Global Cooling
Pledge Signatories
Focal Points Meeting

環境省
Ministry of the Environment

Tackling Adaptation and Extreme Heat through sustainable cooling

June, 2025

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Ministry of the Environment Japan

SUSTAINABLE DEVELOPMENT GOALS
Re-Style
DECOKATSU
つなげよう、支えよう 森里川海
Plastics Smart

Outline

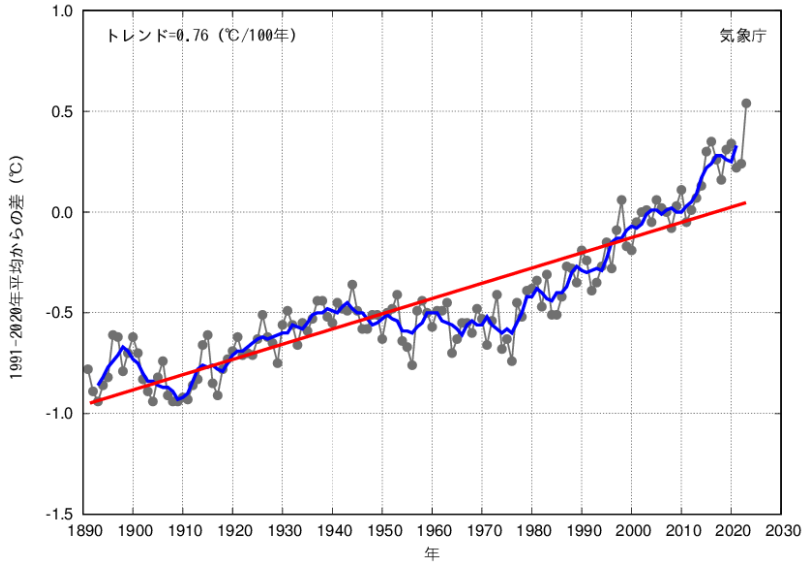
1. Impact of Climate Change Adaptation in Japan
2. Climate Change Adaptation Act in Japan
3. Countermeasures of Heat Stress
4. Aiming to 1.5 degree target

1. Impact of Climate Change Adaptation in Japan

Global and Japanese average temperature change (to 2023)

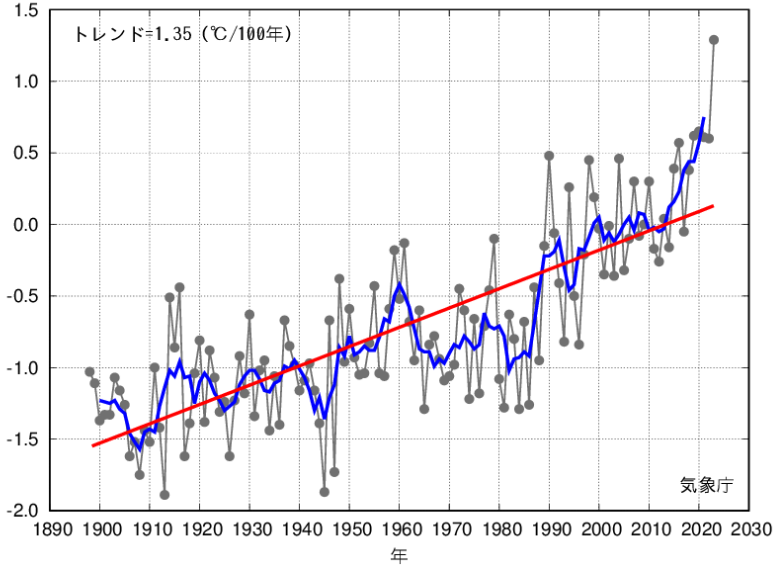
- Annual average temperature **in Japan in 2023** was **the highest** since 1898.
- The **global** annual average temperature **in 2023** was **the highest** since 1891.
- The global average annual temperature is increasing at a rate of 0.76°C per century.
- Japan's annual average temperature is increasing at a rate of 1.35°C per century.

Global annual average temperature anomaly



No.1: 2023 (+0.54°C)
No.2: 2016 (+0.35°C)
No.3: 2020 (+0.34°C)
No.4 : 2019 (+0.31℃)
No.5 : 2015 (+0.30℃)

Annual average temperature anomaly in Japan



No.1 : 2023 (+1.29℃)
No.2 : 2020 (+0.65℃)
No.3 : 2019 (+0.62℃)
No.4 : 2021 (+0.61℃)
No.5 : 2022 (+0.60℃)

*The last 5 years are shown in red.

Source: Japan Meteorological Agency HP

Intensifying weather disasters and record-breaking heat waves

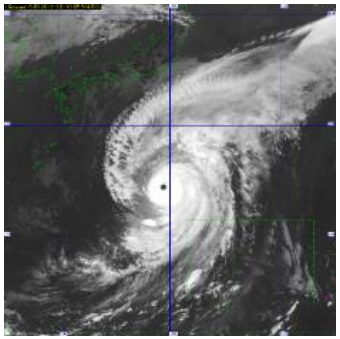
Torrential rain in July 2018

Japan Meteorological Agency, "The heavy rainfall is thought to have been partly contributed by increased water vapor associated with global warming."

Global warming has increased rainfall by about 6.7% (Meteorological Research Institute, Kawase et al. 2019)

Typhoon No. 21 of 2018 (Jebi)

It made landfall in the Shikoku and Kansai areas with very strong force.
Maximum wind speed of 46.5 m/s at (Kansai Airport) Kankujima
Tajiri-cho, Osaka
Highest tides 329 cm in Osaka City, Osaka Prefecture



Typhoon No. 19 of 2019
(Infrared image from Himawari-8, provided by the Japan Meteorological Agency)

Typhoon No. 21 of 2008
Vehicle damage around Osaka Prefecture Sakishima Government Building

Typhoon No. 19 of 2019 (Hagibis)

Large and strong, making landfall in the Kanto area.
In Hakone Town, total rainfall exceeded 1,000 mm.

Increases in air and sea surface temperatures since 1980 and since industrialization (since 1850) are estimated to have contributed to increases in total precipitation of about 11% and 14%, respectively. (Kawase et al. 2020, Meteorological Research Institute)

(Photo courtesy of Hiroshima Prefecture Erosion Control Division)

Extreme heat of summer 2023

Japan Meteorological Agency, "Average summer ground temperatures in Japan are expected to be the hottest since statistics began in 1898."

The record high temperatures in late July and early August 2023 were found to be a case that could not have occurred without global warming. (Ministry of Education, Culture, Sports, Science and Technology, Meteorological Research Institute 2023)

*Evaluation of global warming contribution

The evaluation is based on "event attribution," a method for quantitatively assessing how much the probability and intensity of extreme events, such as extreme weather events, differ when global warming is taken into account and when it is not taken into account.

Concerns about increased risk of heavy rain, typhoons, heat stroke, etc. due to climate change

Need to prepare now for increasingly severe weather disasters and heat waves

Climate Change Impact Assessment Report (Dec. 2020)

- The latest Climate Change Impact Assessment Report was released in December 2020. This assessment report is updated approximately every five years based on the latest scientific findings
- The report indicated that the impact of climate change becomes more serious; so, urgent measures are needed.

Overview

■Enhancement of scientific knowledge

The number of references cited for evidence increased by about 2.5 times from the last report in 2015 (i.e. from 509 to 1261).

■Assessment of severity and urgency

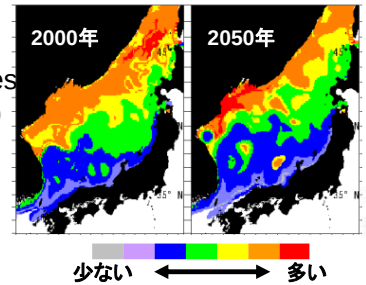
Of the 71 items in all seven areas;

- ✓ 49 items (69%) are considered to have a particularly serious impact
- ✓ 38 items (54%) are considered to have a high urgency for actions
- ✓ 33 items (46%) are considered to have a particularly serious impact and require urgent actions

Examples of key impacts by sectors

■Agriculture, Forestry and Fisheries

・Decline in the yield and quality of rice
・Changes in the distribution areas of migratory fishes (shrinking fishing grounds for squid and saury, etc.)



Prediction of the distribution of Japanese common squid (July)

■Water environment, water resources, natural disasters, and coastal areas

・Increased frequency of landslides due to more frequent and widespread heavy rainfall.

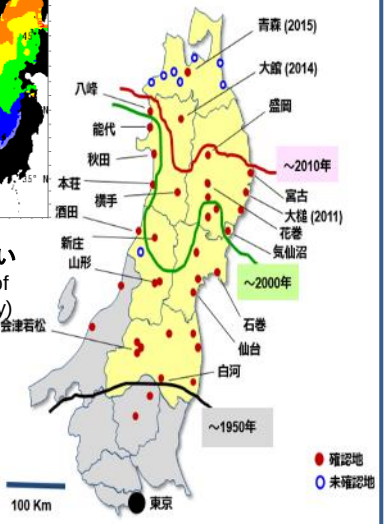
■Natural ecosystems

・Large-scale coral bleaching due to high water temperatures during summer

■Health

・Increase in the number of cases and deaths of heat stroke nationwide
・Habitat of infectious disease vectors such as dengue fever vectors has expanded.


