2010-2025 Scenario Analysis for Hydrogen Fuel Cell Vehicles and Infrastructure Meeting

Review and Discussion of Preliminary Results

August 9-10, 2006, Washington, DC

Discussion Group 1: Summary Presentation
**Market Penetration Rates**

- **General Comment** – Value proposition to the customer and supply chain must be superior to alternatives in the 2010-2025 timeframe

- **General Comment** – Government role in educating the public and providing financial incentives is needed and must be sustained to make the value proposition attractive to customers and the supply chain
  - Early fleet customers are not enough, need mass personal vehicle markets; incentives are mandatory

- **General Comment** – For vehicles sales to begin in 2012, the technology has to be ready to go by 2007 or 2008

- **Suggested Improvement** – Add transit bus scenarios and consider how hydrogen buses will complement the deployment of personal and fleet vehicles and infrastructure

- **Suggested Improvement** – There is a “top-down” and “bottom-down” view and both are critical
  - The credibility of the market penetration rates would be enhanced by providing more transparent information on the assumptions used and the context on which the scenarios are based
**General Comment** – The lighthouse concept is a good approach, it resembles the growth of the gasoline infrastructure, but regional and intercity access is also important.

**Missing Element** – Is there a way to standardize designs on a national basis to streamline the daunting task of local engagement, buy-in, siting, and permitting?

**Suggested Improvement** – Need to include the time and cost associated with complicated state and local permitting processes in the build-out time and cost for lighthouse scenarios.

**Suggested Improvement** – Need to assess the relative risks of build-out strategies in terms of the capital requirements for infrastructure development.
- Relative risk – station size vs. utilization

**Suggested Improvement** – Thousands of vehicles will require public 70 MPa convenient fueling infrastructure; there is no consensus on this point.
Hydrogen Production & Delivery Options

- General Comment – For the early economics to work, it will be necessary to leverage hydrogen production volumes to meet needs other than vehicle fueling, such as industrial and electrical power.

- Missing Element – What is the business model for ownership, operation, and profitability of hydrogen fueling stations?
  - Do not assume existing gas stations are the most likely or desirable sites.

- Suggested Improvement – Need to add life cycle carbon emissions as metric for evaluating hydrogen production and delivery options.

- Suggested Improvement – There needs to be additional “out-of-the-box” thinking about hydrogen production and delivery.
  - For example: near-term renewable supply options, home refueling, neighborhood refueling, co-production, and co-generation.

- Suggested Improvement – Transition scenario should include case studies of local economies.
  - Include analysis of impacts on labor force, maintenance and repair, and electric and natural gas grids.
Options for Policies & Incentives

- **General Comment** – Tie incentives to problems, not solutions; let the marketplace find the best solutions

- **General Comment** – Mandates without the corresponding enabling incentives that change consumer purchasing behavior are crippling to industry (OEMs and vulnerable supply base)

- **Suggested Improvement** – Consider policies to address liability and risks
  - Government risk pools
  - Protection for small station owner/operators
  - OEMs and supply base

- **Suggested Improvement** – Carbon tax that is revenue neutral and split between industry and the customer
**Demonstration Program Scenarios**

- **General Comment** – Demonstration stations should be as publicly accessible with as much open access as possible
  - All major OEMs and their customers
  - Open to non-members; accessible and useable by all OEM technology options

- **General Comment** – DOE’s R&D activity will need to continue during the demonstration phase

- **General Comment** – There is concern that there is not much time to achieve consensus between OEMs and other stakeholders

- **General Comment** – Keep technology validation demonstrations small and concentrated; transport system (market readiness aspect) validation should be large and spatially distributed within a metropolitan region

- **Suggested Improvement** – Involve other Federal agencies, if possible (i.e., DOD)