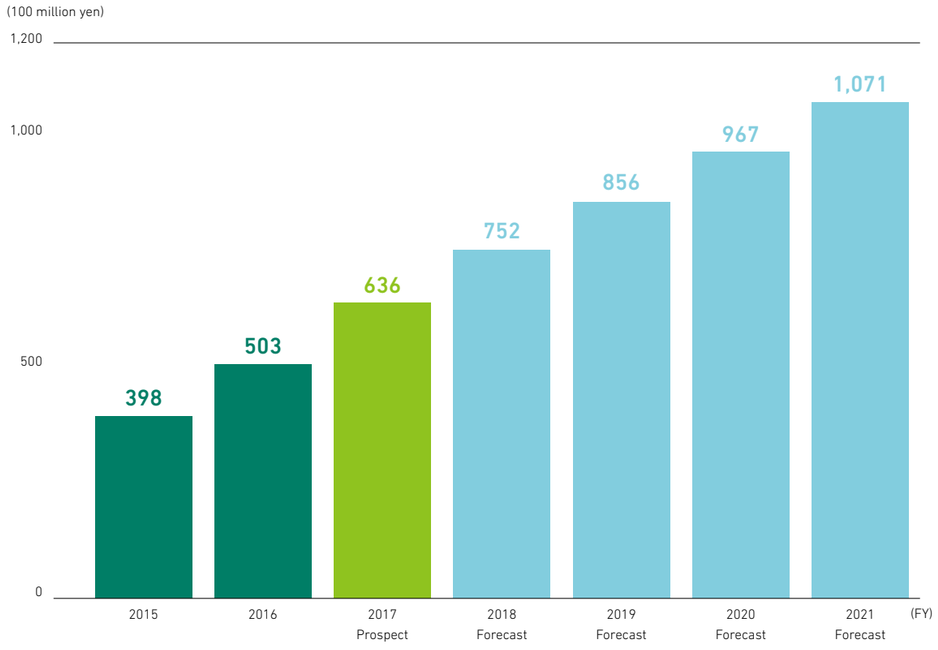
Source : Aeon Co., Ltd.

2 SHARING ECONOMY

To increase resource productivity, the 3Rs (reduce, reuse, and recycle), especially the first 2Rs (reduce and reuse) are important. Traditionally, the store-type reuse business of waiting for customers to bring in used products and selling them to other customers has been the popular business model of the 2Rs.

More recently, the spread of smart phones and advance of AI have enabled sharing information about the availability of personal assets (rooms, cars, etc.) and abilities (skills, knowledge, etc.) among many and unspecified users through the Internet. In Japan, too, the sharing economy is spreading, a trend that can accelerate 2Rs in a way different from the past.
The market size of sharing economy in Japan exceeded 50 billion yen in FY2016 and is expected to reach nearly 100 billion yen in FY2020.

Market size of sharing economy in Japan



Source: Yano Research Institute Ltd.: Sharing Economy Market 2017

Sharing economy offers to consumers a new choice of economic action and enriches their life. In addition, it can result in environmental improvements such as reduction in natural resources inputs and waste generation through more efficient use of resources and reduction of CO_2 emissions through sharing of mobility and spaces. It is expected to raise the overall production value of Japanese economy and to produce in a new lifestyle replacing overconsumption and throwaway practices.

Bike sharing involving local government

DOCOMO BIKESHARE, INC. offers an environment-friendly bicycle sharing system by combining bicycles and mobile phones. Mostly in a joint venture with municipal governments, the company is engaged in "community cycle (bicycle sharing)" services in a number of cities. Currently, the company and nine cities of Metropolitan Tokyo (Chiyoda, Chuo, Minato, Shinjuku, Bunkyo, Koto, Shinagawa, Ota, and Shibuya) are implementing a demonstration project of "Tokyo Bicycle sharing" by which a user can rent a bike at a port in a city and return it in another city. The renting is very simple with smart phone, and one can rent a bicycle at any one of the ports. An increasing number of users ride the bicycle for sightseeing, business, and daily life.

DOCOMO BIKESHARE bicycles at a dedicated port

Source : DOCOMO BIKESHARE, INC.

3 FOOD WASTE REDUCTION

Food and Agriculture Organization of the United Nations (FAO) estimates that 789 million people around the world suffer from malnutrition (3 year average between 2014 and 2016). The SDGs have set up the target of halving per capita global food waste at the retail and consumer levels by 2030.

About one-half of food waste generated in Japan is attributable to general household. Intensified effort on the part of food businesses as well as awareness raising of consumers is neccessary reduce food waste.

NO-FOODLOSS PROJECT

A national campaign coined "NO-FOODLOSS RROJECT" is underway as a public–private joint project involving relevant government ministries to promote reduction of food waste.

As a part of the project, close reviews are made to reduce food waste at every phase of supply chain. They cover, for example, changing the delivery deadline of processed foods to retailers, labeling of "best before" date by year and month only, promoting "Order only as much as you can eat" campaign in restaurants, and enhancing use of food bank. To reduce food waste in household, various campaigns are carried out to change consumer behavior (over-purchase, excessive cooking, etc.).

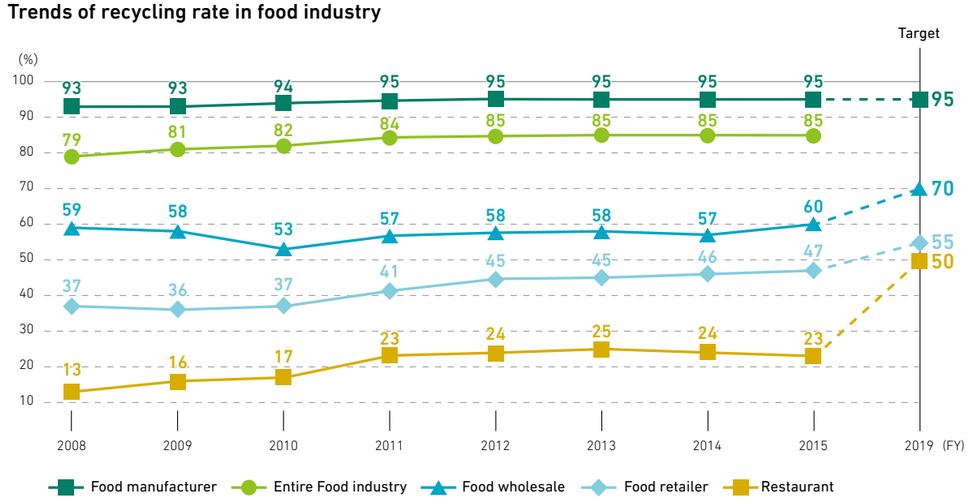
Logo mark of NO-FOODLOSS RROJECT

Source: Ministry of Agriculture, Forestry and Fisheries

Effective use of food waste

For effective use of food waste inevitably generated, recycling and other measures are promoted in Japan by law. The target recycling rate by FY2019 are 95% for food manufacturers, 70% for food wholesale, 55% for food retailers, and 50% for restaurants.

