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Mid- and Long-Term Roadmap for Global Warming Countermeasures

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Bill of Basic Act on Global Warming Countermeasures

The Cabinet decided on the Bill in March, 2010. The bill failed to pass during the previous Diet session and was dropped. The bill will be re-submitted to the next Diet session.

- Mid- and Long-term Goals

- 25% CO₂ reduction below 1990 level by 2020
(premised on the establishment of a fair and effective international framework by all major economies and agreement on their ambitious targets)
- 80% CO₂ reduction below 1990 level by 2050
- Raising the share of RE out of total primary energy supply to 10% by 2020

- Key Policy Measure

- Introduction of domestic emission trading scheme (ETS) within around a year
- “Greening” tax system, including the consideration of a global warming tax to be implemented from 2011
- Feed-in Tariff (FIT) system for whole renewable energy

Roadmap toward 2050

- Draft proposal by Environment Minister Sakihito Ozawa for public consultation (Announced March 31, 2010).
- Setting milestones for measures and policies necessary for a mid-term and long-term goal

- **Daily Life**

- 100% Achievement Rate of a higher Energy Efficiency Standard for all newly built homes and buildings in 2020 / 100% Achievement Rate of Zero Emission Homes and Buildings for all newly built homes and buildings in 2030
- 2.5 million sales of Next-generation Vehicles in 2020

- **Community Development**

- 10% reduction of per passenger automobile use

- **Manufacturing**

- Reduce energy usage by 30 -40% by 2050

- **Energy Supply**

- 10% of primary energy supply to be renewable energy sources by 2020

- **Core Social Systems for Creating a Low-Carbon Society**

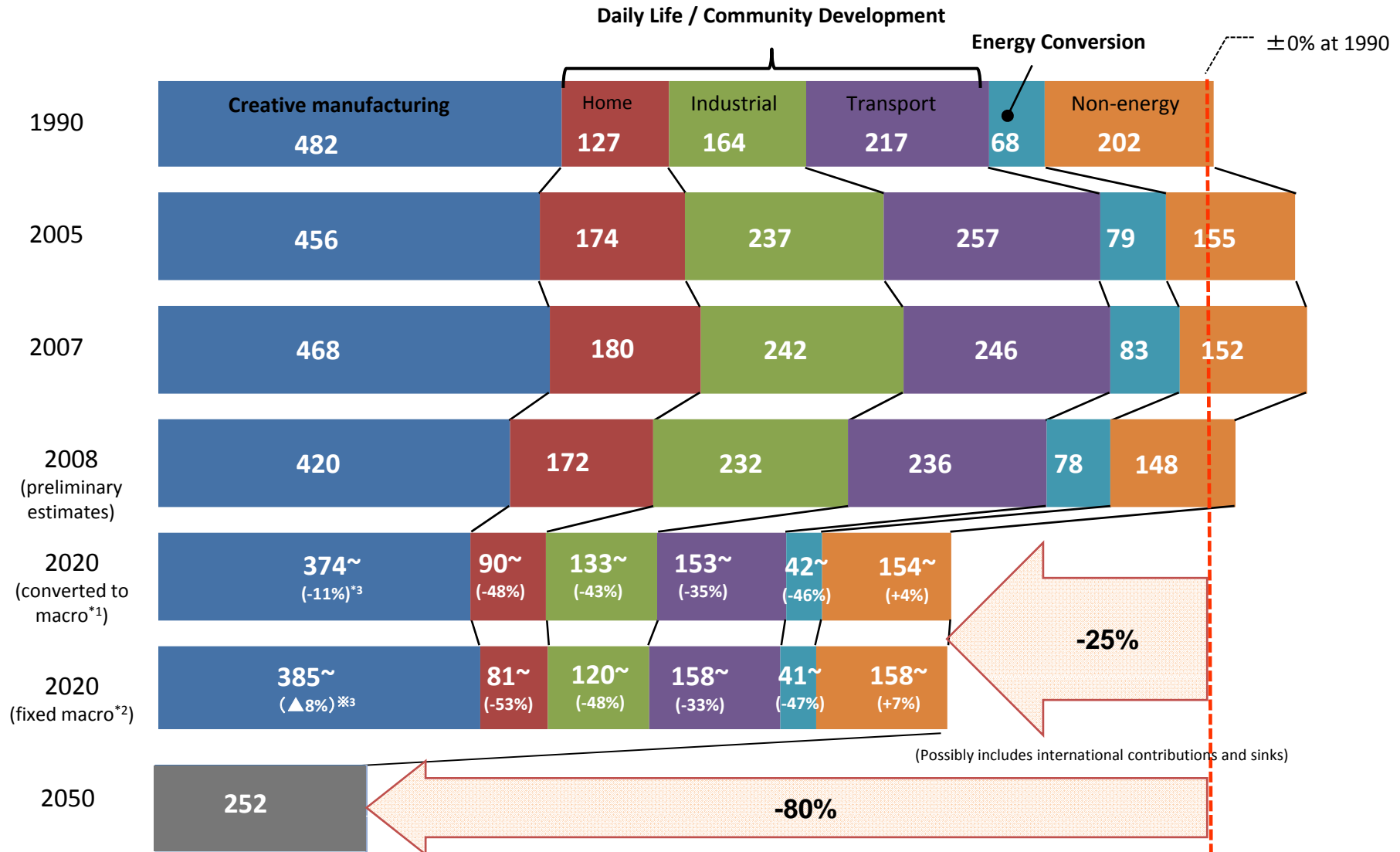
- Domestic emission trading scheme, Global Warming Tax

