



# Technology Advancement Office Advisory Group Meeting

## NextSTEPS Program

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# NextSTEPS Background



- UC Davis Institute of Transportation Studies continues a multi-year research and outreach multidisciplinary program
- Develop and refine the theory, tools, and methods that allow for self-consistent and transparent comparisons of promising alternative energy and vehicle pathways and eight cross-comparative areas
- Four fuels pathways – hydrogen, biofuels, electricity and fossil fuels baseline



# Next STEPS Members

- Energy Sector -  
Aramco, BP, Chevron, Center for High Technology-  
India, Shell, Sempra
- Automotive Manufacturers -  
BMW, Chrysler, Ford, General Motors, Honda,  
Renault, Toyota, Volkswagen, Westport
- Government Sector – SCAQMD plus  
US DOT, US DOE, CARB, Caltrans, CEC



# NextSTEPS Project Completed

- UC Davis Institute of Transportation Studies (ITS) Sustainable Transportation Energy Pathways (STEPS)
- Approximately \$2.6 million from by 21 organizations;
- \$120,000 AQMD Clean Fuels support for four key subject areas:
  - **Transition Scenarios for Alternative Fuels and Vehicles in CA**
  - **Consumer Behavior and Vehicle Choice: Logitudinal Tracking**
  - **Best Policy and Incentive Strategies**
  - **Low Carbon Options for Non Light-Duty Subsectors**



# Next STEPs Key Projects



## Transition Scenarios for Alternative Fuels and Vehicles in CA

- Next 2-3 years will see concerted efforts to introduce 100s of H<sub>2</sub> stations enabling introduction of 10,000s of FCVs in selected regions worldwide, backed by \$100s millions in public funds, \$Billions in private investment. Models estimate that a Regional H<sub>2</sub>/FCV rollout would require rapid FCV uptake, \$100-300 million capital investment for ~100-200 stations (serving 50,000-100,000 FCVs) to reach H<sub>2</sub> <\$7/kg in 7 years.



# Next STEPs Key Projects

## **Consumer Behavior and Vehicle Choice: Logitudinal Tracking**

- Identified several ways to increase markets for PEVs.
- Co-market PEVs with renewable electricity charging.
- Understand why women appear to be under-represented among early PEV buyers and longer term implications for vehicle design and charging infrastructure deployment.
- Attend to the social and behavioral aspects of rolling out new socio-technical systems



# Next STEPs Key Projects

## Best Policy and Incentive Strategies

- Vehicles
  - No major changes likely for 5 years
  - More states embrace ZEV policies (though not necessarily mandate)
  - Feebates: mechanism for providing “permanent” incentive program for advanced low-carbon vehicles and aligning market demand with vehicle GHG regulations
- Fuels
  - LCFS refined & extended to 2030/35
  - RFS fixed?!
- Mobility
  - Gradual realignment of transport funding with SB375 (CA)
  - Decentralization of federal functions/funding to states/locals (U.S.)



# Next STEPs Key Projects

## Low Carbon Options for Non Light-Duty sectors

- Aviation, marine, rail, and especially medium and heavy duty trucks will account for an increasing share of transport energy use in the U.S. over the next decade and beyond
- Long haul trucking has the highest share of fuel cost versus capital cost of the major freight modes.
- Different technologies and fuels appear advantageous in different applications, contributing to an overall conclusion that a portfolio of solutions will be needed.







# Results

- An "All of the above" sustainable transportation strategy is needed to meet long term GHG emission goals. This will require revolutionary change in the transport sector over the next few decades.
- There are many ways to build a sustainable transportation portfolio. These vary with regard to cost, early market dynamics, type of policy needed, geography.
- Over 200 research publications and reports produced by NextSTEPS researchers currently available to the public at <http://steps.ucdavis.edu/>



# Fall 2014 Symposium

- Over 120 people attended, including representatives from 19 consortium sponsors and 8 outside expert organizations.



- Policy in 2010 – 2014: What Changed?
  - Erratic oil prices and fossil energy revolution
  - Light Duty Vehicle Revolution
  - Vehicle Use Flat and Maybe Decreasing
  - H2 station funding in California, Germany, Japan;



# UC Davis STEPs 2015-2018

- **Initiating Transitions 2015-2030**: What is required for early alternative fuel/vehicle transitions to succeed?
- **Future of Fuels and the Oil and Gas Industry**: How will changing geopolitical landscapes and disruptive technology in the oil and gas and clean technology industries impact future business models and the competition of fuels?
- **Global Urban Sustainable Transportation (GUSTo)**: How will a rapidly urbanizing world affect transport and energy demand?
- **Modeling Analysis, Verification, Regional and International Comparisons (MAVRIC)**: What do improved and cross-compared energy/economic/environmental/ transportation models tell us about the future of transportation?

