

Promote new diplomacy on energy through leading global efforts against climate change

Through analyzing global trends, Foreign Minister's Advisory Panel on Climate Change elaborated the following recommendation for Japan's energy and climate change diplomacy. The following recommendations are based on the discussion by the Panel on new diplomacy on energy that responds to the new global situation. In addition to the following recommendations focused on energy, the panel is to present recommendations on broader climate change issues in April.

INTRODUCTION

The world has already started an energy transition, while Japan is markedly lagging behind the trend.

Since the Great East Japan Earthquake, Japan has been pursuing its energy policy, such as introducing feed-in tariff and implementing power industry system reforms. While impacts of climate change have become increasingly severe every year, many countries have aspired to realize a decarbonized society envisioned in the Paris Agreement, and are eagerly promoting industrial, economic and social transformations. These countries have been making progress faster than Japan, and the gap between the world and Japan has been widening.

Carbon dioxide (CO₂) is by far the most important greenhouse gas emitted, contributing around 90% of the annual emissions of greenhouse gases, and is mostly originated from burning fossil fuels in the energy sector. The prominent solution to climate change is therefor decarbonization of the energy sector, that is, the energy transition and utilizing the renewable energy opportunities as well as energy efficiency improvements are increasingly momentous in recent years.

Japan is falling behind other leading countries in expansion of renewables, and its policies for promoting coal-fired power, whose CO₂ emissions are about twice as large as that of natural gas-fired power, has been severely criticized by the international community. This is becoming a bottleneck of Japan's diplomacy in international negotiations fora including the United Nations Framework Convention on Climate Change Conference of the Parties.

If Japan continues to pursue its policy incompatible with the global decarbonizing efforts, Japan may be left behind not only in energy and environment sector, but also may hinder its industrial competitiveness in the global market, which now pays serious attention to carbon risks.

If Japan places at the heart of its energy policy renewables available in its rich natural energy resources to reduce its dependency on imported fossil fuels and uranium, the country can thereby increase energy security and can create a new form of economy in Japan.

Japan's energy diplomacy thus far has focused on efforts securing fossil fuel resources, it should now situate renewables as a core of the pillars of the diplomacy in order to realize a sustainable future in collaboration with other countries.

In the midst of the global trend toward decarbonization, we should first face the data and information that inform us of the reality of the world without prejudice, and accept the situation Japan is surrounded. With such knowledge and attitude, the government and non-state actors, including companies and local governments, should discuss energy and climate change policy, in order to gain the trust of other countries and to enable Japan play a significant role in global energy and climate change issues.

We now live in a new era where energy issue must be approached in a new context, not just in the context of energy. We hope the following recommendations would serve as a first step to facilitate such evolution.

Recommendation: Promote new diplomacy on energy through leading global efforts against climate change

1. Deploy renewable energy diplomacy

- 1) Contribute to the global efforts against climate change and realize economic and social development
- 2) Contribute to the future of developing countries through sustainable energy
- 3) Support and collaborate with various non-state actors in their activities worldwide

2. Define Japan's pathway towards the energy transition

- 1) Place energy efficiency and renewable energy as the core strategy for decarbonization
- 2) Achieve a decarbonized society in line with the Paris Agreement
- 3) Develop further from the starting point of "reducing dependency on nuclear power as much as possible"

3. Take a leading role in realizing decarbonized society and create a new economic system

- 1) Identify and maximize Japan's potentials and lead the world
- 2) Promote responsible investment and finance towards decarbonization
- 3) Contribute to the world through promoting decentralized energy model

The global trend and Japan

1. The global trend toward energy transition

1) Accelerated introduction of renewable energy

The world is now in the middle of energy transition involving industrial, economic and social innovation. Renewable energy used to be the privilege to some industrialized countries in Europe and the United States. As costs have fallen, it has been expanding worldwide to China, India, Africa as well as Central and South America as well as Latin American Countries.

What has been rapidly growing among various kinds of renewable energy are solar power and wind power. The capacity of solar power was only 1.3 gigawatts (GW) in 2000, and was 300 times more with nearly 400 GW in 2017, while the capacity of wind power increased from 17 GW in 2000 to nearly 540 GW in 2017.