Mid- and Long-Term Roadmap for Global Warming Measures -Draft proposal by Environment Minister Sakihito Ozawa- March 31, 2010

Basic Idea of the Mid- and Long-Term Roadmap

- 1) Global warming countermeasures are an urgent issue necessary to protect the the environment in Japan and the rest of the world. The roadmap proposes a path of measures and policies for reducing emissions by 25% by 2020 and by 80% by 2050.**
- 2) Promoting environmental investments and practicing a low-carbon lifestyle (or, an eco-friendly lifestyle) will allow people to live comfortable, affluent lives—not lives based on tolerance. The efforts of each and every national citizen via Challenge 25 are needed in order to achieve mid- and long-term objectives.**
- 3) It is important not to only focus one's attention on environmental burdens alone, but to think of global warming countermeasures as a pillar of new growth. Investing in the construction of a low-carbon society will generate a variety of merits, including the cultivation of new markets and jobs, vitalization of communities, and ensuring energy security.**

A Look at Greenhouse Gas Emissions by Sector in 2020 and 2050 (unit: million tons of CO₂)



*1: "Case of all sectors converted to macro frameworks" based on the pricing of carbon.
 *2: "Case of the industrial sector fixed to macro frameworks"
 *3: Ratio of emissions cut to 2008.

Daily Life

- Spread of Zero-emission Residences and Construction

(policies and specific actions)

- Establishment of zero-emission standards that integrate structures (buildings), energy-consuming appliances and other household electronics, and energy-creating devices such as photovoltaics.
- Make fulfilling energy-saving standards and zero-emission standards compulsory
- Creation of a mechanism that makes housing capabilities visible and grants incentives in response to reduction amounts.

(Target in 2020)

- 100% achievement rate of standards ranking higher than next-generation standards for new housing
- Max. of 16.4 million (1/3 households) **Approx. 33-fold increase** (Electric heat pump water heaters)

Daily Life - Environmentally Friendly Car Market -

(policies and specific actions)

- Heavier and lighter taxation based on CO2 emission levels.
- Phased enhancement of gas mileage standards.
- Certification of E10 vehicles.
- Promote the introduction of hybrid and electric vehicles.
- Development of high-performance and next-generation batteries.
- Promotion of eco driving and car sharing.

(Target in 2020)

- : Approximately 2.5 million cars (1/2 new car sales)



Community Development – Creating Walkable Communities -

(policies and specific actions)

- Formulate an “Action Plan to a Create Low-carbon Community” in all municipalities.
- Development of space for sidewalks and bicycles.
- Support for the promotion of public transportation use.
- Developing low-carbon municipal districts using natural resources.
- Making distribution and interregional passenger travel low-carbon.