Trends of recycling rate in food industry



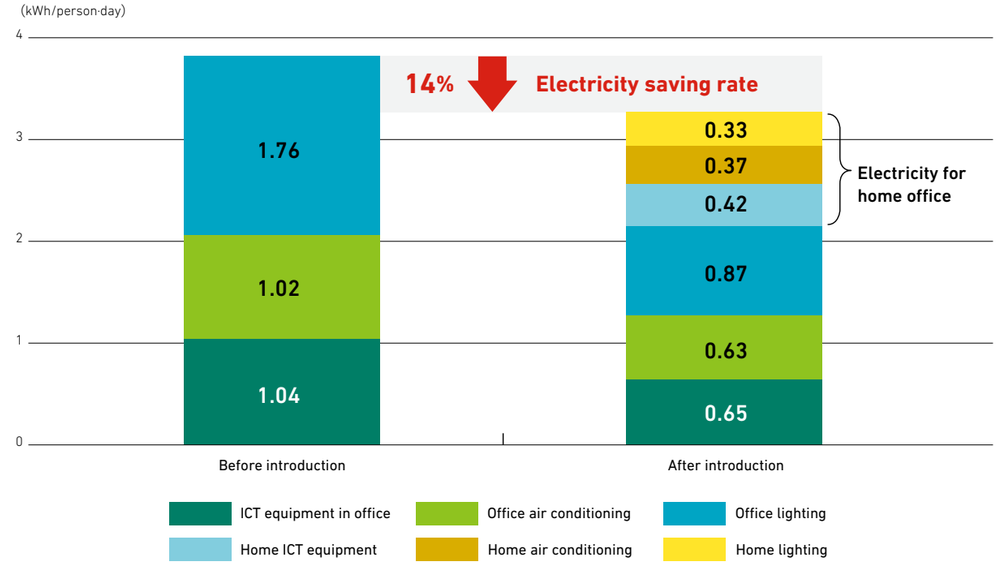
Source: Ministry of Agriculture, Forestry and Fisheries

4 WORK STYLE REFORM

In Japan, telework and other flexible work styles have been gradually spreading, taking advantage of ICT to make better use of time and place. Such new work styles are expected to improve the work-life balance, alleviate the fatigue from long commute, and broaden job opportunities in rural areas. In addition, environmental benefits such as the reduction of CO_2 emissions by less transportation and material conservation by promoting paperless are expected.

The Ministry of Internal Affairs and Communications estimates that introduction of telework to a certain number of employees, making office free-address, alternating lights-off by floor, thinning of lights, shortening the air conditioner run hours, and downsizing the office space, will cut per capita electricity consumption in office building by 43%. Taking into account the increase of power consumption at home because of telework, electricity saving of 14% at the office and home in whole will be achievable per capita.

CO_2 reduction at office by telework



Source: Ministry of Internal Affairs and Communications: FY2010 Study on Next-Generation Telework Environment

In telework, business documents are sent electronically, and so paperless work becomes possible. This makes the work more efficient and also saves space to keep files of paper documents. The prefectural government of Saga estimates that, after introduction of telecommute system, 14.4% saving in paper costs was achieved in FY2014 over FY2012.

Traffic congestion mitigation and environment protection by Telework Day

During the London 2012 Olympic and Paralympic Games, about 80% of firms operating in the city introduced telework in anticipation of traffic congestion. Telework is regarded as a key to preventing traffic congestion in the Tokyo 2020 Olympic Games.

The government has coined July 24, the day of opening ceremony of the Olympics, as the Telework Day, calling on companies and organizations throughout the country to try teleworking. On the 2017 Telework Day, some 63,000 workers from 950 entities participated. As a result, a large-scale work shift occurred and the traffic congestions were alleviated. There were also reports of office floor electricity saving and benefits of paperless work.

TELEWORK DAY
The Day we Change our workingstyle.

Poster of 2017 Telework Day

Leaflet of 2017 Telework Day

Source : Telework Promotion Forum

RECONSTRUCTION AND ENVIRONMENTAL REMEDIATION AFTER THE GREAT EAST JAPAN EARTHQUAKE

On March 11, 2011, the biggest earthquake ever observed in and around Japan (M = 9.0 on the Richter scale) and the accompanying tsunami hit the Pacific Ocean coast of Tohoku and neighboring regions of Japan. The natural disaster was extensive and devastating. The tsunami also attacked the Tokyo Electric Power (TEPCO) Fukushima Daiichi Nuclear Power Plant, which resulted in an accident of a large amount of radioactive materials release into the environment. Many people were forced to evacuate. In this chapter, we describe some of the initiatives taken for reconstruction and revitalization of the region.

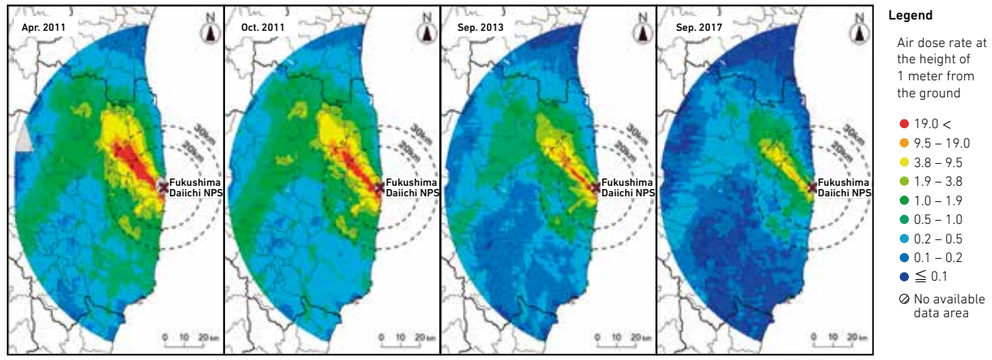
4

1 AIR DOSE RATE

Airborne monitoring results show that the average air dose rate measured at the height of 1 meter from the ground in the 80 km radius area of TEPCO Fukushima Daiichi Nuclear Power Plant in September 2017 was down 74% from the November 2011 level. The radioactive materials that the TEPCO Fukushima Daiichi Nuclear Power Plant accident released were mostly iodine 131, cesium 134, and cesium 137, whose half-lives are 8 days, 2 years, and 30 years, respectively.

Previously, the air dose rate was estimated to go down by about 40% in 2 years and about 50% in 5 years from the August 2011 level, in light of the physical decay of the radioactive materials and the impact of rainfall and other natural factors. The measured decline was faster than the estimate, presumably because of the decontamination work as well as rainfall and other natural factors.

Air dose rate distribution within 80 km radius of TEPCO Fukushima Daiichi Nuclear Power Plant



* The figures include air dose rate by natural radioactive nuclide.
Source: Nuclear Regulation Agency

2 ENVIRONMENTAL REMEDIATION IN AFFECTED AREAS

Decontamination of soil contaminated by radioactive materials and others

In accordance with the law, the national government and municipalities together completed by the end of March 2018 whole area decontamination of 100 municipalities in 8 prefectures, except for Areas where Returning is Difficult (ARD).

Houses in ARD are going to be dismantled and decontaminated in accordance with the Plans for Specified Reconstruction and Revitalization Bases, which is prepared by the municipality and approved by the national government.

To date, the reconstruction and revitalization plans were approved for the town of Futaba in September 2017, followed by town of Okuma in November, town of Namie in December, and town of Tomioka in March 2018. The Ministry of the Environment has already begun some works in accordance with the plans to proceed with the dismantling and decontamination of houses.

