



MARKET BASED APPROACHES



K.G. DULEEP
MANAGING DIRECTOR
EEA



BACKGROUND

- Introduction of fuel-cell vehicles and jump-starting the market will require significant government actions in the near term
- Widespread understanding that command-and-control regulations can work for only very low sales volume.
- Increased public sales and acceptance will need development of market based policies.

ANALYSIS OBJECTIVES

- EEA currently evaluating a number of market based approaches to enhancing fuel economy of conventional and hybrid vehicles.
- Primary objective of effort is to evaluate a range of market based approaches that can be implemented when FCV models are market ready, and identify ones that could make a difference.
- Effort is in the context of modifying existing approaches to special needs of FCVs

OVERVIEW OF MODEL

- Model under development for DOE-EIA is an integrated supply and demand module that forecasts vehicle attributes and sales.
- Vehicle demand model is of the “nested logit” type that can (in theory) work at the vehicle nameplate and configuration level
- General form of model has been widely used in vehicle demand modeling.

MODEL - VEHICLE SUPPLY

- New feature of model is representation of vehicle supply side that has very realistic constraints on platform redesign cycle.
- Manufacturer behavior in redesign and pricing of different models can be simulated with profit maximization and fuel economy target meeting algorithms.
- Current model has extensive data on conventional technology data and hybrid/ diesel vehicles

MODEL USES

- Earlier (simpler) versions of model used for alternative fuels analysis and more recently for hybrid and diesel vehicle analysis.
- Answers provided are in reasonable range. In the AFV model case, good match to actual results for LPG vehicles in Australia was obtained.
- More recent analysis of hybrids and diesels had results quite similar to those predicted by J.D.Power from consumer survey data.

MODEL - USES

- Current parallel work effort focuses on market based strategies to reduce fuel consumption.
- Policies include gas guzzler taxes, efficient vehicle subsidies, fee/rebates, credit trading and travel demand management.
- Intent of this effort is to modify existing tools to examine policies assisting FCVs.

MAJOR ISSUES

- Analysis shows that new technology market penetration is quite sensitive to which type, size and brand of vehicle it is available in.
- Analysis of alternative fuel vehicle penetration patterns in other countries also show significant gestation period as consumers become familiar with technology and refueling
- Effect of ease of refueling and fuel availability have been studied in CNG context but not well proven in the free market.

ANALYSIS OF H2 VEHICLES

- Introduction of hydrogen powered vehicles (FCV or ICEV) will be more complex due to ongoing basic technology development
- Initial very low volume sales regime cannot be modeled except in the context of special fleet introduction (sales < 2000 per year)
- Focus is on market entry for wider introduction, possibly in the 2012+ time frame when sales volumes of 20,000+ per year are possible.

PROPOSED APPROACH

- Key inputs to the process are the types of vehicles likely to be introduced in the 2012 time frame and their attributes of range, efficiency and power.
- Our focus will be to interview auto- manufacturers on what they believe will be the most likely model types and brands to be introduced initially.
- Information on manufacturer pricing strategy and expected range of subsidy will also be sought, to anchor model to manufacturer expectations.

MARKET DRIVERS

- Currently, most significant driver is the California ZEV mandate although some manufacturers are independently driving market introduction (Honda and GM)
- The ZEV mandate requires sales of over 25K FCV per year as of 2015 and other national requirements could increase this to 40 to 50K vehicles in that time frame.

PENETRATION SCENARIOS

- DOE wants an evaluation of specific penetration scenarios as laid out by NRC, in the context of external market drivers.
- Both ZEV mandate and penetration scenarios do not address issue of how the sales volume goals can be realized.
- Goal of analysis is to define size and level of rebates/subsidy/ credits to meet scenario goals.



Market Penetration Scenarios



The following scenarios represent the estimated penetration of hydrogen fuel-cell vehicles (HFCV) given different government incentives:

A. Introduction strategies following “Hydrogen Fuel Initiative”:

Option 1: In 2015 HFCVs are introduced into the market. The government introduces a program to support the introduction of *thousands* of vehicles per year and by 2018 the government supports the introduction of *tens of thousands* of vehicles per year. This option is expected to have a market penetration of 1.8 million HFCVs by 2025.

Option 2: Same as option 1, but the government supports the introduction of *hundreds of thousands* of HFCVs by 2018. Expected market penetration for this option is 3.4 million HFCVs by 2025.

B. Early Introduction Strategy:

Option 3: The government supports the introduction of *thousands* of HFCVs by 2012, and *tens of thousands* by 2015 and by the *hundreds of thousands* by 2018. This strategy is expected to have a market penetration of 5.0 million HFCVs by 2025.

Option 4: The government supports the introduction of *thousands* of HFCVs by 2012, and *millions* by 2021. Expected market penetration is 10.0 million by 2025 with support for multiple OEMs and multiple vehicle models.

SCHEDULE

- Analysis expected to start next month
- We anticipate meeting with auto-manufacturers in spring on defining likely FCV products for 2012 introduction
- Close coordination with ORNL on their transition analysis strategy.
- Draft report in fall for review and comment.