



Hydrogen Economy Workshop May 13 – May 14, 2020

The challenge of drastically reducing greenhouse gas (GHG) during the 21st century requires a multi-dimensional strategy, and one of the critical elements is the use of Hydrogen with low GHG footprint. Developing a viable supply chain for Hydrogen requires a cost-effective production and distribution, sufficient demand (scale), and a regulatory structure that would provide an incentive to facilitate the introduction of an economically viable Hydrogen supply chain.

This workshop aims to address these issues focusing on the US (in particular, California markets). We will consider the challenges and opportunities of the Hydrogen production from both renewable resources (Green) and fossils with carbon capture (Blue). We will also focus on the US Gulf coast/Texas, which is an ideal location for the production from Natural Gas with carbon capture and storage (CCS). The hosts of the workshop are Shell and the Energy & Biosciences Institute (EBI), which is a collaborative research network of University of California at Berkeley, University of Illinois's Champaign Urbana, and Lawrence Berkeley Lab.

The workshop will identify the opportunities, demand, and constraints for establishing the Hydrogen supply. Both the opportunities as well as challenges are affected by government policies, and we will hear representatives of the Federal and State governments, providing their perspective on reliable Hydrogen. We will learn about the results of research in universities, government, and companies that have identified some of the opportunities to supply clean Hydrogen. We will determine the possibilities to use Hydrogen in different sectors, including ports, transport, data centers, forklifts/warehouses, concrete, and blending into natural gas supply chain. Finally, we will organize discussion groups where participants will address some of the significant issues associated with the supply of Hydrogen, government policy, and demand.

The first day will mostly address supply and regulation. The second day will provide an overview of opportunities for demand. We aim to get a better understanding of some of the opportunities that can incentivize the development of an extensive infrastructure, which will target supply in California. We would also like to quantitatively assess the amount of Hydrogen that various sectors envision they are likely to demand under different scenarios.

For more information, please, visit: www.shellebihydrogen.org.



Hydrogen Economy Workshop Agenda

May 13 - Day 1

8:30-9:10 am (PT) 10:30-11:10 am (CDT)	<i>Session 1: Introduction</i> Welcome and Virtual Orientation, Conference Overview Roundtable Participant Introduction - Name and Organization Jotsu Liao (Shell), David Zilberman (UC Berkeley / EBI)
9:10-9:30 am (PT) 11:10-11:30 am (CDT)	Shell - EBI Workshop. H2 Scale-up Activation Ajay Mehta and Joe Powell (Shell)
9:30-9:55 am (PT) 11:30-11:55 am (CDT)	Opportunities for Hydrogen Scale Up through DOE's H2@Scale Initiative Sunita Satyapal (DOE)
9:55-10:10 am (PT) 11:55-12:10 pm (CDT)	TX Lunch Break
10:10-10:40 am (PT) 12:10-12:40 pm (CDT)	H2@Scale: Opportunities for Hydrogen as an Energy Intermediate Mark Ruth (NREL)
10:40-11:00 am (PT) 12:40-1:00 pm (CDT)	Prospects for H2 in the Future Energy System Joan Ogden (UC Davis)
11:00-11:25 am (PT) 1:00-1:25 pm (CDT)	CA Policies and Attitudes Towards Hydrogen Technology Clifford Rechtschaffen (CA Public Utilities Commission)
11:25-11:55 am (PT) 1:25-1:55 pm (CDT)	CA Lunch Break
11:55-12:15 pm (PT) 1:55-2:15 pm (CDT)	<i>Session 2: California Policies and Opportunities</i> Beyond Power: Reimagining the Energy Ecosystem with Green Hydrogen Janice Lin (Strategen Consulting)
12:15-12:35 pm (PT) 2:15-2:35 pm (CDT)	Hydrogen in California Arnab A. Chatterjee (Shell)
12:35-12:55 pm (PT) 2:35-2:55 pm (CDT)	Opportunities for Blue Hydrogen in California Roger Aines (LLNL)
12:55-1:15 pm (PT) 2:55-3:15 pm (CDT)	Clean Transportation Program: A Hydrogen Perspective Ben De Alba (CA Energy Commission)
1:15-2:10 pm (PT) 3:15-4:10 pm (CDT)	<i>Session 3: Break out Discussions</i> Group 1: California Policies and Attitudes towards Hydrogen Technology David Zilberman (UC Berkeley / EBI) Group 2: The Role and Potential of Hydrogen in California Tim Olson (CA Energy Commission) Group 3: Blue H2 Value Proposition for California John D. Coates (EBI)



