

H2@Scale Workshop Agenda

November 16-17 2016, National Renewable Energy Lab – Golden, CO
San Juan Conference Room, Research Support Facility

Objective

The purpose of this workshop is to identify the current barriers and research needs for wide-scale deployment of clean and sustainable hydrogen production. The workshop will guide the development of a DOE roadmap on research, development, and demonstration activities that can enable hydrogen as an energy carrier at a national scale.

Day 1 – November 16

8:00 – 8:30 AM Registration

8:30 – 10:00 AM Plenary Session

- Workshop Overview, *Reuben Sarkar (Deputy Assistant Secretary for Transportation, U.S. Department of Energy) and Dr. Sunita Satyapal (Director of U.S. Department of Energy Fuel Cell Technologies Office)*
- H2@Scale Overview, *Dr. Bryan Pivovar (Manager of Electrochemical Engineering and Materials Chemistry Group at the National Renewable Energy Laboratory)*
- Electrolysis Integration with Energy Infrastructure, *Dr. Jeffrey Reed (Director of Business Strategy and Advanced Technology, SoCal Gas)*
- Decarbonizing Industrial Processes using Renewable Hydrogen, *Dr. Richard Boardman (Energy Systems Integration Initiatives at Idaho National Laboratory)*

10:00 – 10:15 PM Break

10:15 – 11:45 AM DOE Collaboration Panel

Discover the cross-cutting value of hydrogen production to a variety of DOE offices. Offices represented will include the Office of Energy Policy and Systems Analysis (*Sarah Garman, Policy Analyst*), Solar Energy Technologies Office (*Dr. Levi Irwin, Technology Development Manager*), Nuclear Energy (*Dr. Carl Sink, Director*), Fossil Energy (*David Lyons, Technology Manager*), Manufacturing (*Dr. Sridhar Seetharaman, Senior Technical Advisor*), Bioenergy Technologies Office (*Kevin Craig, Program Manager of Conversion Technologies*), Geothermal Technologies Office (*Holly Thomas, Technology Manager of Mineral Recovery*), and Office of Energy Efficiency and Renewable Energy (*Kevin Lynn, Director of Grid Integration*).

11:45 – 1:00 PM Networking Lunch

1:00 – 2:00 PM Hydrogen Production, Storage, and Distribution: Overview and Challenges

Presentations will describe the current status and R&D challenges associated with large-scale electrolysis and hydrogen delivery technologies, such as pipelines, caverns, liquefaction, and fueling stations. Presenters will include *Dr. Kathy Ayers (Vice President of Research and Development, Proton Onsite)*, along with representatives from hydrogen infrastructure development and industrial gas companies (*Tim Brown, First Element, & Al Burgunder, Praxair*)

2:00 – 2:15 PM Break

2:15 – 3:45 PM Grid and Utilities Panel

This panel will consist of presentations regarding the compatibility of hydrogen production with current and future electricity generation technologies. The panel will be kicked off with a presentation from *Michael Pesin (Deputy Assistant Secretary, Advanced Grid Research and Development at the U.S. DOE)*.

Representatives from electric utilities including *Dr. Noah Meeks (Southern Company)*, *Marino Monardi (PG&E Corporation)*, and *Angelina Galiteva (California Independent System Operator)* will then share their perspectives, along with *Evolved Energy Research* providing a high-level analysis aligned with meeting global climate goals.

3:45 – 5:15 PM Day 1 Breakout Sessions: H2@Scale Path Forward

Discuss the role of government, industry, and academia in addressing R&D, economic, and policy barriers to wide-scale deployment of renewable and clean hydrogen. Identify priority needs in R&D that will enable implementation of the H2@Scale vision. Breakout sessions will be divided by topic, including:

1. Incorporating hydrogen production with current and future power generation
2. Integrating value-add applications of hydrogen in current and future markets
3. Infrastructure needs for wide-scale deployment of hydrogen

5:15 – 5:30 PM Report Out

6:00 – 9:00 PM Networking dinner and reception

Table Mountain Inn, 1310 Washington Ave, Golden, CO 80401

Will include H2@Scale booth for feedback, and educational opportunities.

Day 2 – November 17

8:00 – 9:45 AM Industrial End-Uses Panel

This panel will be kicked off with a presentation from *Dr. Mark Johnson (Director of the U.S. DOE's EERE's Advanced Manufacturing Office)*. *Dr. Brian Walker (Portfolio Manager at the U.S. DOE's EERE's Strategic Programs Office)* will then give a presentation on the projected changes in electrification and waste heat in the U.S. in the near to mid term. *Jon La Follet (Shell)* will give a presentation on the hydrogen supply chain and infrastructure needs for widescale deployment. These presentations will be followed by presentations on the industrial uses of hydrogen in ammonia production and metals refining, by *Dr. Grigori Soloveichik (Program Director, DOE ARPA-E)* and *Dr. Hong Yong Sohn (University of Utah)*.

9:45 – 10:00 AM Break

10:00 – 11:15 AM Day 2 Breakout Sessions: Industrial End-Uses

Discussion of opportunities and barriers in using renewable and low-carbon hydrogen in end-use applications. Attendees will have a chance to continue discussions from Day 1. Day 2 breakout session topics will focus on:

1. Chemical applications of hydrogen, such as ammonia production
2. Use of hydrogen in fuels (e.g. synthetic gas, upgrading of petroleum, conversion of bio-oils)
3. Integration of hydrogen with metals refining (e.g. use of hydrogen as a reductant)

11:15 – 1:00 PM Working Lunch, Report Out and Closing Remarks

1:00 - 2:30 PM Optional Site Tour