



Contribution ID: 378 Contribution code: **Plenary talk**

Type: **Plenary Speaker**

A carbon-neutral intelligent energy system using hydrogen technologies and big data

Thursday 23 June 2022 14:00 (1 hour)

Controlling global warming is an essential social issue that humankind must solve in the future. With the Paris Agreement at COP21 (21st Conference of the Parties to the United Nations Framework Convention on Climate Change), Many countries try to limit future temperature rises to 1.5-2 °C or less compared to pre-industrial levels. Furthermore, we are aiming to “pursue the 1.5 °C effort target” agreed in November 2021 at COP26 in Glasgow, UK. In order to achieve such extremely high reduction targets, it is necessary to accelerate research and development in the energy field.

Tokyo Tech “InfoSyEnergy consortium” and “Academy of Energy and Informatics” were established as global research / education organization for industry-academia collaboration toward carbon-neutral society to develop the energy technologies by utilizing energy science and informatics. Twenty-five companies and 16 overseas universities are the members including over 70 Tokyo Tech professors and associate professors.

In the presentation, I will firstly explain the importance of nine priority research fields in InfoSyEnergy toward carbon neutrality, which are (1) Distribution energy systems controlled by using energy big data, (2) Technology for Renewable energy base-load, (3) Solar energy conversion, (4) Fuel cells, electrolysis, hydrogen energy, battery, energy storage, (5) Energy economy, Electricity free market, (6) Energy carriers, low carbon process by catalysts, (7) Hydrogen combustion, heat utilization, (8) Future energy technologies and (9) Tech trends, future scenarios, services in energy sector. I also introduce the present developmental status of the grid cooperated/distributed energy system named as “Ene-Swallow” using big data and required hydrogen technologies like solid oxide fuel cell/electrolysis cell, and finally introduce “carbon air battery system” developed as an original energy storage system.

Keywords: energy system, big data, renewable energy, carbon neutrality, hydrogen energy, energy device

Author: Prof. IHARA, Manabu (Dept. of Chemical Science and Technology, Tokyo Institute of Technology, Tokyo Tech “InfoSyEnergy consortium”, Tokyo Tech Academy of Energy and Informatics)

Presenter: Prof. IHARA, Manabu (Dept. of Chemical Science and Technology, Tokyo Institute of Technology, Tokyo Tech “InfoSyEnergy consortium”, Tokyo Tech Academy of Energy and Informatics)

Session Classification: Plenary talk

Track Classification: Physics Innovation