2) Dramatic cost decline of renewable energy

The global trend has been boosted by a decrease in prices of renewables that has been spreading all over the world. According to the International Renewable Energy Agency, IRENA, the cost for solar photovoltaics (PVs) has been reduced more than 70% in the past seven years and will be reduced 50% further by 2020. By the year, solar and onshore wind power in areas with favorable conditions will generate electricity normally at a price of less than three cents/kWh, and all forms of renewables will cost less than fossil fuels on international average. Offshore wind which used to be considered more expensive than other renewable energy has continued to mark the lowest price, and achieved 70% price reduction in the past five years. Many countries including UK, Denmark, Netherlands and Germany have competed with one another for making policies creating favorable marketing environment with reduced business risks, and broken a series of record-low bidding prices.

3) Transformation of the key players in electricity market

According to the most recent estimate by the International Energy Agency, IEA, renewables, especially solar and wind power, will make the biggest portion in the adding capacity in coming years. Bloomberg forecasts that the percentage of investment in renewables in the electricity market will exceed 60% by 2040, the capacity will increase more than 60% and the global share of electricity powered by coal will reach its peak in the mid-2020s.

The share of nuclear power in the total global electricity generation reached its peak in 1996 at 17% and gradually decreased to the current share of 10%. The pace of new development has also slowed down. The primary reason for the reduced pace is the high cost of new construction. In Europe and the United States, the construction cost of new nuclear power plants has reached nearly one million yen per KW. Nuclear energy is becoming no longer the most effective measures against climate change.

The argument that nuclear and coal-fired power, as baseload power sources, are necessary to ensure stable power supply is already outdated. The countries with a matured electricity market have shifted to a new system with a maximum use of renewable energy available at low marginal cost, and then together with flexible electric power sources including natural gas-fired power for the rest of electricity demand. Electricity trading and broader management of transmission system with weather forecast as well as demand response provide flexibility and assurance to the grid management. The roles played by less flexible nuclear and coal-fired power in generating electricity have gradually been reduced.

It is now clear that some major players in energy market have been replaced by new ones and the basic premise of considering energy issues changed.

4) Energy transition boosting new economy

"Decoupling" that reduces energy consumption and carbon dioxide emissions while maintaining economic growth has already been seen on a global scale. It is a long-term trend in the UK and the US where have been converting from coal to gas-fired power, and in Germany where renewables are highly integrated in their networks.

According to IRENA's study, to decarbonize energy industry through introducing renewables and improving energy efficiency, investments of more than 29 trillion dollars will be needed by 2050. These investment, however, accounts for only 0.4% of the entire world's GDP and they rather promote new economic growth and will boost the worldwide GDP by 0.8% in 2050. Under the progress of the global energy transition, employments in the renewable energy sector has reached nearly 10 million as of 2016, and over 300,000 people are employed in Japan. Investment in climate change is investment in economic growth. It brings benefits not only economically but also environmentally and health-wise through energy transition accompanied by reduced air pollution. Such environmental and society-wise merits eventually enhance the humanity's well-being.

New economy created in such ways has a potential to transform dramatically the structure of rural economy. As renewable energy is locally based and decentralized, it has considerable spill-over effects to promote local economy through creating related businesses.

2. World shifting rapidly toward a decarbonizing society

1) Energy transition accelerated by the Paris Agreement

The Paris Agreement is an international agreement aimed to realize a decarbonized society, and was adopted at the United Nations 21st Conference of the Parties (COP21) in December 2015. Under the agreement, both industrialized and developing countries promised to work together to keep a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels; to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius; to achieve zero emissions of greenhouse gases on the planet in real terms by the latter half of the 21st century.

In order to ensure the achievement of goals agreed under the Paris Agreement, each country defines its policy goals in more concrete terms for 2030 within a long-term context of foreseeing the year 2050. EU sets the goal of 80-95% greenhouse gas reduction by 2050 and at least 40% by 2030 compared with 1990 levels. The target for renewable electricity by 2030 is more than 50% in Germany, 40% in France, 45% in the entire EU countries, and in the US, 50% in the States of California and New York respectively. Emerging countries including China and India define a maximum use of renewable energy as core strategy to realize a shift to a decarbonized society.