2:10-2:40 pm (PT)	Break Out Sessions' Summary Presentations (10 min / group)
4:10-4:40 pm (CDT)	Plenary
2:40-3:10 pm (PT)	<i>Day 1 Close-out</i>
4:40-5:10 pm (CDT)	Highlights and Summary, Feedback for Day 1 Joe Powell (Shell), David Zilberman (UC Berkeley/EBI)

May 14 - Day 2

8:30-9:00 am (PT)	Introduction, Welcome and Virtual Orientation, Day 1 Summary H2 Scale-up Market Activation Nikunj Gupta (Shell)
10:30-11:00 am (CDT)	
9:00-9:20 am (PT)	<i>Session 1: Outside the US</i> On Route to CO ₂ -free Fuels: Hydrogen. Germany Heavy Duty Roadmap Wolfgang Warnecke (Shell)
11:00-11:20 am (CDT)	
9:20-9:40 am (PT)	Energiewende – More than a word? Perspectives on the Energy Transition in Germany Jens Müller-Belau (Shell)
11:20-11:40 am (CDT)	
9:40-9:45 am (PT)	Break
11:40-11:45 am (CDT)	
9:45-10:05 am (PT)	<i>Session 2: Texas and Gulf Coast</i> Hydrogen @ Scale in Texas. DOE H2@Scale Demonstration Project at UT Mike Lewis (UT-Austin)
11:45-12:05 pm (CDT)	
10:05-10:25 am (PT)	Why Houston Will Be the Capital of a Low Carbon Energy World Brett Perlman (Center for Houston's Future)
12:05-12:25 pm (CDT)	
10:25-10:30 am (PT)	Q&A
12:25-12:30 pm (CDT)	
10:30-10:45 am (PT)	TX Lunch Break
12:30-12:45 pm (CDT)	
10:45-11:05 am (PT)	<i>Session 3: Industries and Services</i> Opportunities to Use Hydrogen in Concrete Production Paulo Monteiro (UC Berkeley)
12:45-1:05 pm (CDT)	
11:05-11:25 am (PT)	Hydrogen-Powered Hyperscale Datacenters Mark Monroe (Microsoft)
1:05-1:25 pm (CDT)	
11:25-11:45 am (PT)	Emerging Applications for H ₂ : Iron/Steel, Combined Heat and Power, Grid Support Max Wei (LBNL)
1:25-1:45 pm (CDT)	
11:45-11:50 am (PT)	Q&A
1:45-1:50 pm (CDT)	
11:50-11:55 am (PT)	Break
1:50-1:55 pm (CDT)	



11:55-12:15 pm (PT) 1:55-2:15 pm (CDT)	Hydrogen in Lift Trucks, Forklifts Commercial Markets Tim Cortes (Plug Power)
12:15-12:35 pm (PT) 2:15-2:35 pm (CDT)	Hydrogen in Transport and Trucks Craig Scott (Toyota HD Infrastructure)
12:35-12:40 pm (PT) 2:35-2:40 pm (CDT)	Q&A
12:40-12:55 pm (PT) 2:40-2:55 pm (CDT)	CA Lunch Break
12:55-1:15 pm (PT) 2:55-3:15 pm (CDT)	Clean Hydrogen to US Energy Supply Chain Ronald L. Kent (SoCalGas)
1:15-1:35 pm (PT) 3:15-3:35 pm (CDT)	Moving Towards Zero Emissions: Opportunities and Challenges for Hydrogen Fuel Jacob Goldberg (Port of LA)
1:35-1:40 pm (PT) 3:35-3:40 pm (CDT)	Q&A
1:40-1:45 pm (PT) 3:40-3:45 pm (CDT)	Break
1:45-2:40 pm (PT) 3:45-4:40 pm (CDT)	<i>Session 4: Break out Discussions</i> Group 1: What are near-term opportunities for large scale H2 utilization? David Zilberman (EBI) Group 2: How can policy help realize this opportunity? Jotsu Liao (Shell) Group 3: What are the major technical (scientific) challenges? Bert Harvey (Shell)
2:40-3:10 pm (PT) 4:40-5:10 pm (CDT)	Break Out Sessions' Summary Presentations (10 min / group) Plenary
3:10-3:30 pm (PT) 5:10-5:30 pm (CDT)	<i>Day 2 Close-out</i> Summary of the Workshop, Feedback and Questions Jotsu Liao (Shell), David Zilberman (UC Berkeley / EBI)