S-3 **Low-Carbon Society Scenario toward 2050: Scenario Development and its Implication for Policy Measures**

1. Long-term Scenario Development Study to Integrate Environmental Options using Simulation Models（Abstract of the Interim Report）

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[Abstract]

"2050 Japan Low-Carbon Society" scenario team published a report entitled "Japan Low Carbon Society Scenarios: Feasibility study for 70% CO_2 emission reduction by 2050 below 1990 level" in February 2007, in which it stated that Japan has the technological potential to reduce the emissions of CO_2, which is the major greenhouse gas, by 70% by 2050 from the emission level in 1990, satisfying the required amount of energy services. The report also mentioned that to achieve the goal, the Japanese government must take strong initiatives in sharing the goals of a low-carbon society, establishing comprehensive measures and long-term plans, reforming industrial structures, and funding infrastructures to encourage private investment in energy-saving technologies and R&D of low-carbon energy technologies.

Based on analyses of scenarios, innovations such as technologies and reform programs for social systems have been studied from the viewpoint of when and how such innovations should be implemented and what kind of measures and policies are effective to realize them. A dozen actions are proposed and their effectiveness has been studied with the use of an assessment model. The actions are expected to cover the entire 70% reduction goal. Cross-sectional and/or additional measures will enable emissions to be reduced further, but efforts in the energy demand sectors are particularly important. The 70% reduction will be charged as follows: 13 to 15% to industry, 21 to 24% to buildings, 19 to 20% to transportation, and 35 to 41% to energy sectors.

1. Introduction

To avoid serious climate change impact, there is a discussion to limit the global mean temperature increase to no more than 2 deg C from pre-industrial level. Then the GHG reduction target in 2050 can be required to be 50% of 1990 emission level. It implies that reduction rate for Japan will be around 70-90%. We need Japan low-carbon society scenarios to achieve such ambitious target. A large part of social infrastructure is likely to be replaced by 2050; therefore,

it would be possible to propose concrete policy packages including institutional change, technology development, and lifestyle change towards meeting the target of a low carbon society in 2050.

2. Research Objective

In order to achieve the goal of 70% reduction by 2050, innovations such as technologies and reform programs have been studied from the viewpoint of when and how such innovations should be implemented and what kind of measures and policies are effective to realize them (Figure 1). A dozen actions is proposed and their effectiveness has been studied.

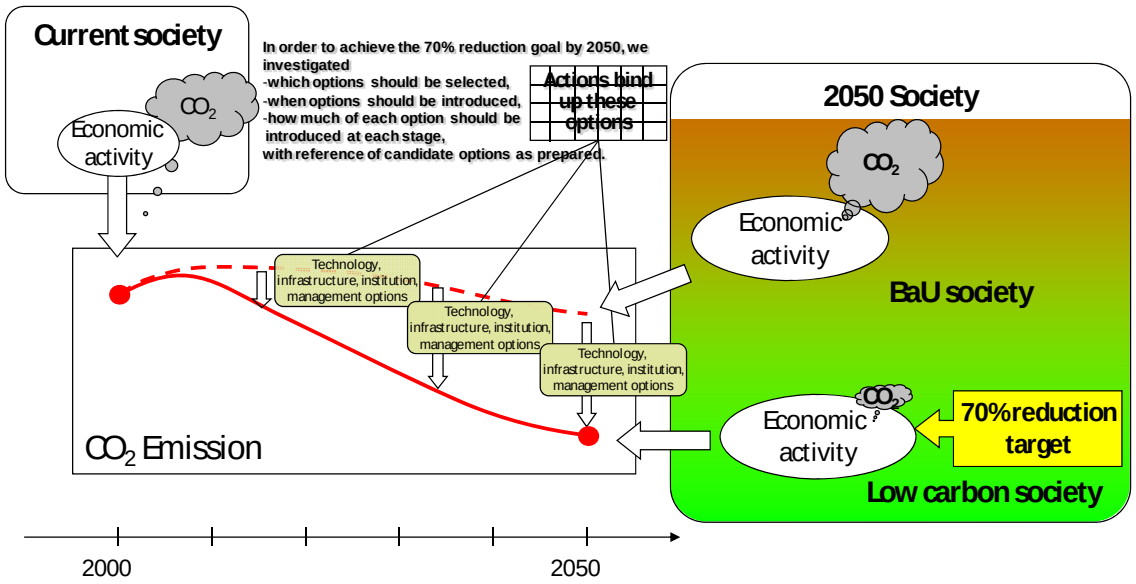

Figure 1 The role of actions towards low-carbon societies in 2050

Measures and policies undertaken in a particular sector for achieving a low-carbon society not only affect that sector but also promote carbon reduction in other sectors. For example, well insulated houses and the use of solar energy are direct and effective low-carbon measures for the residential and commercial sectors. Low-carbon measures taken by primary energy suppliers, such as increased use of renewables, will also contribute to the CO_2 reduction in the building. To expand the use of renewables, it is also necessary to encourage their use in the end-use sectors. Wide publicity and environmental education underpin all measures. There are also various technological and social barriers to achieving reduction goals, and it takes time to remove these barriers. Therefore proper steps must be taken in a due sequence. In this report, an action denotes a set of technological measures, social system reform programs and stimulatory policies that are combined appropriately by also considering mutual relationships (Figure 1).

