POLICY OPTIONS FOR FCV
MARKET INTRODUCTION

Prepared for:
Hydrogen 2010-2025 Scenario Analysis Meeting

K.G. Duleep
Energy and Environmental Analysis, Inc.
www.eea-inc.com
Introduction Phases

- **Phase 1** – sales of few hundred FCVs per year. Cost of vehicles will be $5 \times$ over average vehicle and refueling infrastructure will be in an urban area.
- **Phase 2** – ten to twenty thousand FCVs per model and one/two models per major manufacturer. Cost of vehicles will be $2 \times$ over average vehicle, and urban and limited regional refueling infrastructure.
- **Phase 3** – Mass market introduction, FCV cost at 1.1 to 1.2 $x$. Good regional refueling and limited city pair refueling sites.
Policies for Phase 1

- Vehicles will not be sold commercially but leased to select fleets and owners. Government fleet buy-down expected.
- DOE will negotiate with each manufacturer on FCV subsidy-cost share up to 50%.
- DOE funds 50% of capital cost for refueling sites, with energy firms contributing 50%.
- Hydrogen fuel cost subsidy to approximately equalize cost with gasoline.
- All three subsidies and ZEV mandate needed.
Strategies for Phase 2

- FCV subsidy policy could be dependent on manufacturer strategy.
- Introduction in “near luxury” car market ($30k-40K price) could provide reasonable sales volume with shared subsidy of $8K to $15K per vehicle.
- FCV introduction in mass market vehicles may require larger subsidy to reach same sales volume due to consumer price resistance in non-luxury markets.
- Strategies can be explored to minimize subsidies.
Policies for Phase 2

- Supplementary policies considered include
  - CAFÉ credits similar to those for EV,
  - ZEV mandates in California and the Northeast states at levels similar to existing requirement, potentially different timing relative to requirement.
  - motor fuel tax exemption for hydrogen, and
  - 50% cost-sharing for regional infrastructure
  - Consumer purchase tax credit
  - Guaranteed trade in value?
  - Government fleet buy-down continues
Policies for Phase 2

- Capital cost for refueling infrastructure at regional level (within lighthouse) could be phased out and replaced with accelerated depreciation or loan guarantees to reduce risk of stranded assets.
- Non-regional refueling sites will require full capital cost coverage.
- Fuel cost subsidy will be required to maintain near-parity with gasoline.
Policies for Phase 3

- FCV incremental price will be similar to current hybrid vehicle incremental price.
- Vehicle related policies could be similar to current hybrid vehicle polices:
  - tax credit of $2500 to $5000
  - local/state sales tax and registration exemption.
  - CAFÉ credits for FCV production
  - continued forcing function of ZEV mandate?
Policies for Phase 3

- With significant existing fleet and high growth of FCV fleet, infrastructure subsidy will likely not be needed in Phase 3.
- However, to maintain FCV sales, hydrogen fuel price parity with gasoline will be necessary.
- Hydrogen fuel can have Federal/state fuel tax exemption similar to ethanol, or additional subsidy may be required depending on hydrogen delivered cost and gasoline retail price.
Scenario 1 Regional Volumes

Hydrogen Vehicle Penetration in Scenario 1

Annual Vehicle Sales (000)

RoUS High-Medium
NE Other
NYC
Pacific Other
LA
Scenario 2 Regional Volumes

Hydrogen Vehicle Penetration in Scenario 2

Annual Vehicle Sales (000)

RoUS High-Medium
NE Other
NYC
Pacific Other
LA
Scenario 3 Regional Volumes

Hydrogen Vehicle Penetration in Scenario 3

Annual Vehicle Sales (000)

RoUS High-Medium
NE Other
NYC
Pacific Other
LA
Policies versus Scenarios

- Phase 1 occurs prior to any “scenario” requirements which start in 2015, and policies are independent of scenarios.
- Different scenarios could be generated by differing strength of policies, different assumptions about technology progress or different consumer response to FCVs.
- Future analysis will focus primarily on changing policy strength to attain scenarios.
Future Analysis

- Analysis of regional co-development of infrastructure and FCV sales will utilize ORNL HyTrans model in combination with NREL inputs
- Analysis of vehicle and auto-manufacturer related policies (CAFÉ, ZEV mandates) will rely on EEA models such as FEM or FERAM
- Goal of analysis will be to define optimal policies to meet goals and also determine if FCV markets can progress without continuing subsidy.