



H2-FCV Option Requires Renewed Policy & Stakeholder Coordination

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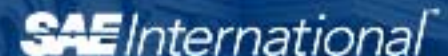
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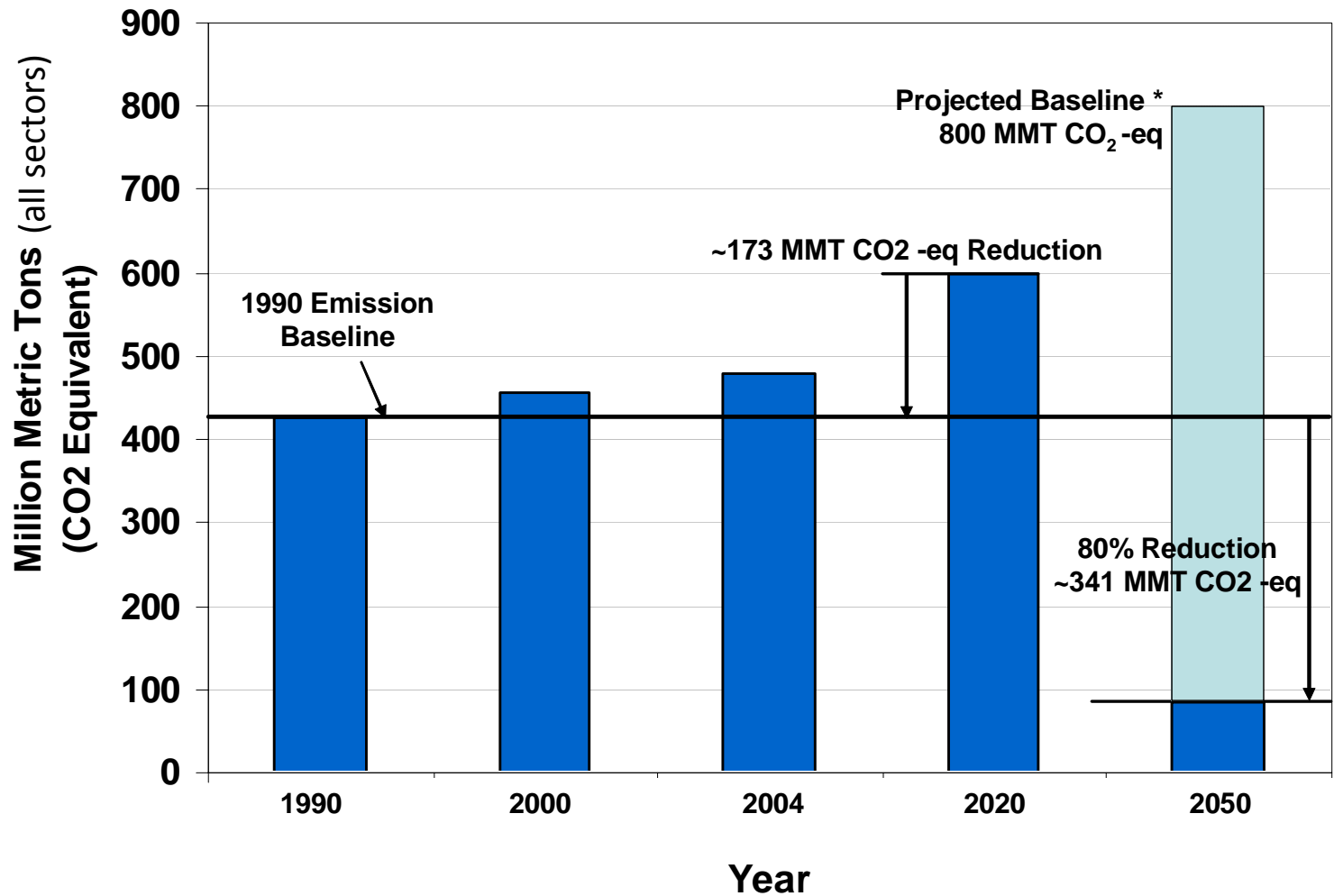
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Key Messages

- There won't be “one” solution for transportation's future, large use of ZEVs required to meet CO2 + oil reduction goal
- H2-FCVs can provide deep reductions in oil usage and CO2 emissions - ***in the Long Term, need to begin in 2010's***
- It will take 10-15 years to introduce H2-FCVs (transition)
 - Early deployments (1,000's of cars)
 - FCVs will be unprofitable for 10+ years, public subsidies will be required to launch market (10,000's of cars)
 - H2 station network requires coordinated industry and government actions – more so than any other alternative
- Large advancements have occurred. Remaining challenges:
 - Vehicle: H2 storage, system cost, durability
 - Infrastructure: Station size, fueling pressure, “green” hydrogen
- Federal comprehensive energy “vision” important