(Target in 2020)

- 10% reduction in automobile driving distances by doubling the share of public transportation

Community Development - Realizing Zero Carbon in Rural Communities-

(policies and specific actions)

- Promote the use of lumber in buildings, and the use of biomass, as well as the use of forest and farmland etc. as sinks.
- Expand the application of local energy business models nationwide.

(Target in 2020)

- About 550,000 hectares trimmed yearly
- Promote use of Japanese wood

Creative Manufacturing

- Worldwide Expansion of Japanese Low-Carbon Manufacturing

(policies and specific actions)

- Creation of markets that reward emission-cutting companies.
- Creating an environment that supports companies financially.
- Promoting information disclosure through financial reports.
- A public system for calculated reports that evaluates lifecycle emission amounts.

(Target in 2020)

- the world’s latest technologies will be introduced when upgrading for all areas
- Reduce energy usage by 30-40% by 2050

Energy Supply

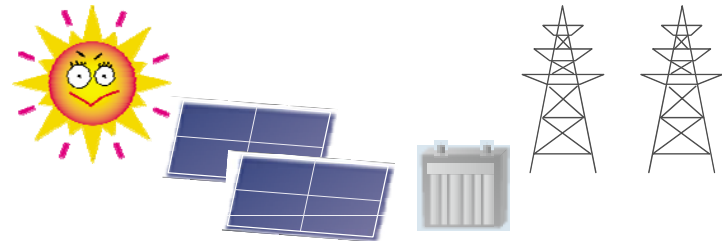
- Next-generation energy supply aimed at a low carbon society -

(policies and specific actions)

- A fixed price buyback system using levels that promote business investment (e.g., IRR of 8% or more), and a green certification system for heat.
- Cultivating companies and regions that aim to reduce business risks and initial costs and to diffuse renewable energies.
- Mandating usage of renewable energies and reforming social systems in response to diffusion level.
- Upgrading the grid and preservation systems to bear large volumes of renewable energy, installation of the smart grid.
- Making thermal power generation low-carbon using fuel conversion and highly efficient thermal power generation technologies, expanding the use of nuclear power generation based on the main premise of ensuring safety.

(Target in 2020)

- 10% of primary energy supply to be renewable energy sources by 2020, and 100% diffusion rate of smart grid systems by 2030
- Solar power generation: 2020: Maximum 50,000 MW(Approx. 35-fold increase)
- Carbon Capture Storage :Maximum 4.4 million tons of CO₂
- Nuclear Power Generation: Maximum of 62 plants (expansion of 8 plants), maximum operation rate of 88%.



