**Program**

**CO₂ Summit II:**
Technologies and Opportunities

April 10–14, 2016
Santa Ana Pueblo, New Mexico, USA

**Conference Chair**

Holly Krutka  
Formerly Shenhua Science and Technology Research Institute  
Tri-State Generation & Transmission Association, Inc.

**Conference Co-Chair**

Frank Zhu  
UOP/Honeywell

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XPRIZE Foundation
Sunday, April 10, 2016

16:00 - 18:00  Conference Check-in (Mountain View Foyer)
18:00 - 19:00  Opening Reception (Tamaya Veranda)

NOTES

• Technical sessions will be held in the Tamaya ABC Rooms.
• Poster sessions will be in the Wolf Room.
• Breakfasts and lunches will be in the Hawk Room.
• Dinners on Monday and Wednesday will be in the Puma Room. Dinner on Tuesday will be in the Hawk Room.
• Speakers – Please leave at least 5 minutes for questions and discussion.
• Please do not smoke at any conference functions.
• Turn your cellular telephones to vibrate or off during technical sessions.
• Please write your name in the front of this booklet in case it is misplaced.
• Be sure to check the participant list in this booklet to confirm that your listing is correct. If there are changes or updates, please login to the ECI website and update your listing so that the list that ECI will send to all participants after the conference will be correct.
Monday, April 11, 2016

07:00 - 08:30  Breakfast

08:30 - 08:40  Opening Remarks - Conference Chair and ECI Liaison

08:40 - 09:30  Conference Plenary
Robin Batterham, University of Melbourne and Former Chief Scientist of Australia
CO2: The good, the bad and the ugly

Keynote panel: Reducing CO2 emissions from the US electricity sector
Chair: Holly Krutka, Tri-State Generation and Transmission Association, Inc.

09:30 - 10:00  Keynote panel: Reducing CO2 emissions from the US electricity sector
Chair: Holly Krutka, Tri-State Generation and Transmission Association, Inc.
Brad Crabtree, Great Plains Institute, USA
The critical role of CCS and EOR in managing US carbon emissions

10:00 - 10:30  Coffee Break

10:30 – 11:30  Keynote panel (continued)
Barbara Walz, Tri-State Generation and Transmission Association, Inc., USA
Managing CO2 in rural America

Matt Usher, AEP Generation
AEP perspectives on 21st century power generation

11:30 – 11:45  Discussion

11:45 – 12:00  Invited presentation: Catalyzing the carbon utilization industry through the
NRG COSIA Carbon XPRIZE
Paul Bunje, XPRIZE

12:00 - 13:30  Lunch

13:30 - 14:45  Networking / Free time

Carbon capture and storage - processes – I
Chair: Carl Bozzuto, Global Resources Development & Management Company
Co-Chair: Debangsu Bhattacharyya, West Virginia University

14:45 - 15:10  Invited presentation: CCS cost trends and outlook
Edward S. Rubin, Carnegie Mellon University, USA

15:10 – 15:35  U.S. DOE carbon capture program: Advancing multiple generations of
carbon capture solutions laboratory to pilot scale development
José Figueroa, US Department of Energy, National Energy Technology Lab

15:35 - 16:00  Assessment of the CO2 capture potential from irreplaceable industrial
sources
Peter C. Psarras, Stanford University, USA
Monday, April 11, 2016 (continued)

16:00 - 16:25  Iron-based chemical looping processes
Cheng Lung Chung, Ohio State University, USA

16:25 - 16:50  Novel advanced solvent-based carbon capture pilot demonstration
Erik Meuleman, ION Engineering, USA

16:50 - 17:15  Cryogenic carbon capture
Larry Baxter, Sustainable Energy Solutions, USA

17:15 - 17:45  Coffee Break

CO₂ utilization – I
Chair: Peng Pei, University of North Dakota
Co-chair: Steve Carpenter, University of Wyoming, Enhanced Oil Recovery Institute

17:45 - 18:15  Update on the status and development of issues surrounding enhanced oil
recovery (EOR) in the state of Wyoming
Steven M. Carpenter, EORI at University of Wyoming, USA

18:15 - 18:45  Geologic CO₂ storage using pre-injection brine production in tandem
reservoirs: A strategy for improved storage performance and enhanced
water recovery
Thomas A. Buscheck, Lawrence Livermore National Lab, USA

