

I²CNER

Tokyo Symposium

Japan-US Collaboration on Energy



EVENTREPORT

December 12, 2014
1:00-6:00 p.m.
TKP Garden City Shinagawa



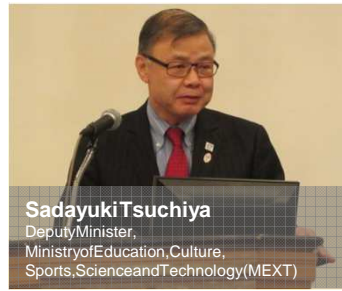
KYUSHU UNIVERSITY



PHOTO GALLERY



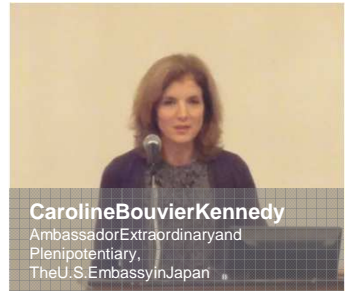
Chiharu Kubo
President, Kyushu University



Sadayuki Tsuchiya
Deputy Minister,
Ministry of Education, Culture,
Sports, Science and Technology (MEXT)



Toshio Kuroki
WPI Program Director



Caroline Bouvier Kennedy
Ambassador Extraordinary and
Plenipotentiary,
The U.S. Embassy in Japan



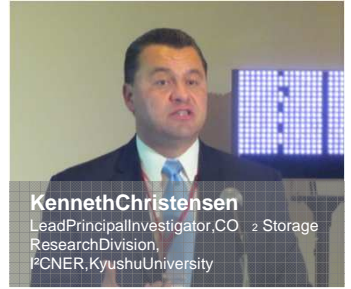
Petros Sofronis
Director,
ICNER, Kyushu University



Kenshi Ito
Energy Analysis Research Division,
ICNER, Kyushu University



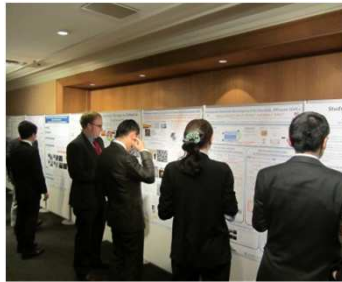
Takeshi Tsuji
Lead Principal Investigator, CO₂ Storage
Research Division,
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Kenneth Christensen
Lead Principal Investigator, CO₂ Storage
Research Division,
ICNER, Kyushu University



Seiji Ogo
Lead Principal Investigator, Catalytic Materials
Transformations Research Division,
ICNER, Kyushu University



Cyrus Wadia
Assistant Director, Clean Energy and
Materials R&D, The White House Office
of Science and Technology Policy



Toyoki Kunitake
President, Kitakyushu Foundation for the
Advancement of Industry Science
and Technology



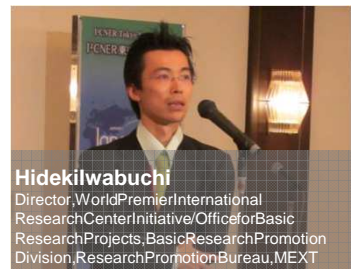
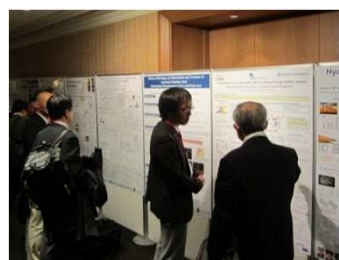
James Stubbins
Professor and Head, Department Nuclear,
Plasma, and Radiological Engineering,
ICNER, University of Illinois
at Urbana-Champaign



Shigenori Fujikawa
Lead Principal Investigator, CO₂ Capture
and Utilization Research Division,
ICNER, Kyushu University



Kazunari Domen
WPI Program Officer



Hideki Wabuchi
Director, World Premier International
Research Center Initiative/Office for Basic
Research Projects, Basic Research Promotion
Division, Research Promotion Bureau, MEXT