During COP23 in November, 2017, “Powering Past Coal Alliance” was formed to declare their commitment to phase out domestic coal-fired power plants, as well as to stop investing in domestic and overseas coal-fired power. The Alliance has members from 26 countries, 8 regional governments and 24 companies, as of December, 2017, when the One Planet Summit took place in Paris. While industrialized nations like Canada, UK and France set a goal of complete coal-fired power phase out, China and India have shifted from coal-fired power to renewables for developing new generation capacity.

2) Worldwide expansion of decarbonization in the financial market

Decarbonization as creative destruction is an emerging trend in the finance sector. International investment and financing institutions including the World Bank and the European Investment Bank, as well as sovereign wealth funds and institutional investors declared either a halt to investing or “divestment” in new business operations with fossil fuels including coals, and put it into practice. For example, one of the prominent sovereign wealth funds in Norway, Government Pension Fund Global (GPF), with operating fund of 96 trillion yen assesses investment in coal-related businesses as high-risk in light of climate change and asset management. In June, 2015, Norwegian Parliament officially approved the sale of coal-related shares owned by GPF, whose amount totaled more than 900 billion yen. GPF divested holdings of 77 international coal-related companies including Japanese firms by March, 2017.

Another expanding movement is “engagement” that requires invested companies to take active initiatives against climate change. Along with the US’s largest public pension fund, California Public Employees’ Retirement System (CalPERS), as an example, more than 200 world leading institutional investors have launched “Climate Action 100+” at COP23 in 2017 to engage with 100 global corporate greenhouse gas emitters to improve governance on climate change.

3) Businesses leading decarbonization

Not only governmental and financing institutions but also worldwide business-operating corporates are taking the lead in decarbonizing a society. Internationally prominent companies including Google, Apple, Microsoft, Amazon, GM, and Budweiser have already launched their efforts to shift their consumption and the energy consumed in their value chain into renewables.

Such companies' transformation to renewables is not only due to the response to climate change, but it is integrated with their business activities. It has become apparent that conventionally practiced investment in fossil fuels and continued uses of these are becoming risks to their business operation; that long-term purchase of renewable energy, whose price is stable, can save companies energy costs, and eventually brings them profits.

Japan in the world in terms of energy

1. Slow shift to decarbonization

1) Uneven introduction of renewables and low numerical target

After the Great East Japan Earthquake, Japan has implemented energy and environmental policies such as the introduction of the Feed-in Tariff and the promotion of power system reform. The FiT facilitated solar PVs, which grew to supply some 5% of the entire electricity supply in just five years. It is estimated that PVs are installed about 50 GW in total by 2017. On the other hand, the pace of renewables other than solar power introduced is still stagnant. Onshore wind, which is globally competitive in costs, in particular, has no sign of spreading on a full scale. The same is true of geothermal and small scale hydro power. As seen in the case of dependence on imported fuel for the expansion of bioenergy, the nation has not sufficiently utilized its rich domestic renewable energy yet.

Japan has set a goal of covering 22 to 24% of electricity with renewables by 2030, but the numerical target is not sufficient to send a message to the market that Japan will continue stable expansion of renewable energy.

2) Renewable energy costs still higher than in other countries

As mass introduction of solar power has gradually reduced its costs in Japan. The cost of commercial and roof-top solar PV has fallen around 60-70% compared to before the introduction of the Feed-in Tariff. The best performance case of solar PV is now as much as competitive as an efficient gas-fired generation. However, as other countries were successful in rapid cost reduction of renewables, Japan still remains as a nation where average costs of solar power and wind power are one of the highest in the world.

Many countries have launched policies that provide better competition environments, and reduce renewable energy costs via auction scheme. In Japan, however, there is no guarantee of interconnection and priority dispatch that make difficult investors to forecast the profit from the business. The low numerical target also contributes to the low prospects for expansion of renewables in the future. As such, there is no environment for renewable energy industry to make efforts in reducing costs of renewables.