Landslide disaster caused by heavy rain in July 2020



Changes in the northern limit of the habitat of human striped mosquito which transmit dengue fever

■Industrial and economic activities, people's lives and urban life

・Conflict risk and other security impacts due to climate change

https://www.env.go.jp/en/earth/cc/adaptation.html

Climate Change Impact Assessment Report (Dec. 2020)

Sector	Category	Sub-category	Significance (RCP2.6/8.5)	Urgency	Confidence
Agriculture Forest/, Forestry, Fisheries	Agriculture	Paddy field rice	●／●	●	●
		Vegetables, etc.	◆	●	▲
		Fruit trees	●／●	●	●
		Barley/wheat, soybean, feed crops, other crops	●	▲	▲
		Livestock farming	●	●	▲
		Plant pests, weeds, etc.	●	●	●
		Water, land and agricultural infrastructure	●	●	●
		Food supply and demand	◆	▲	●
	Forest/Forestry	Timber production (e.g., plantations)	●	●	▲
		Non-timber forest products (e.g., mushrooms)	●	●	▲
	Fisheries	Migratory fish stocks(ecology of fishes)	●	●	▲
		Propagation and aquaculture	●	●	▲
		Fishery environments in coastal areas and inland waters, etc.	●／●	●	▲
Water Environment, Water Resources	Water environment	Lakes, marshes, dams (reservoirs)	◆／●	▲	▲
		Rivers	◆	▲	■
		Coastal zones and closed sea areas	◆	▲	▲
	Water resources	Water supply (surface water)	●／●	●	●
		Water supply (groundwater)	●	▲	▲
		Water demand	◆	▲	▲
Natural ecosystems	Terrestrial ecosystems	Alpine/subalpine zone	●	●	▲
		Natural forests, secondary forests	◆／●	●	●
		Countryside-landscape ("satochi-satoyama")	◆	●	■
		Planted forests	●	●	▲
		Damage from wildlife	●	●	■
		Material balance	●	▲	▲
	Freshwater ecosystems	Lakes, marshes	●	▲	■
		Rivers	●	▲	■
		Marshlands	●	▲	■
	Coastal ecosystems	Subtropics	●／●	●	●
		Temperate, subarctic	●	●	▲
	Marine ecosystems		●	▲	■
Natural ecosystems	Others	Phenology	◆	●	●
		Shifts in distribution and populations (Endemic) (Exotic)	●	●	●
			●	●	▲
	Ecosystem services		●	–	–
		Nutrient and turbid material retention functions in watersheds	●	▲	■
		Supply of fisheries resources by coastal seagrass ecosystems	●	●	▲
		Eco-DRR functions of coral reefs	●	●	●
		Recreational functions related to natural ecosystems	●	▲	■

Note: For some categories, urgency has been assessed separately for RCP2.6/ RCP8.5 senarios.

Sector	Category	Sub-category	Significance (RCP2.6/8.5)	Urgency	Confidence
Natural Disasters, Coastal Areas	Rivers	Floods	●／●	●	●
		Inland waters	●	●	●
	Coastal areas	Sea-level rise	●	▲	●
		Storm surges, high waves	●	●	●
		Coastal erosion	●／●	▲	●
	Mountain areas	Debris flows, landslides, and other disasters	●	●	●
	Others	Strong winds, etc.	●	●	▲
	Impacts of complex disasters				
Human health	Winter warming	Mortality in winter season	◆	▲	▲
	Heat stress	Risk of mortality, etc.	●	●	●
		Heat illness, etc.	●	●	●
	Infectious disease	Water- and food-borne diseases	◆	▲	▲
		Vector-borne infectious diseases	●	●	▲
		Other infectious diseases	◆	■	■
	Others	Complex impacts of warming and air pollution	◆	▲	▲
		Impacts on vulnerable populations (elderly, children, persons with underlying health conditions, etc.)	●	●	▲
		Other health impacts	◆	▲	▲
Industrial / Economic Activities	Manufacture	—	◆	■	■
		Food manufacturing industry	●	▲	▲
	Energy	Energy supply and demand	◆	■	▲
	Commerce		◆	■	■
		Retail industry	◆	▲	▲
	Finance, insurance		●	▲	▲
	Tourism	Leisure	◆	▲	●
		Leisure industry based on natural resources	●	▲	●
	Construction		●	●	■
	Medical		◆	▲	■
	Others	Others (overseas impacts)	◆	■	▲
	Others	Others	–	–	–
Life of Citizenry, Urban Life	Urban infrastructure, critical services	Water supply, transportation, and others	●	●	●
	Life with sense of culture and history	Phenology, traditional (Phenology) events/ local industry (Local industry)	◆	●	●
			–	●	▲
	Others	Impacts on life due to heat stress, etc.	●	●	●
Inter-sectoral Impact Linkages	Impacts of disruptions of urban infrastructure and critical services				

Legend

Significance

- ● : Recognized as having particularly significant impacts
- ◆ : Recognized as having impacts
- – : N/A (cannot currently be assessed)

Urgency and Confidence

- ● : High
- ▲ : Medium
- ■ : Low
- – : N/A (cannot currently be assessed)

Indicates that changes and/or updates have been made in categories and/or assessment results since the first impact assessment.
Assessment of significance and/or urgency has been revised upwards
New category added for this assessment

https://www.env.go.jp/content/000047546.pdf

2. Climate Change Adaptation Act in Japan

Outline of the Climate Change Adaptation Act

(Act No. 50 of 2018)
Enacted in June 2018, revised in April 2023
(addition of heat illness countermeasures)

環境省

1. Integrated Promotion of Adaptation

- Set out clear roles for national and local governments, private sectors, and citizens to promote climate change adaptation.
- The national government shall formulate the **Climate Change Adaptation Plan** to promote adaptation in sectors such as agriculture and DRR. It should develop methodologies to monitor and evaluate the progress of adaptation. (The plan approved by the Cabinet was upgraded to a statutory plan to further enhance the description.)
- MOE shall implements **climate change impact assessments**, almost every five years. The Climate Change Adaptation Plan needs to be revised accordingly.

Promote effective adaptation measures in various sectors based on reliable detailed information

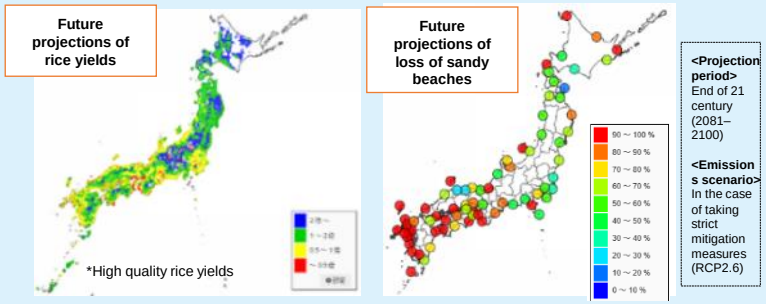
- Agriculture, Forestry, and Fisheries
- Water Environment, Water Resources
- Natural Ecosystems
- Natural Disasters
- Human Health
- Industrial / Economic Activities
- Life of Citizenry

On the basis of scientific knowledge of future impact projections,
- Develop and popularize heat-tolerant varieties of agricultural crops
- Set up fishing grounds based on the changes in fish distribution
- Maintain tangible infrastructure such as embankments and flood control facilities steadily
- Support for hazard mapping
- Promote heat illness prevention measures

2. Development of Information Platforms

- The **National Institute for Environmental Studies (NIES)** is **positioned as the core of the information platforms** for adaptation.

Key information from the Climate Change Adaptation Information Platform (from NIES website)



http://www.adaptation-platform.nies.go.jp/index.html

3. Enhancement of Local Adaptation

- Local governments (prefectures and municipalities) shall endeavor to formulate **Local Climate Change Adaptation Plans**.
- Prefectures and municipalities should establish systems to collect and provide information on adaptation (**Local Climate Change Adaptation Centers**).
- Organizing **Regional Councils on Climate Change Adaptation**, national and local governments and other entities promote adaptation measures locally.

4. International Development of Adaptation and Other Issues

- Promote international cooperation
- Promote initiatives by business entities and adaptation business

5. Promotion of Heat Illness Prevention Measures

- Formulate an action plan for heat stroke countermeasures
- National government response: Announcement and dissemination of heat stroke alert information・heat stroke special alert information
- Local government response: Designation and utilization of designated heat evacuation facilities and heat stroke prevention promotion organizations

Promotion of Climate Change Adaptation in Japan
under the Leadership of the Ministry of the Environment

Government initiatives

- **Establishment of the Climate Change Adaptation Promotion Council, chaired by the Minister of the Environment and consists of top officials from concerned ministries and agencies**

- Establishment of a close coordination system among concerned ministries and agencies.
- The government takes the initiative and promotes measures on climate change adaptation in a comprehensive and systematic manner.

