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Recent Developments In Climate Change Policy In Japan and a Discussion of Energy Efficiency

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1. Overview of recent developments in Japan's climate change policy

Although electricity accounts for less than half of Japan's total energy consumption, the country's climate change policy debate has focused on the controversial use of nuclear power plants since the Fukushima I Nuclear Power Plant accident caused by the Great East Japan Earthquake on March 11, 2011. Before the earthquake, nuclear power constituted around 25 to 30% of Japan's total electricity supply (World Nuclear Association 2015). Since the quake, all nuclear plants have shut down, and natural gas and coal power plants now provide that portion of the electricity supply. As a result of this switch from nuclear to fossil fuels, carbon dioxide (CO_2) emissions in Japan are steadily on the rise. Total greenhouse gas (GHG) emissions increased 2.7% between 2011 and 2012and 1.3% between 2012 and 2013. In 2013, emission levels were 10.6% greater than those in 1990 (MOE 2014a).

At the time of the 2011 earthquake, Japan had submitted its GHG emission reduction target for 2020 to be a "25% reduction from 1990 levels." This target assumed a larger share of the electricity supply for nuclear power. Changes in this underlying assumption brought about changes in emission reduction targets, but any references to nuclear power were considered politically risky for more than a year after the earthquake. The Japanese government announced at the Conference of the Parties (COP) 18 in 2012 that it would reconsider its 2020 emission reduction target. In November 2013 at COP19 in Warsaw, it announced that the new 2020 target would be a "3.8% reduction from 2005," which was actually an increase of about 3.1% from 1990 (MOE 2013). This target assumed no nuclear power use through 2020, and the government declared its readiness to further revise the target if conditions changed.

The government rapidly began considering Japan's Intended Nationally Determined Contribution (INDC) after the Lima Call for Climate Action was adopted at COP20 in December 2014, requesting that parties submit their INDCs by the first quarter of 2015, well in advance of COP21 (UNFCCC 2014). Japan, however, was not ready to submit its INDC by the end of March, as any discussion related to the INDC in Japan involved extensive debate on future energy policy. The Japanese government now aims to determine its INDC by the end of May so that Prime Minister Shinzo Abe can announce the numbers at the Group of 7 (G7) Summit in Germany on June 7 and 8.

2. Latest debates over Japan's INDC

At the national government level, formal discussion on Japan's INDC started in October 2015 with the establishment of a Joint Council Meeting consisting of two key committees, the Global Environmental Committee under the Central Environmental Council and the Technology and Environment for Industries Committee under the Industry Structure Council. The Ministry of the Environment (MOE) is responsible for the former committee, while the Ministry of Economy, Trade, and Industry (METI) is responsible for the latter. Some of its members emphasize the importance of achieving the Copenhagen Accord's long-term target of a 2 °C maximum increase in global temperature, as well as Japan's role to be taken at international negotiations from equity perspectives. Others, however, argue that any global emission reduction targets can only be achieved with significant contributions from large emitters, such as China and the United States, and that Japan, currently responsible for less than 3% of global emissions, cannot make any changes at the global level by reducing only domestic emissions. Simultaneously, many are aware that they do not have the ability to determine Japan's INDC singlehandedly when other governmental committees and working groups are also discussing the future energy mix.

Prime Minister Abe has repeatedly pledged that his administration is seeking to reduce Japan's dependency on nuclear power as much as possible. However, there is inconsistency among members of his political party, the Liberal Democratic Party (LDP). Some hold economic growth as their top priority, and they want to see nuclear power back in its previous position as a "base-load" resource, supplying more than a quarter of the total electricity supply. In the latest Basic Energy Plan adopted in April 2014, nuclear power is described as "an important base-load power source as a low carbon and quasi-domestic energy source, contributing to stability of [the] energy supply-demand structure, on the major premise of ensuring of its safety" (METI 2014).The stringency of the INDC has been used as a justification to rehabilitate nuclear power plants. A calendar for meetings of the committees and councils is set up so that the energy mix for 2030 will be determined by the end of April, leaving almost no time for the Joint Council Meeting to discuss adequate levels to meet requirements of the INDC.

A proposal on energy mix within the electricity sector in 2030 was officially made public by the Agency for Natural Resources and Energy on 27 April. The proposal suggested that 20 ~ 22% of electricity in 2030 should be supplied by

nuclear, 22~24% by renewables, 26% by coal, 27% by Liquefied Natural Gas (LNG) and 3% by oil. About 36 or 37 nuclear power plants out of 43 existing currently shut down nuclear plants need to be utilized to fulfill this proposal. Three days later, on 30 April, the government disclosed its proposal for Japan's INDC, 26% reduction by 2030 from 2013. This was equal to 25.4% from 2005, and 18.0% from 1990. Choice of base year does not affect absolute amount of emissions in 2030, but it conveys different messages. By choosing 2013 as the base year, Japanese government insists that Japan's INDC is more ambitious than that of the United State and EU, but it is easily recognized that the ambitiousness changes according to the base year (Table 1). The government is going to collect comments from experts and stakeholders and make the final decision by early June.