With renewable energy costs remaining high, Japanese industry cannot sufficiently utilize renewables domestically. Continuation of such situation can be a factor for Japan to lose its international competitiveness.

3) Efficient heat utilization

Conventional coal-fired or nuclear power can convert only 30 to 40% of input energy into electricity. Even high efficient gas power is at around 50%, and the remaining energy is discharged into the environment as heat. On the other hand, thermal demand accounts for one-third of overall energy consumption. Because Japan has promoted policies focusing on electricity, solar heat, bioenergy heat, and geothermal heat that possess great potential have been marginalized and there is little progress in district heating or combined heat and power (CHP). The active promotion of renewable heat resources is essential since Japan has a huge potential of these resources domestically.

4) Energy saving and energy efficiency that leave much to be improved

Annual electricity consumption in Japan reduced around 10% after the Great East Japan Earthquake. While this results significantly from overhaul of how to use electricity or introduction of highly efficient energy equipment, such energy efficiency cannot be seen in all sectors. There is a myth in Japan that the Japanese industry is just like a dry rag as it went through most rigorous and advanced energy saving measures. The first oil shock in the 1970s accelerated energy efficiency, which turned Japan into an energy efficient power. Nevertheless, energy efficiency became stagnant from the 1980s to 90s, and national statistics show that energy productivity in the manufacturing industry makes little progress. In particular energy saving and energy efficiency by small and medium-sized companies and enterprises, which generate half of the nation's GDP, are left far behind.

An energy performance standard in the construction industry, which has just been made mandatory, has not been applicable to many houses and buildings yet. Measures for existing buildings are not taken. On the other hand, European countries impose an energy saving standard on all buildings and set numerical targets for renewable heat usage to promote energy consumption reduction on the demand side.

In Japan, utilizing Internet-of-things (IoT) technologies will contribute to a significant reduction in energy consumption while quality of life is enhanced with comfortable environments both in workplace and home.

5) Growing dependency on coal-fired power

After the Paris Agreement came into effect, Japan's new construction plan of coal-fired power plants amounting to around 17 GW and the government-led support for exporting coal-fired power plants to developing countries have come to be discussed more frequently at international conferences.

If the domestic plan is put into practice, it may be impossible to achieve the goal of limiting power generation with coal to 26% in 2030 specified in the current Strategic Energy Plan. Due to growing renewable energy and energy efficiency, Japan's greenhouse gas emissions are decreasing after 2013, but building additional coal-fired power will make it significantly difficult to achieve the reduction goal.

What is more, if the additional construction plan is carried out, a large scale investment is at the high risk to turn into stranded assets due to the low capacity factors of the plants.

6) Decreased role of nuclear power

It is almost seven years since the accident of Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Plant took place. 54 nuclear power reactors were in operation before the accident, but the number has been reduced to 4.

Although it is globally evident that nuclear energy is a high-risk and uneconomical power source, the estimate based on the competitive costs of nuclear power in comparison to other energy sources is still used in Japan. As illustrated in overseas cases in which new construction of nuclear power requires a huge amount of public assistance, building new reactors is economically unrealistic in Japan. As nuclear power as well as coal-fired power, is low in demand following capability and not flexible to the power grid management, it is inconsistent with renewable energy-oriented power system globally.

Adhering to an energy technology that is high investment risk and lacks flexibility will prevent renewable energy from expanding, detrimental to the nation's energy transition.

2. Rulemaking of green business without Japan

1) Renewable energy usage required for participation in value chains

As decarbonization is becoming a corporate evaluation standard, companies other than the energy industry are fearlessly exploring the renewable energy use for decarbonization of their business. Meanwhile, Japanese products and services, out of step with the rest of the world, are exposed to the risk of being left behind value chains.

Apple, for example, is striving to go 100% renewables globally. The company has been building renewable power stations that account for nearly 500 megawatts, calling for its suppliers to also become green. Walmart, the world's largest supermarket chain, has been committed to Project Gigaton since 2017, an initiative for requiring the company's suppliers to reduce CO2 emissions.

