

Refueling Infrastructure for Alternative Fuel Vehicles: Lessons Learned for Hydrogen

Panel Session III: Innovation and Coordination

Stefan Unnasch

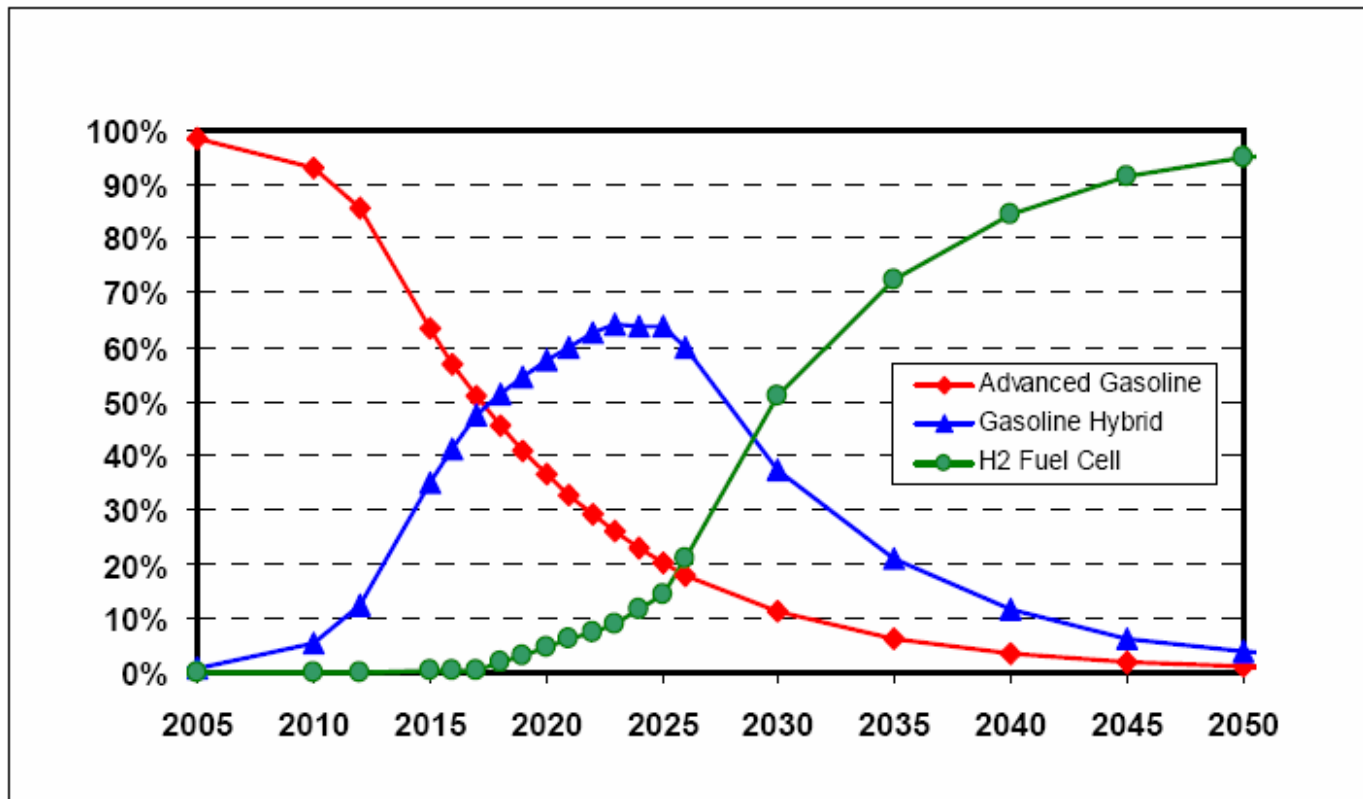
Life Cycle Associates

3 April 2008



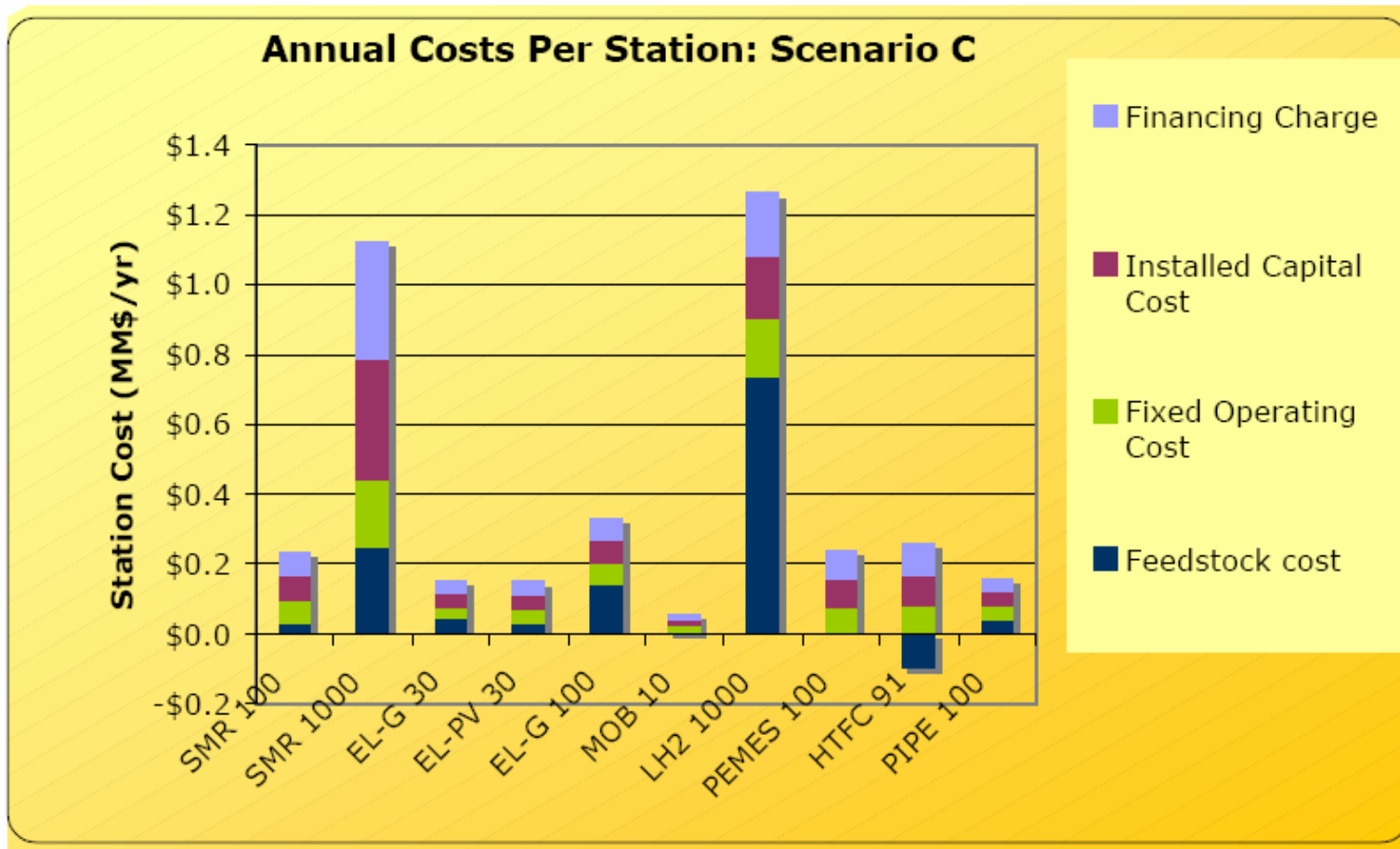
Hydrogen Vision

Figure ES-1. Vehicle Technology Market Shares in Scenario 3



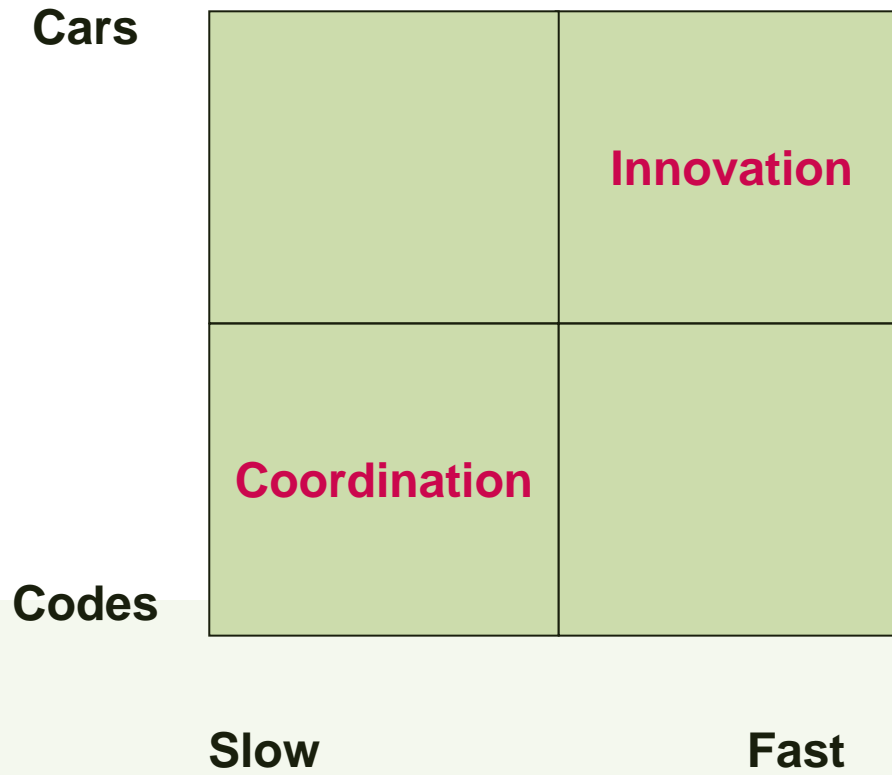
Source: Greene and Leiby, 2007

Hydrogen Infrastructure Today



Source: Weinert, J. X., et al.. (2005). CA Hydrogen Highway Network Blueprint Plan, Economics Report

Innovation and Coordination



Innovation and Coordination



✧ Fuel production and delivery technology

