International Institute for Carbon-Neutral Energy Research (I²CNER) Kyushu University

http://i2cner.kyushu-u.ac.jp

— World Premier International Research Center Initiative (WPI) —

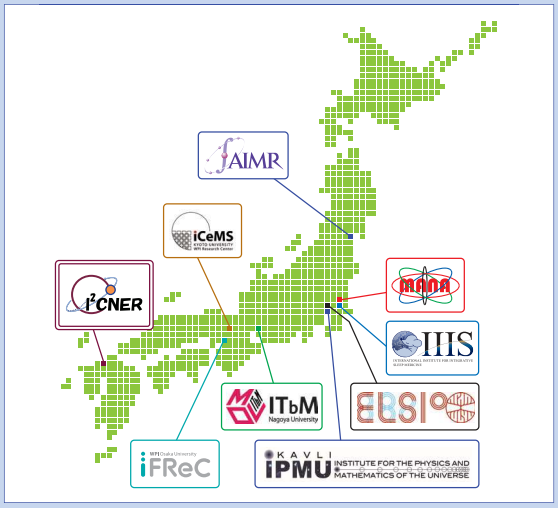
The World Premier International Research Center Initiative (WPI) was launched in 2007 by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in a drive to build within Japan "globally visible" research centers that boast a very high research standard and an outstanding research environment which is sufficiently attractive to prompt frontline researchers from around the world to want to work in them.

■Critical Mass of Outstanding Researchers

- Bringing together top-level researchers within a host research institution
- Inviting top-notch researchers from around the world

■Attractive Research and Living Environment of Top International Standards

- Strong leadership by center director
- English as the primary language
- Rigorous system for evaluating research and system of merit-based compensation
- Strong support function
- Facilities and equipment appropriate to a top world-level research center
- Housing and support for daily living and education of dependent children



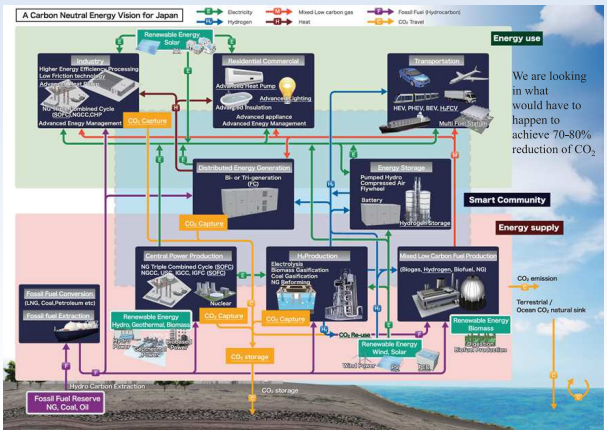
To assist the WPI research centers in carrying out this mandate, the Japanese government provides them with long-term, large-scale financial support.

—International Institute for Carbon-Neutral Energy Research (I²CNER) —

I²CNER's mission is to contribute to the creation of a sustainable and environmentally-friendly society by conducting fundamental research for the advancement of low carbon emission and cost effective energy systems, and improvement of energy efficiency. The array of technologies that I²CNER's research aims to enable includes Solid Oxide Fuel Cells, Polymer Membrane based fuel cells, biomimetic and other novel catalyst concepts, and production, storage, and utilization of hydrogen as a fuel. Our research also explores the underlying science of CO_2 capture and storage technology or the conversion of CO_2 to a useful product. Additionally, it is our mission to establish an international academic environment that fosters innovation through collaboration and interdisciplinary research (fusion).

Director Petros Sofronis

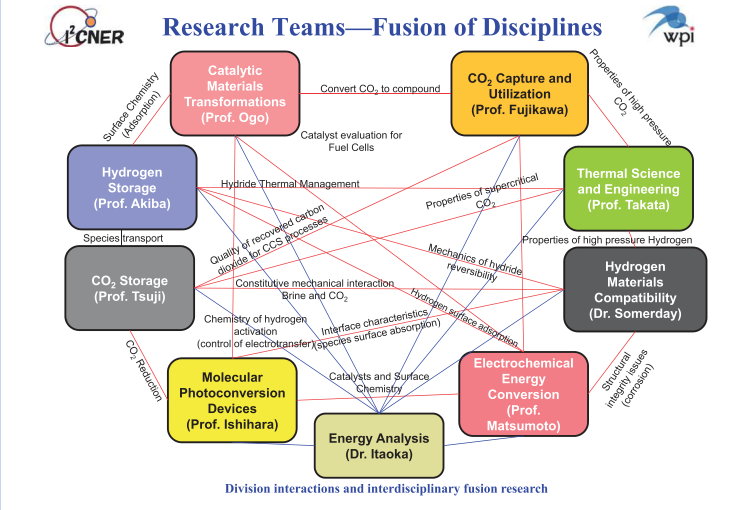
In particular, the Institute's research agenda aims at understanding and advancing the science of hydrogen production and storage using artificial photosynthesis; materials that are structurally tolerant to hydrogen; electrochemical device; catalysis; CO_2 concentration and separation; CO_2 sub-seabed and geological storage; and energy analysis. These challenges require a paradigm shift in our approach to research that not only bridges multiple spatial (from Angstrom to kilometers) and temporal (from nanoseconds to decades) scales, but which also brings together scientists and engineers from disparate disciplines such as chemistry, materials, geoscience, and engineering to work cooperatively and synergistically. The Institute's integrative approach focuses on multi- and inter-disciplinary strategies for discovering, controlling, and manipulating the interactions between materials, fluids, and interfaces with gases such as hydrogen, oxygen, and CO_2.

