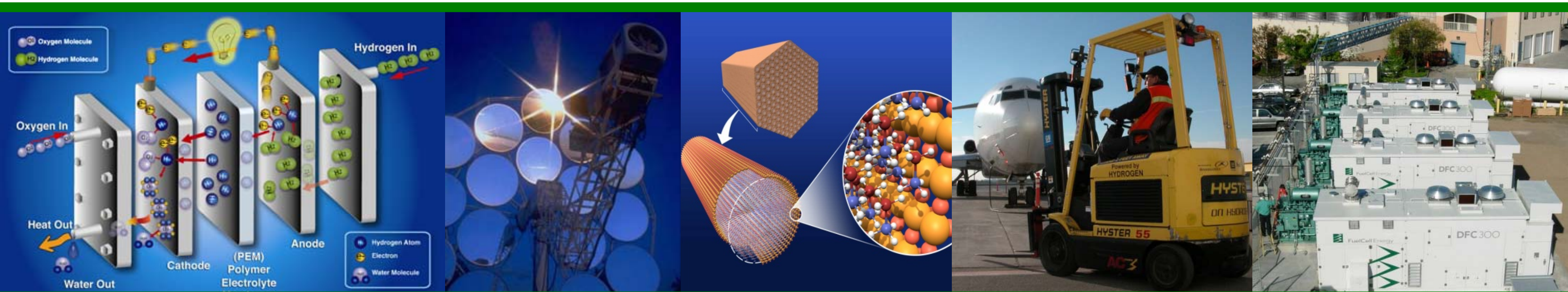

DOE Hydrogen and Fuel Cell Activities

Panel Discussion

Dr. Sunita Satyapal
Chief Engineer & Deputy Program Manager
Fuel Cell Technologies Program
United States Department of Energy

SAE World Congress
April 15, 2010

Key Challenges

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

The DOE Program has been addressing key challenges facing the widespread commercialization of fuel cells.

Technology Barriers*

Fuel Cell Cost & Durability

Targets*:

Vehicles: $30 per kW, 5,000-hr durability

***Stationary Systems:* $750 per kW, 40,000-hr durability**

Hydrogen Cost

Target: $2 – 3 /gge, delivered

Hydrogen Storage Capacity

Target: > 300-mile range for vehicles—without compromising interior space or performance

Technology Validation:

Technologies must be demonstrated under real-world conditions.

Economic & Institutional Barriers

Safety, Codes & Standards Development

Domestic Manufacturing & Supplier Base

Public Awareness & Acceptance

Hydrogen Supply & Delivery Infrastructure

Market Transformation

Assisting the growth of early markets will help to overcome many barriers, including achieving significant cost reductions through economies of scale.

***Metrics available/under development for various applications**

DOE Fuel Cell Technologies Program R&D Progress

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Program participants have:

Reduced the high volume cost of fuel cells to $61/kW*

- ***More than 35% reduction in the last two years More than 75% reduction since 2002.***

More than doubled durability in the last few years

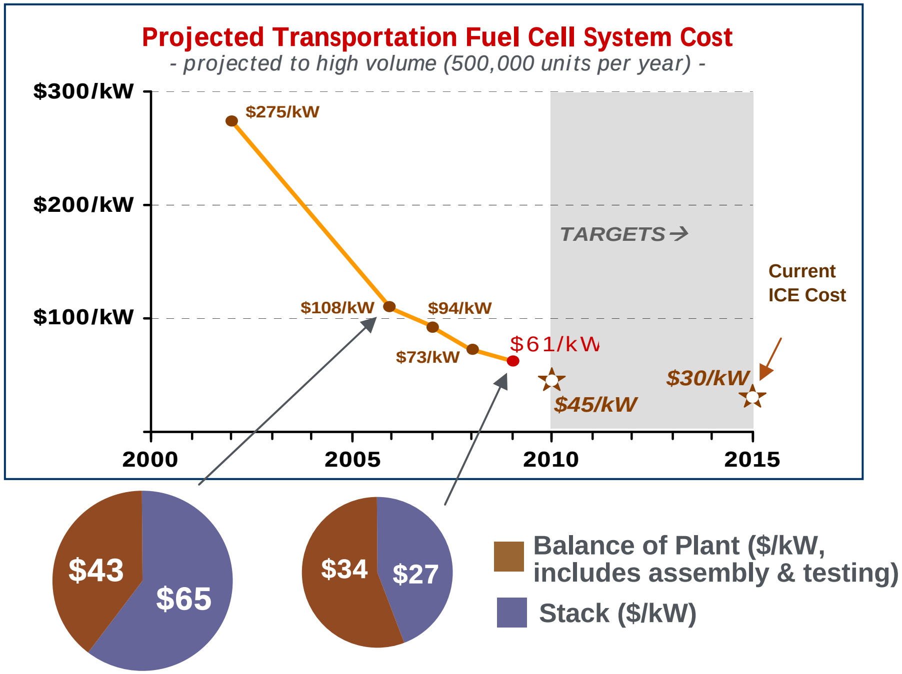
- ***More than 7,300 hrs in the lab (single cell). More than 2,500 hrs (75,000 miles) in DOE Learning Demo vehicles.***