CA Greenhouse Gas Reduction Goals



Sources: CARB Scoping Plan Presentation, Nov 30, 2007. 2050 projection from S.Schiller, "Implications of Defining and Achieving CA's GHG Goals"

Addressing Transportation Energy Challenges

Climate change, Air quality, Energy security

Reduced Vehicle Miles Traveled (VMT)

- Carpooling
- Mass transit
- Urban design
- Intelligent Transportation Systems (ITS)

Vehicle Technology

- Advanced conventional vehicles (ICE)
- Plug-in hybrid electric
- Battery electric
- Fuel cell electric

Fuel Alternatives

- Hydrogen
- Biofuels
- Electricity
- Low-carbon liquid fuels (coal / NG with sequestration)



A comprehensive energy strategy should have a “portfolio” approach with multiple solutions

Existing Public Policy Context

- CA ZEV Regulation (2008 ruling, min “ZEVs”)
- California Climate Change Goals
 - 80% reduction in CO₂ (below 1990) by 2050
 - Needs majority of vehicle fleet to be ZEVs by 2050
- California SB-1505
 - Once CA H₂ demand reaches 3.5 Mkg/yr, requires 33% of all new H₂ supply to come from renewable sources
- Federal CAFÉ – 35 mpg by 2020
- Federal (DOE) R&D along with demonstrations
- Low Carbon Fuel Standards

Hydrogen Stations Today



- 25+ stations in California
- 40+ stations nationally
- Major energy firms: Shell, Chevron, BP
- Industrial gas firms: Air Products, Praxair, Linde, Powertech

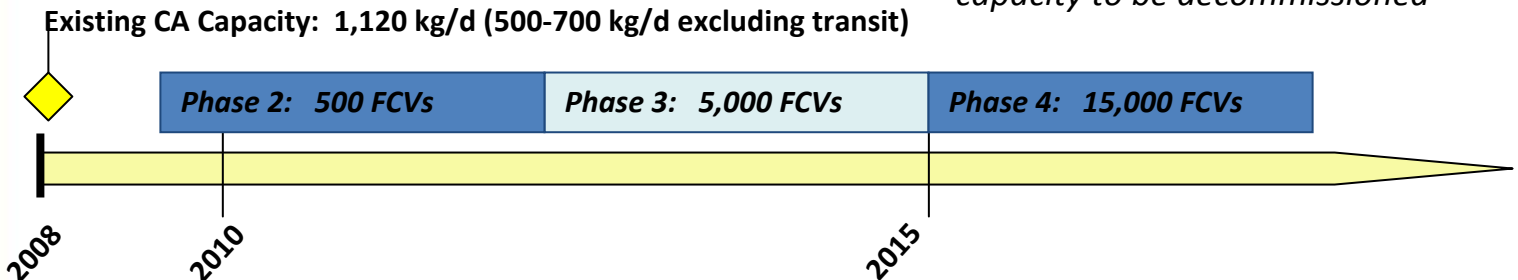


Automaker Activities

- 200+ FCVs in California, activities in NY, W.DC, MI, FL
- Planned activities follow ZEV Mandate; Projected volumes:

ZEV Reg Phases and H2 required

** Shortfall expected, mis-match in locations of supply and future demand, some existing capacity to be decommissioned*



New Policy Ideas



California

- Secure cost-share from AB-118 and continue SB-76
 - Capital cost share for new stations
 - Station operation fund – \$\$ to keep existing stations operational
 - Outreach task team: local training, permitting support, land identification
- Local incentives
 - Tax breaks on land purchase/lease for new stations
 - Streamlined permitting process
- State incentives - Reduce vehicle registration fees for purchasing/driving FCVs
- H2 station regulation – requirement for a specified # new stations

Federal

- Secure cost-share - Congressional authorization (with DOE program)
- Federal fleet purchase of FCVs - if consumer market lags (“back stop”)
- Hydrogen fuel tax waiver
- Sanction studies on station designs that may help codes/standards –
 - For example, underground and above canopy storage designs

Final Comments

- FCV volumes tied to ZEV Regulation (can be estimated)
- By 2010, DOE FCV technology review important
 - Kick-off pre-production FCV development programs
 - Key signal to energy providers on auto commitments
- By 2010, need consensus on LA regions – “ground zero”
 - Kick-off large station placement programs
 - Capacity shortfall by late 2010 ???
- New policies important
 - Vehicle incentives
 - State station on-going operation budget
- “Path to Consensus” necessary – Create trust between auto and energy firms on viability of this alternative