Breakout Group 4: Early Markets and Demonstrations

Participants

Name	Organization
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Graham Hards	Johnson Matthey Fuel Cells
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Mark Aitken	Ansaldo Fuel Cells
Jack Paterson	JA Paterson LLC
Randy Petri	Versa Power
Steven Ragsdale	Cyvolt Energy System
Pete Devlin (Facilitator)	U.S. Department of Energy
Kevin McMurphy (Scribe)	U.S. Department of Energy

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GOALS, QUESTIONS AND COMMENTS

- Goals
  - Get something like 1000 units in use as quickly as possible
  - Practical consumer exposure
  - Supply chain support to stop attrition
  - Identify codes and standards gaps
  - Increase private equity confidence
  - Performance validation
- Questions
  - Can the government subsidize the difference in cost between (for instance) a diesel generator at Pep Boys and a fuel cell backup unit?
  - Can DOE get more involved in venture capital? The U.S. Fuel Cell Council has balked at this offer in the past
  - How does cost sharing work with multiple agencies?
  - Can a state take up a portion of the cost share?
  - Would the government be willing to lease platinum?
- Comments
  - The government should lead by example.
    - Government purchases and deployments in government facilities (increase number of purchases in 2008)
  - May help accelerate normal market adoption to a 10-year market adoption curve, as with the historical example of valve-regulated lead-acid (VRLA) batteries
  - Government should be looking to reduce barriers--for each application, identify the barriers and then determine what DOE can do to support barrier reduction
  - More analysis is required of fuel cell benefits and commercial impacts
  - In any application, we need to find ways to mitigate the risk of new technology to gain acceptance
  - There is a difference between technological and economic demonstrations and we should decide which type of demonstrations would be most useful

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METRICS
(priority votes are shown in parentheses)

TEAMING ASPECT (1)	SUPPLY BASE (3)	EDUCATION & USER CONFIDENCE (11)	INFRASTRUCTURE IMPACT (8)	COMPETITIVE (4)
• Must consider how teaming is done for any demonstration or early market project	• Industry is observing a problem with supplier attrition as technology commercialization is delayed • Projects should quantifiably bolster the supplier base	• Include lessons learned • Include information on material disposal • Identify hurdles with regards to codes and standards • Increase public visibility • Application should be in market where fuel cell technology matches the market need	• Quantifiable impact on increasing infrastructure • Reliance on existing infrastructure • Application should rely on readily available fuels • Application should be convenient for users	• Application should be measurably better in one or more ways than the competition in the same space • Safer than incumbent technology • More convenient (value added) • Cleaner • More reliable • **Alternatively** – application should have no competition (perhaps as a waste remover)

APPLICATION COST (18))	DURABILITY & RELIABILITY (12)	MARKET SIZE (4)	SOCIETAL BENEFITS (4)
• Consider total life cycle cost v. conventional generation • Current system price is within some multiplier of realistic sales price • Focus on cost components generic to all applications, not economies of scale	• Identify reliability improvements for applications where reliability is within reach of incumbent technologies • Focus on demonstrating maintainability, as well, where manufacturer is not required for maintenance	• Demonstrate that fuel cells can penetrate a market where large numbers of units can be sold • Either a small percentage of a large market or a large percentage of a small market • However, be careful with this metric not to ignore cost effectiveness	• Quantifiably demonstrate: - Efficiency - Reduced emissions - Reduced oil dependence - Waste-derived renewable fuels

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SUGGESTED APPLICATIONS

- Backup and critical power
  - Telecom (durability, reliability, and cost; more than 250,000 sites in U.S.)
  - Hybrid Fuel Cell – Hydrogen Generator
  - Provides defined duty cycle, regulatory environment, available infrastructure, and controlled environment for increased chance of technical success
  - Remote (oil/gas pipeline monitoring) – cost is less of a barrier, always on, kW application demand grown beyond incumbent
- Fork lift vehicles
- Small fleet vehicles
  - Police or Postal (single refuel for infrastructure; extended range over battery; environmental benefit over internal combustion engine)
- Multi-purpose auxiliary power unit (APU)
- Cost-sensitive consumer electronics
  - Potential to demonstrate reliability
  - Educate consumers
  - Least expensive – 1000 units would approach market incumbent cost
  - Market size
- Technology demonstration replacing batteries
- Waste water treatment and plant gas
- Fuel cell buses
  - Reliability
  - Central infrastructure
  - Consumer exposure
  - Significant global market potential
  - Builds supply base
- Large-scale (MW) stationary application

OTHER TOPICS

- Low-cost liquid reforming
- Reliability study for reformer-based small stationary
- Standardized hydrogen containers and distribution similar to propane
- Computer-based tools to compare alternatives
- For field demonstrations, DOE pays incumbent price, rather than 50/50 cost share, and partner pays the “premium” of the fuel cell
- Analysis of fuel cell placement at public facilities or combined heat and power applications
- Economic analysis of waste water or ammonia as fuel
- Models for total life cycle cost of non-automotive applications
- Alpha testing in real markets
- Analyze efficiencies of consumer electronic fuel cells vs. recharging
- Analyze complete value proposition