



## **CCUS CONFERENCE WEEK 2022** (Tentative program as of Sept. 20<sup>th</sup>, 2022)

### **“Whole Value Chain Carbon Capture, Utilization, and Storage (CCUS)”**

**Venue: CSM & Golden Hotel, 800 11th St, Golden, CO 80401, USA**

**Time: Monday Nov. 14<sup>th</sup> - Friday Nov. 18<sup>th</sup>, 2022**

**Provided by: Petroleum Research School of Norway (NFIP), The Colorado-Norway Clean Energy Research and Educational Collaboration (ColNor), NorTex Petroleum Cluster, Rice University and Co-Hosted by Colorado School of Mines and Royal Norwegian Consulate General in San Francisco.**

**Sponsored by: Norwegian Research Council Research School Funding Program and RCN/Climit.**

#### **Conference Objectives:**

1. Emphasize Technological Solutions to the Dual Challenge of Climate Change & Energy Needs
2. Provide a Whole Value Chain Approach Overview within CCUS
3. Demonstrate how CCUS may assist in reducing energy poverty while mitigating climate change
4. Accelerate CCUS collaboration between Norway, Europe, South America, Asia, and USA
5. Provide opportunity for experts in industry and academia to collectively discuss CCUS research
6. Provide PhD students with current CCUS research status and the way forward
7. Emphasize how captured anthropogenic CO<sub>2</sub> may mitigate climate change and provide reliable, affordable and sustainable energy for the future utilizing CCUS in oil production
8. Provide oil industry opportunities to communicate needs to next generation energy engineers

#### **Scientific Program:**

- Day 1:** Climate Perspectives and CO<sub>2</sub> Capture
- Day 2:** CO<sub>2</sub> Capture and CO<sub>2</sub> Transport
- Day 3:** CO<sub>2</sub> Storage
- Day 4:** CO<sub>2</sub> Utilization in Hydrates and in Enhanced Oil Recovery (EOR)  
- Tour of CSM CCUS and EOR Laboratories
- Day 5:** CO<sub>2</sub> EOR and Whole Value Chain CCUS Future Development

#### **Social Program:**

- Day 1:** - Reception at Golden Hotel
- Day 4:** - Tour of the Coors Brewery
- Day 4:** - Conference Dinner at The Golden Hotel

**Day 1: Monday Nov. 14<sup>th</sup>****Climate Perspectives and CO<sub>2</sub> Capture****08:30** Registration and Coffee**09:00** *Welcome and Symposium Objectives*Arne Graue, Prof. of Physics, University of Bergen, Norway;

Chair of the Boards: Petroleum Research School of Norway, ColNor and NorTex Petroleum Cluster

John Bradford, Vice President for Global Initiatives, Colorado School of Mines**Climate Perspectives****09:30** *CCUS Assessment: CCUS in the US - CCS in Europe - Global Importance of CCUS*Arne Graue, Prof. of Physics, University of Bergen, Norway;

Chair of the Boards: Petroleum Research School of Norway, ColNor and NorTex Petroleum Cluster

**10:00** *Reflections on IPCC Perspectives*Klaus Lackner, Arizona State University**10:30** *Coffee***11:00** *Global Climate Concerns – The Air We Breathe: It Is Not What it Used To Be*Russ Schnell, National Oceanic and Atmospheric Administration (NOAA)**11:30** *Economic Determinants of Success in CCUS*Ian Lange, Colorado School of Mines**12:00** *Lunch***13:00** *SDG & CCUS*Charles McConnell, University of Houston (TBC) / or Mike Matson, Boston Consulting Group**13:30** *Inflation Reduction Act & Future CCUS in USA*Morgan Bazilian, CSM**14:00** *Policies and Economics of CCUS*Ken Medlock, Baker Institute (TBC)**14:30** *The Business Case for Carbon Capture, Utilization, and Storage*Anna Littlefield, CSM**15:00** *Coffee***15:30** *North American Projects and Policy Landscape vs. Energy Needs in Undeveloped Countries*Michael J. Nasi, Jackson Walker's Climate Change & Carbon Management Group



16:30 *Energy Balance of the Climate System: Contribution of Clouds and Aerosol to Uncertain Futures*  
James Wilson, University of Denver (TBC)

17:30 End of Day

19:00 - 21:00 *Reception at Golden Hotel*

## Day 2: Tuesday Nov. 15<sup>th</sup>

### CO<sub>2</sub> Capture and CO<sub>2</sub> Transport

#### CO<sub>2</sub> Capture

09:00 *CO<sub>2</sub> Capture Technologies – An Overview*  
Robert Braun, Colorado School of Mines

09:30 *Post Combustion Capture*  
NN

10:00 *CO<sub>2</sub> Capture from the Air*  
Klaus Lackner, Arizona State University

10:30 Coffee

11:00 *Precombustion and Oxyfuel Capture Technologies*  
Greg Jackson, Colorado School of Mines

11:30 *Reactive Capture Integrates CO<sub>2</sub> Capture and Conversion*  
Joshua Schaidle, NREL

12:00 *Lunch*

#### CO<sub>2</sub> Transport

13:00 *Pipelines – The Safest Way for CO<sub>2</sub> to Travel*  
Bailian Chen, Los Alamos Lab