✧ Vehicle technology		
✧ Marketing		Innovation
✧ Policy		
✧ Early introduction strategy	Coordination	
✧ GHG strategies		

✧ Codes and standards

✧ Education and outreach

Cars

Codes

Slow

Fast

What happened?

- ✧ Were obstacles burdensome?
- ✧ Did we invest wisely?
- ✧ Do we have the right incentives?
- ✧ What can we learn from CNG, ethanol, methanol, battery EV?
- ✧ Do we factor in risks of:
 - ✧ Climate Change
 - ✧ Peak Oil?

Panel Session III: Innovation and Coordination

- **Tim Gerlach, *American Lung Association of the Upper Midwest***
- **Britta Gross, *General Motors***
- **Catherine Dunwoody, *California Fuel Cell Partnership***
- **Ulrich Büniger, *L-B-Systemtechnik***
- **Discussion**

A Hydrogen Vision

**“With a new national commitment,
... the first car driven by a child
born today could be powered by
hydrogen, and pollution free.”**

- President George W. Bush

About Life Cycle Associates



Tools

- BEACCON Model
- GREET Poker
- MOUSE
- Pathway PDL



Experience

- Our experience with a broad range of fuels and processes, and our expertise in model development allow us to analyze the complex nature of energy and environmental issues in a transparent manner.



Capabilities

- "Well-to-Wheel" (Fuel Cycle) Analysis
- Process Analysis
- Economic Analysis
- GHG Strategy