Climate Change Adaptation Promotion Council

Members

Chair: Minister of the Environment

Vice Chair: State Minister of the Environment

- Cabinet Secretariat
- Cabinet Office
- Financial Services Agency
- Ministry of Internal Affairs and Communications
- Ministry of Foreign Affairs of Japan
- Ministry of Finance
- Ministry of Education, Culture, Sports, Science and Technology
- Ministry of Health, Labour and Welfare
- Ministry of Agriculture, Forestry and Fisheries
- Ministry of Economy, Trade and Industry
- Ministry of Land, Infrastructure, Transport and Tourism
- Ministry of the Environment
- Ministry of Defense

*Administrative works are handled by the Ministry of the Environment.

Outline of Climate Change Adaptation Plan
(approved by the Cabinet on October 22, 2021, partially amended on May 30, 2023)

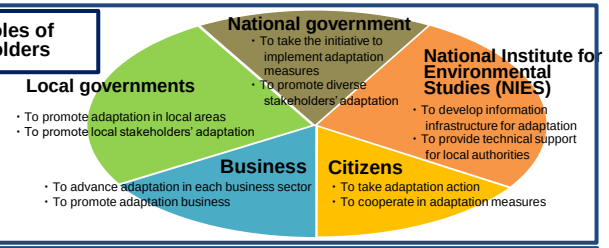
Objective

Achieving a safe and sustainable society by avoiding and minimizing negative impacts of climate change, securing citizen's life, socio-economic development and ecosystem, and building national resilience

Planning period

Approximately in five years

Basic roles of stakeholders



Basic strategies

Based on the 7 basic strategies, the relevant ministries and agencies jointly promote adaptation actions.

1. Mainstreaming adaptation in all policies
2. Promoting science-based adaptation
3. Developing information platform as a center of excellence
4. Localizing adaptation actions
5. Understanding of citizens and business
6. Assistance to developing countries
7. Cooperation among ministries

Progress management

Monitoring and evaluating the progress on adaptation while managing the progress by setting KPIs on sectoral/basic measures and setting indicators* from the perspective of making climate change adaptation firmly established and more widespread at national, local and citizen levels, based on a PDCA cycle

*E.g.(1) Rate of setting KPIs on sectoral measures (categories), (2) percentage of formulating local adaptation plans, (3) percentage of establishing local adaptation centers, and (4) degree of recognition of adaptation efforts.

Climate change impacts and adaptation measures (examples in each sector)

Agriculture, Forestry, and Fisheries

Impact Degraded rice quality under high temperature
Adaptation measure Introduction of high-temperature-resistant varieties

Natural Disasters

Impact Increased heavy rainfall events which might cause floods
Adaptation measure Promoting "River Basin Disaster Resilience and Sustainability by All" initiative

Impact Increase in the frequency of sediment disasters (debris flows, landslides, etc.)
Adaptation measures Installation of sediment control dams and other infrastructure

Water Environment, Water Resources

Impact Decline in groundwater levels during irrigation periods
Adaptation measures Promoting groundwater management and other measures

Natural Ecosystems

Impact Possible disappearance of suitable areas for the growth of coral reef
Adaptation measure Conservation of highly adaptable coral reef ecosystems

Human Health

Impact Increased risk of mortality due to heat illness
Adaptation measure Providing heat illness prevention information to the elderly

Impact Changes in the risks of various infectious disease outbreaks
Adaptation measure Collecting scientific knowledge on climate change impacts

Industrial/ Economic Activities

Impact Impacts on national security
Adaptation measure Promoting policies to minimize impacts

Life of Citizenry/ Urban Life

Impact: impact on infrastructure and lifelines
Adaptation measures: strengthening facilities and systems, use of green infrastructure, etc.

Basic Measures Related to Climate Change Adaptation

- Enhancement and utilization of scientific knowledge on climate change and other related issues
- Ensuring the system for collection, organization, analysis, and provision of information related to climate change, etc.
- Promotion of measures related to climate change adaptation with local governments
- Promotion of climate change adaptation by business operators, etc., and business activities contributing to climate change adaptation
- Securing international collaboration and promoting international cooperation related to climate change, etc.

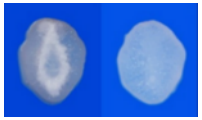
Basic Matters Concerning Action Plan for the Heat Illness Prevention

The plan shall specify the goals and period of the action plan, and the measures and actions to be taken (basic roles of relevant parties, specific measures for heat illness countermeasures, promotion system for heat illness countermeasures, and review and evaluation of the action plan, etc.).

Sectoral Measures Related to Climate Change Adaptation (1) (Agriculture, Forest/Forestry, and Fisheries)

Paddy rice

- Deterioration in quality due to high temperatures.
- If the conversion to high temperature resistant varieties does not proceed, the percentage of the first-class rice may decrease nationwide.



Cross section of immature grain with white portion (left) and normal grain (right)

- **Development and dissemination of high temperature resistant varieties.**
- **Thoroughly implement basic techniques such as fertilizer and water management.**

Livestock and forage crops

- During the summer, milk production, milk composition, and reproductive performance of dairy cattle decline, and the body mass index of beef cattle, pigs, and poultry deteriorates.
- Dry matter yields of forage crops are increasing year by year in some areas.

Kyoto Prefecture: Development of clothing for livestock using cool touch materials for humans

- **Promotion of measures against heat, such as watering and ventilation in barns**
- **Development of productivity-enhancing technologies such as appropriate nutritional management**
- **Construction of cultivation system for forage crops, development and dissemination of cultivation management technology**

Forestry

- Occurrence of woody debris flow accompanying hillside collapses triggered by external forces that exceed forests' ability to stabilize slopes.
- Possible increased risks of mountain disasters such as hillside collapses and debris flow due to more frequent heavy rainfall.
- Possible increase in growth problems of Japanese cedar planted forests in areas with already lower precipitation.

Large-scale mountain disaster caused by heavy rain

- **Prevention of mountain disasters including through erosion control facility deployment and forest management.**
- **Research and study on climate change impacts on forests and forestry**

Fruit tree

- Poor skin color of apple and grape, peel puffing and sunburn of satsuma mandarin, and flowering disorder of Japanese pear.
- There is a possibility that the suitable areas for apple and satsuma mandarin cultivation will shift year by year.

Peel puffing of satsuma mandarin

- **Introduction of superior-colored cultivars or yellow-green cultivars for apple and grape.**
- **convert to medium-late maturing citrus ('Shiranuhi', etc.), which prefer warmer climates to satsuma mandarin.**

Agricultural production base

- In addition to the frequent occurrence of short duration heavy rainfall, drought due to low rainfall also occurred.
- A change in the timing of rice planting and an increase in water management labor.
- The risk of waterlogging damage to farmland may increase.

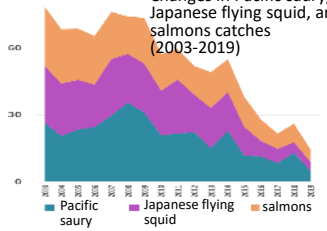
waterlogging damage to farmland caused by torrential rain

- **Efficient use of agricultural water and maintaining and improving of disaster prevention and mitigation functions in rural areas through appropriate combination of hard and soft measures.**

Fisheries

- Decline in catches of Pacific saury, Japanese flying squid and salmons.
- Mass death of scallop and oyster
- Decreased harvest of cultured laver due to shorter cultivation period.
- Changes in the distribution area and body size of migratory fish stocks, and possible impact on fish farming areas due to the rising water temperatures in summer.