These initiatives indicate that decarbonization is becoming a new commercial rule. If Japan's renewable energy introduction rate remains low, Japanese companies' overseas business activities will be made more difficult.

2) Controlling decarbonization in progress globally

The world is making product evaluation criteria and corporate activities rules consistent with a shift to the decarbonized economy. In Europe, for example, there is a movement to evaluate batteries by Life Cycle Assessment (LCA). With such an evaluation formally introduced, products manufactured in each European country, where the power supply rate from renewable energy is high, are likely to receive higher evaluation than Japanese products, which heavily depend on fossil fuel. Continuing to depend on fossil fuel energy instead of positively responding to renewable energy will downgrade the evaluation of the products manufactured in Japan.

Internationally, the emissions trading system and viable carbon taxes have been introduced in some countries including EU and China. Some major American states like California and New York have introduced the emissions trading system as well. However, in Japan, the carbon price established as a global warming tax remains low. The emissions trading system has been introduced to Tokyo Metropolitan Government only. As these examples indicate, Japan is left behind the international discussions on carbon markets and rulemaking.

Setting rules of the decarbonized economy without Japan will have a negative impact on global Japanese industries.

Recommendations:

Promote new diplomacy on energy through leading global efforts against climate change

1. Deploy renewable energy diplomacy

1) Contribute to the global efforts against climate change and realize economic and social development

Climate change is a global crisis that affects the survival of human being. Japan cannot maintain its dignity without seriously combating the issue. Climate change could also be one of factors that causes regional conflicts, thus increasing security risks.

Japan can hardly be seen as a country playing a leading role for achieving the 2 degrees target under the Paris Agreement. In order to depart from this situation, Japan should pursue renewable energy diplomacy to increase credibility of the country by actively deploying renewables both home and abroad that are rapidly expanding in the world moving toward decarbonization.

Renewable energy diplomacy aims to transform the traditional energy diplomacy focused primarily on securing fossil fuel resources into the diplomacy pursuing the sustainable future worldwide, through utilizing unlimited domestic renewable energy resources. Efforts to combat climate change crisis creates growth opportunities for decarbonization business. If Japan's diplomacy leads the world in this area, it can also pave the path for a new growth in the Japanese economy.

2) Contribute to the future of developing countries through promoting sustainable energy

Providing access to electricity to 1.2 billion people living in unelectrified areas is an important objective among the United Nations 2030 Sustainable Development Goals (SDGs). Decentralised renewables that can supply power without the wide regional power grid is the quickest solution to unelectrified areas.

In order to respond to the growing energy demand with the economic growth of developing countries, Japan's energy efficiency technology should be utilized. To make use of renewable energy resources in those countries, Japan's technology and investment should also be provided. Supporting sustainable energy development is a contribution to the future of developing countries and Japan will be a partner to build a new economy together with those countries.

3) Support and collaborate with various non-state actors in their activities worldwide

Non-state actors such as companies, municipalities, NGOs are playing more important roles than ever to realize decarbonized society in many parts of the world. The active role played by non-state actors support and accelerate the implementation of the Paris Agreement. 42 Japanese companies are already committed to "Science Based Targets." In 2017, three Japanese companies announced their commitment to "RE100" for the first time, an initiative for switching to 100% renewable energy in their electricity consumption. In many parts of Japan, community-based small and medium-sized enterprises are working together to actively promote renewable electricity and heat utilization. Some local governments are also ahead of the national government in promoting its own energy policy.

The new role of Japan's diplomacy includes supporting the activities of non-state actors actively working on decarbonization and enhance their presence globally. The new Japanese diplomacy should create a network among domestic pioneer companies, municipalities, NGOs, and it should also develop communication of the roles of these actors to the world in partnership with the civil society.

2. Define Japan's pathway towards the energy transition

1) Place energy efficiency and renewable energy as the core strategy

The transformation towards decarbonized society affects the foundation of Japan's economy and society, and a strong political will should be demonstrated for its immediate realization. It is a common view held internationally that energy efficiency and renewable energy play a central role for decarbonization.