18:45 - 19:15  Electrochemical carbon dioxide reduction as an alternative source of fuels
and chemicals
Kendra P. Kuhl, Opus 12, USA

19:15 - 19:30  Discussion

19:30 - 21:00  Dinner

21:00 - 22:00  Poster Session / Social Hour
Tuesday, April 12, 2016

07:00 - 08:30 Breakfast

08:30 - 09:15 **Keynote**: Hans-Wilhelm Schiffer, World Energy Council, London and Consultant and Advisor to the Executive Board of RWE AG, Germany
Successes and challenges of renewables deployment in the EU power sector

09:15 - 10:00 **Keynote**: Chuck Kutscher, National Renewable Energy Laboratory, USA
Fulfilling the promise of the Paris Agreement: The role of efficiency and renewable energy

10:00 - 10:30 Coffee Break

**Energy efficiency and renewable energy**
Chair: Robin Batterham, The University of Melbourne
Co-chair: Bill Steen, AECOM

10:30 - 10:55 **Sunshine to petrol: Thermochemistry for solar fuels**
James E. Miller, Sandia National Laboratories, USA

10:55 - 11:20 **The value of CO₂-geothermal bulk energy storage to CO₂**
Jonathan D. Ogland-Hand, The Ohio State University, USA

11:20 - 11:45 **Factors that impact the CO₂ mitigation potential of cogeneration**
Carl Bozzuto, Consultant, USA

11:45 – 12:10 **Electrochemical membrane technology for carbon dioxide capture from flue gas**
Stephen Jolly, FuelCell Energy, Inc., USA

12:10 - 13:40 Lunch

13:40 - 14:00 Networking / Free time

**Carbon capture and storage - processes – II**
Chair: Debangsu Bhattacharyya, West Virginia University
Co-chair: Carl Bozzuto, Global Resources Development & Management Company

14:00 - 14:25 **Mist injection causes high CO₂ capture in wastewater stream**
Sanjeev Jolly, Enviro Ambient Corporation, USA

14:25 - 14:50 **Zerronox Corporation: Using pulsed electron beams for the removal of carbon dioxide, nitrogen oxides and other emissions from power plants**
Stephen Kennedy, Zerronox Corporation, USA

14:50 - 15:15 **Update on the NET Power 50 MWth zero emission power station**
David Freed, 8 Rivers, USA
Tuesday, April 12, 2016 (continued)

15:15 - 15:40  Baysian uncertainty quantification and calibration of a clean-coal design code
   Troy M. Holland, Brigham Young University, USA

15:40 - 16:05  Predictive models of carbon capture systems and their validation using bench scale and pilot scale data
   Debangsu Bhattacharyya, West Virginia University, USA

16:05 - 16:30  Integration of high-fidelity CO2 sorbent models at the process scale using dynamic discrepancy
   Joel D. Kress, Los Alamos National Laboratory, USA

16:30 - 17:00  Coffee Break

CO2 utilization – II

17:00 - 17:25  Development of the first internationally accepted standard for geologic storage of carbon dioxide utilizing enhanced oil recovery (EOR) under the international standards organization (ISO) technical committee TC-265
   Steven Carpenter, EORI - University of Wyoming, USA

17:25 - 17:50  Using geologic CO2 storage for enhanced geothermal energy and water recovery and energy storage
   Thomas A. Buscheck, Lawrence Livermore National Lab, USA (Presentation by Jimmy Randolph, TerraCOH)

17:50 - 18:15  Monitoring CO2 at an enhanced oil recovery and carbon capture and storage project, Farnsworth unit, Texas
   Robert Balch, New Mexico Tech / Petroleum Recovery Research Center, USA

18:15 - 18:40  Introduction to the Wyoming Integrated Test Center
   Jason Begger, Wyoming Infrastructure Authority, USA

18:40 - 20:00  Dinner

20:00 - 21:00  Poster Session / Social Hour
Wednesday, April 13, 2016

07:00 - 08:30  Breakfast

08:30 - 09:20  **Keynote**: Wayne Xu, Chief Technology Officer, National Institute of Clean and Low-Carbon Energy, China
CO₂ mitigation opportunities in China

09:20 - 09:50  Coffee Break

**Carbon capture and storage - materials – I**
Chair: Jennifer Wilcox, Stanford University
Co-chair: Simona Liguori, Stanford University