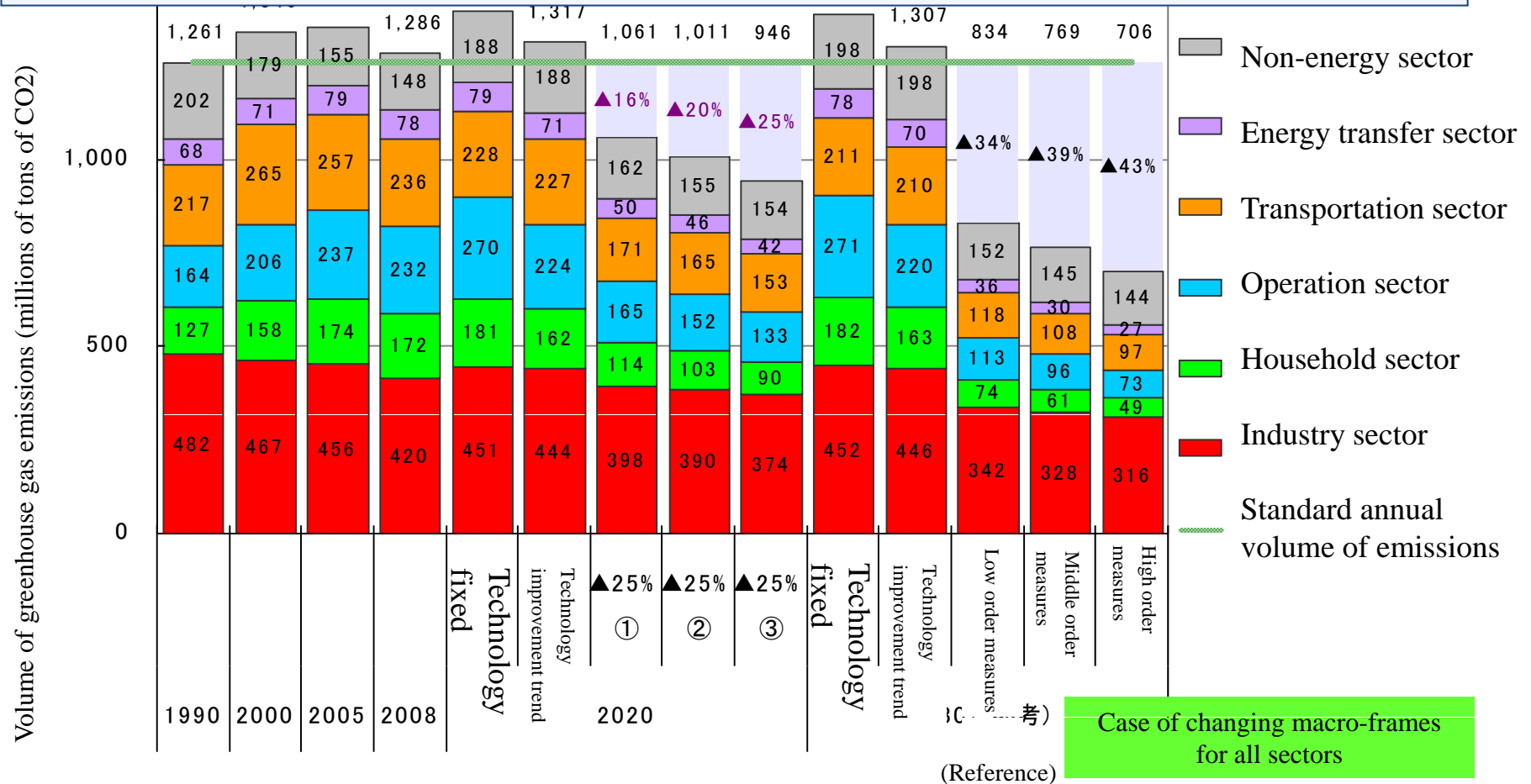
Core Social Systems for Creating a Low-Carbon Society

(policies and specific actions)

- A Cap and Trade domestic emission trading scheme and global warming tax.

Volume of greenhouse gas emissions [2020/2030]

- It is technically possible to domestically reduce the volume of greenhouse gas emissions by 25% in 2020 compared to the level in 1990.
- Efforts in daily life (household, operations, transportation) will have a major effect.