EVENTREPORT

Outline

Date : December 12, 2014
Time: 1:00-6:00p.m.
Venue: TKP Garden City Shinagawa
Organized by: International Institute for Carbon-Neutral Energy Research (I²CNER)
Supported by: Ministry of Education, Culture, Sports, Science and Technology (MEXT)
Japan Society for the Promotion of Science (JSPS)
U.S. Embassy in Japan

Purpose

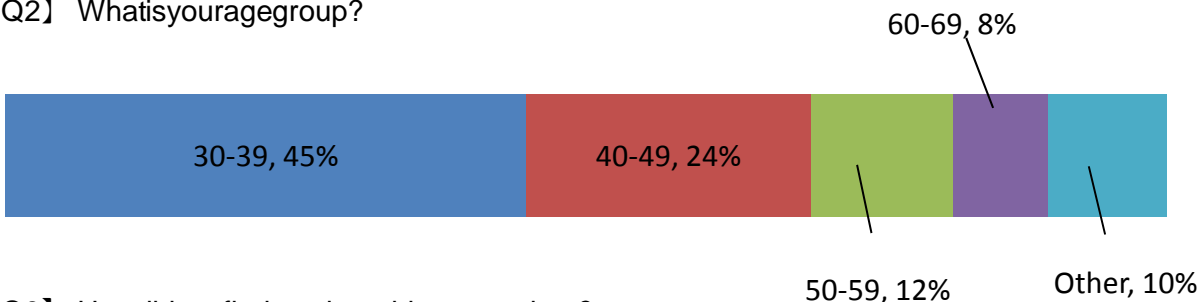
- i) Demonstrate how collaboration between Japanese and US academic and research institutions is providing carbon-neutral energy solutions that will impact our respective countries and more broadly the world.
- ii) Show how merging Japan and the US academic and research cultures is impacting and transforming multidisciplinary international research and academic infrastructures.
- iii) Explore how what can be done to improve, enhance and accelerate the translation of our research to influence energy policy and directions.

Participant Feedback

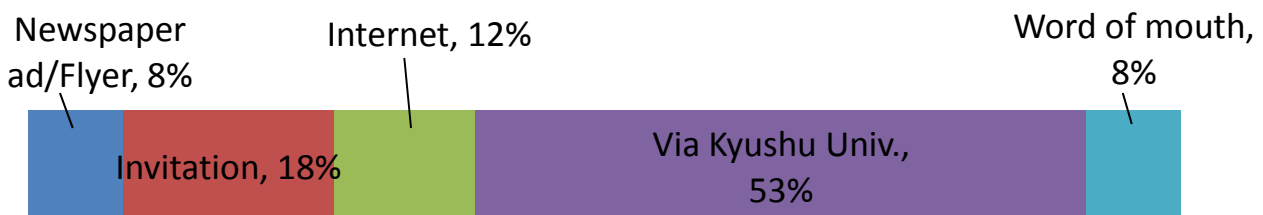
- Number of participants: 125
- Questionnaire analysis based on 49 replies (Response rate: 39%)
- 【Q1】 What is your occupation?



- 【Q2】 What is your age group?



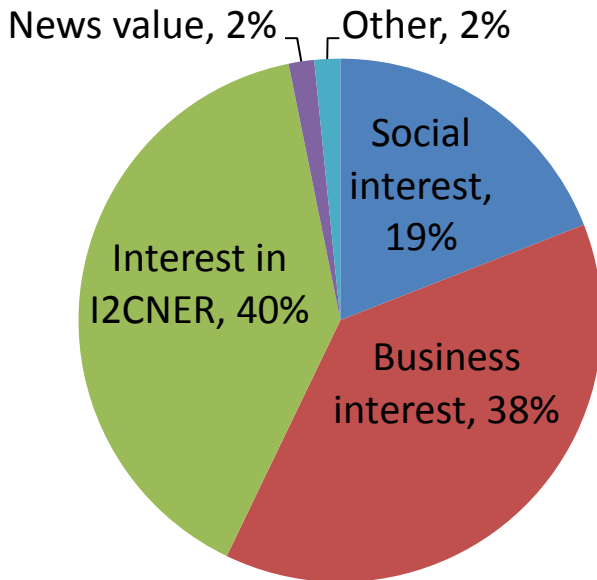
- 【Q3】 How did you find out about this symposium?