Table 1. Intended Nationally Determined Contributions (INDCs) of major economies

	Reduction rate from base year		
Base year	1990	2005	2013
Japan: Reducing GHG emissions 26% from 2013 by 2030	18.0%	25.4%	26.0%
United States: Reducing GHG emissions 26-28% from 2005 level by 2025	14~16%	26-28%	18-21%
EU28: Reducing GHG emissions 40% from 1990 by 2030	40%	35%	24%
Russia: Reducing GHG emissions 25-30% from 1990 by 2030	25-30%	-10 ~ -18% (increase)	-
China: Peaking out CO_2 emission by 2030	-277 ~ -316% (increase)	-82~ -101% (increase)	-

3. Japan's recent climate change policy initiatives

While debates on climate change have been reframed as debates on nuclear power, developments in other aspects of emission mitigation at the domestic level have made little progress. The following subsections discuss a few sectors that have made demonstrable progress in the last five years.

3.1 Renewable energy

The Democratic Party of Japan (DPJ) was the ruling party during the COP15 meeting in Copenhagen where Japan announced the 25% reduction target, as well as at the time of the 2011 earthquake. To compensate partially for the phase-out of nuclear power plants, then-prime ministers Naoto Kan and Yoshihiko Noda both sought for rapid implementation of renewable energy. Just before the 2011 disaster, hydropower accounted for 8.5% of the total electricity supply, and other renewable sources accounted for only 1.1%. Japan's Feed-in Tariff Scheme was introduced in November 2011 to promote the installment of solar photovoltaics (PVs), and the rules were revised in July 2012 to support other types of renewables. The new rules also obligated power companies to purchase all renewable energy that was generated. With this change, the share of renewable energy in the supply of electricity has been growing.

After the LDP took office with a landslide victory in the December 2012 election, however, opposition to renewable energy, which was deemed too expensive, gained traction, claiming that the high cost of electricity affected energy-intensive industries and low-income households. Power companies started to build new small-scale coal-fired plants to reduce costs, leading to considerable growth in Japan's CO_2 emissions. These companies also temporarily halted their purchase of electricity from solar power firms in 2014 on the grounds that they could not sustain a rapid increase in power supply from such sources with their limited transmission capacity. The future of renewable energy is now totally dependent upon how the Japanese government determines the future energy mix through 2030.

3.2 Joint Crediting Mechanism

According to members of the Joint Council Meeting on INDC, there exists a perception that it will be difficult and expensive for Japan to reduce GHG emissions at home. At the same time, many believe that exporting Japanese products and technologies to developing countries to help reduce emissions in those countries is a better strategy for Japan to respond to the climate change problem. A speech by Minister of the Environment Yoshio Mochizuki at COP20 emphasized Japan's financial and technical contributions to developing countries for the reduction of GHG emissions and

achievement of low-carbon development (MOE 2014b). Specifically, Japan has established a unique approach called the Joint Crediting Mechanism (JCM), which is similar to, yet simpler and quicker than, the Clean Development Mechanism (CDM) outlined by the Kyoto Protocol. There are currently 12 JCM partner countries (Bangladesh, Cambodia, Costa Rica, Ethiopia, Indonesia, Kenya, Laos, Maldives, Mexico, Mongolia, Palau, and Vietnam). The Japanese government hopes that this mechanism will be accepted at the United Nations Framework Convention on Climate Change (UNFCCC) level so that Japan can count on credit acquisition to achieve its INDC.

3.3 Energy-saving approaches

Energy consumption can be reduced through two approaches. One involves simply decreasing the demand for energy services, while the second method is to improve energy efficiency. Decreasing the demand for energy can be achieved by, for instance, turning off unused electric appliances or using bicycles rather than cars for mobility. Demand also decreases when the economy experiences a depression. Energy efficiency, on the other hand, can be improved mainly by technological improvements, but these technologies must be distributed widely and purchased by a large portion of consumers in order for total energy consumption to decline. The Japanese government, particularly the METI, was largely supportive of this latter approach, which was successful in a number of sectors, for many years. However, the approach does not include other dimensions of emission mitigation, including policies that reduce demand for energy services and decarbonize the Japanese economy by restructuring energy-intensive industries. As a result, Japanese manufacturing and products have achieved high energy efficiency for many years, but the economy as a system has not been decarbonized.