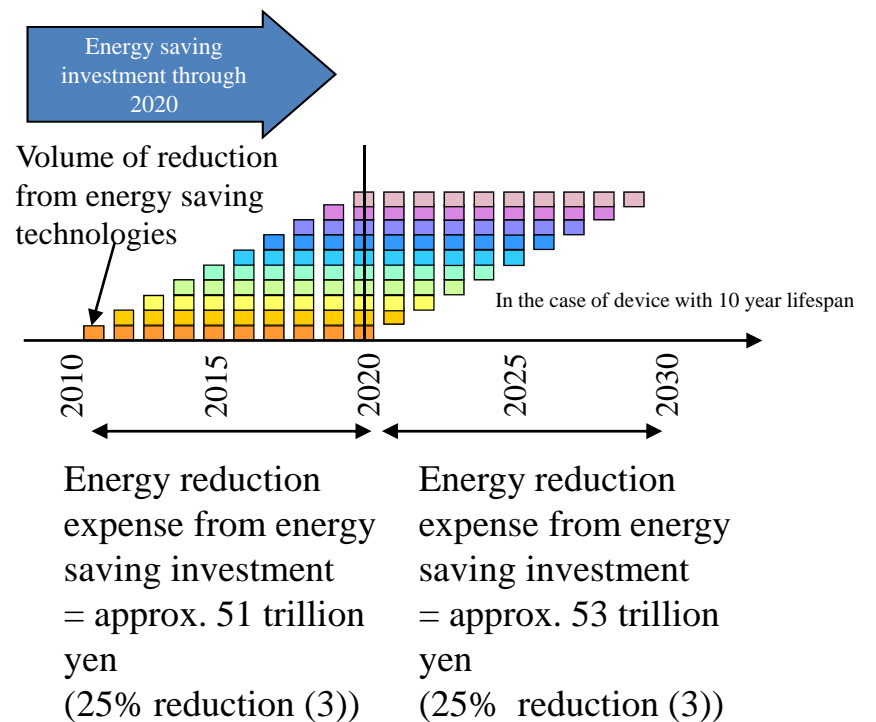
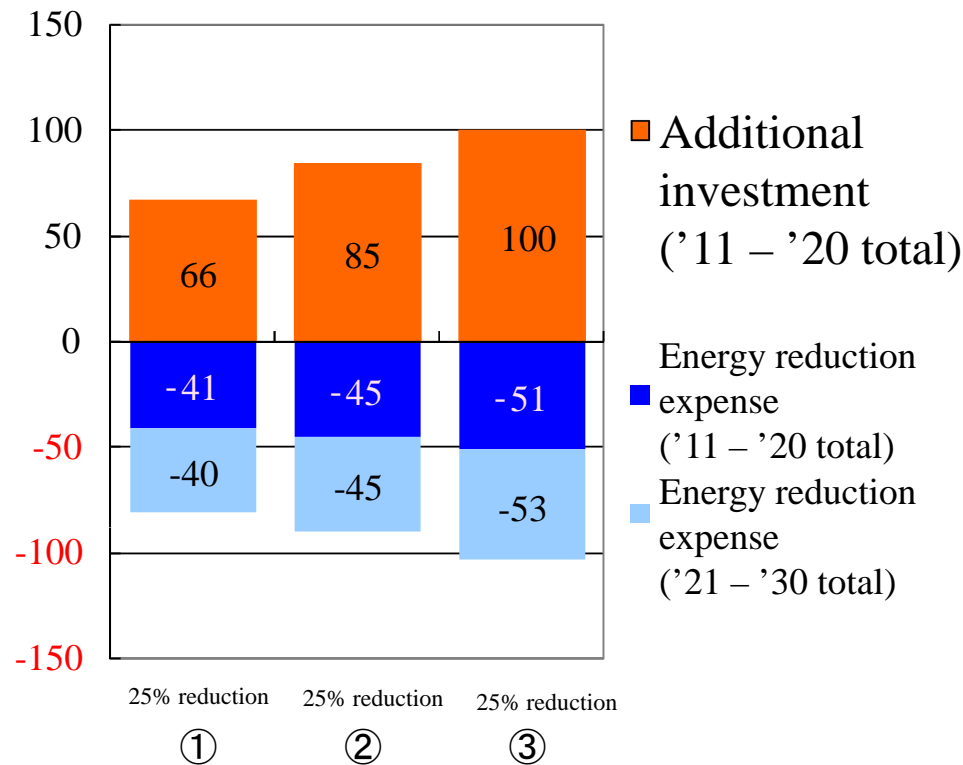


Note: 2020 25% (1): case including around 10% of international contribution and sinks; 25% (2): case including around 5% of international contribution and sinks; 25% (3): case including no international contribution and sinks. 2030 lower order to high order measures: the emissions volume for 2030 is done assuming that the measures that have been carried out in order to reduce emissions toward the 25% reduction in 2020 will continue to be carried out in 2012 through 2030.

Relationship between low-carbon investment amount and energy reduction expense

- As for the investment amount for global warming, half of the overall investment amount will be collected by 2020 and an amount equal to the investment amount will be collected by 2030 based on energy expenses that can be saved through technologies introduced.