Changes in Pacific saury, Japanese flying squid, and salmons catches (2003-2019)



- **Comprehend the impact of marine environmental changes on fishery resources and improve the precision of stock assessment**
- **Improvement of aquaculture breeds tolerant to higher water temperatures and technology for monitoring harmful algal blooms over wider areas**

《Examples of KPIs》
【Agriculture (paddy rice)】Percentage of area planted with high temperature resistant varieties (staple food rice)
【Forestry (timber production (plantation forests, etc.))】Percentage of prefectures where the pine weevil damage rate in pine forests to be conserved is kept at "slight damage" of less than 1%.
【Fishery (Migratory fish stocks (Ecology of fish, etc.)】Number of fish species assessed based on MSY (Maximum Sustainable Yields)

Sectoral Measures Related to Climate Change Adaptation (2) (Water Environment, Water Resources, and Natural Ecosystems)

Water Environment, Water Resources

Water Supply

- Droughts in various areas in Japan due to absence or lack of rain for a prolonged period of time, resulting in water supply restriction
- Possibility of more severe droughts, affecting many areas such as waterworks, agricultural, and industrial water
- Possibility of constant intrusion of highly concentrated saltwater in downstream areas due to sea-level rise

Yagisawa dam in drought
(2016, Gunma Prefecture)
Source: "Water Cycle Policy (FY2017)"

- **Assessment of drought risks and information sharing among actors**
- **Improving functions of existing facilities and preparing drought measures such as the use of rainwater and reclaimed water**
- **Promoting formulation of action plans against droughts and further encouraging groundwater management**
- **Promotion of efficient securing and usage of agricultural water**

Examples of KPIs: Number of published action plans against drought

Natural Ecosystems

Note: Promoting initiatives considering that land, freshwater, coastal, and marine ecosystems are closely interconnected and that climate change-induced changes will affect entire ecosystems

Terrestrial Ecosystems

- Changes and shifts in distribution of vegetation, plant community types, and species composition due to higher temperature and earlier melting of snow
- Expansion of the distribution of *sika* deer and wild boars across Japan
- Projections of changes or reductions in suitable habitats for plant species, vegetation, and animals (such as ptarmigans) in alpine and subalpine zones

Ptarmigans live only in alpine zones such as the Northern Alps and their habitat is projected to be reduced.
Source: The website of the Ministry of the Environment

- **Monitoring and evaluation with a focus on significant zones such as alpine zones**
- **Promoting the creation of forest ecological networks integrated with valley forests**

Examples of KPIs: [Impact of Wildlife] Number of developed category 2 specified wildlife control plans (*sika* deer) with numerical targets

Coastal Ecosystems

- Increased frequency of subtropical coral bleaching due to a rise in seawater temperature
- Progressing transition from low-temperature to high-temperature species in conjunction with rising seawater temperature
- Projections of disappearance of sea areas suitable for the growth of tropical and subtropical reef-building coral in Japanese coastal waters due to an increase in seawater temperature and ocean acidification (Projections assuming a global average temperature increase of 4°C by the second half of the 21st century)

Coral bleaching
Source: Ministry of the Environment

- **Monitoring and evaluation with a focus on coral reefs and other areas**
- **Restoring healthy ecosystems that are highly adaptable to climate change and conserving biodiversity to promote the creation of ecological networks**

Examples of KPIs: [Coastal Ecosystems (Subtropical Zone)] Number of initiatives conducive to conserving coral reef ecosystems reported by the government ministries and agencies, as well as local governments

Sectoral Measures Related to Climate Change Adaptation (3) (Natural Disasters)

Rivers

- The number of points where water levels exceeded the level of flood risk are increasing.
- Heavy rains that can cause floods will increase significantly by the end of this century compared to the present in major river basins in Japan.
- Damage caused by flood is expected to increase due to temperature rise.

・Reviewing flood control plans reflecting the impacts of climate change

・Promoting "River Basin Disaster Resilience and Sustainability by All" Initiative that integrate structural and non-structural measures in cooperation among all stakeholders

・Promoting the use of green infrastructure in "River Basin Disaster Resilience and Sustainability by All" Initiative

Coastal Areas (Storm surges/High waves)

- The sea level around Japan was increasing according to the analysis result of tidal observation records.
- Potential increase of risks of high waves is expected as a result of changes of tropical cyclone intensity and tracks.
- Sea-level rise raises the possibility of coastal erosion.

・Impact assessment based on meteorological and oceanographic monitoring, projections for storm surges and high waves and other methods

・Development of embankments with robust structures, parapet walls, and tsunami seawalls

・Promote the development and conservation of coastal disaster-prevention forests

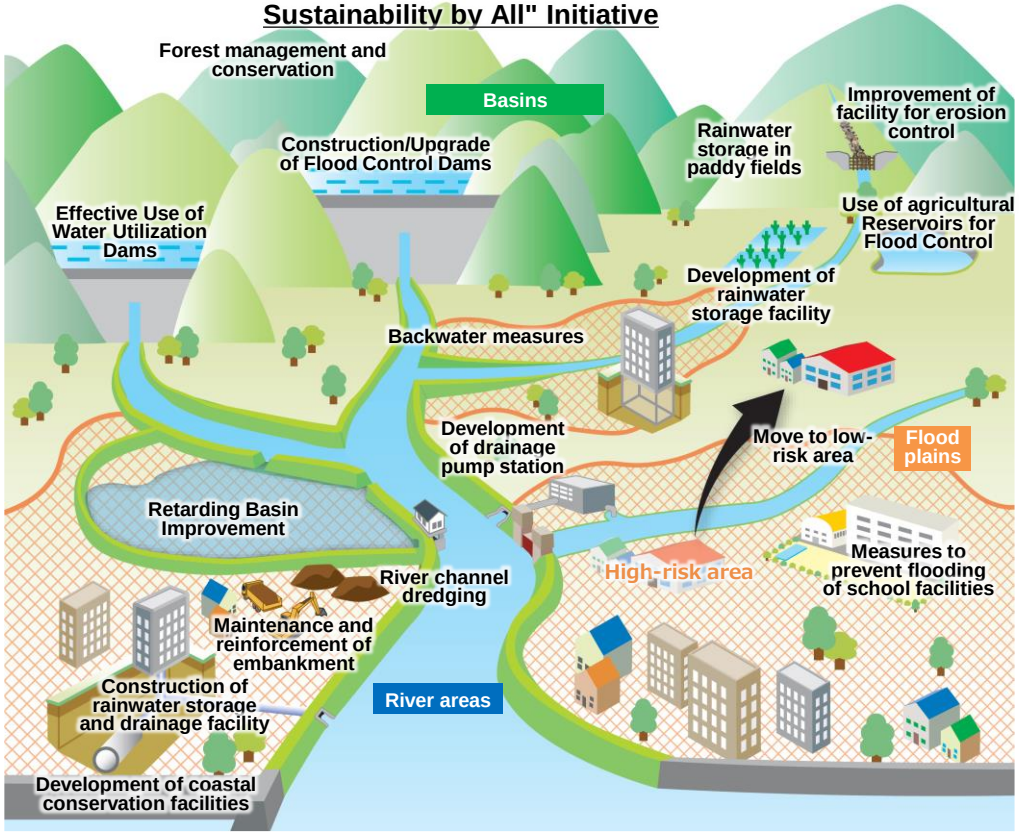
Examples of KPIs:
[Rivers (Floods)] Number of river improvement plans reflecting the future impacts of climate change
[Mountain areas (Debris flows, landslides, and other disasters)] Number of newly announced sediment disaster prone areas based on the hazard maps for sediment disasters

Mountain Areas (Sediment Disasters)

- Assuming that recent distinctive rainfall conditions were due to climate change, changes in the form of sediment disasters have already occurred, and the disasters will become more severe in the future.
- If rainfalls become more severe, debris flows, and sediment-laden flood is expected to occur more frequently.

・Development of facilities focusing on the protection of “human life and livelihood”
・Support for hazard mapping, etc.
・Implementation of countermeasure projects based on the “Plan against Sediment-laden Flood”

Image of "River Basin Disaster Resilience and Sustainability by All" Initiative



Sectoral Measures Related to Climate Change Adaptation (4)
(Human Health, Industrial/Economic Activities, Life of Citizenry, and Urban Life)

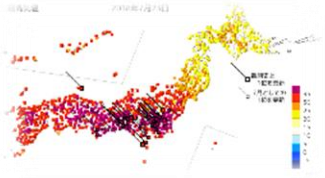
Human Health

Heat Stress

・Observed increase in excess mortality* due to increased temperatures

*An indicator showing an increase in the total mortality from illness, whether directly or indirectly

・Projections of an increase in death from cardiovascular diseases due to temperature increase and increasing death of elderly people due to heat stress by 2030-2050



Daily maximum temperature (July 23, 2018)

・Provision and cautionary alerts based on meteorological information and Wet Bulb Globe Temperature (WBGT), as well as raising public awareness for appropriate prevention and treatment

・Information dissemination regarding occurrence of heat illness

Infectious Diseases

・Expansion of the habitat of mosquitoes that transmit dengue fever to Aomori Prefecture (northern part of Japan)

・Concerns about a domestic infection chain due to changes in the habitat and population density of mosquitoes carrying infectious diseases

Asian tiger mosquito (*Aedes (Stegomyia) albopictus*) (Photo provided by the Department of Medical Entomology, the National Institute of Infectious Diseases)

・Collection of scientific findings about aspects such as the correlation between temperature increase and changes in the risk of infectious disease outbreaks

・Ongoing fixed-point observation, measures targeting sources of larvae, extermination of adult insects, and understanding of trends in the occurrence of infectious diseases

Examples of KPIs: [Heat Stress (Heat Stroke, etc.)] Number of deaths due to heat illness per year and the progress of raising public awareness for heat illness

Industrial/Economic Activities

Industrial and Economic Activities (Construction industry), Other Impacts (Overseas impacts)

・The construction industry has the highest number of deaths and injuries due to heat illness in the workplace.

