Special Bulletin

A Japanese Perspective on the International Energy Landscape (539) June 30, 2021

Key Points for Considering Energy Transition towards Decarbonization

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Throughout June, I had opportunities to participate in online discussions on global, U.S., European, Asian and Japanese decarbonization and relevant challenges from various angles. The discussions focused on how to promote decarbonization initiatives, how to achieve ambitious targets and how to balance the achievement of greenhouse gas emission reduction targets with energy security, economic efficiency and economic growth. The discussions came as Japan was seriously considering a target energy mix for 2030 and 2050 to revise its Strategic Energy Plan. In the following, I would like to make my personal comments on a future energy transition towards decarbonization, based on the abovementioned discussions through various opportunities.

First, I felt anew that net-zero GHG emissions or carbon neutrality through decarbonization would be extremely ambitious or challenging targets for any country in the world. At present, the world depends on fossil fuels for about 85% of energy supply, the European Union and other advanced economies for about 80% (or more) and developing economies for nearly 90%. To dramatically reduce the fossil fuel share and reach net-zero GHG emissions in the coming three decades, revolutionary changes in our social, economic and energy systems will be required to occur. There are sufficient reasons the fossil-based energy system has been developed. One reason is that fossil fuels are competitive and available abundantly and stably. The current energy system has been developed as a result of natural economic and social selection. The energy system comprises enormous international and domestic supply chains linking energy development and final consumption stages, energy equipment and consumption facilities, most of which are long-life legacy assets that are used over a long time. Even if some large changes trigger great and quick changes on a flow basis, any change on a stock basis tends to be mild due to the enormousness of the energy system and the infrastructure's long service life. Any large change on a stock basis takes considerable time. This is an important fact.

Second, a number of countries in the world are about to change their courses to achieve difficult and challenging targets, despite the above-mentioned fact. National leaders have demonstrated their political will to embark on a great voyage towards decarbonization one after another, attracting growing support from various layers of society. More than 120 countries have pledged to reach carbon neutrality by the middle of the 21st century. The ambitious pledge is a response to frequent abnormal weather events in recent years and to a rapidly growing awareness that the global environment should be protected to depict a sustainable future picture of the world. The value of protecting global interests has attracted growing support and developed social and political power. Another factor behind the enhanced decarbonization initiatives may be that the serious social and economic impacts of the COVID-19 pandemic since last year have led the European Union and other economies to increasingly advocate that clean energy investment towards energy transition for decarbonization would contribute to the recovery and long-term growth of devastated economies.

Third, clear and feasible means, methods or roadmaps to reach the target of net-zero GHG emissions have yet to be given amid the political and social trends in which a number of countries embark on the abovementioned great voyage. In the first place, there is the fact that only a limited number of countries have indicated specific scenarios for decarbonization or net-zero emissions. Those that have announced official energy scenarios (developed by government or quasi-government organizations) are limited to the European Union, the United Kingdom, France, Germany, China and some others. Most of the countries in the world have not prepared such scenarios. Even the United States under the Biden administration has not offered such a scenario. As noted above, Japan is now preparing its scenario. In the absence of energy scenarios for reaching the targets, it is difficult to decide whether future initiatives would be effective or not. It is more important that even if such energy scenarios exist, they alone cannot lead anyone to conclude whether or not decarbonization or net-zero emissions would be realized. If ambitious initiatives depicted in a scenario deviate far from realities, the development of any scenario may not be identical to the realization of decarbonization or net-zero emissions. As a back casting approach is frequently used for depicting net-zero emissions scenarios, these scenarios tend to deviate from realities. In the discussions in June, various arguments were made about how the European Union, the United States and Japan would reach their present emission reduction targets for 2030 before 2050. As 2030 comes in only nine years, how to reach the targets for 2030 is an urgent issue, a kind of “fight against time”. Anyway, the world seems to be embarking on an uncharted great voyage towards decarbonization or net-zero emissions.

Fourth, an emerging common wisdom for the world is that innovations as well as existing technologies would be required for the great voyage. The most interest-attracting innovation is the utilization of CO_2-free hydrogen. The first step toward the utilization is the development of CO_2-free ammonia technology. CO_2-free hydrogen/ammonia technology is expected to play an extremely important role in making non-power sectors carbon neutral after achieving net-zero emissions in the power sector. CO_2-free hydrogen/ammonia can be produced through various methods including the use of renewable energy, fossil fuels and CCUS (Carbon Capture, Utilization and Storage) technology and nuclear energy utilization, meaning that various countries and companies have potential to play key roles on the supply side depending on resources endowment, energy technologies and infrastructure. This is the reason for the current status representing a hydrogen/ammonia boom in many parts of the world. As a matter of course, important innovations are not limited to hydrogen/ammonia. CCS (Carbon Capture and Storage) and CCUS technologies, as well as negative-emission technologies such as the direct air capture of CO_2, are expected to become indispensable for net-zero emissions, attracting global interests.

Fifth, we must consider various differences between countries and other relevant players when decarbonization is promoted for the global interest of climate change prevention. The north-south issue, or the confrontation between advanced and developing economies, should be prevented from escalating for the global interest of climate change prevention. Countries differ in energy resources endowment, economic development, geographical, technological, infrastructure and other conditions. Such differences are seen between advanced economies and between developing and emerging market economies, and even among advanced/developing countries. It is important for each country to tackle decarbonization based on its own conditions and realities. Countries’ individual efforts should be supported by international cooperation to serve the global interest most effectively. At a time when geopolitical relations have become more difficult as indicated by the intensification of the U.S.-China confrontation, global initiatives are required for climate change prevention as a global interest. Including the recent initiative between Japan and the Association of Southeast Asian Nations, efforts to balance decarbonization with sustainable economic development are required for the current world.

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