

Outline of this seminar

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This seminar is planned to introduce the preliminary results on DDPP (Deep Decarbonization Pathway Project) and its simulation results on Japan, which were introduced at the Climate Summit 2014. And the analysis on DDPP in Japan has been implemented under the Environment Research and Technology Development Fund of the Ministry of the Environment, Japan, 2-1402 "Research on Evaluation of Mitigation Strategies to achieve Long-term Reduction Targets of Greenhouse Gases in Japan and the World," and this seminar is treated as a science & technology dialogue with citizens for the program 2-1402.

In "outline of this seminar," the previous discussion about the GHG mitigation target in Japan will be explained from the viewpoint of the Asia-Pacific Integrated Model (AIM) involvement. Based on the previous discussions and today's presentations, we want to enhance the discussion about the post-2020 target in Japan.

Time	Activities in Japan	Activities in the world
1992.5		Adoption of UNFCCC.
1997.12	COP3 in Kyoto. Adoption of Kyoto Protocol. ■ During 1st commitment period (2008-12), 6% reduction compared with those in base year.	
2007.5.24	Invitation to "Cool Earth 50" by then Prime Minister Abe. ● Halving global GHG by 2050 compared with present level.	
2007.6.8		G8 Summit at Heiligendamm: we will consider seriously the decisions ... which include at least a halving of global emissions by 2050.
2008.11-2009.4	Discussion of GHG mitigation target at Mid-term Target Committee, Cabinet office.	
2009.6.11	Then Prime Minister Aso announced GHG emission reduction target in 2020. ■ 15% reduction of domestic emission compared to 2005 level.	
2009.9	Address by then Prime Minister Hatoyama at the 64th session of the general assembly of the UN. ■ GHG emissions in 2020 will be reduced by 25% compared to 1990 level under fair and effective international framework.	
2009.10-12	Discussion at Task force meeting on climate change.	
2009.12-2010.3	Discussion at Investigative commission on mid-/long-term roadmap to combat climate change; How to realize 25% reduction by reconsidering assumptions and countermeasures	
2010.1	Based on "Copenhagen Accord", each country submitted mitigation target/action plan. ■ 25% reduction, which is premised on the establishment of a fair and effective international framework in which all major economies participate and on agreement by those economies on ambitious targets.	
2010.4-2011.3	Results from Sub-committee on Mid-/Long-term Roadmap, Central Environment Council showed the society in Japan achieving 25% GHG reduction in 2020 compared to 1990.	
2010.11-12		Cancun Agreements at COP16: "Establish clear goals and a timely schedule for reducing GHG emissions over time to keep the global average temperature rise below two degrees."
2011.3.11	East Japan great earthquake and TEPCO Fukushima Dai-ichi nuclear power plant accident.	
2011.7-	Discussion at Sub-committee on countermeasures/policies post 2013, Central Environment Council.	
2012.4.27	The 4th Environmental Basic Plan. ■ GHG emissions in 2050 will be reduced by 80%.	
2012.9	Options for Energy and the Environment by The Energy and Environment Council. ■ In the low economic growth case, GHG emissions in 2020 will be reduced by 5-9% compared to 1990 level. In the high economic growth case, 2-5% reduction. ■ GHG emissions in 2030 will be reduced by about 20% compared to 1990 level. ■ GHG emissions in 2050 will be reduced by 80%.	
2013.11	Then Environment Minister Ishihara, announced the new emission target in Japan at COP19. ■ 3.8 % reduction in 2020 compared to the 2005 level.	
2015.3	Each country will submit the post-2020 target.	
2015.12	COP21 in Paris. The post-2020 target will be decided?	

Deep Decarbonization Pathways in Japan

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4. Background

To achieve the political GHG mitigation target of reducing 80% emissions compared to the 1990 level by 2050 with lower nuclear dependence, it is necessary to reduce energy consumption by reducing energy service demands and by increasing the use of energy saving technologies, and to increase the share of renewable energies. Japan's Country Team (NIES & MHIR) has assessed the Deep Decarbonization Pathways in Japan using AIM/Enduse model.

5. Deep Decarbonization Pathways in Japan

In Japan's illustrative deep decarbonization scenario, the long-term GHG emission reduction target is achieved by large scale energy demand reduction in end-use sector and decarbonization in power generation sector including deployment of CCS.

Total final energy consumption in 2050 decreases substantially and accounts for approximately 50% of the 2010 level. Share of renewable energy and CCS account for more than 50% of total primary energy supply in 2050 despite almost complete phase out of nuclear power.

Renewable energy reaches approximately 59% of total electricity generation. Due to large-scale deployment of renewable energy and natural gas equipped with CCS, carbon intensity of electricity falls to nearly zero in 2050. In end-use sectors, CO₂ emissions are substantially reduced by large-scale energy efficiency, electrification and diffusion of renewable energies.

In an alternative pathway without nuclear power, an 80% emission reduction in 2050 is still feasible with additional deployment of renewable energy and natural gas equipped with CCS. However, higher carbon intensity is experienced during the transition period where coal and gas without CCS compensates the gap caused by the phase-out of nuclear.

Achieving long-term emission reduction target with less CCS deployment proves to be still feasible with substantial increase of renewable energy, particularly solar PV and wind power. In the scenario, the share of variable renewable energies account for about 63% in electricity generation in 2050, hence imposing a further challenge for integration into the electricity system.

6. Conclusions

With large scale diffusion of low-carbon technologies, Japan's long term GHG emission reduction is feasible, even if availability nuclear power and/or CCS is limited, although many challenges remain to achieve deep decarbonization pathway in Japan.

