

HTAC Working Group Status Update

“Hydrogen As Enabler For
Renewables” Working Group

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Background

- SEC.807(c) of the EPACT states, “The “Technical Advisory Committee” shall review and make recommendations to the Secretary on –
 - (1) the implementation of programs and activities under this title;
 - (2) the safety, economical and environment consequences of technologies for the production, distribution, deliver, storage or use of hydrogen energy and fuel cells; and
 - (3) the plan under section 804.”
- In carrying out its role in Item (2) above, and in prioritizing its activities for 2010 and 2011, the HTAC identified the need for specific consideration of how hydrogen might be used to enable high penetrations of variable renewal energy.

Working Group Purpose

Examine the various ways in which hydrogen might serve as an enabler for high penetrations of variable renewable energy in the United States. Summarize the opportunities and challenges of using hydrogen as an enabler for renewables in a white paper for DOE executive management.

Working Group Members

- Peter Bond (Brookhaven National Laboratory)
- Robert Friedland (*Outside Member* - Proton Energy Systems)
- David Friedman (Union of Concerned Scientists)
- Maurice Kaya (Energy and Management Consultant)
- Harol Koyama (IdaTech)
- Robert McGillivray (*Outside Member* – Hydrogenics)
- Frank Novachek (Xcel Energy)
- Robert Shaw (Aretê Corporation)
- George Sverdrup (*Outside Member* – National Renewable Energy Laboratory)

Scope

The types of applications that will be considered by the Working Group include, but are not limited to, the following:

- Energy storage
 - Integration of variable renewable resources (ramp rate controls, time shifting from off-peak to on-peak, reserve margins, etc.)
 - Reduce variable renewable energy curtailments due to baseload bottoming and/or transmission and distribution system constraints
- Energy transmission & distribution
 - Use of hydrogen production & pipeline transport where advantageous over electric transmission lines to move renewable energy to markets
 - Importance of grid constraints on hydrogen system costs (ie need for transformers?)
 - Use high voltage DC lines for transmission of wind/solar electricity to areas where electrolysis can take place?
- Improved renewable resource utilization via vehicle fuel production
 - Large scale storage for more reliable delivery of hydrogen produced from renewable energy to transportation markets
 - Utilization of excess renewable energy (e.g. geothermal, waste biofuels, etc.) to produce hydrogen transportation fuel
 - Use of otherwise curtailed or stranded variable renewable energy for vehicle fuel production when the electric system cannot use it
- Supplement to Natural Gas System
 - Use of hydrogen production from renewables to supplement natural gas in the gas transportation and distribution systems, thereby reducing CO2 emissions
 - Use of hydrogen production from renewables to supplement natural gas fuel for combustion and combined-cycle turbines

Working Group Deliverables

- ❑ Summaries of conclusions from relevant publications on the subject of renewables enabling large scale renewables
- ❑ Summary of the most promising roles that hydrogen could play in enabling large scale penetrations of renewables, along with an overview of competing technologies in those roles
- ❑ Prioritized list of key advances required to position hydrogen as a competitive technology for enabling large scale penetration of renewables
- ❑ Recommendations for new research, studies, and demonstrations that could expedite the achievement of the key advances identified

Plan

- ❑ Develop an inventory of existing research relevant to our scope and objectives.
- ❑ Assimilate existing research identified above, and summarize conclusions.
- ❑ Brainstorm areas for Working Group focus.
- ❑ Prioritize Working Group focus areas.
- ❑ Develop plans/assignments for evaluating focus areas.
- ❑ Assimilate and/or develop comparative analyses of hydrogen solutions versus those of other alternatives related to the focus areas.
- ❑ Conduct evaluations and develop recommendations.
- ❑ Document efforts, results and recommendations.

Current Inventory of Studies

- FY 2011 Hydrogen Production Portfolio studies (EERE Fuel Cell Technologies Program) - *Attached*
- Currently requested/being assembled – *back to 2006*
 - Related pre-FY2011 Hydrogen Production Portfolio studies
 - List of NREL related studies
 - List of related studies from Fred Joseck's analysis portfolio
- **Others studies recommended by HTAC?**

HTAC Feedback?

- Scope?
- Approach?
- Missing Team Members?
- Deliverables?