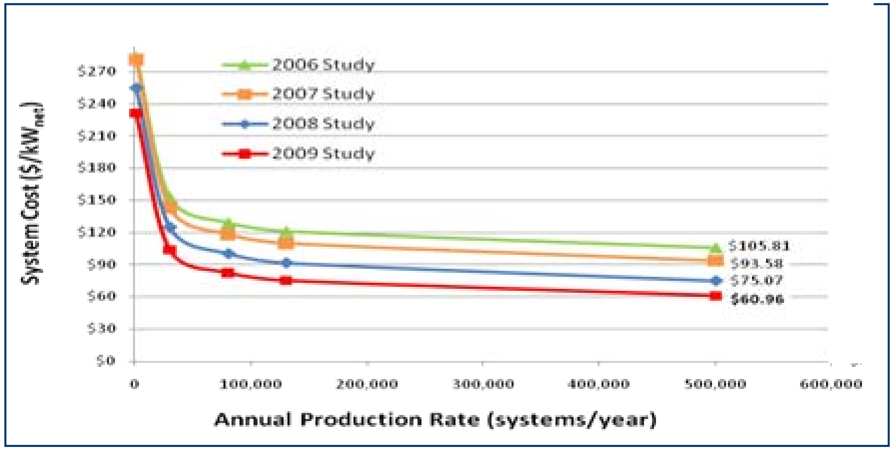
Demonstrated adequate driving range

- ***Up to 254 miles in DOE Learning Demo vehicles. Verified ~430 miles on 1 fill with more recent technology.***

Reduced the cost of H_2 technologies

- ***Met targets for distributed natural gas. Roughly 15-30% cost reductions for delivery, up to 40% cost reductions for H_2 production on track towards long term goals of $2-3/gge.***





****Based on projection to high-volume manufacturing (500,000 units/year). Methodology validated by Independent Panel: $60 – $80/kW is a "valid estimate": http://hydrogendoedev.nrel.gov/peer_reviews.html***

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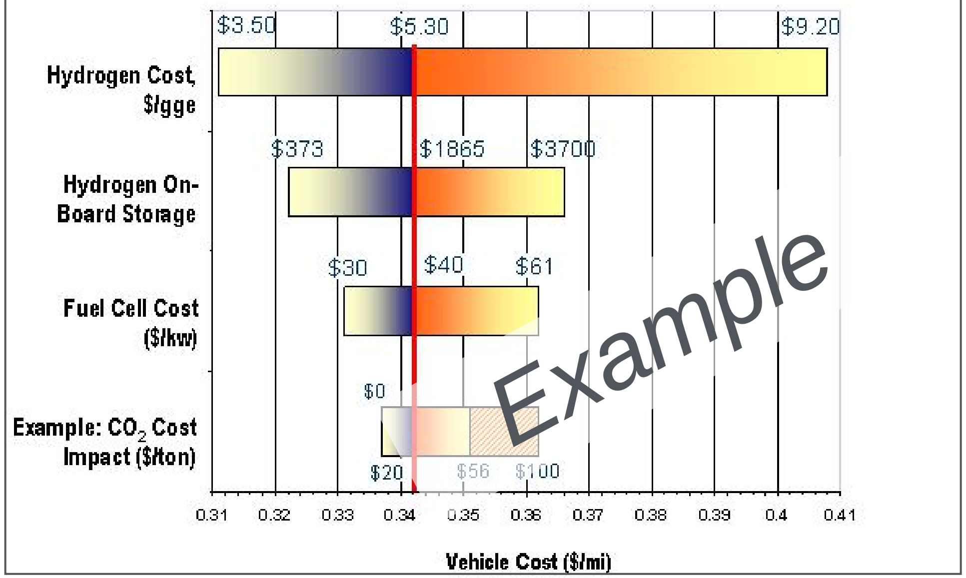
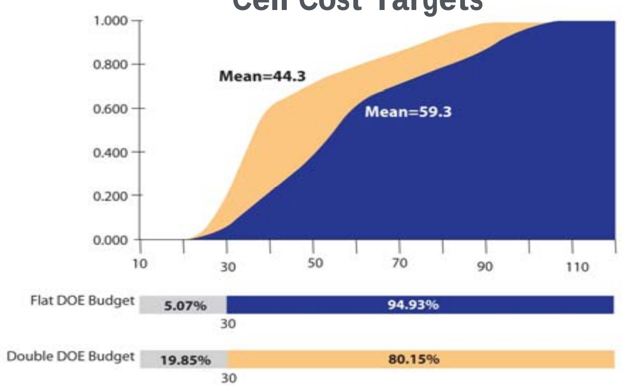
Preliminary Fuel Cell Vehicle Cost Analysis



Example of Risk Analysis for Achieving Fuel Cell Cost Targets



Summary & Questions

- Need to reduce H_2 cost (production, delivery & storage)
- Need to sustain R&D (e.g. need both cost and durability) ***and*** cross-cutting activities (e.g. safety, codes and standards)

What fuel cell cost is acceptable?
What H_2 cost is acceptable?
What are the priorities for RDD&D and in each key area (e.g. BOP, etc.)?

Webinar planned in mid-May to solicit industry input on fuel cell risk analysis activity. If interested contact Sunita.Satyapal@ee.doe.gov or Mark.Ruth@nrel.gov

Note: Costs in analyses assume high volume costs

Thank you

http://www.eere.energy.gov/hydrogenandfuelcells