Construction of Interim Storage Facility (ISF)

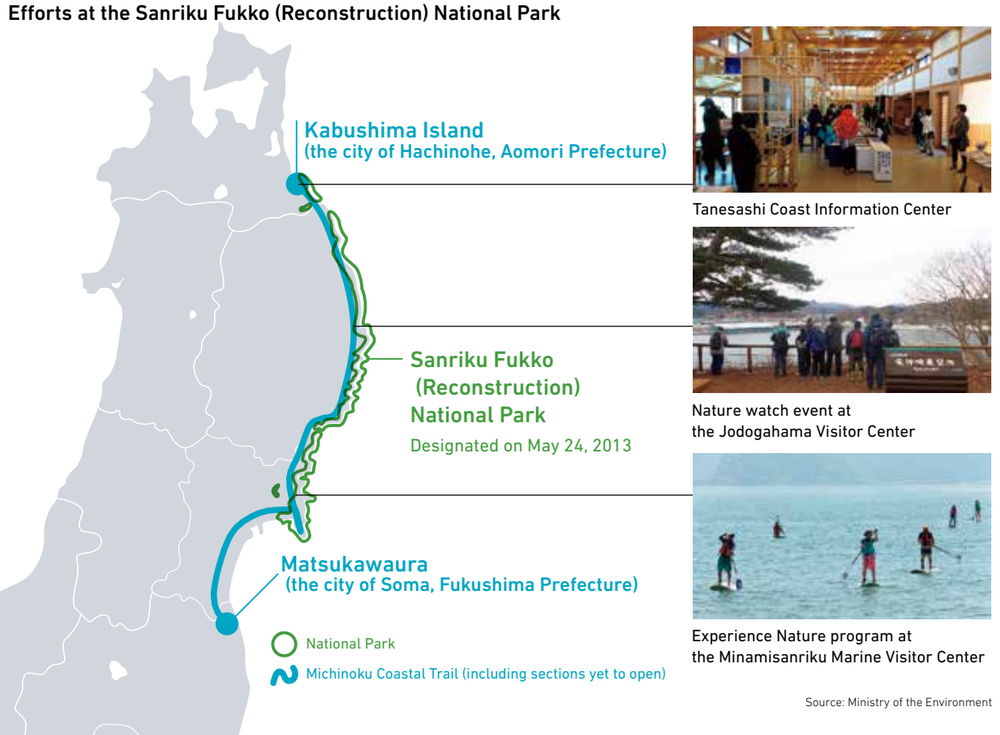
The soil contaminated by radioactive materials generated from the decontamination works in Fukushima Prefecture and the designated waste having radioactive concentration more than 100,000 Bq/kg currently stored in the prefecture are going to be stored in the Interim Storage Facility (ISF) safely and intensively until their final disposal. The planned total amount of delivery into the ISF by FY2020, the final year of the Reconstruction and Revitalization Period, is maximum 12.5 million m3 of the soil and waste. MOE is now making every effort to achieve the goal.

Green reconstruction

The Michinoku Coastal Trail that would stretch from the city of Hachinohe, Aomori Prefecture to the city of Soma, Fukushima Prefecture, with approximate total distance of 1,000 km, is being opened on a section-by-section basis. Between April and September of 2017, the sections of the town of Onagawa, the city of Minamisanriku, and the city of Rikuzentakata were opened in Miyagi Prefecture (about 250 km in total) and the sections of the town of Otsuchi and the city of Kuji in Iwate Prefecture were also put to service (about 40 km in total). They represent a new addition of about 290 km to the existing trail. Thus, the total length already in use has increased to about 690 km.

Various projects have been implemented in major locations of Sanriku Fukko (Reconstruction) National Park and the Michinoku Coastal Trail including enhanced disaster risk management, refurbishing of disaster-affected park installations, and remodeling and upgrading of tourist attraction spots. Recently, the Ishinomaki Riverside Visitor Center was opened in the city of Ishinomaki, Miyagi Prefecture. It will serve as the core base for the Satoyama Satoumi Field Museum project of the national park.

Efforts at the Sanriku Fukko (Reconstruction) National Park



Source: Ministry of the Environment

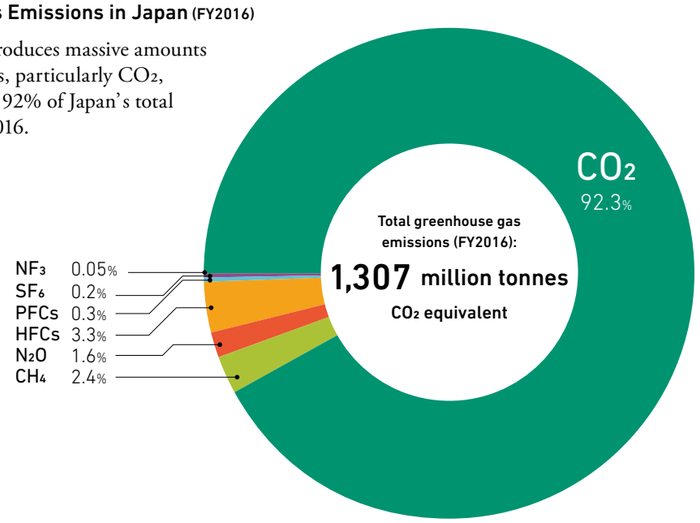
ADDITIONAL MATERIALS FROM THE 2018 ANNUAL REPORT ON THE ENVIRONMENT

Low-carbon society

Additional materials provide more details about the global warming issue.

Breakdown of Greenhouse Gas Emissions in Japan (FY2016)

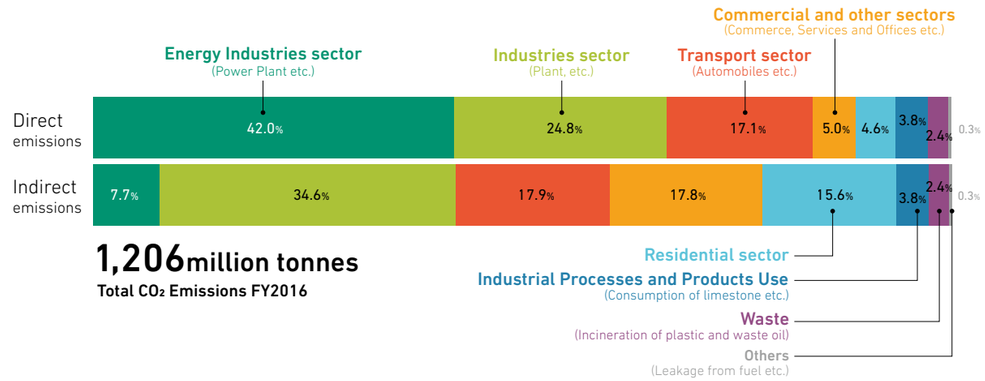
Globally, fossil fuel combustion produces massive amounts of anthropogenic greenhouse gases, particularly CO_2, which accounts for approximately 92% of Japan's total greenhouse gas emissions in FY 2016.