One way to create a shift toward a less carbon-intensive economy involves raising the prices of energy. A carbon tax was introduced in October 2012 to compensate partially for the loss of nuclear power while striving to achieve the 25% reduction target by 2020. The tax rate at the time of implementation was about 1 USD per total CO_2 content (tCO_2). This rate will eventually rise to 289 yen (about 2.40 USD) per tCO_2 in 2016, but even that level is considered too modest to change industries' or people's consumption behavior.

3.3.1 Residential and commercial sectors

The Japanese government has revised the Act on the Rational Use of Energy several times so that industries must both use their production processes and equip their products with the best available technologies. Through the "top-runner program," manufacturers must meet current standards of the most advanced devices, along with those for technological advances assumed over the next three to 10 years. Additionally, a variety of subsidies are granted for energy-efficient products, including electric home appliances, buildings, houses, and automobiles.

Many Japanese home appliances have improved their energy efficiencies over the last decade due to various regulations and standards. A refrigerator and an air conditioner sold in 2013, for example, had a 67% and 21% reduction, respectively, in electricity consumption from those sold in 2003. Among the measures implemented was a type of subsidy known as an "eco-points scheme" for relatively more energy-efficient appliances. In addition, Japan called for "electricity saving" in 2011 and 2012 to adjust to insufficient power supply due to the aftermath of the earthquake. During that time, with high awareness of the people and increasing electricity prices, electricity-saving home appliances, such as refrigerators, air conditioners, TV sets, and LED lumps, sold well. After replacing such appliances, however, people's awareness seems to fade away. Furthermore, as the installation of coal power plants increases, many now believe that there is no longer a need to save electricity to avoid blackouts.

Improvements in insulation of buildings and houses began about a decade ago. Energy management systems, such as the building energy management system (BEMS) and housing energy management system (HEMS), have been invoked but have not proven effective. Recent policy developments include another kind of subsidy called "housing eco-points" for those who build houses using better-insulating windows and construction materials. The Tokyo Metropolitan Government also introduced a local emissions trading scheme in 2008 as a means of improving energy efficiency in commercial buildings.

Despite these efforts and achievements in energy efficiency in the residential and commercial sectors, however, CO_2 emissions from these sectors still increased 11.9% and 16.7%, respectively, between 2005 and 2013. This growth in the commercial sector can be attributed mainly to an increase in the use of computers and other office automation (OA) tools, as well as in floor space, leading to a demand for more air conditioning and lighting.

3.3.2 Transportation sector

Automobiles sold in Japan have been among the most energy-efficient in the world for a long time. The Prius, the first Toyota hybrid car, debuted in 1995. Since then, hybrid and compact cars have been subsidized and have experienced healthy sales. Electric cars, considered the cleanest cars in terms of CO_2, have also attracted much attention, especially before the earthquake when the price of electricity was expected to decrease further with the construction of more nuclear plants, which were seen as the cheapest energy source at the time. Since the earthquake, more people have selected hybrid cars to save gasoline, and over one-third of newly sold small-size private cars were hybrids in 2014 (U-Car Guide Web 2015). On the other hand, potential owners of electric cars are waiting to see how the government's decisions on energy supply will affect the price of electricity in the long run. The batteries in electric cars can be charged by electricity generated by solar PV cells during the day, and the power can be released at night, promoting the use of renewable energy. Such usages are, however, not yet widespread.

With these technological advances in the transportation sector, CO_2 emissions from the sector decreased 6.3% between 2005 and 2013.

3.3.3 Industry sector

Total CO_2 emissions from the industry sector decreased 6% between 2005 and 2013. Most of this reduction, however, has been attributed to the economic crisis of 2008 and confusion in the aftermath of the 2011 earthquake. This indicates that the reduction has been achieved by a decrease in the demand for energy services, rather than by improvements in energy efficiency. The level of improvements that have been made also seems to differ from one industry to another. Energy efficiency of the materials industries, such as iron and steel, cement, and paper and pulp, has mostly been stable over the years, and CO_2 emissions from these industries are affected mainly by production output.

Japanese industry groups have established voluntary action plans (VAPs) which allow each industry group to set its own emission limits and reduction targets voluntarily in either absolute or efficiency terms. The top-runner standard set by the government pushes industries to achieve their voluntary targets. The national government also operates the J-Credit Scheme established in April 2013 as a new credit creation scheme. Emissions trading has not been introduced at the national level, but a crediting system could be utilized if emission caps were to be set for industries.

4. Conclusion

As the INDC is a nationally determined contribution to mitigate climate change, high-level Japanese politicians and governmental officials seem to agree that any emission reduction target shall be accepted multilaterally, as long as it is also determined nationally. This perspective, however, leads them to neglect the equity dimension of the climate change problem, the achievement of long-term goals, the idea of carbon budget and consequences of climate change, such as worsening of extreme weather. It is correct that changing the energy consumption pattern will affect future emissions, but there is an additional need for political agreement that the issue is not merely about energy and a recognition that our climate as a whole is at stake.

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