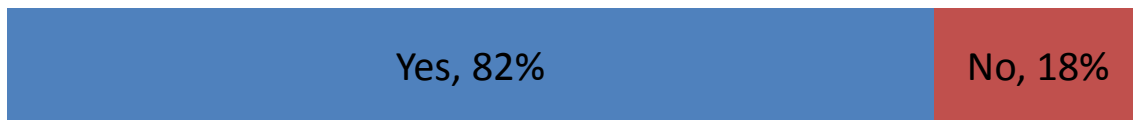
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ParticipantFeedback

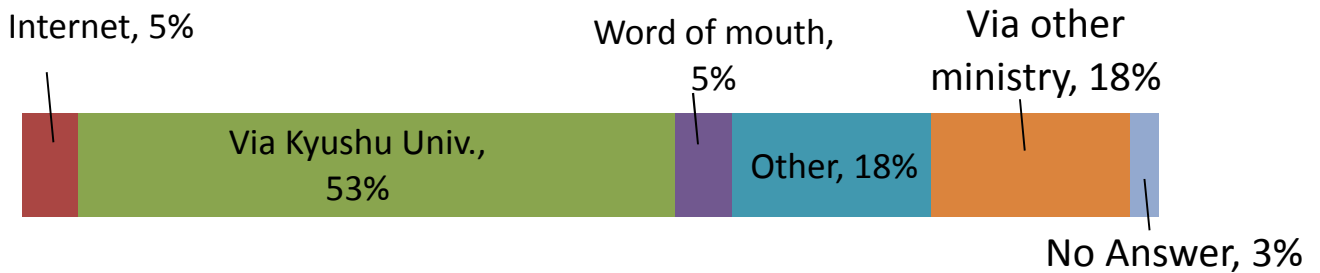
■ 【Q4】 Whatmadeyoujointhissymposium?(multipleanswersallowed)



■ 【Q5-1】 DidyoualreadyknowabouttheInternationalInstituteforCarbon-NeutralEnergyResearch?



■ 【Q5-2】 Ifyouanswered"yes",howdidyouhearaboutit?



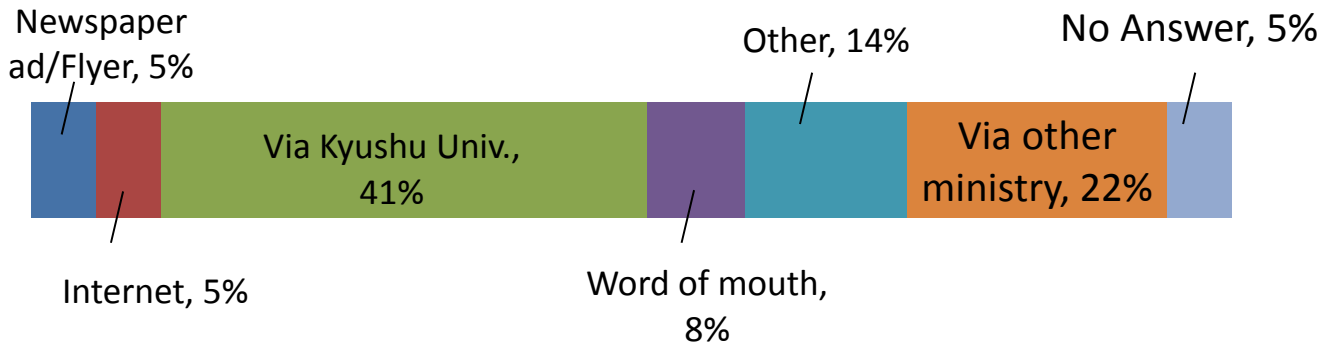
■ 【Q6-1】 Didyoualreadyknowaboutthe"WorldPremierInternationalResearchCenterInitiative"?