・Reports on the impacts of climate change on international relations and security in Europe, the United States, and other countries predict weakened international support, increased burdens, and intensified conflicts over resource management.

Flood in Rojana Industrial Park (Thailand, October–November 2011)
Source: Basic knowledge on flood control, the Ministry of Land, Infrastructure, Transport and Tourism

・Measures to address heat illness in the workplace in the manufacturing and construction industries

・Implementing surveys of impacts on the economic and social state in Japan from the overseas impact of climate change

Examples of KPIs: [Construction Industry] Dissemination of "Combat Heatstroke at Work"

Lives of the Citizenry, Urban Life

Infrastructure, Critical Services, etc.

・Impacts of meteorological events such as heavy rains, tropical cyclones, and droughts on infrastructure and critical services have recently been observed in many places in Japan.

・There are reports of disrupted transportation networks due to heavy rains and resulting isolated areas, and damaged and halted critical services such as electricity, gas, and water supply.

Measures against inundation at subway stations

・Social implementation of green infrastructure through cross-sectoral and public-private cooperation

・Preparation of crisis management manuals for water supply infrastructure and improvement of systems to enable timely and appropriate emergency response measures and repairs

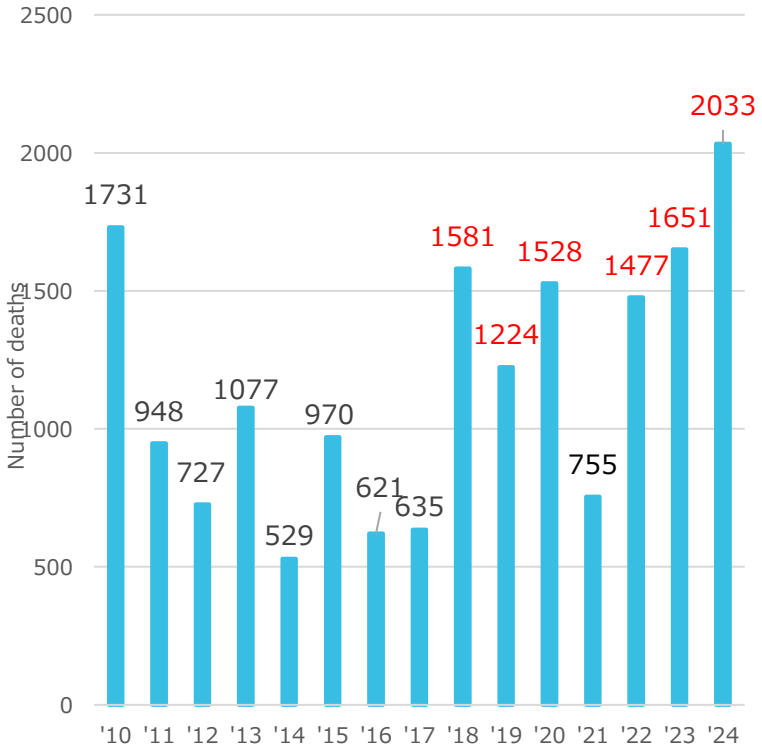
Examples of KPIs: [Urban Infrastructure, Critical Services (Water Supply, Transportation, and Others)] Preparation of crisis management manuals (water supply), Maintenance rate of disaster-resilient equipment (aids to navigation)

3. Countermeasures of Heat Stress

Deaths due to heat illness

Annual trends in deaths due to heat illness

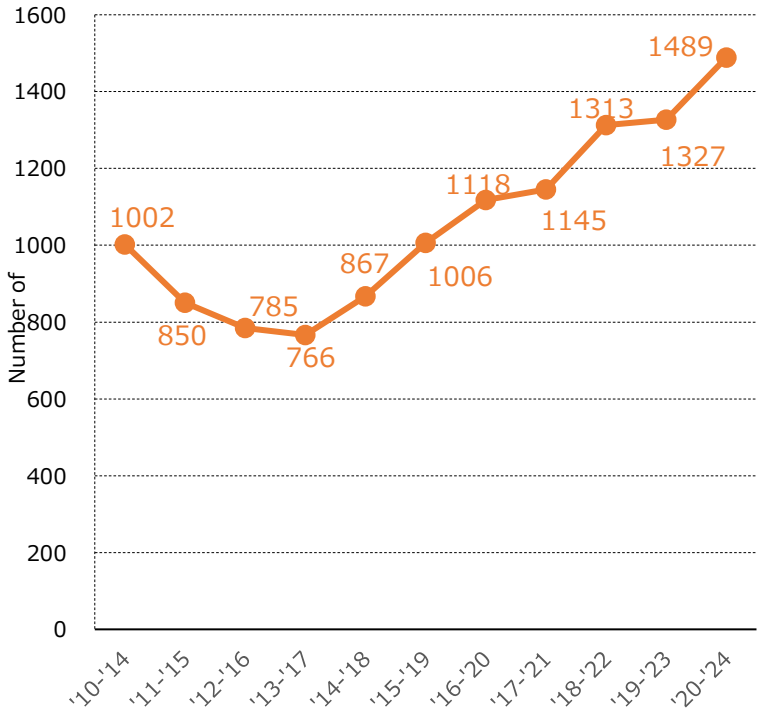
Since 2018, the number has exceeded 1000, except for the year 2021.



Source: Vital Statistics, Ministry of Health, Labour and Welfare
(https://www.mhlw.go.jp/toukei/list/81-1.html)
Deaths in 2024 are approximate numbers (from June to September).

Deaths due to heat illness (5-year moving average)

The number of deaths in recent years (5-year moving average) exceeds 1000 people



Source: Compiled from Vital Statistics, Ministry of Health, Labour and Welfare
Deaths in 2024 are approximate numbers (from June to September, 2024)

Source: Partial modification to Document 1 of the FY2024 1st Working Group on Special Heat Stroke Alert (held on November 15, 2024)

Heat illness Prevention Action plan（Summary）
(Decided by the Cabinet on May 30, 2023)

Mid-term goal

The mid-term goal (2030) is to halve the number of deaths due to heat illness from the current level*.

(*5-year moving average of deaths is used; the 5-year moving average in 2022 (preliminary) was 1,295)

Duration

Around 5 years

Specific measures to prevent heat stroke

1. Public awareness raising and information provision to protect people's lives and health
2. Heat illness prevention for people vulnerable to heat illness, e.g., elderly people and children
3. Heat illness prevention in the places where personnel in change of management are present
4. Heat illness prevention by local governments and community stakeholders concerned
5. Collaboration with industrial players
6. Promotion of research on heat illness countermeasures

Response to extremely high temperatures

7. Preparedness for extreme high temperatures
8. Announcement and public awareness raising of Special Heat Stroke Alerts and prompt implementation of countermeasures

Implementation and review of action plans

The action plan will continue to be reviewed for addition and reinforcement of further measures by the situation of climate change, future trends in heat illness, and trends in public opinion. The promotion system for extremely high temperatures will also be reviewed in response to the results of the study.

Wet-Bulb Globe Temperature（WBGT）

Government of Japan and the Ministry of the Environment take measures based on the heat stress index (WBGT value).

WBGT （WBGT : Wet Bulb Globe Temperature）

- An index of susceptibility to heat illness that focuses on the exchange of heat between the human body and the outside air (heat balance) and is calculated based on temperature, humidity, solar radiation/radiation, and wind factors, etc.

WBGT Measuring device

WBGT Calculation Formula

WBGT＝0.7 × Wet-bulb temperature + 0.2 × Black-bulb temperature
+ 0.1 × Natural Dry-bulb temperature

○Wet-bulb temperature:
Temperature that indicate the degree of humidity of the air, since the lower the humidity, the greater the heat of vaporization due to evaporation of water. Wet-bulb temperature approaches the dry-bulb temperature when humidity is high and decreases when humidity is low.

○Black-bulb temperature:
Temperature measured by a hollow copper sphere painted black. The black-bulb temperature increases with solar radiation and the intensity of radiant heat from hot road surfaces.

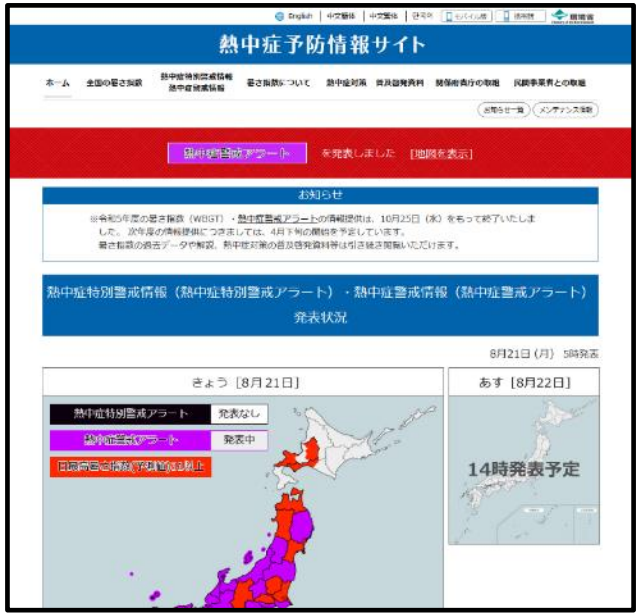
○Natural Dry-bulb temperature:
Temperature indicated by an ordinary thermometer. So-called air temperature.