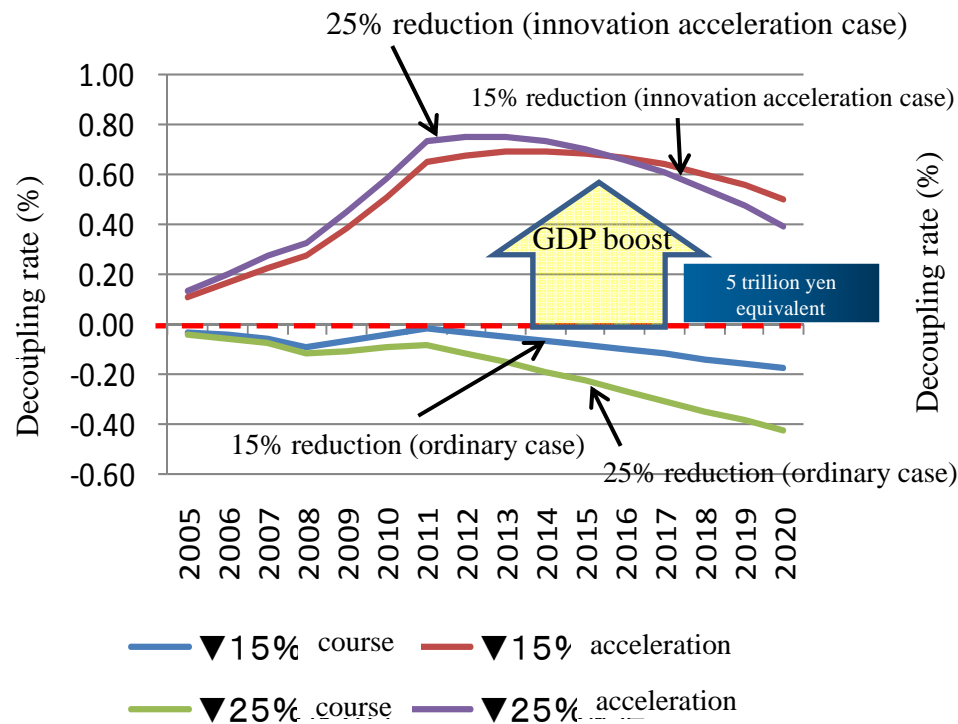
<Low-carbon investment amount and energy reduction expense>



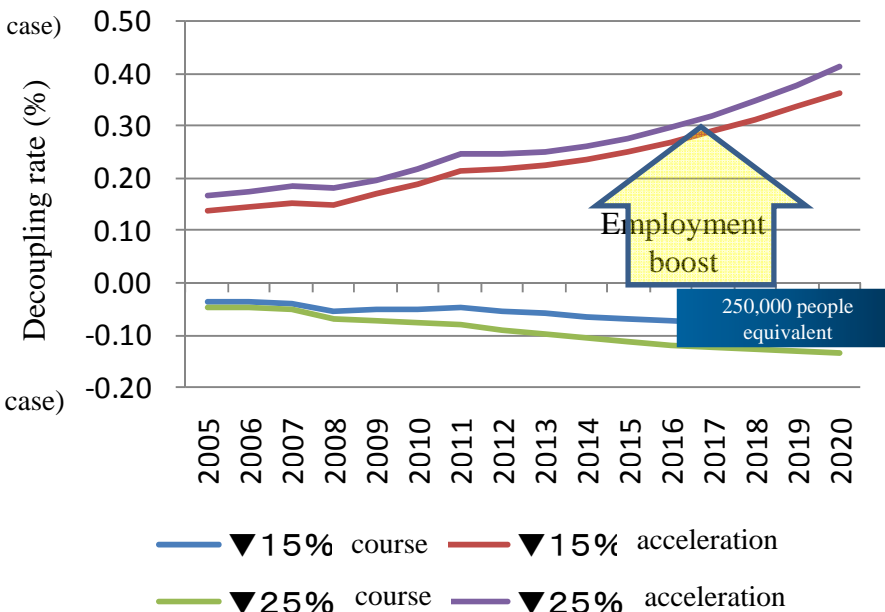
Suggestion from applied general equilibrium model

“If a gear change is done early, the economy will follow along.”

In a forward-looking-type dynamic optimization model incorporating forward-looking investment behavior, there is a 5 trillion yen increase in GDP as of 2020 (consumption is replaced with assets) and a net increase in employment of 250,000 people when the direction of policy is clarified compared to when it is not clarified, and an early signal has an effect on the low-carbon society direction.



<Movement of GDP (comparison with course case)>



<Movement of employment (comparison with course case)>

Research needs

- Evaluation of “cost” toward LCS: cost, insurance or investment?
- Evaluation of economic impacts of early actions of mitigation based on, e.g., game theory.
- Guideline for appropriate interpretation of the results of economic modeling
- Appropriate combination of top-down and bottom-up modeling
- Research on the potential of GHG reduction and appropriate policy measures to enhance mitigation in developing countries.