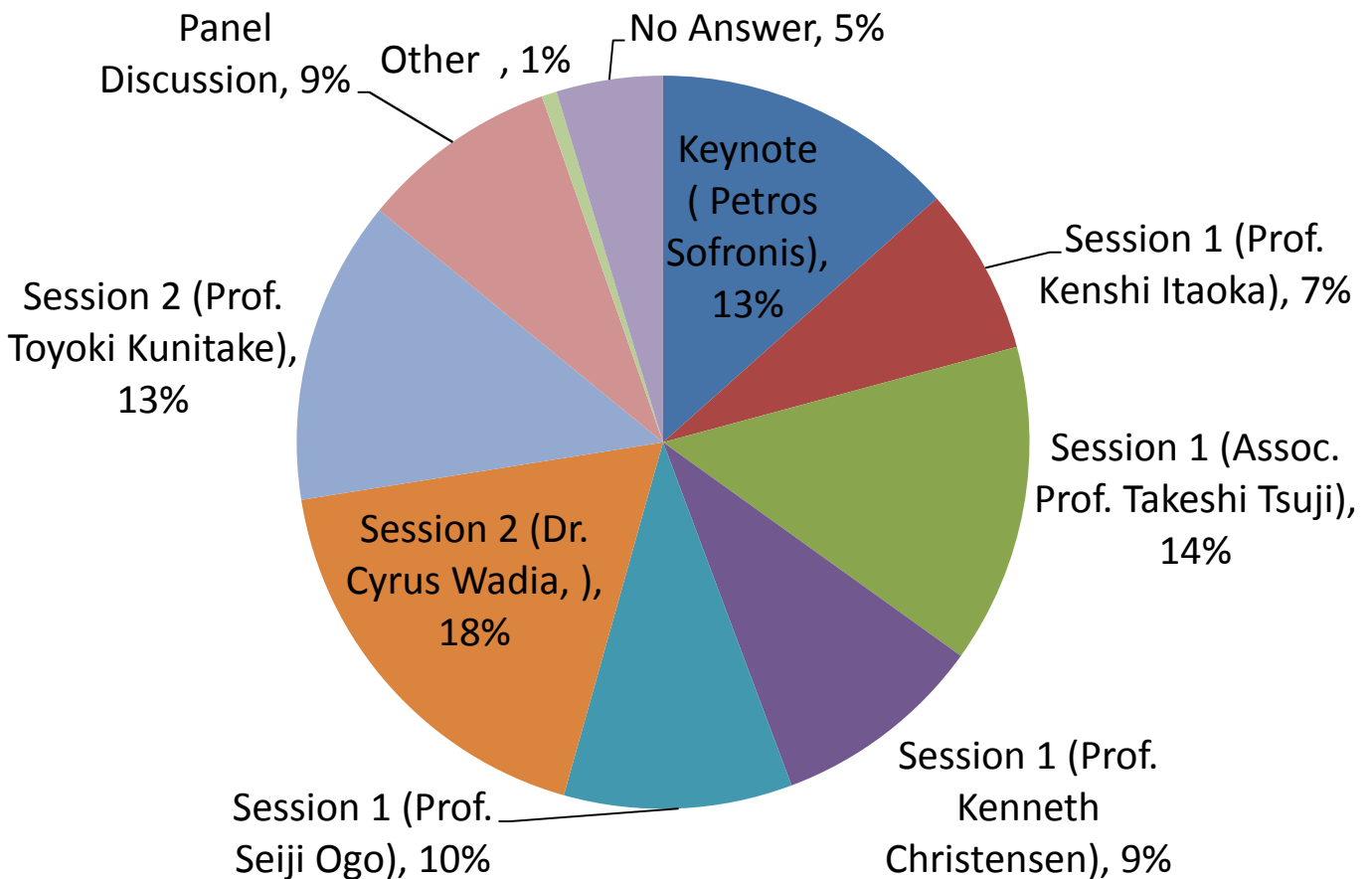
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Participant Feedback

■ 【Q6-2】 If you answered "yes", how did you hear about it?



■ 【Q7】 Which program were you most interested in? (multiple answers allowed)



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ParticipantFeedback

■ 【Q8-1】 Whatwereyouexpectationsforthissymposium?