Source: Ministry of the Environment

Breakdown of CO_2 Emissions by Sector

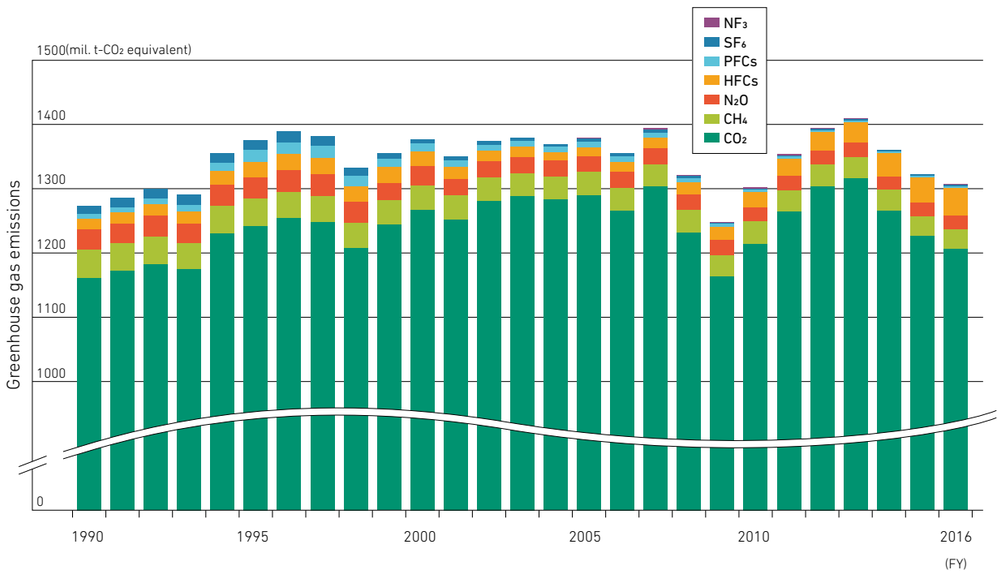
The sector with the largest CO_2 emissions in indirect emissions in FY 2016 was industries sector, accounting for approximately 34.6% of Japan's total.



Source: Ministry of the Environment

Greenhouse Gas Emissions in Japan

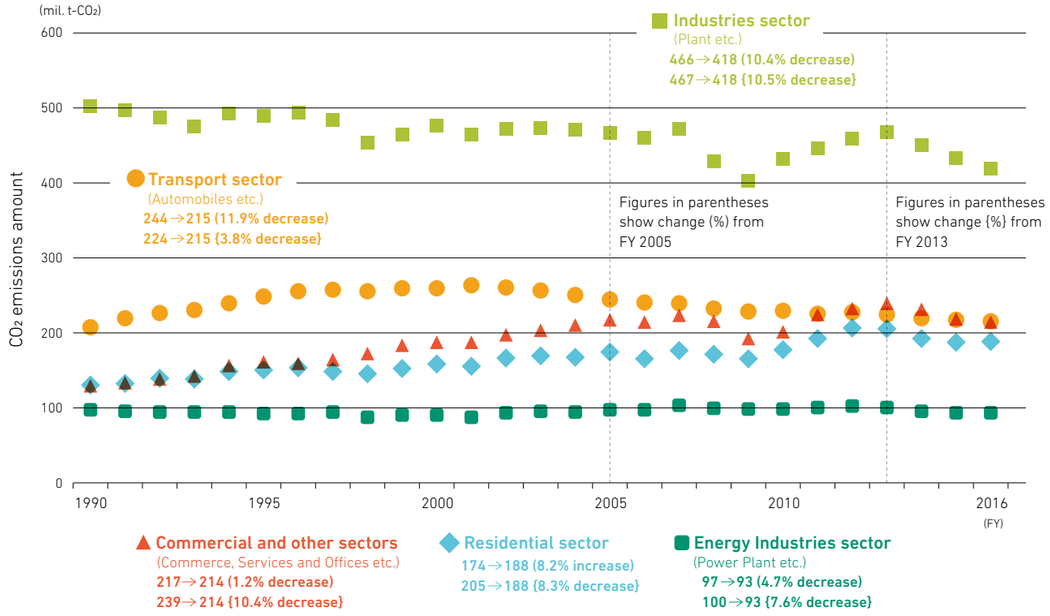
Japan's total greenhouse gas emissions in FY 2016 were equivalent to approximately 1,307 million tonnes of CO_2, a 1.2% drop from the previous year. This was due to the decrease in energy consumption through energy conservation, and the increase in the share of non-fossil fuels within the domestic energy supply.



Source: Ministry of the Environment

Energy originated CO_2 Emissions by Sector (Indirect Emissions)

Plotting energy originated CO_2 emissions by sector reveals that emissions in every sector decreased from FY 2013.



Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE 2018 ANNUAL REPORT ON THE ENVIRONMENT

Biodiversity

Additional materials provide more details about biodiversity in Japan.

Threatened Species in Japan

With an increasing number of species being put on the Red List, which publicizes threatened species, it is clear that the circumstances of wild fauna and flora in Japan continue to be severe.

(Reported in May 2018)

	Taxon	Species Targeted for Evaluation	Extinct	Extinct in the Wild	Threatened Species			Near Threatened	Data Deficient	Total of listed species	Endangered Local Population
					Endangered Class I		Endangered Class II				
					Class IA	Class IB					
			EX	EW	CR	EN	VU	NT	DD		LP
Fauna	Mammals	160 (160)	7 (7)	0 (0)	**33(33)**			18 (18)	5 (5)	63 (63)	23 (23)
					24(24)		9(9)				
					12(12)	12(12)					
	Birds	Approx. 700 (Approx. 700)	15 (13)	1 (1)	**97(97)**			21 (21)	17 (19)	151 (151)	2 (2)
					54(54)		43(43)				
					23(23)	31(31)					
	Reptiles	100 (100)	0 (0)	0 (0)	**37(37)**			17 (17)	4 (4)	58 (58)	5 (5)
					14(13)		23(24)				
					5(4)	9(9)					
	Amphibians	77 (76)	0 (0)	0 (0)	**29(28)**			22 (22)	1 (1)	52 (51)	0 (0)
					17(15)		12(13)				
					4(3)	13(12)					
	Brackish water and freshwater fish	Approx. 400 (Approx. 400)	3 (3)	1 (1)	**169(169)**			35 (34)	37 (35)	245 (242)	15 (15)
					125(125)		44(44)				
					71(71)	54(54)					
	Insects	Approx. 32,000 (Approx. 32,000)	4 (4)	0 (0)	**363(358)**			350 (352)	153 (153)	870 (867)	2 (2)
					177(173)		186(185)				
					71(68)	106(105)					
	Shellfish	Approx. 3,200 (Approx. 3,200)	19 (19)	0 (0)	**616(587)**			445 (446)	89 (89)	1169 (1141)	13 (13)
					288(264)		328(323)				
					33(13)	16(7)					
	Other invertebrates	Approx. 5,300 (Approx. 5,300)	0 (0)	1 (1)	**65(63)**			42 (42)	43 (42)	151 (148)	0 (0)
					22(21)		43(42)				
					0(0)	2(1)					
	Subtotal of Fauna		48 (46)	3 (3)	**1409(1372)**			950 (952)	349 (348)	2759 (2721)	60 (60)
					721(689)		688(683)				
Flora	Vascular plants	Approx. 7,000 (Approx. 7,000)	28 (28)	11 (11)	**1786(1782)**			297 (297)	37 (37)	2159 (2155)	0 (0)
					1045(1041)		741(741)				
					525(522)	520(519)					
	Bryophytes	Approx. 1,800 (Approx. 1,800)	0 (0)	0 (0)	**241(241)**			21 (21)	21 (21)	283 (283)	0 (0)
					138(138)		103(103)				
	Algae	Approx. 3,000 (Approx. 3,000)	4 (4)	1 (1)	**116(116)**			41 (41)	40 (40)	202 (202)	0 (0)
					95(95)		21(21)				
	Lichens	Approx. 1,600 (Approx. 1,600)	4 (4)	0 (0)	**61(61)**			41 (42)	46 (46)	152 (153)	0 (0)
					41(41)		20(20)				
	Fungi	Approx. 3,000 (Approx. 3,000)	26 (26)	1 (1)	**62(62)**			21 (21)	50 (50)	160 (160)	0 (0)
					39(39)		23(23)				
	Subtotal of Flora		62 (62)	13 (13)	**2266(2262)**			421 (422)	194 (194)	2956 (2953)	0 (0)
					1358(1354)		908(908)				
	Total of thirteen taxonomic groups		110 (108)	16 (16)	**3675(3634)**			1371 (1374)	543 (542)	5715 (5674)	60 (60)
					2079(2043)		1596(1591)				