09:50 - 10:15  **Evaluation of physical adsorbents for post-combustion CO₂ capture**
Youssef Belmabkhout, KAUST, Saudi Arabia

10:15 - 10:40  **Design and testing of sorbents for CO₂ separation of post-combustion and natural gas sweetening applications**
Jen Wilcox, Stanford University, USA

10:40 - 11:05  **CO₂ capture using nanoporous TiO(OH)₂/tetraethylpentamine**
Mohammed Assiri, University of Wyoming, USA

11:05 - 11:30  **Optimal molecular design of poly (ionic liquids) for CO₂ capture from the atmosphere**
Kun Ge, Zhejiang University, China

11:30 - 13:00  Lunch

13:00 - 14:15  Networking / Free time

**Carbon capture and storage - materials - II**
Chair: Jennifer Wilcox, Stanford University
Co-chair: Peter Psarras, Stanford University

14:15 - 14:45  **Metallic membranes for N₂ separation & post-combustion CO₂ capture improvement**
Simona Liguori, Stanford University, USA

14:45 - 15:15  **Metal oxides with ionic-electronic conductivity for thermochemical energy storage**
Eric N. Coker, Sandia National Laboratories, USA

15:15 - 15:45  **Nitrogen-functionalized porous carbons for enhanced CO₂ capture**
Peter C. Psarras, Stanford University, USA

15:45 - 16:15  Coffee Break
Wednesday, April 13, 2016 (continued)

**Negative emissions and air capture of CO₂**
Chair: Klaus Lackner, Arizona State University
Co-chair: Antti Arasto, VTT Technical Research Centre of Finland

16:15 - 16:40
Pathway to achieve negative CO₂ emissions - combining biomass with CCS
Antti Pekanpoika Arasto, VTT Technical Research Centre of Finland, Finland

16:40 - 17:05
Techno-economic challenges associated with biomass energy utilization and CCS
Carl Bozzuto, Global Resources Development & Management Company, LLC, USA

17:05 - 17:30
Direct air capture versus post combustion capture for coal fired power plants: Energy balance and life cycle environmental assessment
Christoph J. Meinrenken, Columbia University, USA (Presentation by Klaus Lackner)

17:30 - 17:55
CarbonCycle and other profitable strategies for air capture of CO₂
Deane Little, New Sky Energy, USA

17:55 - 18:20
Kinetic enhancement of adsorbent for CO₂ capture from atmosphere by porous material
Tao Wang, Zhejiang University, China

18:20 - 21:00
Conference Banquet
Thursday, April 14, 2016

07:00 - 08:30  Breakfast and departures
1. **The production of water from saline aquifers through carbon dioxide capture and storage operations**
   Kelsey A. Hunter, The Ohio State University, USA

2. **Development and planning for carbon dioxide (CO2) capture, utilization, and storage (CCUS) infrastructure in geothermal reservoirs**
   Julie K. Langenfeld, The Ohio State University, USA

3. **Optimal Geothermal Heat Extraction using CO2**
   Iti H. Patel, The Ohio State University Main Campus, USA

4. **Emissions and Deforestation Associated with Household Energy Use: A Case of the Thulamela Local Municipality, South Africa**
   Solomon Uhunamure, University of Venda, South Africa, South Africa

5. **Minimizing the energy and economic penalty of CCS power plants through waste heat recovery systems**
   Vaclav Novotny, Czech Technical University in Prague, Czech Republic

6. **Chemical Utilization of CO2 for grid-scale energy storage: a prospective scenario of China and global energy connection**
   Pengxiang Song, State Grid Corporation of China, China

7. **Perspectives of pre-combustion CCS systems for central Europe**
   Monika Vitvarova, Czech Technical University in Prague, Czech Republic

8. **Techno-economic evaluation of retrofitting CCS in an integrated pulp and board mill - Case studies**
   Antti Arasto, VTT Technical Research Centre of Finland Ltd., Finland

9. **Combined magnesium oxide/water gas shift-based CO2 capture process**
   Santosh K. Gangwal, Southern Research, USA

10. **Development of chemical looping combustion technology for bio-CCS application**
    Antti Arasto, VTT Technical Research Centre of Finland Ltd., Finland

11. **Poly(4-vinylpyridine) as a platform for robust CO2 electroreduction**
    Ponisseril Somasundaran, Columbia University, USA