- The staff of AIST gave a lecture on carbon nanotube the other day in Tsukuba. Today's symposium about carbon neutral reminds me the lecture.
- To understand outline about the latest information on the current status and future prospects of Energy problem.
- Research results and progress of FC & CCS. Lecture by Ambassador Kennedy
- Efforts to CO₂ problem.
- Efficient use of renewable energy (New Catalyst), Practicality and problem of CSS.
- How we are going to use the next-generation energy in all over Japan.
- To learn leading edge technology for basic research trends on CO₂ reduction.
- Introduction on the energy policy and directions for research in Japan.
- Improvement of visibility on I²CNER.
- Energy Policy trends in US and in Japan.
- Development of high-efficiency power generation technology and CCS technology.
- Energy production, wide perspective of the use, the positioning of hydrogen in the usage.
- CCS technology, Level of cost.
- Wide range presentation about Carbon-Neutral.
- To learn the outline of I²CNER activity.
- CO₂ recovery, Utilization status, Future prospects.
- The way to CO₂ reduction
- To learn about the discovery and progress of research seeds, and those future prospects
- Although I just joined for information gathering, the talk by Wadia was interesting.
- CO₂ reduction technology.
- To become familiar with global interaction in Energy-Environment areas.
- Free food and beer! Petros should be MC. Longer poster session.
- Recent progress in this area and at I²CNER.
- How to reduce CO₂ concentration.
- Hoped to meet new people interested in Japan-US Collaborations and increase visibility of our work.
- Get understanding of I²CNER's activities status. Status of US/Japan academic collaboration on H₂ & FC.
- I've expected to see more detail talk & discussion on the collaboration between US & Japan. It would be more interesting that other divisions present their collaboration work with us in I²CNER.

■ 【Q8-2】 Pleaserateyouoverallsatisfactionregardingthissymposium



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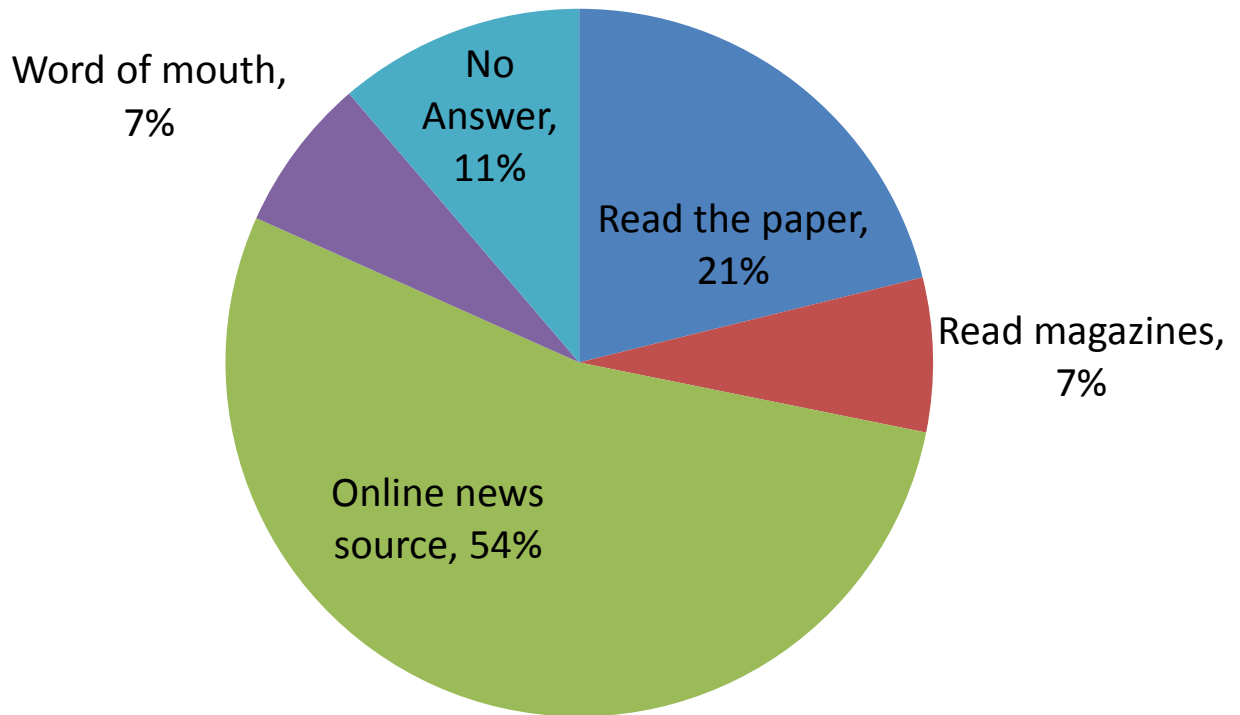
ParticipantFeedback

