ICEF 2021 Statement from the Steering Committee

October 7, 2021

The eighth annual meeting of the Innovation for Cool Earth Forum (ICEF 2021) was held online on October 6 and 7, 2021 (https://www.icef.go.jp/) as an initiative of "Tokyo 'Beyond-Zero' Week 2021", a series of eight conferences that deal with a wide range of energy and environmental issues. More than 2,000 people from governments, international organizations, industry, and academia participated in this online event, representing 87 countries and regions. As a result, ICEF 2021 is releasing the following statement based on a series of discussions under the main theme of "Pathways to Carbon Neutrality by 2050: Accelerating the Pace of Global Decarbonization."

1. Necessity of Realistic Discussions

More than 120 countries have declared their intent of achieving carbon neutrality so far. ICEF welcomes this trend of nation-led decarbonization. Yet, according to the IEA, carbon dioxide emissions temporarily dropped in 2020 in the wake of the COVID-19 pandemic, but they have begun to increase again. The ambitious goals can only be achieved through policy, socio-economic and behavioral change as well as green innovations. We need many more in-depth discussions on what technologies should be introduced in order to realize carbon neutrality, how they should be integrated into industry and society, and in what time frame. Making it happen would also require efforts to change the mindset of companies and individuals, and innovation in government policies.

2. A Variety of Pathways

Economic structures and natural environments vary among different countries and regions, and the energy supply and demand systems affected by them are accordingly diverse. For this reason, realizing the policies and energy mixes appropriate for each country is crucial, and the timing of achieving carbon neutrality may differ depending on the country and region. Therefore, international cooperation needs to be promoted in way that it would be mutually beneficial, based on this understanding of national or regional differences. In this regard, developed countries have important roles to play in supporting developing countries. In the civil society, nobody must be left behind in achieving carbon neutrality.

3. Roles of Innovation

Keeping in mind the importance of 1 and 2 above, ICEF 2021 discussed innovation in both technology and society in the short and long-time frames that will lead to practical pathways to achieve carbon neutrality.

We will need to accelerate multi-facet innovations, i.e. policy, business and behavior. The government will be required to go beyond conventional energy and environmental policies to encourage game changes and paradigm shifts in the private sector. Private sector actors are responsible not only for creating technologies, products and services, but also for taking action to transform the entire supply chain and guide the transformation of the industrial structure. People's awareness as well as behavioral change is required to achieve carbon neutrality. It is encouraging to see many visible and innovative trends in each category, which is mutually interrelated. Every stakeholder must take action to achieve carbon neutrality.

We have been discussing various technological fields that play pivotal roles in the pathways to carbon neutrality, such as renewables and hydrogen. ICEF 2021 focused on five specific technology areas among them, i.e. digital technologies, energy system integration, nuclear power, food systems, and negative emission technologies, and discussed their challenges and possibilities.

- Two fields, digital technologies and energy system integration are strongly related in the carbon neutral society. "Green by digital" has significant potential as a game-changer for both energy management systems and services in the short- and long-term. At the same time, "green of digital" such as semi-conductors to reduce energy demand is required. Energy system integration, with advancement of technologies for sector coupling which interconnect various energy carriers and sectors, can optimize the society-wide energy supply and demand.
- Nuclear energy will also play a role with the development of innovative technologies for existing and future reactors; inter alia, flexible advanced nuclear reactors such as small modular reactors (SMRs) are getting attention.
- Greenhouse gas (GHG) emissions from food systems can be mitigated by technologies and procedural changes in production-distribution as well as agriculture with information and communication technologies (ICT), and in the long-term, consumer's eating behaviors will also have large impact.
- Negative emission technologies, i.e. direct air carbon dioxide capture and storage (DACCS) biomass carbon removal and storage (BiCRS) and carbon mineralization, will be essential in order to neutralize GHG emissions in the hard-to-abate sectors, thus requiring continuous investment to reduce cost of these technologies. The need to research cost and benefits, and associated risks of geo-engineering was also pointed out.

4. In Closing

ICEF 2021 invited the younger generation, who will play a central role in the society of 2050, to the discussions. The intent was to highlight cross-generational dialogue and inclusion to take the next step in better understanding the different perspectives. ICEF will continue to welcome the participation of the younger generation in its discussions to encourage the involvement of diverse stakeholders.

By continuing these activities, we hope that realistic discussions will become further widespread toward the realization of carbon neutrality.