※Actual and predicted WBGT values for approximately 840 locations nationwide, based on Japan Meteorological Agency data, are available on the “Ministry of the Environment's Heat Illness Prevention Information Website (https://www.wbgt.env.go.jp/).

Status of visits to the Heat Illness Prevention Information site

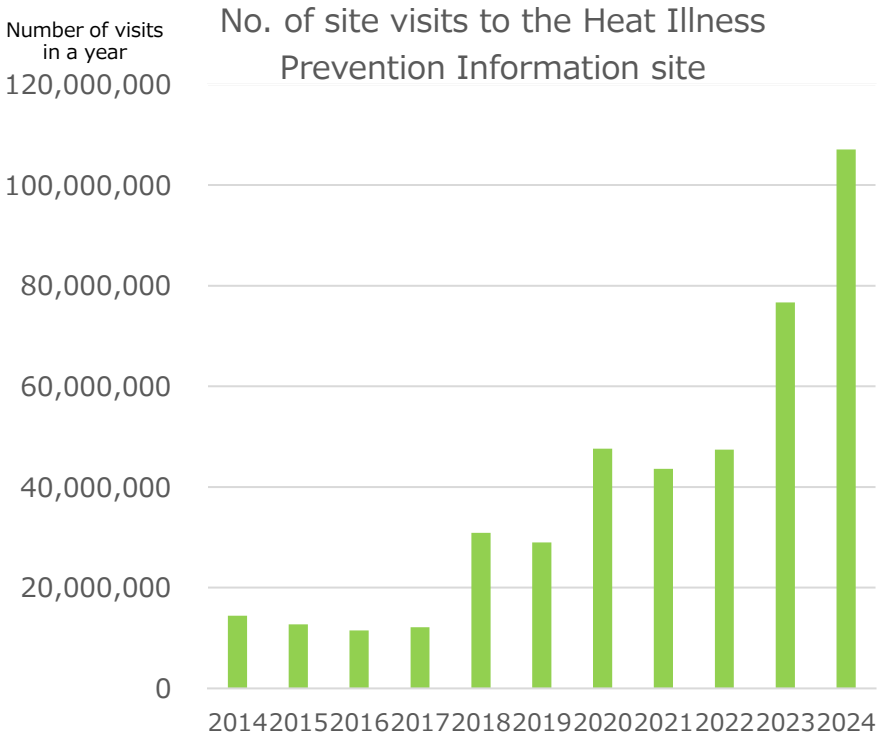
Centralized information that contributes to heat illness prevention

- ○ WBGT index at 841 locations nationwide
- ○ Announcement status of the Heat Stroke Alert and Special Heat Stroke Alert
- ○ How to prevent and deal with heat illness
- ○ Leaflets, manuals, etc.
- ○ Efforts by the Ministry of the Environment and related ministries and agencies, etc.



https://www.wbgt.env.go.jp/

The number of visits to the Heat Illness Prevention Information site operated by the Ministry of the Environment has been increasing year by year, with a cumulative total of approximately 107 million views in 2024 (approximately 77 million views in 2023).



Source: Document 1-2 of the 7th Heat Illness Prevention Study Group (held on March 3, 2025)

Heat Stroke Alert and Special Heat Stroke Alert

	Heat Stroke Alert	Special Heat Stroke Alert
Common name	Heat Stroke Alert	Special Heat Stroke Alert
Positioning	When **there is a risk of damage to human health** due to heat illness as a result of extremely high temperatures (Promotes awareness of the dangers of heat illness) Number of alerts issued to date R3: 613 times, R4: 889 times, R5: 1232 times **R6: 1722 times**	When **there is a risk of serious damage to human health** due to heat illness as a result of **extremely** high temperatures (All people should practice individual preventive actions through their own efforts, as well as support preventive actions through mutual and public assistance.) **Implementation began in April 2024.** **There has not been a single alert issued.**
Alert criteria	When the daily maximum Heat Stress Index (WBGT) is predicted to reach **33** (predicted value, rounded to the nearest whole number) at any of the locations where the Heat Stress Index information is provided **within the prefectural forecast area**.	When the daily maximum Heat Stress Index (WBGT) for the next day is predicted to reach **35** (predicted value, rounded to the nearest whole number) at **all** locations where the Heat Stress Index information is provided **within the prefecture**. (Criteria for announcement regarding natural and social conditions other than the above will continue to be considered in FY2024 and beyond.)
Announcement time	Around **5:00 pm** on the day before and around **5:00 am** on the day	Around **2:00 pm on the day before** (Judged by the predicted value around 10:00 am on the previous day)

2024 operation period: April 24, 2024 - October 23, 2024

Cooling Shelter

○ The mayor of a municipality may designate facilities that meet certain requirements within that municipality as designated cooling shelters. The designated facilities are commonly referred to as “**Cooling Shelters”.**

○ When a Special Heat Stroke Alert is issued, the designated facility will be opened to residents on a predetermined date and time by the manager of the facility.

Requirements for facilities (Article 21, Paragraph 1, Items of the Climate Change Adaptation Law and Article 4 of the Enforcement Regulations of the Climate Change Adaptation Law)

(1) Have appropriate air-conditioning facilities.

(2) To be open to residents, etc. during the period when Special Heat Stroke Alerts are issued.

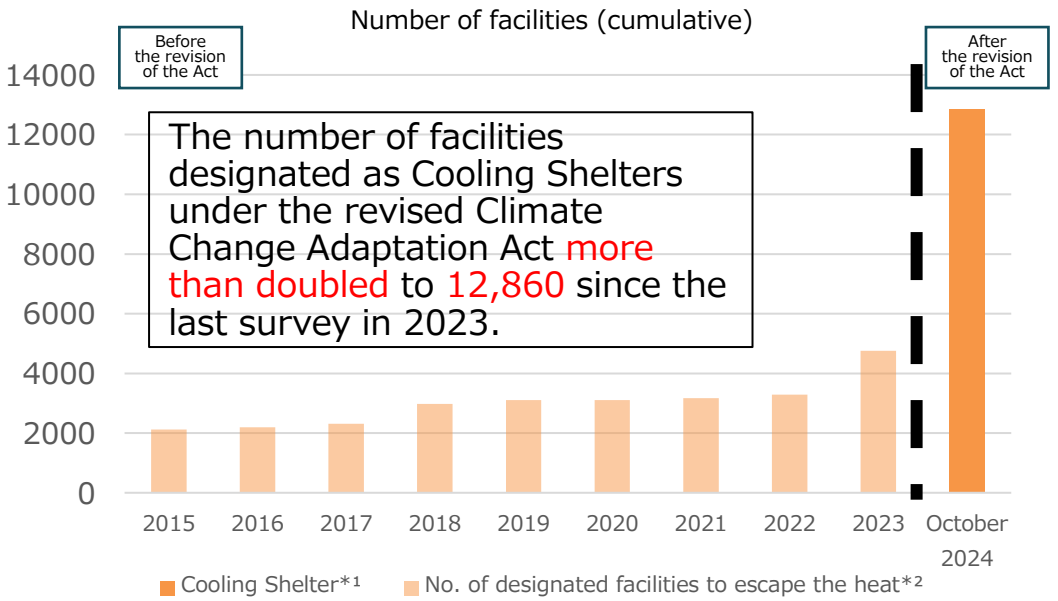
(3) Necessary and appropriate space must be secured for residents, etc. to stay.

○ The Ministry of the Environment established a logo mark for Cooling Shelters as shown in the figure on the right to make it easier for residents to access designated Heat Shelters.

○ For the reference in the operation of designated Cooling Shelters, “Examples of Operation of designated Cooling Shelters” was and published in February 2024 (*Examples are from before the enforcement of the amended law).

○ Prefectures and municipalities that are not designated as designated Cooling Shelters, some local governments are implementing their own initiatives such as “Cool Spots” etc.

