

-Innovation for Cool Earth Forum (ICEF2021)

The Innovation for Cool Earth Forum (ICEF) will be held by the government of Japan on October 6th and 7th. This is one of the conferences included in “Tokyo ‘Beyond-Zero’ Week 2021,” in which energy and environment related international conferences are held intensively from October 4 to 8, aiming at presenting realistic means and pathways to realizing virtuous cycles of environmental and economic growth in order to achieve global carbon neutrality and “Beyond-Zero” initiatives for retroactively reducing carbon dioxide (CO₂) emissions.

Every year since 2014, Japan's METI and NEDO have hosted the Innovation for Cool Earth Forum (ICEF) to gather leading international figures in Tokyo to discuss how to combat climate change through technological innovation.

ICEF's mission is to nurture discussion and collaboration among participants and to disseminate the industry's latest innovations in energy and environmental technologies by providing a place where experts can share their knowledge on how to tackle the 21st century's greatest environmental challenge.

A distinguished steering committee, consisting of members from all around the world, strives to bring the best minds together to develop a program which addresses forces of change while ensuring they are based on solid evidence.

-Program

<https://www.icef.go.jp/program/>

The program is subject to change; information is updated regularly.

■ **Plenary Session PL1: Policy Innovation**

Wednesday, October 6 15:10 - 16:40

The Greenhouse Gas (GHG) emissions has dropped at the global level during the COVID-19, however, they continued to rebound. Therefore, various actions respectively need to be taken in order to achieve the carbon neutrality (CN) targets globally.

Depending on each country's economic structure, current energy systems, and CO₂ emission reduction target, they would pass through different pathways to achieve CN targets.

This session will discuss practical ways to achieve those targets, such as political approaches and opportunities to learn each country's case, by understanding structure and concept of each government's policy.

Moderator:

Tanaka Nobuo

Chair, Innovation for Cool Earth Forum (ICEF) Steering Committee;
Former Executive Director, International Energy Agency (IEA)

Hoesung Lee

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Chair of the Intergovernmental Panel on Climate Change (IPCC);
Endowed Chair Professor, Graduate School of Energy and Environment, Korea University

■ **Technology Session TS1: Sustainable Food System for 2050**

Wednesday, October 6 16:50 - 17:50

Food systems (including production, transportation, processing, packaging, storage, retail, consumption, loss and disposal) are the areas where little attention has been paid to as climate measures. However, a present estimate suggests that food systems has a potential to abate about 20% of the CO2 reduction required to achieve carbon neutrality (CN) around 2050.

In this session, the current food system situation and the future perspectives will be presented, and then it will discuss along the supply chain. Specifically, in addition to the necessary actions and the required societies in the long-term (2050), the short-term efforts (until 2030) will be also discussed by dividing them into the production-distribution stage and the consumption stage.

Moderator:

David Sandalow

Innovation for Cool Earth Forum (ICEF) Steering Committee;

Inaugural Fellow, Center on Global Energy Policy, Columbia University;

Co-Director, Energy and Environment Concentration, School of International and Public Affairs, Columbia University

Vaclav Smil

Innovation for Cool Earth Forum (ICEF) Steering Committee;

Distinguished Professor Emeritus, University of Manitoba

Panelist:

Ismail Serageldin

Innovation for Cool Earth Forum (ICEF) Steering Committee;

Emeritus Librarian of Alexandria, Founding Director of the Library of Alexandria

■ **Technology Session TS2: Energy System Integration**

Thursday, October 7 9:00 - 10:00

This year ICEF will have two technology sessions on using digital technologies as solutions for supply-demand mismatches and digital optimization: “Energy System Integration” and “Digital Technology to achieve Efficiency and Decarbonization.” The “Energy System Integration” Session will cover solutions toward achieving carbon neutrality by around 2050 from an energy supply viewpoint. Discussions will focus on not only electricity but also other energy sources and reach beyond the energy sector to cover connection and interaction among the electric power sector and non-energy sectors, as well as optimal supply-demand balancing and energy systems to support integration. Near future and medium-term aspects will also be discussed.

Moderator:

Sally M. Benson

Innovation for Cool Earth Forum (ICEF) Steering Committee;

Professor, Department of Energy Resources Engineering,

School of Earth, Energy & Environmental Sciences, Stanford University;

Former Co-Director, Precourt Institute for Energy, Stanford University

Yamaji Kenji

Innovation for Cool Earth Forum (ICEF) Steering Committee;
President/Director-General, Research Institute of Innovative Technology for the Earth (RITE);
Professor Emeritus, The University of Tokyo

■ **Technology Session TS3: Nuclear Power as a Power Source for Decarbonization**

Thursday, October 7 10:10 - 11:10

In this session, from the perspective of the short-term and the mid- to long-term, we will discuss the technical development of existing light-water reactor (LWR) technologies and next-generation reactor technologies in the context of the timeframe aimed at carbon neutrality by 2050. In addition, we will also touch upon initiatives concerning the social acceptance of nuclear power technologies.