* Numerals within parentheses indicate the respective numbers of species (including subspecies, variety (only for flora) and form (only for algae and fungi)) from the Red List 2017. The numbers in the LP column are the numbers of local population. ** The number of species excluding those that cannot be evaluated by the naked eye.

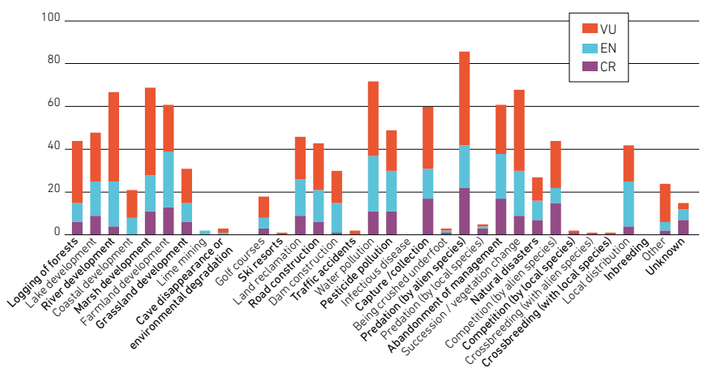
The categories are considered as follows:

Extinct [EX]: Species that are likely to already be extinct / Extinct in the Wild [EW]: Species that exist only in captivity or as a naturalized population outside its natural habitat / Endangered Class I (Critically Endangered + Endangered) [CR+EN]: Species that are threatened to extinction / Endangered Class I A (Critically Endangered) [CR]: Species that are facing an extremely high risk of extinction in the wild in the near future / Endangered Class I B (Endangered) [EN]: Species that are facing a high risk of extinction in the wild in the near future / Endangered Class II (Vulnerable) [VU]: Species with and increasing risk of extinction / Near Threatened [NT]: Species that are not currently endangered, but may possibly qualify for "endangered" status with changes in their habitat conditions / Data Deficient [DD]: Species with data insufficient for adequate evaluation / Endangered Local Population [LP]: Species with a population isolated regionally, and face a high risk of extinction

Source: Red List 2018 by the Ministry of the Environment

Drivers of Loss of Threatened Species (insects)

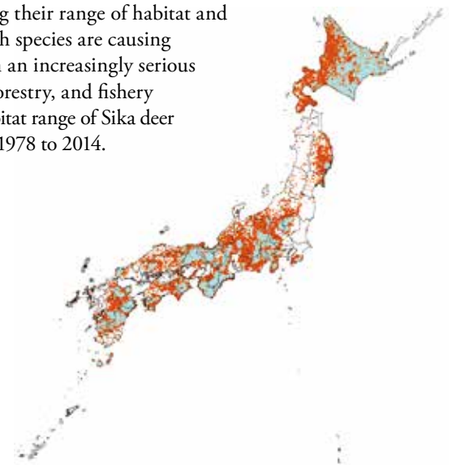
There are various drivers of loss of threatened species, but typical drivers include development, capture/collection, abandonment of management or succession, overuse, water pollution, and alien species.



Note: CR: Category IA. EN: Category IB. VU: Category II.
Source: Ministry of the Environment

Growing Range of Sika Deer

While certain flora and fauna are endangered, there are also issues with other species, such as Sika deer and wild boar, that are rapidly expanding their range of habitat and growing their populations. Such species are causing increasing damage, resulting in an increasingly serious situation for the agricultural, forestry, and fishery industries. For example, the habitat range of Sika deer expanded approx. 2.5 fold from 1978 to 2014.



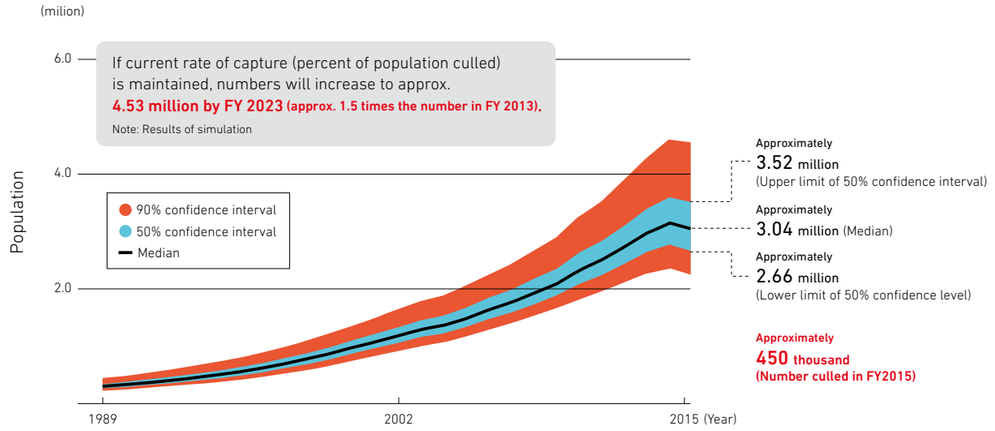
Range of distribution of Sika deer

- Range of distribution in 1978
- Expanded range of distribution by 2014

Source: Ministry of the Environment

Estimated Number of Sika Deer in Japan (excluding Hokkaido prefecture*)

Furthermore, the number of sika deer on the main Japanese island of Honshu and further south is forecast to increase to 1.4 times its 2011 level by 2023.



*: In FY 2013, estimated number in Hokkaido was approx. 540,000, and number culled was approx. 130,000 (Hokkaido data).

Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE 2018 ANNUAL REPORT ON THE ENVIRONMENT

Sound material-cycle society

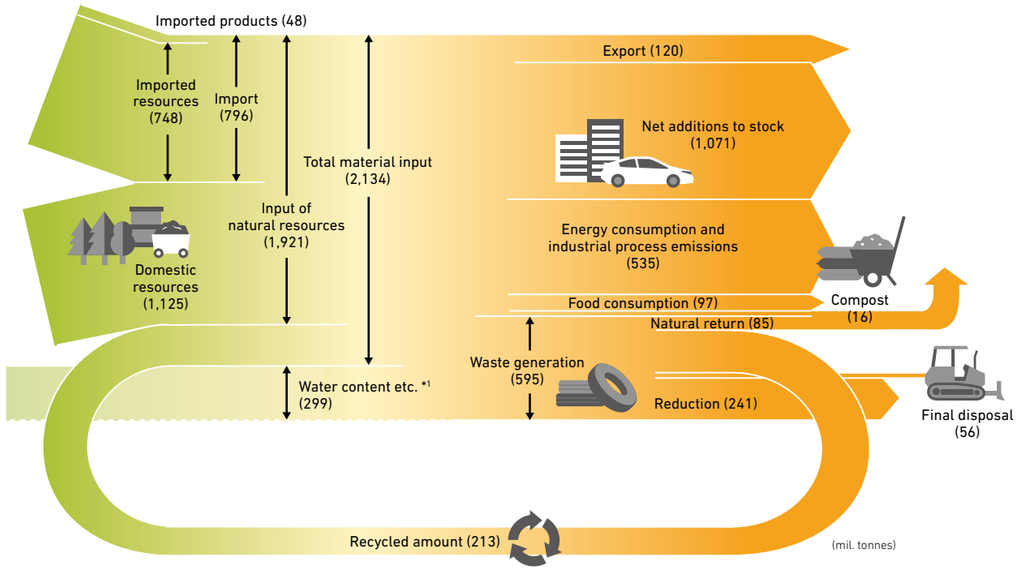
Additional materials provide more information about current efforts to form a sound material-cycle society.

Material Flow in Japan

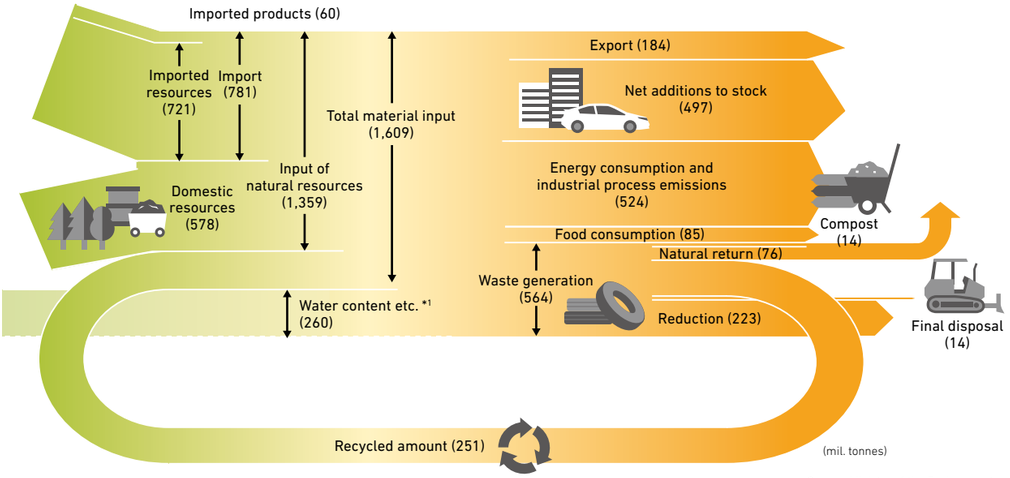
In order to establish a sound material-cycle society, it is necessary to comprehend material flows (or substance flows) to understand the extent of material extraction, consumption, and disposal in Japan. Japan uses material flows to determine targets for the three indicators of resource productivity, cyclical use rate, and final disposal amount.

*1 Water content: water contents of wastes (sludge, livestock waste, night soil, waste acid, waste alkali) and sediments dumped in association with the process of economic activities (sludge in mining, construction and in waterworks as well as slag)

FY2000 (for reference)



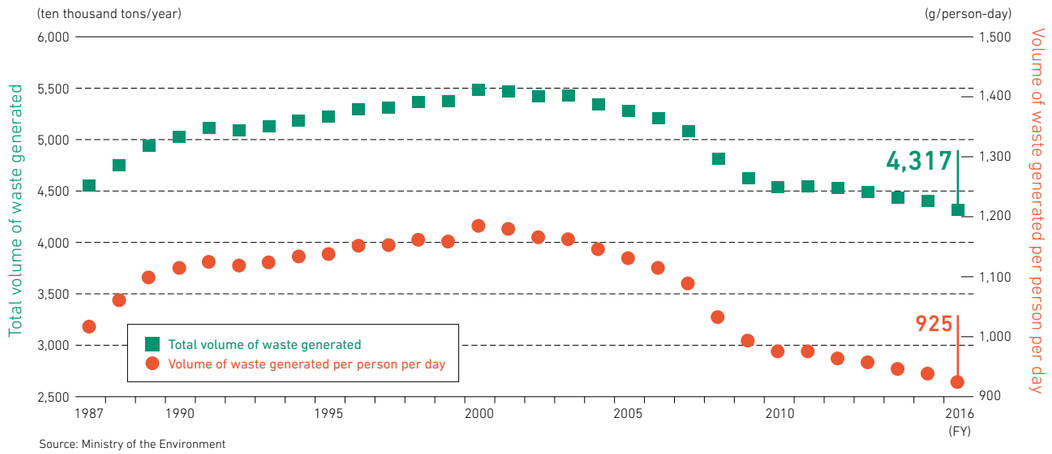
FY2015



Source: Ministry of the Environment

Total Volume of Waste Generation and Waste Volume Per Person Per Day

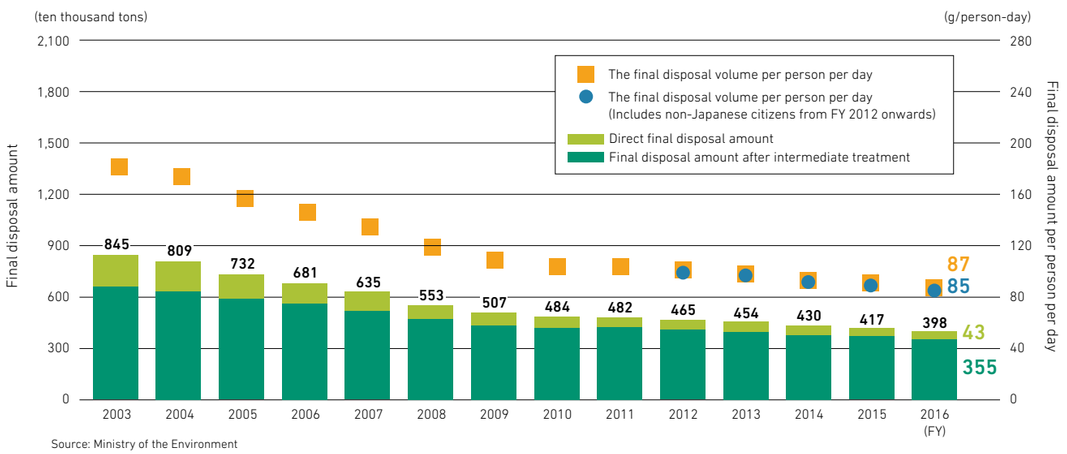
Total generated waste and waste generated per person per day are declining year by year.



Source: Ministry of the Environment

Final Disposal Amount and Final Disposal Amount Per Person

Final disposal amount of waste and final disposal amount per person per day are trending downwards.