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A Climate Target towards 2030

NGO Perspectives

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A Climate Target towards 2030

IPCC AR5 again shows rapidly increasing dangers of climate change. At the same time, in order to keep the global temperature increase below 2 °C compared to the pre-industrial level as agreed internationally, the current efforts are vastly insufficient and countries around the world need to enhance their action to have the global emissions trend peak and decline as soon as possible. The COP19 agreement last year invites Parties to communicate their intended nationally determined contributions (INDCs) by March 2015 (for those ready to do so). Although there is no explicit agreement on the timeframe of INDCs, Parties are generally expected to present their INDCs towards either 2025 or 2030. Japan also has to start its preparation as soon as possible to show leadership in climate action.

CAN-Japan's Proposal

Climate Action Network Japan (CAN-Japan), of which WWF Japan is also a member, launched its proposal for Japanese climate mitigation target towards 2030 on 12 September 2014. CAN-Japan proposes a target to “reduce GHG emissions by 40-50% by 2030 below 1990 (41-51% below 2010)” for Japan.

CAN-Japan came up with this target proposal based on consideration from the following three perspectives. The first is how much GHG reduction is needed globally. The second is what would be an “equitable” level of emission reduction for Japan in global joint efforts to mitigate climate change. There are numerous approaches to equity and thus we refer to a review study on this topic. The third is emission reduction potential for Japan. For this, we refer to a few NGO scenario studies including WWF's.

WWF Japan's Energy Scenario Proposal for Decarbonizing Japan

In order to achieve ambitious emission reduction such as our target proposal, it is imperative to increase the share of renewables massively as well as to improve energy efficiency dramatically. In the period between 2011 and 2013, WWF Japan has conducted four-part energy scenario study which examines energy efficiency measures, renewable potentials, costs and power-grid capability respectively. The results have collectively shown 100% renewable future is possible in Japan by 2050.

Toward achieving the 2 °C goal: With a focus on carbon budget and resource efficiency

Takeshi Kuramochi, PhD

Climate and Energy Area, Institute for Global Environmental Strategies

This presentation highlights two key elements to achieve the global 2 °C target, i.e., long-term carbon budget management and the enhanced resource efficiency.

With regard to the carbon budget management, results from the recently published paper on Japan's "fair" carbon budget consistent with the 2 °C target between 1990 and 2100 are presented. The global carbon budget for 1990-2100 that would likely achieve the 2 °C target was allocated across countries based on two frequently referred effort-sharing approaches based on converging per capita emissions in the long-term. The calculated carbon budgets were compared with Japan's projected cumulative greenhouse gas (GHG) emissions in case of adhering to the existing national mitigation targets committed for 2020 and 2050 ("Nationally Committed Amount": NCA). The remaining carbon budgets for Japan under two effort-sharing approaches were found to be about 50%-60% of the amount the country would emit up to 2100 under the reference NCA. Moreover, the average emissions reduction rate for 2020-2050 based on the government's current mitigation targets was found to be similar to that required under one effort-sharing approach with immediate actions from 2014. If Japan is to consider the carbon budget concept, strengthening the current 2020 target, rather than adhering to the current targets, would allow mitigation rates to remain within a more realistic range and would limit the need to buy international offsets.

With regard to the enhanced resource efficiency, preliminary results on the Japanese iron and steel industry from the research project funded by the Ministry of the Environment, Japan, are presented (Environment Research and Technology Development Fund 1RF-1301). Firstly, it is presented that the strengthened global climate mitigation actions will lead to enhanced steel scrap recovery worldwide. Secondly, it is presented that Japan can increase its use of recycled steel scrap without harming the capacity to produce high quality products. In Japan, the discussions on CO₂ emissions reduction in the iron and steel industry were often formulated around the share of recycled steel scrap-based electric furnace steelmaking, which consumes much less energy than the iron ore-based integrated steelmaking. The analysis finds that Japan can increase the steel scrap consumption equivalent to the currently exported amount in the integrated steelmaking process at possibly acceptable costs without prohibitively increasing the contamination level in the final steel product.

Japan's Opportunity for Shifting to the New Society Era through Achieving Deep Decarbonization Pathways

Shuichi Ashina (National Institute for Environmental Studies)

Japan has a target of GHG reduction in 2050 as an 80% reduction from 1990 level. After the Great East Japan Earthquake on March 11, 2011 and Fukushima Nuclear Power Plant Accident, Japan's energy policy forced to change from conventional way of thinking, which relies on nuclear power as one of key energy sources both for stable energy supply and GHG reductions. Low Carbon Society Scenario, or Deep Decarbonization Pathways also faces revision by the accident and domestic/international situation change.

New Low Carbon Society scenarios and roadmaps for achieving deep decarbonization Pathways in Japan need to include new viewpoints in it, such as behavior change for energy saving, rapid acceleration of renewable energy diffusion, economic growth through taking low carbon action and dematerialization of lifestyle.

The 2-1402 project aims to establish methodology for designing visions/scenarios and its implementation strategies for achieving Deep Decarbonization Pathways in Japan by using integrated assessment models. As for the new socio-economic scenarios, the project put emphasis not only on industrial structure but also on lifestyle, energy consumption behavior and energy-intensive material production and stock. Through the project, we will propose concrete strategy for achieving Japan Low Carbon Society by 2050 and determine mid-term (esp. 2030) GHG reduction target in line with long-term target of 80% reduction from 1990 level, and will propose new growth patterns and innovation strategies for Japan in order to achieve the Deep Decarbonization Pathways.