3. Research Results

The model studies indicate the reduction potential in each sector. The effective measures and policies to realize such reduction potential are summarized as actions. A dozen actions are formulated by taking into account the model results and experts interviews (Table 1).

Principal target fields of the actions are residential and commercial sector (1 and 2), agriculture and forestry (3 and 4), industries (5), transportation sector (6 and 7), and energy (8, 9 and 10). Actions 11 and 12 are cross-sectional actions.

In this report, economic methods that are cross-sectorally effective, such as a carbon tax and emissions trading, are not included as independent actions. The addition of economic methods will add value effects and enhance the effects of the dozen actions. Social infrastructures, such as public works and the capital market, were assumed to be properly in place and improved.

The total reduction value of 230 MtC corresponds to a 70% reduction from the emission level in 1990. The reduction levels in each sector are shown in the right column for each scenario. Combinations of the dozen actions result in reductions of 35 to 42 MtC in industry, 60 to 65 MtC in residential and commercial, 52 to 62 MtC in transportation, and 68 to 96 MtC by energy conversion. Thus, the 70% reduction will be charged as follows: 15 to 18% to industry, 26 to 28% to residential and commercial, 23 to 27% to transportation, and 33 to 17% to energy conversion.

Improvement of carbon intensity in both energy supply and demand and improvement of energy efficiency on the demand side will be especially effective. On the whole, efforts in the energy demand side will be the key.

Taking measures against climate change is a major opportunity to transform the conventional technological society that depends on huge resources and energy, into a society in which little energy and resources are used. This will also be the first step towards a sustainable society, which is our goal. Japan is one of the most rapidly aging societies, and now is the time to restructure the nation. A low-carbon society should be created by fully considering these conditions, which require reforms, and so as to be mutually effective.

The government must demonstrate leadership for creating a low-carbon society, but this alone is insufficient. The national government, municipal governments, citizens, business entities, NGOs and other entities should share the vision of a low-carbon society, understand their roles and act in cooperation with each other. Most of the actions proposed here will be the basis of such cooperation and cannot be fulfilled unless all cooperate.

Table 1 A Dozen Actions towards Low-Carbon Societies

	Name of Action	Explanation	Expected CO_2 reductions
1	Comfortable and Green Built Environment	Efficient use of sunlight and energy efficient built environment design. Intelligent buildings.	Residential sector: 56~48 MtC
2	Anytime, Anywhere Appropriate Appliances	Use of Top-runner and Appropriate appliances. Initial cost reduction by rent and release system resulting in improved availability.	
3	Promoting Seasonal Local Food	Supply of seasonal and safe low carbon local foods for local cuisine	Industrial sector: 30~35 MtC
4	Sustainable Building Materials	Using local and renewable buildings, materials and products.	
5	Environmentally Enlightened Business and Industry	Businesses aiming at creating and operating in low carbon market. Supplying low carbon and high value-added goods and services through energy efficient production systems.	
6	Swift and Smooth Logistics	Networking seamless logistics systems with supply chain management, using both transportation and ICT infrastructure	Transportation sector: 44~45 MtC
7	Pedestrian Friendly City Design	City design requiring short trips and pedestrian (and bicycle) friendly transport, augmented by efficient public transport	
8	Low-Carbon Electricity	Supplying low carbon electricity by large-scale renewables, nuclear power and CCS-equipped fossil (and biomass) fired plants	Energy conversion sector: 95~81 MtC
9	Local Renewable Resources for Local Demand	Enhancing local renewables use, such as solar, wind, biomass and others.	
10	Next Generation Fuels	Development of carbon free hydrogen- and/or biomass-based energy supply system with required infrastructure	
11	Labeling to Encourage Smart and rational Choices	Publicizing of energy use and CO_2 costs information for smart choices of low carbon goods and service by consumers, and public acknowledgement of such consumers	Cross-sectional
12	Low Carbon Society Leadership	Human resource development for building “Low-Carbon Society” and recognizing extraordinary contributions.	

The reductions in each sector are based on Scenario A and Scenario B, respectively.

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