Source: Ministry of the Environment

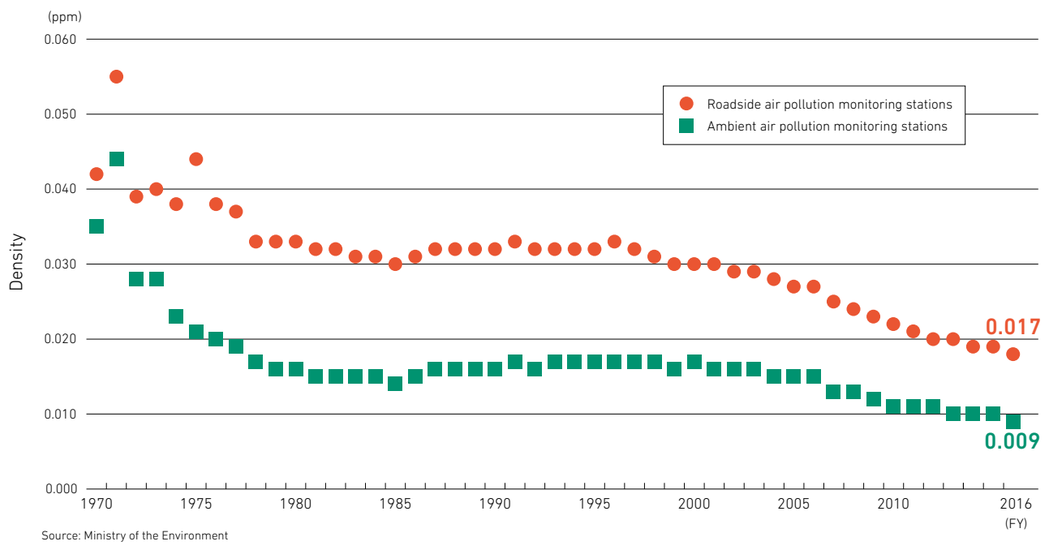
ADDITIONAL MATERIALS FROM THE 2018 ANNUAL REPORT ON THE ENVIRONMENT

Atmospheric and water environments

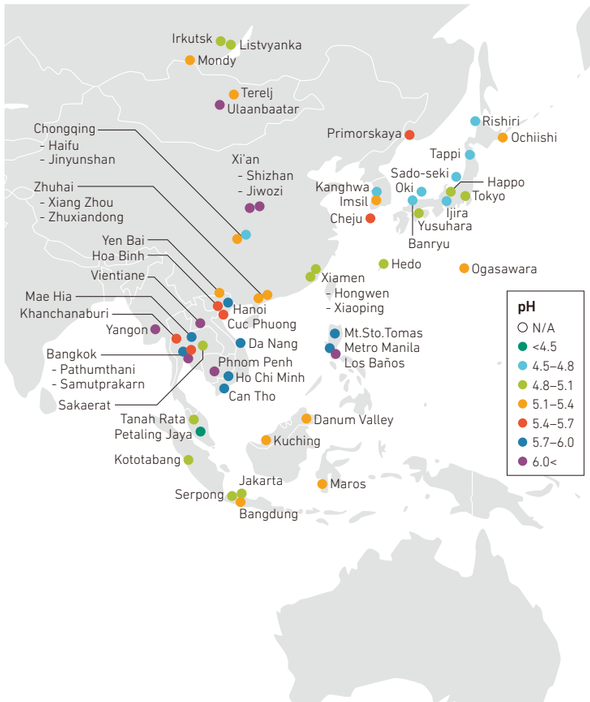
Additional materials provide more information about atmospheric and water environments.

Annual Average Density of NO_2 (from FY1970 to FY2016)

A gradual fall in mean nitrogen dioxide levels can be seen recently at both ambient air pollution monitoring stations and roadside air pollution monitoring stations.



Source: Ministry of the Environment



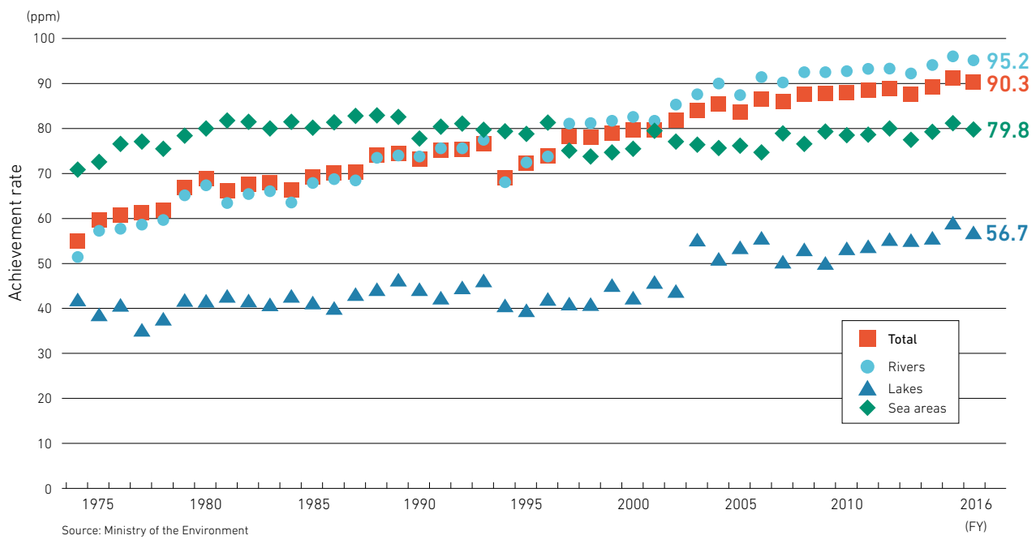
pH in Precipitation in EANET Region
(Average pH 2013 - 2016)

The Acid Deposition Monitoring Network in East Asia (EANET) was established with the aim of establishing a regional cooperative framework regarding acid rain, and of making clear the state of the acid deposition issue and its impact in the East Asian region. Currently thirteen East Asia nations participate, collecting reliable data through acid deposition monitoring using the same methodology. The network will expand its range of operations to include PM2.5 and ozone monitoring.

Source: EANET "Data Report on the Acid Deposition in the East Asian Region 2016"

Achievement of Environmental Standards (BOD or COD)

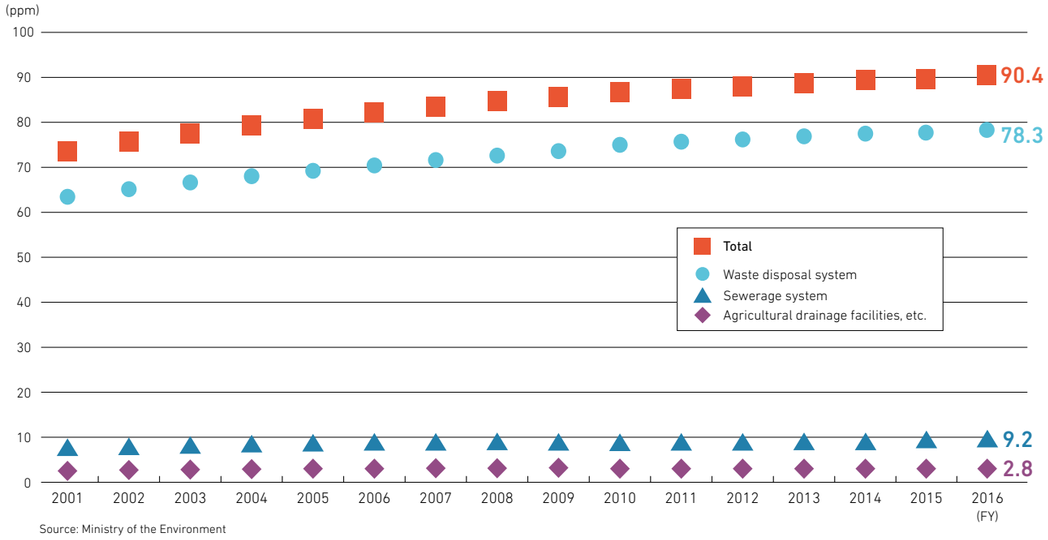
An overall level of 90.3% has been achieved for the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) environmental standards relating to the maintenance of living environments. BOD and COD are leading indicators of water quality in respect of organic pollution.



