DOE Materials-Based Hydrogen Storage Summit
National Renewable Energy Laboratory
Golden, CO
27-28 January 2015

Participant Survey Results

Number of completed surveys received: 49

Question #	Question	Response	#	Percent
1	Do you feel the meeting objectives were clearly communicated?	Yes	48	98%
		No	1	2%
2a	Did the presentations provide useful information for the discussions?	Yes	48.5	99%
		No	0.5	1%
2b	The technical level of the presentations was?	Too high	2	4%
		Just right	43	88%
		Too low	3	6%
		No response	2	4%
2c	The length of the presentations were?	Too long	2.5	5%
		Just right	45	92%
		Too short	1.5	3%

2d: Concerning the technical presentations:

- Could do a follow-up for the niche applications to rank and understand the business case.
- There were a lot of assumptions / equations omitted from the presentations that should have been included.
- Would have appreciated a bit more science content in some of the Day 1 talks.
- A couple of the presentations were not focused enough and went too long into unnecessary detail. The materials-based presentations seemed scoped about right.
- More time for questions is needed, after every presentation.
- Would like to have had a few more review presentations on the state of the art in MH, CH, and Ads.
- I liked the reverse engineering talks. Others not as useful. Bart's talk was good.
- All nice and informative presentations.
- You did a great job keeping on schedule.
- Majority of talks were very well presented. Mike Veenstra's was particularly informative and useful.
- These are excellent and gave the view of different stakeholders, their needs and material requirements.
- Talks on Wednesday didn't have universal relevance (good for some sub-specialties).
- Each presentation lacked a more concise summary that links the outcome of the programs with specific gaps in performance of materials.
- A Q&A session following the presentation could have been helpful.

- The presentations did well to set the stage for the breakout sessions, however, if they were more technical, perhaps the discussions could be more detailed / directed.
- The tech presentations did a good job to set the stage for follow-up discussions.
- Instead of presentations, an attendee list might be helpful.
- This is a summit that addresses materials needs. Presenters should focus on progress made and gaps. Not pure science presented as society conferences.
- I felt all talks were relevant and sufficiently detailed.
- Good job.
- It would have been useful to have a presentation regarding material-based hydrogen systems that have been demonstrated since the learning for these systems are important.

Question #	Question	Response	#	Percent
3a	Session attended	MH	12.5	25%
		CH	15.5	32%
		Adsorbents	19	39%
		No response	2	4%
3b	The length of breakout sessions were?	Too long	5	10%
		Just right	41	84%
		Too short	1	2%
		No response	2	4%
3c	Do you feel you had adequate opportunity to express your views?	Yes	45	92%
		No	1	2%
		No response	3	6%
3d	Do you feel the report out was reflective of the breakout discussion?	Yes	45	92%
		No	2	4%
		No response	2	4%
		Uncertain		

3e: Concerning the breakout sessions:

- I believe breakouts are very effective in drawing out good ideas.
- There was not enough guidance and direction. Made for some entertaining discussion, but limited usefulness.
- Would be helpful for DOE to issue a report out to the attendees to possibly get further feedback.
- Good discussion. Educational on state-of-art/knowledge on H_2 storage materials.
- My session went well.
- Kevin did an excellent job moderating the sessions and summarizing the outcome.
- There is a need to support cross-cutting capabilities on both theory and experiments which cover multiple length-and-time scales and are material agnostic.
- Agreed with conclusions of most important areas for future FOAs to address.
- This was well formatted, kept pretty much on track (despite the tendency for side discussions) and opened a pretty non-combative discussion of issues. I feel that specifics were purposefully withheld by many however.
- I feel that it was hard for the MH breakout session to provide a path to solving the issues—the MH report out wasn't concrete enough to help DOE formulate programs.