Logo: Cooling Shelter



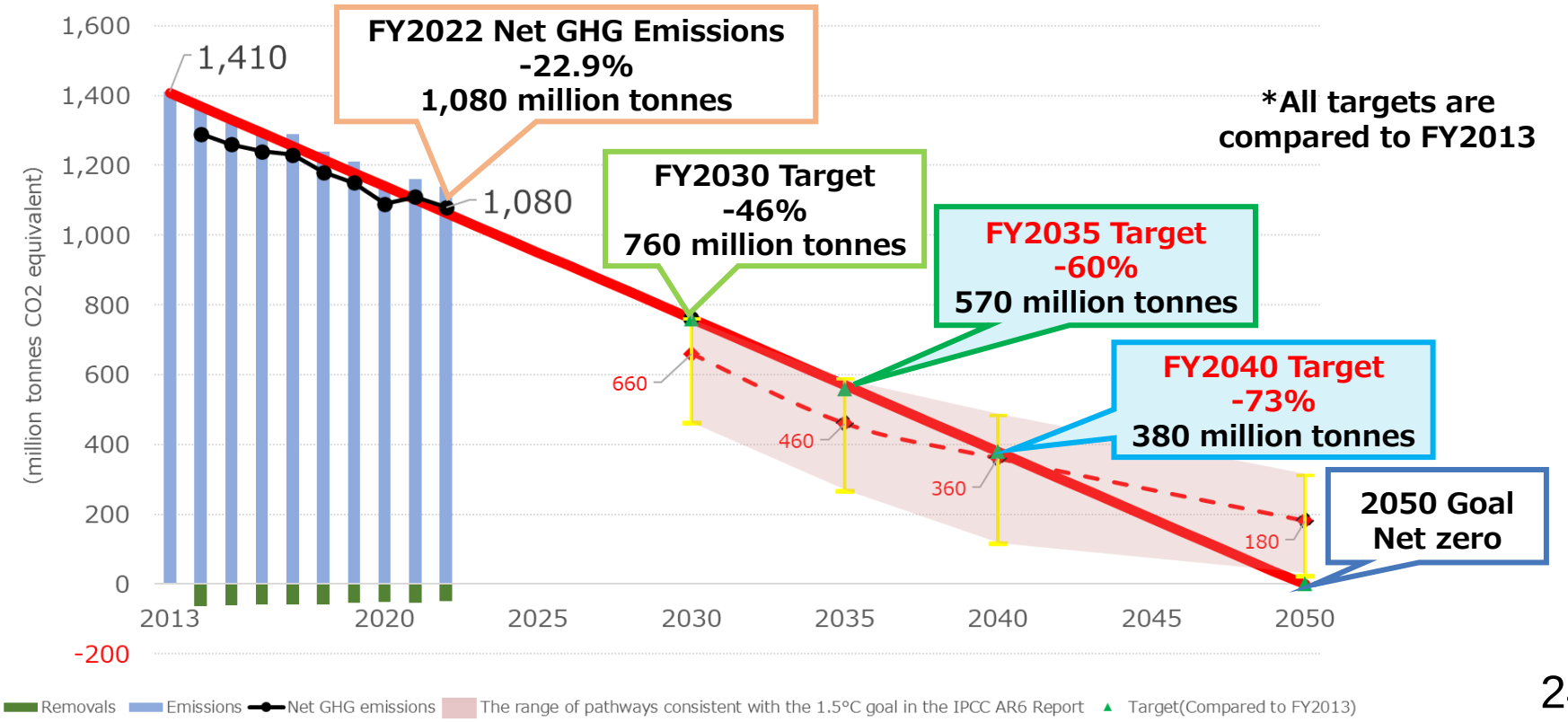
4. Aiming to 1.5 degree target

Japan's New GHG Emission Reduction Targets (NDC)

Japan will pursue efforts to steadily reduce its GHG emissions on a **linear pathway from FY2030 target towards the achievement of net zero by 2050.**

As for the new NDC, Japan sets ambitious targets to reduce its GHG emissions **by 60% in FY2035 and by 73% in FY2040**, from its FY2013 levels, **aligned with the global 1.5°C goal.**

These targets will **increase** medium and long-term predictability and **accelerate Green Transformation (GX) investments, towards simultaneous achievement of net zero and economic growth.**



Key Policies and Measures under the Action Plan

- To achieve Japan's new NDC, the following policies and measures will be implemented under the **Action Plan: the Plan for Global Warming Countermeasures**, in coordination with **the Strategic Energy Plan and the GX2040 Vision**.
- These policies and measures will be advanced or revised through follow-up activities.

Energy Conversion

- Maximize the use of renewable energy, nuclear power, and other highly effective decarbonization power sources
- Utilize LNG-fired power as a transition energy, promote decarbonization of thermal power plants using hydrogen, ammonia, CCUS, etc., and facilitate efforts to fade out inefficient coal-fired power plants
- Utilize CCUS, hydrogen in hard-to-abate sectors

Industry, Business, Transportation, etc.

- Support transition to innovative equipments in factories and introduction to energy efficient facilities in SMEs
- Improve energy efficiency of semiconductor products, develop and utilize cutting-edge technologies such as photoelectric conversion, and improve energy efficiency of data centers, with expected increase in electricity demand
- Reduce CO2 emissions throughout product lifecycle, from manufacturing to disposal, in the automotive sector, advance decarbonization in logistics systems, and use next-generation fuels in aviation and marine transportation sectors

Local Communities and Lifestyle

- Accelerate local decarbonization and revitalization and create more than 100 "decarbonization leading areas" by FY2030
- Shift to decarbonized lifestyles, including energy-efficient housing and food loss reduction
- Support installation of high insulation windows, energy efficient water heaters, electric commercial vehicles, and perovskite solar cells, and its demand generation by introducing such products to national and municipal government buildings
- Advance decarbonization of the entire value chain, including development of Scope 3 GHG emissions accounting methods

Cross-cutting Issues

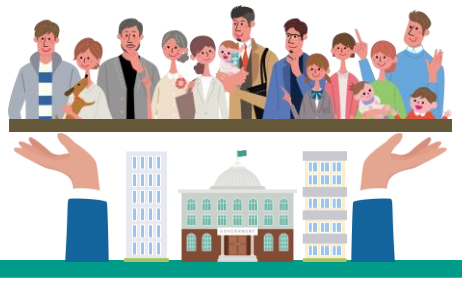
- Establish and implement "pro-growth carbon pricing"
- Promote transition to a Circular Economy, advance measures under the Act concerning Sophistication of Recycling Businesses, facilitate deployment of waste treatment facilities with CCU and facilitate solar panel recycling
- Advance efforts on forest management, blue carbon and other carbon removal activities
- Contribute to global emissions reduction utilizing Japan's decarbonization technologies and expand cooperation under the Joint Crediting Mechanism (JCM) and City-to-City collaboration including under the Asia Zero Emissions Community (AZEC)

What is "Decokatsu”?

○ We started a national movement to change people's behavior and lifestyles toward decarbonization. The movement is named **"Decokatsu", combining "DE"carbonization, "ECO", and "Katsu" (Japanese word for activity and lifestyle)**

1 Present an **overall image, picture of future prosperous lifestyles**

2 **Support new lifestyles of citizens and consumers**



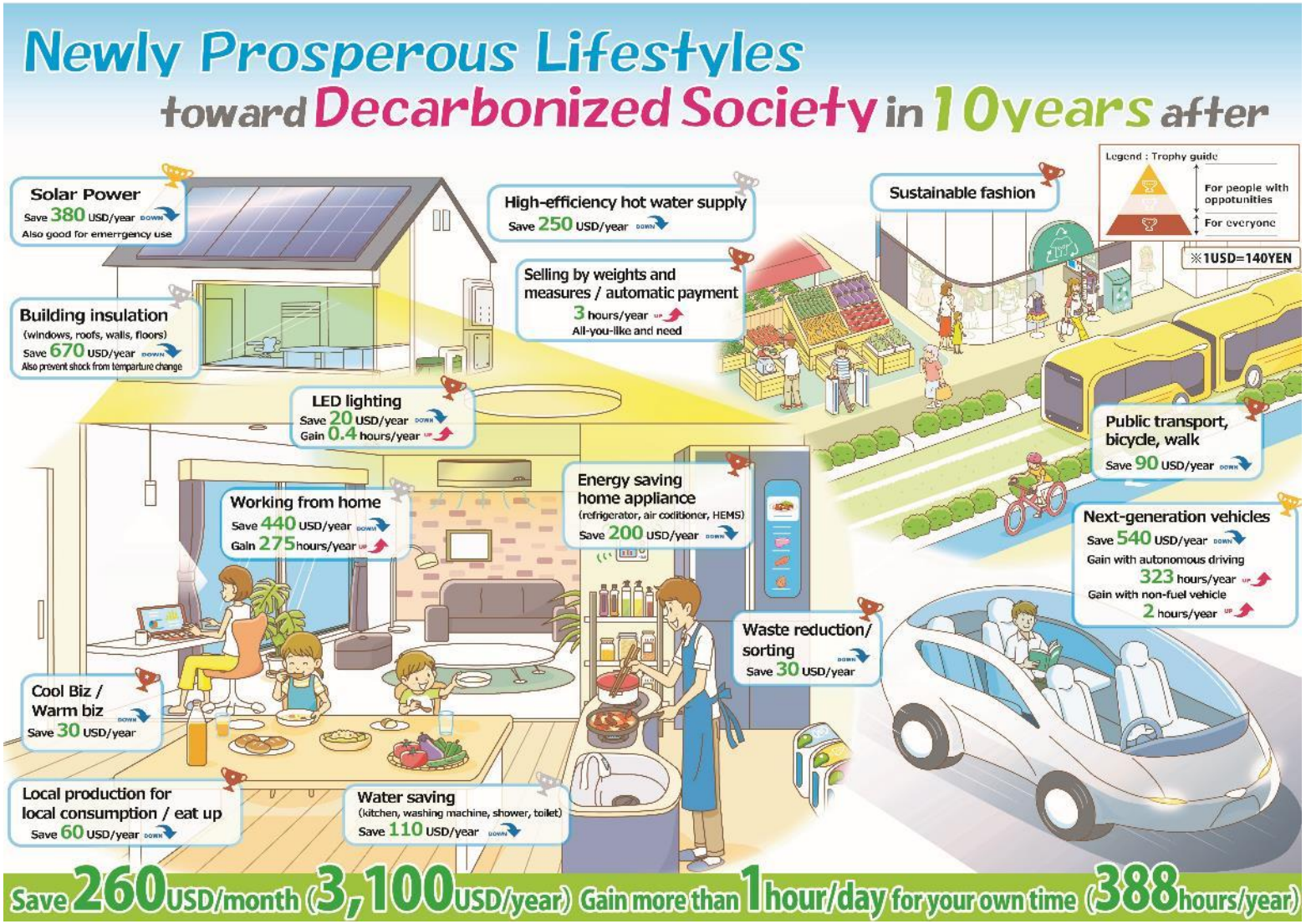
- Suggest **new lifestyles packaged with products/services**
- Propose & inform of **International Coordination of Lifestyle Innovation through Public-Private Partnerships**

