

IEEJ Forum on Latest Energy Situation towards Carbon Neutrality

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On July 26, the Institute of Energy Economics, Japan, held its 438th forum on research works online. Under the general theme “the latest energy situation towards carbon neutrality,” IEEJ experts made reports on five topics: (1) carbon neutral policy trends in major countries, (2) Japanese and foreign initiatives for carbon pricing, (3) European Union and other trends regarding carbon border adjustment, (4) challenges for further renewable energy diffusion and (5) fossil fuel decarbonization initiatives in the world. These reports were followed by a question-and-answer session in which reporters answered questions from participants. I moderated the session. As decarbonization initiatives have accelerated in the world, interests in long-term energy transition are growing globally. The forum became the largest ever IEEJ-hosted webinar attracting more than 570 participants at the peak. Participants asked a large number of questions in the question-and-answer session, leading to vigorous discussions. In the following, I would like to summarize key points of the five reports and review highlights of the webinar forum.

The first report titled “Carbon Neutrality Trends in Major Countries – How Do Major Countries Plan to Reach Carbon Neutrality?” came from Takahiko Tagami, Manager, Climate Change Group, Climate Change and Energy Efficiency Unit. The report reviewed key points of energy scenarios (supply and demand outlooks) in the European Union, the United Kingdom, France, Germany, Japan and other major economies and analyzed the characteristics of their respective prescriptions for carbon neutrality. As for greenhouse gas emission cuts towards 2050, these economies basically plan to reduce such emissions by around 80% from the present levels and use forest sinks and CO₂ removal technologies (including direct air capture) to offset the remaining emissions. They commonly place great hopes on energy savings among GHG emission reduction measures, planning to cut final energy consumption by 30-40% by 2050. They also plan to promote electrification and achieve zero emissions in the power sector. Most of these economies plan to raise their respective electrification rates from present levels around 20% to about 50%. China has set a goal of boosting the electrification rate to more than 70%, indicating that electrification holds the key to carbon neutrality in the country. Great hopes are placed on renewable energy to achieve zero emissions in the power sector. However, renewables’ shares of power generation mixes in 2050 range wide from more than 50% for Japan to more than 80% for the United Kingdom and the European Union. Nuclear shares range from 9% to 16% for these economies other than France with a high nuclear share. Hydrogen (and synthetic fuels and synthetic methane) is projected to account for some 20% of final energy consumption in 2050, indicating that hydrogen and other innovative technologies hold the key to reaching carbon neutrality.

The second report titled “Carbon Pricing Trends in Japan and Other Countries – Can the Related Mechanism Be Designed to Contribute to Economic Growth?” was made by Tohru Shimizu, Senior Researcher, Climate Change Group, Climate Change and Energy Efficiency Unit. Explicit carbon pricing systems including carbon tax and emissions trading have attracted interests as

economic means for promoting GHG emission cuts. Cases of European and other countries that have introduced high carbon taxes indicated that backgrounds and effects of the carbon tax introduction differ from country to country, including tax reforms and national energy supply and demand characteristics (such as a unique power mix comprising hydro and nuclear alone). The report pointed out that it is difficult to predict the relationship between tax rates and CO₂ emissions and that it is not easy to make carbon taxes consistent with emission reduction targets. Attracting attention regarding emissions trading are the recent trend of the European Union Emissions Trading System known as EU-ETS (including the enhancement of emission reduction targets for some sectors from 2030) and China's introduction of emissions trading touted as featuring the world's largest scale. The report also indicated that any emissions trading system, though being made consistent with an emission reduction target easily in comparative term, would be extremely complex and that emissions prices would be very volatile. It pointed out that carbon pricing towards carbon neutrality would contribute to hikes in final energy prices, affecting industrial competitiveness and household consumption.

The third report titled “Up-to-date Carbon Border Adjustment Trends – Cooperation or Confrontation?” was made by Miki Yanagi, Senior Researcher, Climate Change Group, Climate Change and Energy Efficiency Unit. It focused on the Carbon Border Adjustment Mechanism proposal announced by the European Commission in July. Carbon border adjustment is designed for a country to impose a tax or surcharge on imports from countries with lax GHG emission reduction measures to adjust emission reduction cost gaps. It is aimed at spreading momentum for enhancing emission cuts in the world, securing fair competitive conditions, preventing carbon leakage, and protecting domestic industries forced to take tougher emission reduction measures or ensuring tax revenue. The European proposal calls for testing the CBAM from 2023 to 2025 before its full introduction in 2026. While details of the CBAM are being discussed now, relevant issues to note may include its consistency with World Trade Organization rules, its impact on the global economy, developing economies' possible opposition to the CBAM and the escalation of the North-South confrontation. The report noted that Japan should proactively engage with the European mechanism by promoting talks with Europe and cooperating with countries outside the European Union in dealing with the European measure.

The fourth report came from Yoshiaki Shibata, Manager, New and Renewable Energy Group, Electric Power Industry & New and Renewable Energy Unit, under the title “Challenges for Further Renewable Energy Diffusion – What Diverse Viewpoints Are Required?” As solar photovoltaics and wind power generation expands, hopes are growing on renewable energy's roles in realizing carbon neutrality. Japan's draft strategic energy plan indicates that renewable energy power generation would expand substantially to 330-350 billion kWh by 2030. Solar PV and other renewable energy power generation will have to be expanded dramatically to achieve a target of cutting GHG emissions by 46% in 2030. However, challenges for the expansion exist, including how to secure suitable sites for solar PV and wind power generation and how to utilize renewable energy power generation projects for which the feed-in-tariff scheme has expired. Although renewable energy power generation costs are expected to decline in the future, the report pointed to a potential rise in renewable energy costs including those for countering variable output and inertia, as well as the need for developing wider grid networks and battery systems. Hydrogen as well as batteries will be important for storing electricity. Anyway, additional costs will be required for storing electricity in line with the expansion of renewable energy power generation. The report also pointed out that how to secure lithium and other key materials would become a significant challenge in line with the promotion of renewable energy and that policy to enhance domestic relevant industries would be required in parallel to the renewable energy promotion.

The fifth report titled “Fossil Fuel Decarbonization Trends: Could Stable Supply Be Balanced with Emission Cuts?” was presented by Yoshikazu Kobayashi, Manager, CCUS Group, Fossil Energies & International Cooperation Unit. While interests are growing in the key role of renewable and other non-fossil energy sources in realizing carbon neutrality, the decarbonization of fossil fuels accounting for most of present energy consumption could play a key role. The report introduced decarbonization initiatives in the downstream oil sector (transition to biorefineries and supply of sustainable aviation fuels and synthetic fuels) and the gas sector (synthetic methane and carbon-neutral LNG initiatives) and pointed out relevant challenges. It also indicated hopes and technological and economic challenges for carbon capture and storage technology as one of the key technological options for decarbonizing fossil fuel. The report noted that international rulemaking for measuring, reporting and verifying methane emissions will be required as Europe and the United States move to toughen restrictions on such emissions and that there are challenges regarding CO₂-free hydrogen/ammonia utilization initiatives on which hopes are growing towards realizing carbon neutrality. Future relevant developments in the world would be worthy of attention.

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