13:30 *Offshore Challenges - Ships or Pipeline*  
NN



- 14:00 *The Intersection of Environment and EOR, How Carbon Capture is Changing Tertiary Recovery*  
Bob Balch, PRRC, New Mexico Tech (TBC)
- 14:30 *CCUS in the USA and Industry Opportunities*  
Nigel Jenvey, Baker Hughes (TBC)
- 15:00 *Coffee*
- 15:30 *Panel Debate: USA and the World on CCUS – Energy Poverty, Climate Change & CCUS -  
Technology Solutions or Climate Ideology?*  
Moderator: John Bradford & Arne Graue, Univ. of Bergen, Norway
- 17:00 End of Day

### Day 3: Wednesday Nov. 16<sup>th</sup>

#### CO<sub>2</sub> Storage

- 09:00 *Overview of CO<sub>2</sub> Storage Options*  
Steve Melzer, Melzer Consulting
- 09:30 *Regulatory Challenges in CO<sub>2</sub> Storage*  
Michael Moore, USEA
- 10:00 *Geomechanics in CO<sub>2</sub> Storage / or CO<sub>2</sub> Storage*  
NN, Colorado School of Mines
- 10:30 *Coffee*
- 11:00 *CO<sub>2</sub> Atlas Developments and CO<sub>2</sub> Storage Achievements*  
Erik Rundell, Norwegian Petroleum Directorate
- 11:30 *Global Status: CO<sub>2</sub> Storage vs. CCUS & Future Developments*  
Tim Dixon, IEAGHG / Jarad Daniels, Global CCS Institute (TBC)
- 12:00 *Lunch*
- 13:00 *CCUS in USA & Global Project Developments - Economics, Technology and Policies*  
Vella Kuuskra, AEC (TBC)
- 13:30 *The Longship Project: Whole Value Chain CCUS Demonstration Project on the Norwegian  
Continental Shelf*  
Erik Rundell, Norwegian Petroleum Directorate



- 14:00 *Ongoing and Planned Large Scale CO<sub>2</sub> Storage Projects Worldwide*  
Erik Lindeberg, SINTEF (TBC)
- 14:30 *4D VSP (Vertical Seismic Profiling) Monitoring at the Farnsworth CO<sub>2</sub>-EOR Field*  
Lianjie Huang, Los Alamos Lab
- 15:00 *Coffee*
- 15:30 *Numerical Simulation of CO<sub>2</sub> Storage in Saline Aquifers*  
Yu-Shu Wu, Colorado School of Mines (TBC)
- 16:15 *CO<sub>2</sub> Storage, Monitoring, Verification and Accounting*  
Bjørn Paulsson, Paulsson Inc.
- 17:00 End of Day

#### **Day 4: Thursday Nov. 17<sup>th</sup>**

#### **CO<sub>2</sub> Utilization in Hydrates and in Enhanced Oil Recovery (EOR)**

- Tour of CSM CCUS and EOR Laboratories
- Tour of Coors Brewery

- 09:00 *Fundamentals of Hydrates, Climate Perspectives, and Energy Potentials*  
Carolyn Kho, Colorado School of Mines
- 09:30 *CO<sub>2</sub> Storage in Hydrates with Associated Methane Production*  
Arne Graue, University of Bergen
- 10:00 *Field Experiences from CO<sub>2</sub> Injections in Hydrates: North Slope CO<sub>2</sub>-CH<sub>4</sub> Exchange Project*  
Arne Graue, University of Bergen
- 10:30 *Coffee*
- 11:00 *CO<sub>2</sub> EOR Assessment*  
NN, Oxy Inc.
- 12:00 *Lunch*



## CO<sub>2</sub> Utilization in EOR as CCUS

- 13:00 *CO<sub>2</sub> for EOR – Historical Perspectives, Current State of the Art Technology Status, and Technological Challenges*  
Larry Lake, UT, Austin or (Ganesh C. Thakur, Univ. of Houston, 2012 SPE President & Former VP Chevron and Ramanan Krishnamoorti, University of Houston.)
- 14:00 *Utilizing CO<sub>2</sub> in Beer Manufacturing, Tour of Coors Brewery for Group 1/CSM Lab Tour for Group 2*
- 15:00 *Utilizing CO<sub>2</sub> in Beer Manufacturing, Tour of Coors Brewery for Group 2/CSM Lab Tour for Group 1*
- 17:00 End of Day
- 19:00 *Conference Dinner at the Golden Hotel*

## Day 5: Friday Nov. 18<sup>th</sup>

### CO<sub>2</sub> EOR, Policy, Economics and Whole Value Chain CCUS Future Development

- 09:00 *How Foam Develops Apparent Viscosity in CO<sub>2</sub> EOR*  
George Hirasaki, Rice University
- 09:30 *CO<sub>2</sub> Foam EOR for Mobility Control*  
Arne Graue, University of Bergen
- 10:00 *CO<sub>2</sub> Foam EOR Field Pilots in Texas*  
Zachary Alcorn, University of Bergen
- 10:30 *Coffee*
- 11:00 *Historical Overview of CO<sub>2</sub> EOR Field Applications*  
David Schechter, Texas A&M University (or David Hamilton, Oxy) (TBC)
- 12:00 *Lunch*
- 13:00 *Global Strategies to Meet the Dual Challenge*  
Arne Graue, University of Bergen
- 13:30 *Current CO<sub>2</sub> EOR Perspectives*  
Hossein Kazemi, Colorado School of Mines



14:30 Open slot

15:00 *Synthesize Student Learning and Discussion*  
John Bradford, Colorado School of Mines

15:30 End of Conference