- [Q9] Please let us know your comments on this symposium/our research etc..
- Too small screen. Could not see any characters in the presentation.
 - This symposium was the contents of the very high qualities. I request for the continuous research on the global environment
 - It was very stimulating that the basic research of technology is progressing.
 - "Though photography is prohibited, some people were taking photos with smartphone. Thoroughly notification is required. There were some vacant seats in Reserved and Press areas. We could not see presentation data from the back of the seats. Please assign some non-reserved seats in the front as well."
 - There were too many Press and Reserved seats. And most of those seats occupied the front area.
 - "The story of Hydrogen Energy" was well done. I think general public is likely to have an interest
 - I was very interested in Molecular fuel cell, thank you.
 - Room shape was oblong and the people in the back of the seat could not see the screen. There were too technical talks and the audience was bored.
 - Wi-Fi be provided
 - Most of session progress, except a part, was punctual and good.
 - Panel discussion seems to include a little political contents.
 - Is there any plan to upload the presented data's of today? Please upload later.
 - Presentation by Prof. Ogo was a little unconventional, but it was easy to understand for amateurs and fresh and interesting.
 - More industrial comments are better
 - impressive, very interesting talk by Dr. Wadia
 - Coffee should be provided. Longer screen.
 - Top-notch researches in every area
 - Longer poster session would have been better - didn't have time to meet anyone. Commitment to Japan-US funding frameworks would have been nice but missing.
 - Good overview of vision by Prof. Itaoka.
 - Inviting other Institute from Japan or US in the symposium would be more interesting to engage them in similar project. (in the same field)
- [Q10] Please make suggestions for topics you would like to see covered during the next I2CNER Tokyo Symposium.
- Harmonic relations between living environment and energy development
 - Horizontal cooperation of research. If there are any specific ideas.
 - Target value of CO₂ and current status
 - I won't come anymore
 - CO₂ Capture and how to use it
 - Technical problem and its solution for CCS, From the view of commercial value
 - Energy issue is always good.
 - Development of high-efficiency power generation technology and CCS technology
 - CO₂ EOR/CCS
 - CCS (possibility, scale, plan in the world)
 - Now emerging industrial technology to reduce CO₂ emission.
 - More "Governmental" Representatives - to see "political" requirements, needs for research directions
 - Presentations from young researchers in separate academic session.
 - Materials for high-pressure hydrogen gas environment.
 - Young researcher presentations.
 - More information on how cost/commercial challenges are viewed for the different technology options.
 - More details on the collaboration & projects in academy & industry level.

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ParticipantFeedback

■ 【Q11】 Through which forms of media do you prefer to get your news? (multiple answers allowed)



PROGRAM


PROGRAM	TIME	GUESTS, MODERATOR & PRESENTERS
OPEN	12:00-	
OPENING REMARKS	13:00-13:05	Chiharu Kubo President, Kyushu University
GREETINGS	13:05-13:20	Sadayuki Tsuchiya Deputy Minister, Ministry of Education, Culture, Sports, Science and Technology (MEXT) Toshio Kuroki WPI Program Director Caroline Bouvier Kennedy Ambassador Extraordinary and Plenipotentiary, The U.S. Embassy in Japan
LECTURE	13:20-13:40	Petros Sofronis Director, I ² CNER, Kyushu University
SESSION I	13:40-15:00	Kenshi Taoka Energy Analysis Research Division, I ² CNER, Kyushu University Takeshi Tsuji Lead Principal Investigator, CO ₂ Storage Research Division, I ² CNER, Kyushu University Kenneth Christensen Professor and College of Engineering Chair in Fluid Mechanics, I ² CNER, University of Notre Dame Seiji Ogo Lead Principal Investigator, Catalytic Materials Transformations Research Division, I ² CNER, Kyushu University
BREAK	15:00-15:20	