Source: Ministry of the Environment

Coverage of Population Served by Waste Disposal System

The population coverage of wastewater treatment systems in Japan is 90.4%. Wastewater treatment facilities are being installed to cover the population not yet served by the wastewater treatment systems.



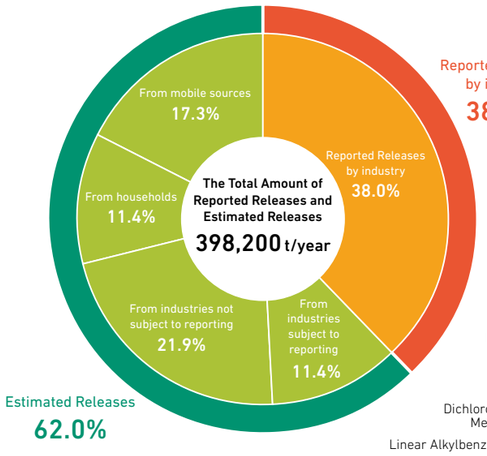
Source: Ministry of the Environment

ADDITIONAL MATERIALS FROM THE 2018 ANNUAL REPORT ON THE ENVIRONMENT

Environmental risks of chemical substances

The following data provides information on action regarding chemical substance emissions into the environment and initiatives for children's environmental health.

Breakdown of Reported Releases by Industry and Estimated Releases of Chemical Substances in FY 2016

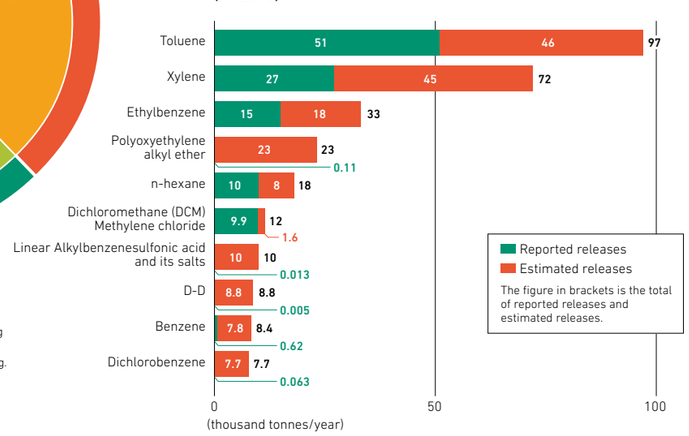


Notes: The reported releases are from the business entities categorized as subjected to reporting. Releases are estimated for businesses that do not meet the reporting requirements, such as number of employees, annual handling quantity, etc., and are exempted from reporting.

Figures in parentheses are the totals of reported and estimated releases.

Source: Ministry of Economy, Trade and Industry and Ministry of the Environment

Top 10 Chemicals with High-volume of Reported Releases and Estimated Releases (FY 2016)



Source: Ministry of Economy, Trade and Industry and Ministry of the Environment

In March 2018, the government compiled data reported from businesses concerned on release and transfer of chemical substances complying with the Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Law). Releases that were not subject to reporting were estimated.

The Japan Environment and Children's Study (JECS)

The Japan Environment and Children's Study (JECS), a large-scale, long-term national birth cohort study involving 100,000 mother-child pairs, was launched in FY 2010. The Sub-cohort study, which includes home visits for environmental measurements, medical examinations and children's bio-specimen collection, began in November 2015, involving 5,000 participants selected from the Main Study.

JECS is a large-scale, long-term prospective cohort study to examine the impact of the exposure to chemical substances during pregnancy and childhood on children's health.

Study protocols

Recruitment (3 years)

FY 2010: Establishment of national and regional organizations and formulation of research protocols
January 2011: Start of recruitment period (100,000 pregnant women)
March 2014: Completion of the recruitment

Follow-up period (13 years)

Pregnancy	- Questionnaire - Collection of maternal blood, urine, and hair samples as well as paternal blood samples
At birth	- Health check of the babies - Collection of cord blood samples
One month old	- Physician's examination and questionnaire - Collection of breast milk and babies' hair samples
Until 13th birthday	- Physician's examination and questionnaire - Collection of children's bio-specimens

Chemical analysis on bio-specimens
Long-term storage of bio-specimens
↓
Multivariate analysis of the environmental factors on children's health including hereditary, lifestyle, and social factors
↓
Identification of the impact of environmental factors on children's health

Follow-up completes in 2027 / Study concludes in 2032

Organization

Ministry of the Environment (MOE)
Considers environmental policies incorporating results of the study, and conducts coordination with other ministries as well as on an international level.

Programme Office
(National Institute for Environmental Studies)
Leads the study, manages the collected data and bio-specimens, and conducts exposure analysis

Medical Support Center
(National Centre for Child Health and Development)
Provides medical expertise

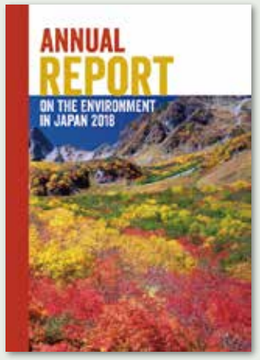
Regional Centers
(15 universities and institutes)
Recruit participants and conduct follow-up study (in cooperation with local health care providers)

Accreditation from the MOE (April 2010)
[1] Hokkaido [2] Miyagi [3] Fukushima [4] Chiba [5] Kanagawa [6] Koshin [7] Toyama [8] Aichi [9] Kyoto [10] Osaka [11] Hyogo [12] Tottori [13] Kochi [14] Fukuoka [15] South-Kyushu / Okinawa

Expected outcomes

- Policy development to provide parents with the safe and secure child-raising environment
- Development of better strategies for chemical risk assessment and management that considers children's vulnerability

Source: Ministry of the Environment



Cover: Chubusangaku National Park

Chubusangaku National Park, established in December 1934 as one of the first national parks in Japan, is located in the region that spans Niigata, Toyama, Nagano and Gifu Prefectures. The park consists of mountains rising 3,000 meters above sea level and is rich in a spectacularly diverse landscape that fascinates visiting climbers. With the "Use Promotion Program 2020" developed in 2018 in the southern region, activities are conducted for a greater satisfaction of visitors from home and abroad.

Rock Ptarmigan

Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2018

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