



Electrolysis Breakout Report Out

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Hydrogen Shot Summit

Electrolysis Breakout - Overview

Objective – With a focus on the primary near-term commercial electrolyzer technologies

- Understand the state-of-the-art status for performance and commercialization,
- Key challenges to enable achieving the Hydrogen Shot goal of \$1/kg H₂ by 2030 for the technology,
- Identify promising applications for the technology's deployment, and
- Identify the role the DOE can play to help enable achieving the goal.

Breakout Organization –

- Two expert presentations to “set the stage” for Low and High-Temperature Electrolysis
- Five Industry Expert Panels –
 - Low-temperature (Alkaline and PEM) Electrolyzer Industry Panel
 - High-temperature (SOEC) Electrolyzer Industry Panel
 - Stack Component Supply Chain Panel
 - Balance-of-Plant Supply Chain Panel
 - Integrated/Hybrid Energy Systems Panel

Electrolysis Breakout - By the Numbers

Participants -

- Presenters & Moderators from National Laboratories: 5
- Panelists from Industry and Academia 21
- Attendees ≥ 970

Demographics of attendees (based on Menti responses) –

– US: 82.5% - Non-US: 17.5% Countries represented ≥ 16

Attendees that self-identified as:	% of respondents
Currently involved with electrolyzer technology	71
Involved with electrolyzer R&D and/or commercialization	29
Involved with electrolyzer deployment and demonstrations	19
Interested most in low-temperature electrolyzer technology	11
Interested most in high-temperature electrolyzer technology	13
Interested in both low and High-temperature electrolyzer technology	24

Electrolyzer Breakout – Key Points of Discussion

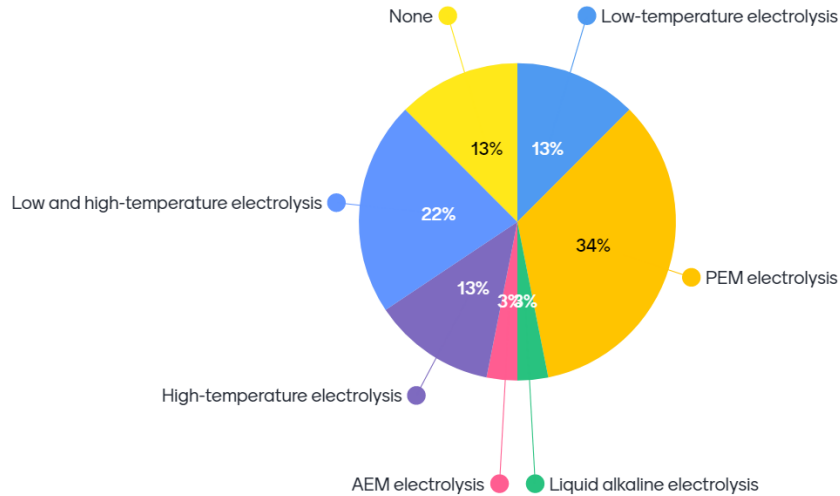
- Electrolysis is happening, customers/markets are needed to drive down costs
 - Needs investment to maintain and advance U.S. position, large investments are occurring in Europe and Asia
 - Established industries exist for component supply chain, electrolyzer volume needed for component systems to be optimized for electrolysis and drive down costs
 - Government funding critical at this stage, for large-scale demonstrations and deployments
- Feeling is that there is a role for the different electrolyzer technologies going forward
 - Different technologies have various pros and cons and some will be more applicable for certain applications than others
 - Monitoring developments in the other technologies, but not concerned over competition
 - Many of the companies are involved with more than one of the electrolyzer technologies
- Intermittent or dynamic cycling is not seen as a major concern for electrolyzer operation
 - Turn-down preferable over turn-off
 - Fast response for both LTE and HTE technologies
 - Need to consider impact on balance-of-system components as well as the stacks
 - Bigger concern is stranded assets with low-capacity factor

