Outline of Long-term Low-carbon Vision
Long-term low-carbon vision (whole picture①)

**Current Situation**
Scientific evidence of climate change is unequivocal. It was agreed in Paris Agreement to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHG in the second half of this century. Japan takes steady steps to achieve the mid-term target of 26.0% reduction by FY2030 compared to FY2013, and aims to reduce greenhouse gas emissions by 80% by 2050 as its long-term goal.

**Economic and social challenges**
Respond to various problems including depopulation, aging, requirement for economic revival, local/global issues.

**Need action based on principles**

<table>
<thead>
<tr>
<th>Japan’s Role</th>
<th>Japan’s future vision</th>
</tr>
</thead>
<tbody>
<tr>
<td>To inherit our environment as a foundation for human beings to our future generation and contribute to global sustainable development through climate change policy and to be a expected and trust worthy country in the international society.</td>
<td>Forerunner of Finding Answers for Emerging Issues to achieve both tremendous GHG reduction &amp; prosperity, tackling with simultaneous solution for climate change and economic/social challenges</td>
</tr>
</tbody>
</table>

"Simultaneous solution" of economic and social problems, driven by climate change

| Contribution to global reduction as well as domestic reduction | Innovation (on technology, socioeconomic system and lifestyle) is a key |
| "Now" is the time to act |

**Vision**

<table>
<thead>
<tr>
<th>Life style(Home, automobiles)</th>
<th>Industry &amp; Business</th>
<th>Energy supply-demand</th>
<th>Region and City</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 emission is almost zero</td>
<td>Investment for decarbonization, market gain by low-carbon products/service</td>
<td>low-carbon power source is &gt;90%</td>
<td>Compact city, distributed energy</td>
</tr>
</tbody>
</table>

**Aim to reduce GHG by 80% by 2050, in light of Paris Agreement**

- ①Energy efficiency
- ②Low-carbon energy supply
- ③Switch to low-carbon energies in end-use

**Policy and measures to realize**

<table>
<thead>
<tr>
<th>①Full usage of existing technologies, know-how and findings</th>
<th>③ Full mobilization of all effective policies and measures (PaMs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>② Development and deployment of new innovation</td>
<td></td>
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</tbody>
</table>

**Policy Direction**

<table>
<thead>
<tr>
<th>Carbon pricing</th>
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<tbody>
<tr>
<td>Make best use of market dynamism. Enhance market competitiveness of low-carbon technologies, products and services. Improve an environment for innovation.</td>
</tr>
</tbody>
</table>

Disclose environmental information, Regulation, Promote and diffuse innovative technology, land use, Contribute to global GHG reduction.

**Making progress for long-term significant reduction**

Review progress incl. cumulative GHG emission.

※There exist different opinion on several policy directions, incl. carbon pricing.
**Long-term low-carbon vision (whole picture②)**

**Climate change policy for green growth**

- **Actions based on science is fundamental**
  Climate change is a scientific fact. It was agreed in Paris Agreement to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHG in the second half of this century. Japan aims to reduce greenhouse gas emissions by 80% by 2050 as its long-term goal.

- **Climate change policy can take central role for growth strategy**
  Future market is huge for technologies, products and services for tremendous GHG reduction. This is a so-called “promised market”, and forerunner country which can provide low carbon solutions can take an initiative in the world.

- **Contribution to global GHG reduction as well as domestic reduction**
  Domestically, residential sector and transportation sector have huge potential for GHG reduction. Achieve great reduction in a long term, producing a big low carbon market and promoting investment through innovation of consumption pattern. It enhances Japan’s global competitiveness to increase the productivity on each domestic sector continuously.

**Key to long-term significant reduction is innovation**

Great social transformation is essential to achieve massive GHG reduction in a long term. Innovation beyond the extension of existing measures so far is necessary.

- **Innovation of economic and social system**
  Create mechanism to produce incentives for enhancing needs of new technology

- **Innovation of technology**
  Promotion of advanced technology and combination of existing technologies

- **Innovation of lifestyle**
  Transformation of life style, work style, choice of services toward decarbonization

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**Long-term significant reduction**

- **Demand side = Creation of Decarbonization market**
  Arouse demand for low-carbon technologies/services, renewable energy.

- **Supply side = High-value added**
  Promote innovation by stimulating motivation to invest in low-carbon technology: development and intangible assets.

**Companies**

- **Market**
  Enhance investment and loan For lower-carbon tech/product/service

- **Low-carbon footprint product/service**
- **Autonomous region/economy**
  Use of natural capital Independent/distributed energy Compact city
- **Rich and comfortable life**
  Improve QOL

- **Reduce fossil fuel imports**

**Long-term significant reduction**
### Simultaneous solution of economic and social problems, driven by climate change policy

**Economic growth**
- **Key is “carbon productivity increase”**
  - “from quantity to quality”
  - Same direction as increase of productivity of added value
- **Potential needs and foreign demands**
  - Climate change is a so-called “promised market”

**Added value productivity**
- GDP \( \times \) added value
- Labor input

**Same direction from the viewpoint of economic growth “from by quantity to by quality” through increasing added value**
- Carbon productivity
- GDP \( \times \) added value
- Carbon input

**Utilize local energy**
- Creation of business/jobs relating to renewable energy, realization of land resilience, etc.

**Compact urban area**
- Increase of labor productivity by improving population density, revitalization of urban area, etc.