PROGRAM

PROGRAM	TIME	GUESTS, MODERATOR & PRESENTERS
SESSION II	15:20-16:50	<p>Cyrus Wadia Assistant Director, Clean Energy and Materials, R&D, The White House Office of Science and Technology Policy</p> <p>Toyoki Kunitake President, Kitakyushu Foundation for the Advancement of Industry Science and Technology</p>
PANEL DISCUSSION	16:50-17:50	<p>James Stubbins Professor and Head, Department Nuclear, Plasma, and Radiological Engineering, I²CNER, University of Illinois at Urbana-Champaign</p> <p>Toyoki Kunitake President, Kitakyushu Foundation for the Advancement of Industry Science and Technology</p> <p>Cyrus Wadia Assistant Director, Clean Energy and Materials, R&D, The White House Office of Science and Technology Policy</p> <p>Takeshi Tsuji Lead Principal Investigator, CO₂ Storage Research Division, I²CNER, Kyushu University</p> <p>Kenneth Christensen Professor and College of Engineering Chair in Fluid Mechanics, I²CNER, University of Notre Dame</p> <p>Shigenori Fujikawa Lead Principal Investigator, CO₂ Capture and Utilization Research Division, I²CNER, Kyushu University</p> <p>Kenshi Ito Energy Analysis Research Division, I²CNER, Kyushu University</p>
CLOSING REMARKS	17:50-18:00	<p>Kazunari Domen WPI Program Officer</p>

ABSTRACT

SESSION I

Presentation Title:	International Approach to Developing Technologies for Aggressive CO ₂ Emissions Reduction by 2050	
Name:	Kenshi Itaoka	
Affiliation:	Energy Analysis Research Division, I ² CNER, Kyushu University	
Abstract:	<p>Japan has had a long-term commitment to greenhouse gas (GHG) emissions reduction as a member of the Group of Eight (G8) countries. In 2009, the G8 announced the commitment to 80% GHG reduction by 2050 relative to the 1990 levels for their countries, realizing that such a commitment is needed to achieve an overall 50% reduction in the world to stabilize the global GHG concentration in the atmosphere at a non-destructive level in the long term.</p> <p>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 emissions and cost-effective energy systems and improvement of energy efficiency.</p> <p>To develop technologies efficiently and effectively, we adopted an international approach. I²CNER's research teams involve a large number of international researchers within/outside the institute. Domestic and foreign researchers not only do they share information for research projects but also exchange relevant ideas and review research methodologies and results from an international standpoint. As a result, Kyushu researchers are advancing their research activities in accordance to the most updated international information on technical, societal, and political aspects of current and future energy technologies.</p> <p>To help identify the future technology options for a carbon-neutral energy society (CNES) through sharing a common image of the energy future for Japan amongst I²CNER researchers, we created an energy vision of an idealistic future low-carbon energy society by examining necessary technologies to meet the aggressive emissions reduction target by 2050. Back-casting from the vision to present energy situation, we developed several scenarios assuming development and deployment of important energy technologies. Researchers in I²CNER then coordinate and target their research efforts in order to help the development of the technologies involved in these scenarios that promise a CNES.</p> <p>The process of creating and updating the vision and scenarios is also international and a result of collaborative research between domestic and foreign researchers. In summary, our vision and scenarios are harmonized with the efforts of the international community to meet the energy challenges of the 21st century.</p>	