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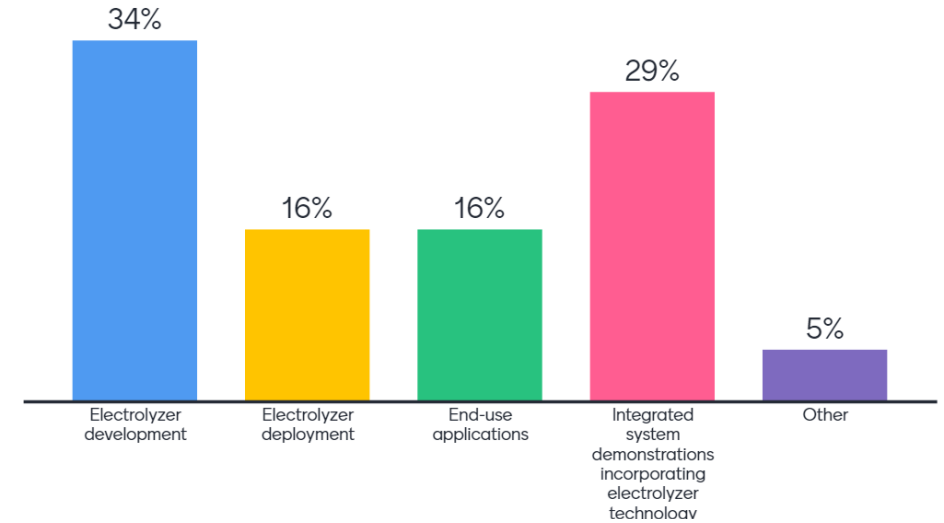
- Use of precious metals (e.g., Ir in PEM) and materials isn't seen as a critical concern
 - Loadings are expected to decrease as technology advances
 - Cost additive to the cost of hydrogen is relatively low
 - Recycling of electrolyzers at end-of-life will recover a lot of the precious metals and other materials
- There needs to be a consideration of the entire system to drive down costs
 - Modularization – manufacturing higher volumes of standard systems
 - Continuous in situ monitoring with embedded sensors
 - Component suppliers should be part of the “team” to optimize overall systems
- Key point raised
 - Having a trained workforce is a critical concern across the supply chain
- **High level summary and conclusions**
 - ***Clean hydrogen production through electrolysis is happening, however aggressive advancement is needed to achieve the DOE's Hydrogen Shot goal. Accelerating deployment of the technology is a key need in the near-term.***

Additional Menti results

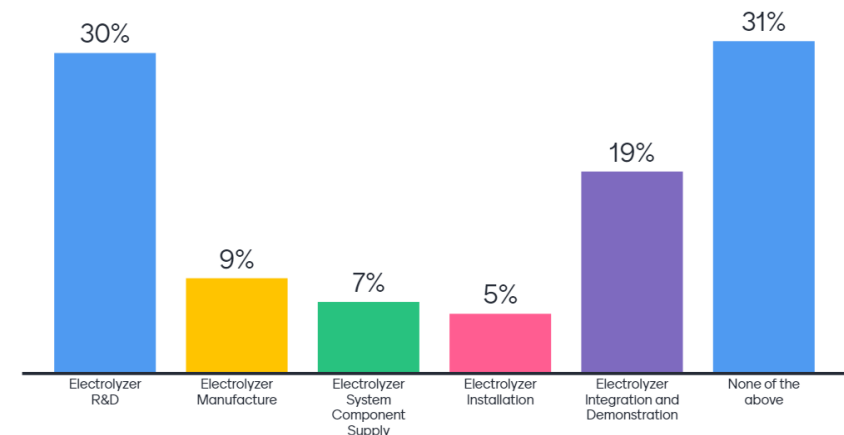
What electrolyzer technology are you most interested in?



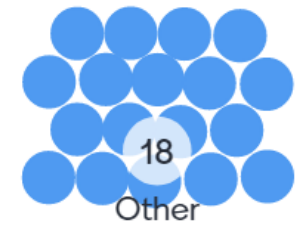
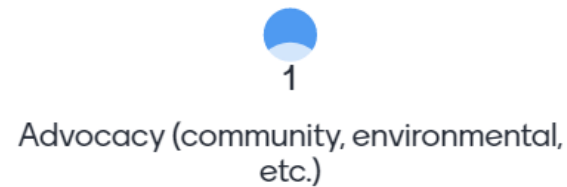
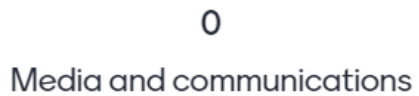
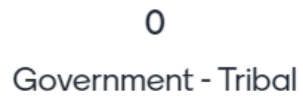
What is your primary interest?



What area(s) are you affiliated with?



What is your primary affiliation?



Additional Menti things

If you are in the hydrogen industry, which of the following do you consider your organization to be?