**Maintain and enhance natural capital**
- Source of value-added goods and service based on regional originality

**Regional revitalization and land resilience**

**Security of climate and energy**
- **Contribution including security of climate**
  - Protect not only current but also future generation from a threat of climate change
  - Global improvement by deployment and diffusion of technology and knowhow
- **Energy Security**
  - Increase of energy self-sufficiency by utilizing local energy

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**Basic concept towards long-term significant reduction & decarbonization**

**Simultaneous solution of economic and social problems**, driven by climate change policy.
Basic concept towards long-term significant reduction & decarbonization

“Now” is the time to act

Carbon budget

- "Carbon budget" is one of the most important concepts in climate change action.
- For significant reduction of cumulative emissions as much as possible, continuous and serious actions, with a sense of crisis, is necessary.

Avoidance of “lock-in”

- Once city structure and large-scale facilities are introduced, CO2 emissions could be remained high (lock-in effect) over time.
- Need response considering long-term environmental impact.
- Need perspective of what to do “now” looking to the future.

Principle of environmental policy

- Prevention approaches, Precautionary principle and polluter pays principle are principles of environmental policy, established in the development of several international laws and in the history to overcome the environmental pollution.
- Now is the time to act to avoid/ decrease damages from climate change, though damage is already visible.

Technology diffusion

- Together with R&D and demos of new technologies, gradual diffusion should be promoted as it takes time.

Global trend

- Actions of countries around the world, local governments and various actors such as business, finance industry, civil society are accelerated.
- Failure of following this trend will possibly harm Japan’s interests.

Change of ownership rate in Japanese household

【Smartphone】
9.7% in FY2010 → 64.2% in FY2014

【ETC On-Board Unit】
10.2% in FY2004 → 47.6% in FY2010

(Source) MIC HP
Drastic social transformation is indispensable for realization of low-carbon society achieving 80% reduction by 2050.

1. Energy efficiency, 2. Low-carbon energy supply, 3. Switch to low-carbon energies in end-use, should be promoted comprehensively as three pillars.

- **Energy efficiency**
  - Reduce energy use
  - Increase energy efficiency etc.

- **Low-carbon energy supply**
  - Utilize low-carbon energy source (e.g. renewables)

- **Switch to low-carbon energies in end-use**
  - Shift from ICE to EV
  - Utilize heat pump for hot water and space heating

**Current CO2 emissions**

**CO2 emissions in 2050**
Nearly zero-carbon emission from daily life

Buildings /Life Style

- Nearly zero-emission on stock average
  【Energy-efficient house and building】

Transportation

- Use of Electric or fuel cell cars and large cut of oil use
  【New values to be created by electric cars】

House led to carbon-minus during life cycle (LCCM house)
Images of significant reduction in various sectors ③

**Industry • Business**

- Low-carbon investment and market gain by low-carbon products service all over the world
  - [Embed ultra-high efficient devices]

**Energy demand and supply**

- More than 90% of electricity comes from low-carbon power source
  - [Image of 80% reduction by 2050]

**Region • City**

- Compactness, and independent & decentralized energy
  - Use of renewable energy: Miyagi pref.

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**MOE NCV project**

- 4H-SiC, GaN (半導体材料)

**Centralized/distributed energy management**

- 5%の損失⇒0.75%

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**Maniwa city, Okayama**

- バイオマス産業社

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**Tsuyama city, Okayama**

- CCS
Policy direction towards long-term significant reduction

Three basic directions

① Full utilization of existing technologies, knowhow and findings
  - Diffusion of Japanese technologies and knowhow inside and outside the country is important, considering the importance of “carbon budget” and international contribution.
  - The experience of “Diagnosis of CO2 reduction potential” shows room for diffusion of existing technologies and knowhow is still large even inside Japan.

② Create innovation of technology, socioeconomic system and lifestyle
  - Every kind of innovation is necessary without being caught up by industry structure and traditions.
  - Increase of productivity through innovation is indispensable for economic growth.
  - Government’s role is to show consistent direction looking at future decarbonized society and to develop policies along the direction.

③ Mobilize all policies
  - Realize ① and ② by implementing various combinations of PaMs.
  - Need to incorporate climate change perspective into policies of all areas including energy and spatial planning appropriately.

Direction of main PaMs

- Long-term goal lies ahead the mid-term goal of 2030. Steady actions based on the current “Climate Action Plan” are the first step.
- Need implementation of PaMs to accelerate reduction, promoting actions based on the “Climate Action Plan”.

① Utilize market dynamism through carbon pricing. Enhance market competitiveness of low-carbon technologies, products and services. Develop a market environment for innovation acceleration.

② Other PaMs for significant GHG reduction:
  - Disclose environmental information, Regulation, Promote and diffuse innovative technology, land use,
  - Contribute to global GHG reduction.

Make progress for long-term significant reduction
Check progress including accumulated emission.

※There exist different opinion on several policy directions, incl. carbon pricing.