Moderator:

Richard K. Lester

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Associate Provost, Massachusetts Institute of Technology

Eija-Riitta Korhola

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Delegate of the Consultative Commission on Industrial Change;
Advisor in the EU Affairs

■ **Technology Session TS4: Negative Emission Technologies**

Thursday, October 7 11:20 - 12:20

Aiming for the achievement of Carbon Neutral in 2050, Negative Emission Technologies (NETs) such as Direct Air Capture and Storage (DACCS) and Bioenergy CCS (known as BiCRS or BECCS) are drawing attention in various fields as methods of treating residually emitted CO₂.

In this session, we will provide an overview of the current situation regarding cost, one of the major challenges regarding NETs, and discuss the social systems necessary to promote the introduction and diffusion of these technologies, as well as challenges in the social implementation phase. Toward carbon neutrality, we will discuss the initiatives that are required in the short-term and mid- to long-term.

Moderator:

David Sandalow

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Inaugural Fellow, Center on Global Energy Policy, Columbia University;
Co-Director, Energy and Environment Concentration, School of International and Public Affairs, Columbia University

■ **Plenary Session PL2: Behavioral Innovation for a Decarbonized Society**

Thursday, October 7 13:30 - 14:45

Individual behavioral change of all stakeholders in society plays essential roles to achieve carbon neutrality (CN). As an example, households consume 29% of global energy (21% of resultant CO₂ emissions), and one study

implies that individual behavioral change across various sectors such as agriculture, food, energy, and transport could abate 20-37% of the projected total GHG emissions from 2020 to 2050.

To make individuals change, we need to design how behavioral innovations could be triggered towards the reduction of GHG emissions since human behavior is not always backed with rationality. Behavioral innovation can be defined as causing a fundamental change in human behavior by effectively triggering right actions in order to create an impact that matters. In this point, public awareness is only a precondition to lead to behavioral change and social innovations towards a decarbonized society. However, the key question here is how to keep the public awareness at its present level (against other urgent problems such as COVID-19, shortage of housing, etc.) and how to "use" this level of awareness towards emission reductions.

This session will discuss the short-term (2030) and the long-term (2050) changes/pathways for individual behavioral innovation, and also what kind of public awareness is expected to accelerate such innovation.

Moderator:

Kuroda Reiko

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Designated Professor, Frontier Research Institute, Chubu University;
Professor Emeritus, The University of Tokyo

Georg Erdmann

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Retired Professor for Energy Systems, Berlin University of Technology;
President of the Board, KSB Energie AG, Berlin

■ **Technology Session TS5: Digital Technology to achieve Efficiency and Decarbonization**

Thursday, October 7 15:00 - 16:00

This year ICEF will have two technology sessions on using digital technologies as solutions for supply-demand mismatches and digital optimization. The "Digital Technology to achieve Efficiency and Decarbonization" Session will forecast the changes of lifestyle, values of living, and the new business through societal digitalization and how such changes may impact the energy demand. We will then discuss the development of power saving technology to achieve both digital business expansion and the carbon neutrality.

Moderator:

Nebojsa Nakicenovic

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Executive Director, The World in 2050 (TWI2050);
Emeritus Scholar, International Institute for Applied Systems Analysis (IIASA)

■ **Plenary Session PL3: Private Sector's Responsibility for Achieving Carbon Neutrality**

Thursday, October 7 16:15 - 17:30

In recent years, there are a number of huge trends that various countries have been declaring carbon neutrality (CN) and taking actions to achieve it at the national level. Likewise, private sector also plays a crucial role in supporting the CN achievement in terms of the decarbonized technologies' development and dissemination. Besides, each company itself should take actions such as their business model changes for the long-term vision to achieve CN. They are also strongly required to meet the demands from customers and financial institutions,

and enhance the mechanism of climate-related disclosure to show their strategies/activities to others.

This session will explore how companies are seeing this global CN movement and how they formulate and execute their business strategies. The expectations from private sector to governments or financial institutions will be also discussed.

Moderator:

Jon Moore

Innovation for Cool Earth Forum (ICEF) Steering Committee;
Chief Executive Officer, BloombergNEF

Laurence Tubiana

Innovation for Cool Earth Forum (ICEF) Steering Committee;
CEO, European Climate Foundation;
Chair of the Board of Governors, French Development Agency (AFD);
Professor, Sciences Po Paris

Side Events

- **NEDO Moonshot R&D Program Symposium “Future Prospect for Direct Air Capture and CO2 Utilization”**
Wednesday, October 6 9:00 - 11:00
- **Roadmap Event “Carbon Mineralization”**
Thursday, October 7 9:00 - 10:00
- **The co-hosted event by UNIDO “Achieving global carbon neutrality – collaboration with developing and emerging nations”**
Thursday, October 7 15:00 - 17:00