ABSTRACT

SESSION I

Presentation Title:	Unraveling Pore-Scale Processes Central to Safe and Reliable Geologic CO ₂ Storage Through a Collaborative Numerical, Experimental, and International Approach	
Name:	Takeshi Tsuji and Kenneth Christensen	
Affiliation:	Takeshi Tsuji Lead Principal Investigator, CO ₂ Storage Research Division, I ² CNER, Kyushu University Kenneth Christensen CO ₂ Storage Research Division, I ² CNER, University of Notre Dame	
Abstract:	<p>Carbon Capture and Storage (CCS) mitigates CO₂ emissions by capturing CO₂ prior to emission and safely storing it in the geosphere until it mineralizes and becomes permanent rock. This strategy is central to CO₂ mitigation in both Japan and the United States and relies upon trapping the CO₂ in rock formations, primarily by immobilizing it in the rock's tight porous matrix. Doing so will limit the possibility that the CO₂ potentially escapes back into the atmosphere prior to mineralization. Successful CCS therefore requires accurate evaluation of candidate geologic reservoirs prior to CO₂ injection and accurate predictions of CO₂ fate once it is stored in geologic formations. Our international research collaboration utilizes numerical and experimental approaches to fully understand the physics of CO₂ at the pore scale to enhance the reliability of reservoir-scale predictions based on numerical simulations. At Kyushu University, we have developed a highly efficient and accurate pore-scale modeling method to directly simulate multiphase and multicomponent flows based on images of actual rock structure. This tool allows the evaluation of complex movement of CO₂ in natural sandstone with high-resolution and on a large scale. At Notre Dame, we have developed complementary experimental tools that allow such processes to be directly visualized and quantified at reservoir-relevant conditions for the first time. Together, these tools have revealed unique physics about CO₂ trapping at the pore scale that will undoubtedly enhance our ability to predict CO₂ fate in candidate and actual geologic reservoirs. Achieving these scientific advances would not have been possible without bringing together the unique expertise of Japanese and US researchers.</p>	


ABSTRACT

SESSION I

Presentation Title:	Inspired by Nature — New Energy Sources from Hydrogenase Model Complexes	
Name:	Seiji Ogo	
Affiliation:	Lead Principal Investigator, Catalytic Materials Transformations Research Division, I ² CNER, Kyushu University	
Abstract:	<p>We have invented a new catalyst that can release electrons from hydrogen gas. The catalyst is a molecule that relies on cheap iron and nickel and works at room temperature and atmospheric pressure. This development is a crucial step in replacing fossil fuels with renewable energy sources. The catalyst's structure was inspired by natural enzymes called nickel-iron hydrogenases. Chemists have been trying to understand how they work for decades. The first breakthrough came in 2007, when we first managed to copy the working of hydrogenases using a nickel-ruthenium molecular catalyst— though ruthenium was more expensive than iron, it pointed the way to a revolution in molecular catalysts for hydrogen splitting. The substitution of iron for ruthenium not only makes the new catalyst four thousand times cheaper, it also forms a crucial model for explaining how some bacteria and algae can harness energy from hydrogen so efficiently. The future development of this catalyst will not only make energy generation cheaper, it will also provide chemists with a whole new way to control reactions that use hydrogen molecules as an important building block.</p>	


ABSTRACT

SESSION II

Presentation Title:	Federal Energy and Materials Policy, Opportunities for Bilateral Cooperation	
Name:	Cyrus Wadia	
Affiliation:	Assistant Director, Clean Energy and Materials, R&D, Office of Science and Technology Policy	
Abstract:	<p>Dr. Cyrus Wadia will reflect on his experiences going over the Lawrence Berkeley National Lab to articulate a new set of grand challenges toward the expansion of clean-energy and accelerated deployment of advanced materials. He will draw on his past work in all sectors to provide insights into U.S. federal policy on climate, energy and advanced materials. This will include both regulatory and innovation policies. Wadia will also explore modes by which nations might collaborate on these topics going forward.</p>	

ABSTRACT

SESSION II

Presentation Title:	The Future of CO ₂ Management in Japan	
Name:	Toyoki Kunitake	
Affiliation:	President, Kitakyushu Foundation for the Advancement of Industry Science and Technology	
Abstract:	<p>Uncontrolled release of CO₂ to our environments as a result of human activities is becoming impossible. This is a common understanding among industrialized countries in the world. However, realistic approaches to its solution would be variable among these countries, since the CO₂ release is closely connected to the energy situation of the individual country. We would like to discuss the Japanese situation on this matter, by referring to our ongoing research activity.</p>	