There should be more ambitious targets set in Japan than ever before. Ambitious targets will send a clear message to the market and society, and facilitate energy efficiency technologies, create long-term and stable markets that foster renewable energy expansion, establish a condition for fair competition, and reduce costs through increased size of economy.

2) Achieve a decarbonized society in line with the Paris Agreement

Even the most advanced coal-fired power cannot meet the 2 degrees target of the Paris Agreement. Japan should be prepared for the retirement of its coal-fired power plants and should announce this basic stance globally. While presenting a road map for the gradual retirement of domestic coal-fired power plants, Japan should focus on energy efficiency and renewable energy deployment for providing support to developing countries. Japan should aim for the immediate end to the public assistance for the export of coal-fired power.

3) Develop further from the original statement after 3.11, “minimizing its dependency on nuclear energy”

The current Strategic Energy Plan, the first plan formulated after the Great East Japan Earthquake, clearly states in Introduction that “Japan will review from scratch the energy strategy that it mapped out before the Great East Japan Earthquake. Japan will minimize its dependency on nuclear power. Needless to say, that is the starting point for rebuilding Japan’s energy policy.”

With the recognition that the world situation in which nuclear energy is losing economic competitiveness and renewable energy is increasing cost competitiveness, Japan should reduce its dependency on nuclear power as much as the lowest.

3. Take a leading role in realizing decarbonized society and create a new economic system

1) Identify and maximize Japan’s potentials and lead the world

Japanese companies possess various advanced decarbonization technologies such as energy efficiency, next-generation vehicles including electric vehicles, energy storage technologies, next-generation solar panels, and off-shore wind turbines. The government’s new vision for promoting energy transition will create new markets inside Japan where Japanese companies’ new and existing and yet underutilized technologies can be fully utilized. This will in turn establish a foothold for Japanese companies to play a more prominent role in the global market.

It is also necessary to build a framework in which companies can easily select and use high efficient energy systems and renewable energy and take a leading role in the formulation of global evaluation standards. Japan’s active participation in setting rules regarding decarbonization will ensure Japan’s stable position in global value chains.

2) Promote responsible investment and finance towards decarbonization

Based on the recognition that green finance is indispensable for decarbonization, an integrated approach of including finance into energy policy is being promoted. In addition to stopping new investment in or withdrawing existing investment from fossil fuels such as coal, “divestment,” a policy is needed to promote responsible investment loans and insurances with long-term perspectives in areas of enhancing energy efficiency and renewables. This policy should encourage investment, loan, and insurances in areas of enhancing energy efficiency renewables both home and abroad. As the so-called ESG investment in companies that address environment, social, and governance issues is on the rise, the disclosure of financial information associated with climate change risks and opportunities, such as the ones presented by the Task Force on Climate-related Financial Disclosures (TCFD) should be promoted in order to accelerate investment for decarbonizing the entire value-chains both home and abroad.

In addition, it is important to expand the Official Development Assistance in the area of climate change and promote the use of international financial mechanisms on climate change such as Green Climate Fund (GCF) in partnership with developing countries.

3) Contribute to the world through promoting decentralized energy model

Decentralized renewable energy systems are capable of supplying electricity and heat even when broad area energy infrastructure fails. As such, they contribute to the development of resilient society against disasters. As natural disasters impacted by climate change are expected to occur more frequently, the decentralized renewable energy system is becoming more important.

After the experience of the Great East Japan Earthquake, there are growing number of community-based renewable energy power operators established by small and medium-sized businesses as well as local governments and citizens. Such trend indicates that local communities and their lands are now playing a central role in utilizing renewable energy and promoting energy saving. Such approaches will also reduce the draining of resources in the form of energy related costs to the outside and will benefit the local economies. Besides creating electricity, local areas can also take effective measures by developing renewable heat utilization.

In order to further accelerate these efforts, revision of existing institutions and establishment of a new legal framework should be pursued. Support for capacity building and sharing of expertise should also need to take place. In addition, international cooperation for supporting the introduction of decentralized renewable energy should be promoted in collaboration with other countries so as to promote these efforts worldwide.