- Variable quality. The break out was poor. Discussions on Wednesday were insightful. It seemed most participants were trying to support their current lives of research rather than highlighting new areas (admittedly difficult).
- The personal beliefs of the individuals presenting the effort should be left out of the discussion.
- We identified that reversibility was important. But it might have been useful to go into more detail about what was known / suspected.
- Good exchange of info—healthy disagreements, but finally able to reach consensus—good convergence of views.
- Good cross sections of the industry = good discussion.
- I did not attend these breakouts, but the report outs were good.
- People unlikely to share what could be their response to a FOA.
- Scope of comments and concerns were varied with some better than others. However no ranting or really "off-the-wall" speeches.
- The free form breakout sessions could be improved since the discussion was random and not focused. I recommend a different approach that would have additional structure.
- Renewable carbohydrate as a high-density H_2 carrier is a disruptive concept, but it is against current DOE-funded projects. So existing researchers are against it, because they may lose their career. Megatrend cannot be changed.
- I liked the recommendation from the chemical hydride session, also from Majzoub's lecture that there are a whole bunch of issues of fundamental basic research that need to be addressed in order to make progress in the areas of applications. I feel the same is true for metal hydrides and adsorbents.

4. Please provide comments on your opinion of the overall quality of the discussions:

- Occasionally struggles to stay within the scope of the discussion.
- See above.
- OK.
- Good / lively / informative.
- Discussions were good quality. Moderators did a good job keeping things on track; i.e., not derailing by side issues and personal agendas.
- A bit too much focus on tangential issues (e.g., spider charts), but good detail in general.
- Mostly good. I thought we should have taken a wider view earlier rather than shooting down specific projects which took place a little too often in my opinion.
- Very good.
- Discussions limited to competitive issues. How can this be averted?
- Good discussions, some PIs too focused on their own work. Hard to prevent that.
- High quality and frank discussions.
- The discussions were fine considering the uncertainties in obtaining the future support.
- Breakout #1 was great. Good overview of challenges and good consensus of problems/concerns. Glad it was a mixture of presenters (Ford, national lab) and topics.
- Good discussions on a variety of topics.
- A few people tended to dominate the discussions with rather repetitive ideas. Going around one by one to hear from each person in the last hour was a great idea.
- The niche applications breakout was the most useful, I think.
- Very impressive with the way the program managers are open and flexible.
- Very productive and worthwhile meeting.

- Good!
- High quality—candid but respectful.
- Very good.
- Presenters knew their material.
- Limited funding for fuel cells and H_2 storage makes projects so competitive that it is difficult for people to get into the required detailed discussions.
- Good, but many were narrowly focused.
- Somewhat constrained at times, but helpful.
- Overall, workshop turned out better than I expected.
- Not open enough. A small group dominates it.
- Fruitful, candid discussions. Very productive and informative.

5. Are there any topics or issues you would have like to discuss but were not addressed? If so what are they?

- The forecourt issues relevant to hydrogen storage could have been discussed further.
- More discussion on funding opportunities / potential.
- Material shelf life is an issue that doesn't seem to be addressed well by the DOE.
- Need teams to focus on materials development.
- Standard measurements for evaluating the storage materials. Consistent usage of terminology (adsorption capacity, etc.).
- Some individuals don't see the picture from DOE perspective and wish to only sell the science they want to. Tiresome.
- A detailed presentation on the 700 bar high pressure system would have provided a good point for comparison.
- Need to invent some fuel production of promising fuels and do some applications and refine fuel.
- $CH_2O + H_2O \rightarrow 2H_2 + CO_2$. Starch has a volumetric density of >100 kg H_2/m^3 gravimetric density of 8.3%
- I wish the last presentation "Bridging fundamental and applied research" had been a plenary session.

Question #	Question	Response	#	Percent
6	Was participation in the workshop beneficial to you?	Yes		88%
		Uncertain		12%
		No		0%

7. Please provide additional comments about the workshop on the reverse side.

- More coordination with other DOE/DOD/science groups.
- It was very good and informative at times, but also frustrating at times.
- Mostly beneficial for the discussion during the applied/functional gaps.
- I wonder if it makes sense to "break down" the seemingly artificial barriers that exist because of the stove piping of "metal hydrides", "chem hydrogen", and adsorbents. Maybe it's time to merge??

- Maybe the program should focus on more applied projects and basic science projects go to other programs.
- Good for networking.
- After participating in this summit, I further believe that renewable sugar (CH_2O) will be the best H_2 carrier. All technical obstacles can be solved by integrating multidisciplinary efforts. This is a technical megatrend! No one will stop or prevent it. The only difference is who will do it first and who will be the leader in the next revolution. Check website sugarcar.com