↓

Stimulate **new behaviors** and **global market creation /integration of market needs**

DECOKATSU

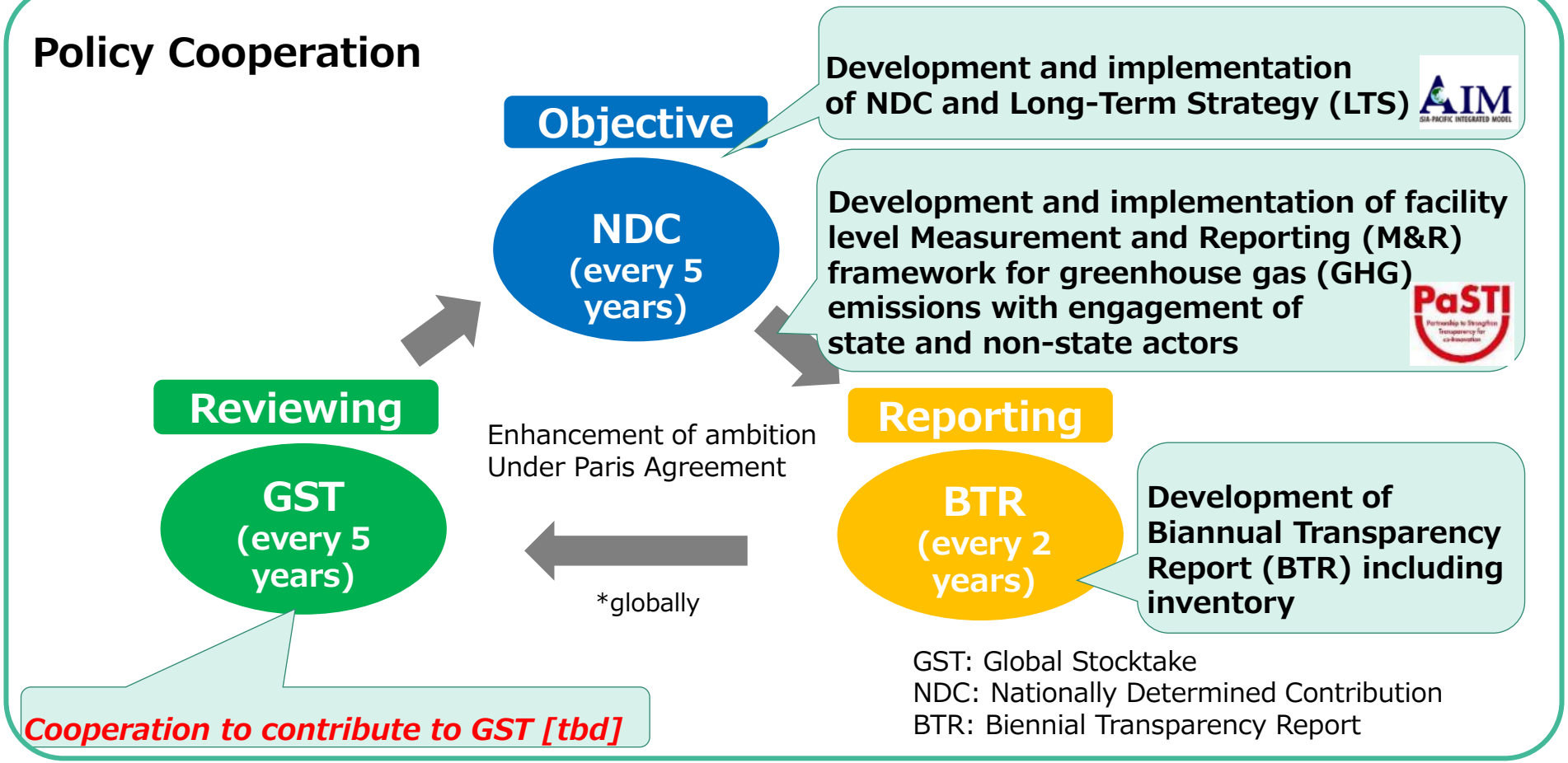
Decokatsu's vision



※ The rationale for the new lifestyle and numerical back data can be found on the Ministry of the Environment's website (https://ondankataisaku.env.go.jp/cn_lifestyle/)

International cooperation to achieve decarbonization society

Policy Cooperation



GST: Global Stocktake
NDC: Nationally Determined Contribution
BTR: Biennial Transparency Report

Suggestion of solution

- **Proving the information of suitable technologies**
- **Development of concrete project (e.g. Joint Crediting Mechanism (JCM) project)**

This invites international investment of decarbonization in Asia

Initiative on Fluorocarbons Life Cycle Management (IFL)

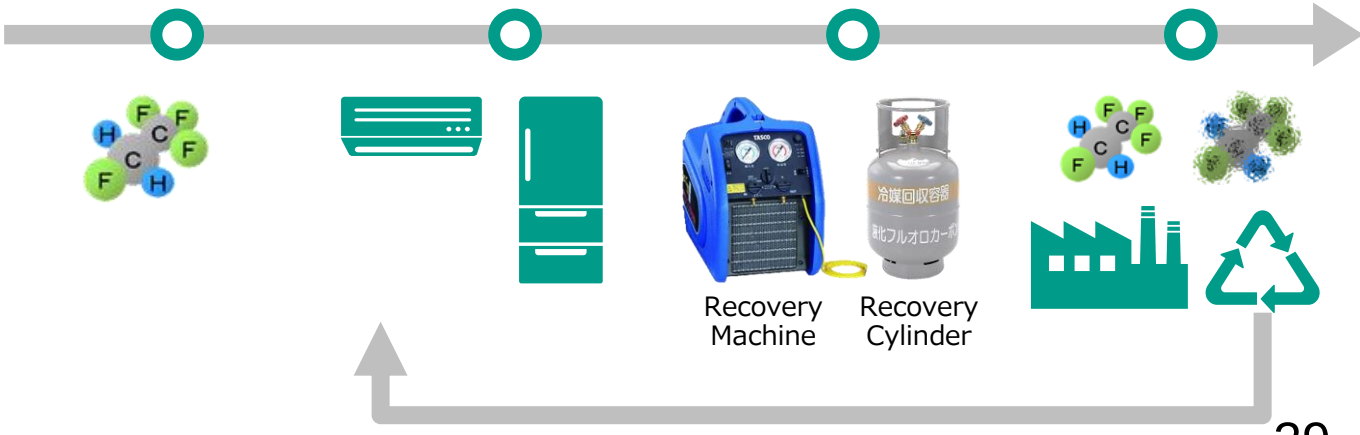
- Japan has worked for a long time to implement life cycle management of fluorocarbons by developing legal systems.
- Based on the experience, **Japan launched the Initiative on Fluorocarbons Life Cycle Management (IFL)** at UNFCCC COP25 in December 2019 to internationally promote the life cycle management.

Target Activities

- Mitigation ambition and transparency
- Legislation and policy development
- Training and capacity building
- Infrastructure development

Life Cycle Management of Fluorocarbons

1	2	3	4
Production/ Consumption Reduction	Leakage Prevention in use	Recovery (Collection)	Destruction /Reuse*
Production	**Use**	**Recovery**	**Destruction /Reuse**



Thank you for your attention !

環境省
Ministry of the Environment