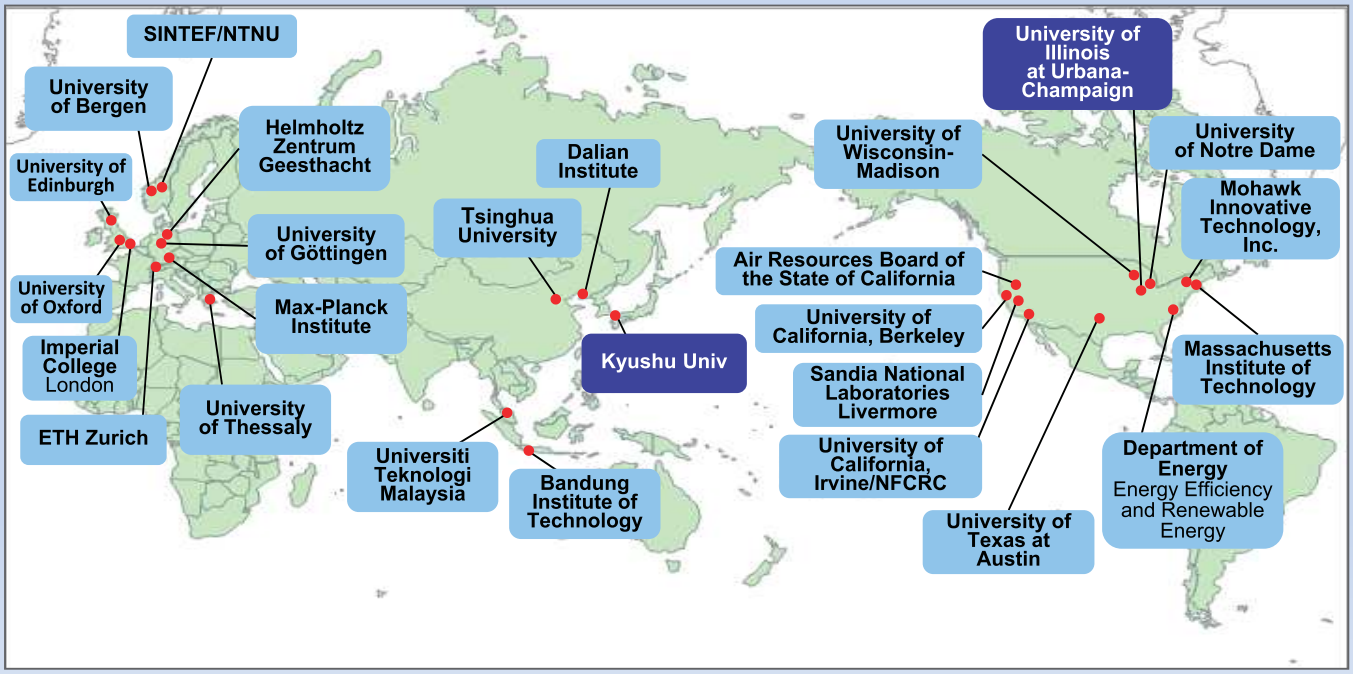


Energy Vision for Japan
Parameter Space of Technology Options

■Organization

The Institute was established as an organization that reports directly to the President of Kyushu University. The Institute is a unique collaborative project between Kyushu University and the University of Illinois at Urbana-Champaign, with the main facility located on the Ito campus in Japan, and a Satellite Institute located on the Urbana-Champaign campus in Illinois. Kyushu University provides the Institute with the best-equipped laboratories for hydrogen research in the world, which is a truly attractive feature that encourages the international community to converge to the Ito Campus for scientific interaction and discussion. To carry out its mission, the Institute has established collaborations with internationally recognized research centers, universities, and national laboratories. These collaborations involve research interactions and exchange of researchers between the institutions.





■The I²CNER Buildings

I²CNER Building 1 was completed in December 2012 (the lefthand side houses the Next-Generation Fuel Cell Research Center, Kyushu University) and I²CNER Building 2 was completed in February 2015. At I²CNER, internationally-acclaimed researchers are working together "under one roof" in pursuit of interdisciplinary research.

I²CNER Buildings (Right: Building 1, Left: Building 2)

I²CNER Annual Symposium (February 2015)