

The Need for Cleaner Transportation Technologies

California Energy Commission

DOCKETED

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The Value of a Portfolio Approach

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Integrated Solutions

**Climate
Change**

**Air Quality
Improvement
Needs**

**Transportation
& Land Use**

**Energy
Reliability and
Security**

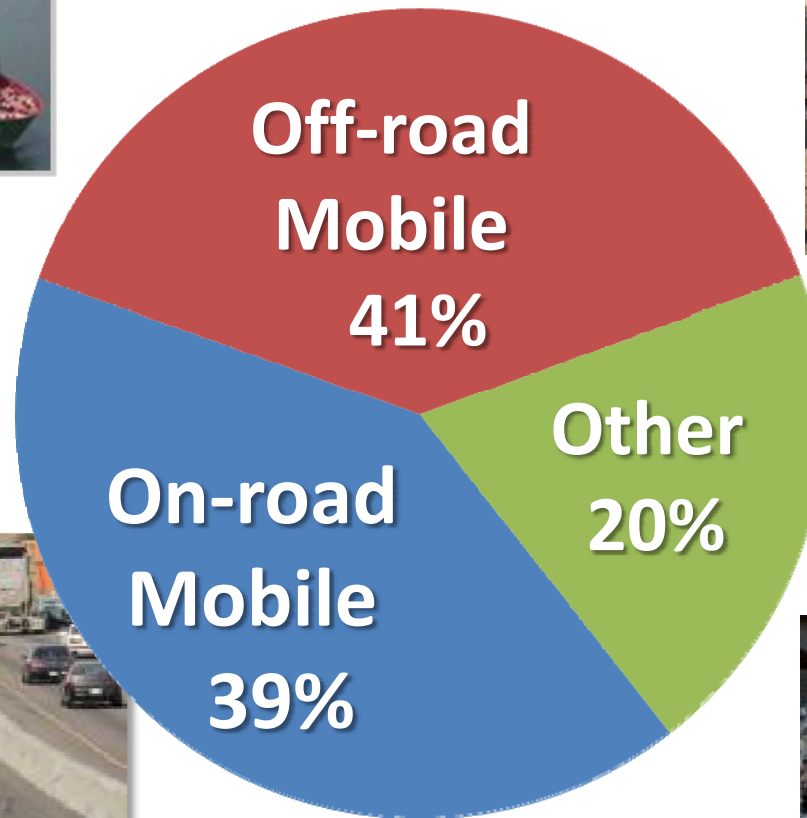


Under Development

- CEC IEPR Update
- CARB AB 32 Scoping Plan Update
- CARB Sustainable Freight Strategy
- CalTrans California Freight Mobility Plan
- National Freight Advisory Committee recommendations
- 2016 Update to South Coast AQMP
- 2016 Update to South Coast RTP



Mobile Sources Cause 80% of Air Pollution in South Coast



The Relationship



**Energy
Use**

Air Quality

Health



Growing Body of Evidence Linking Traffic Indicators to Health Effects

- Asthma and allergic disease
- Reduced lung function growth
- Increased risk of adverse birth outcomes
- Cardiac effects
- Respiratory symptoms
- Premature mortality
- Lung cancer

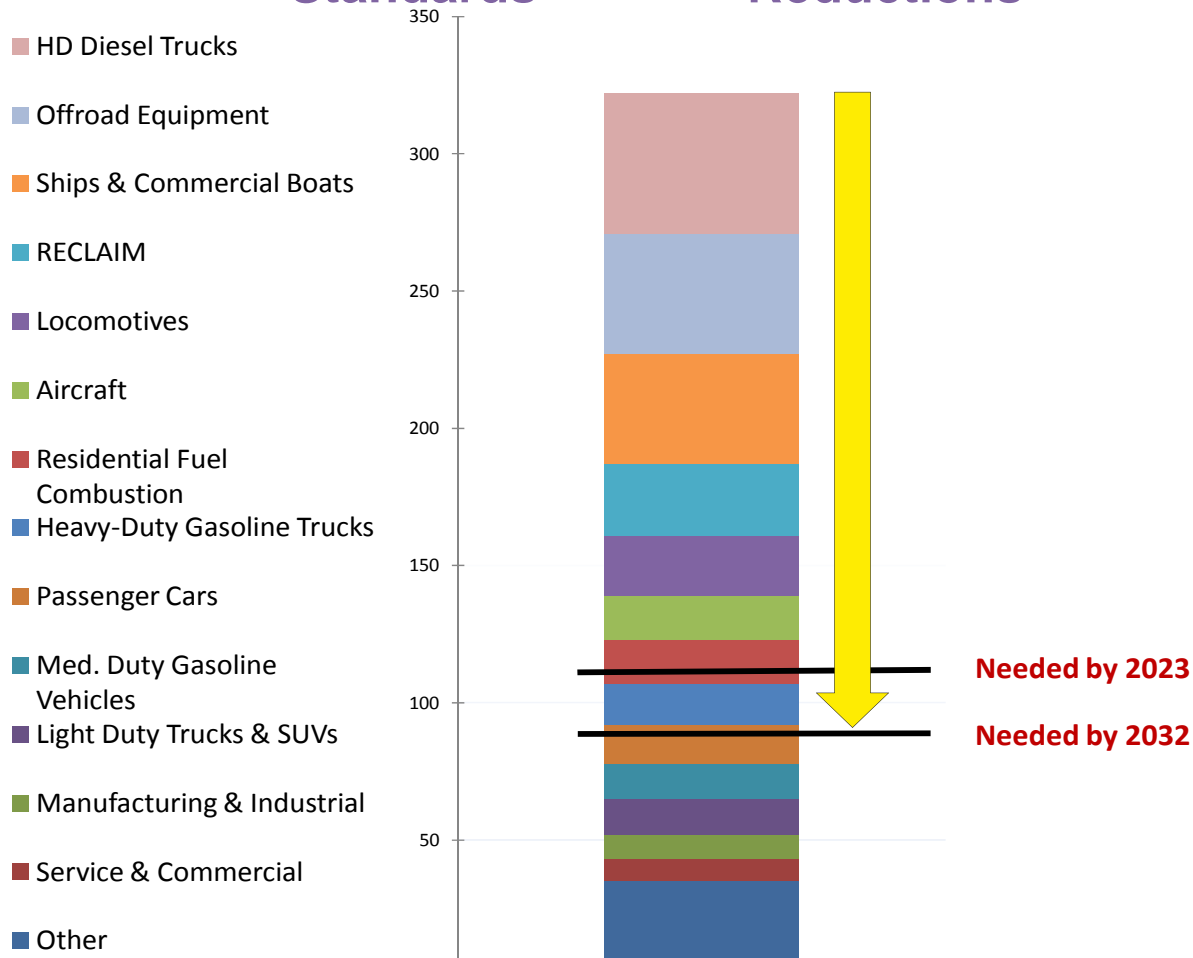
Samet, J.; Traffic, Air Pollution, and Health *Inhalation Toxicology*, 2007



**Two-thirds to
three-quarters
reduction in
NO_x needed to
attain ozone
standards**

Nitrogen Oxides Emissions in 2023 with Adopted Standards

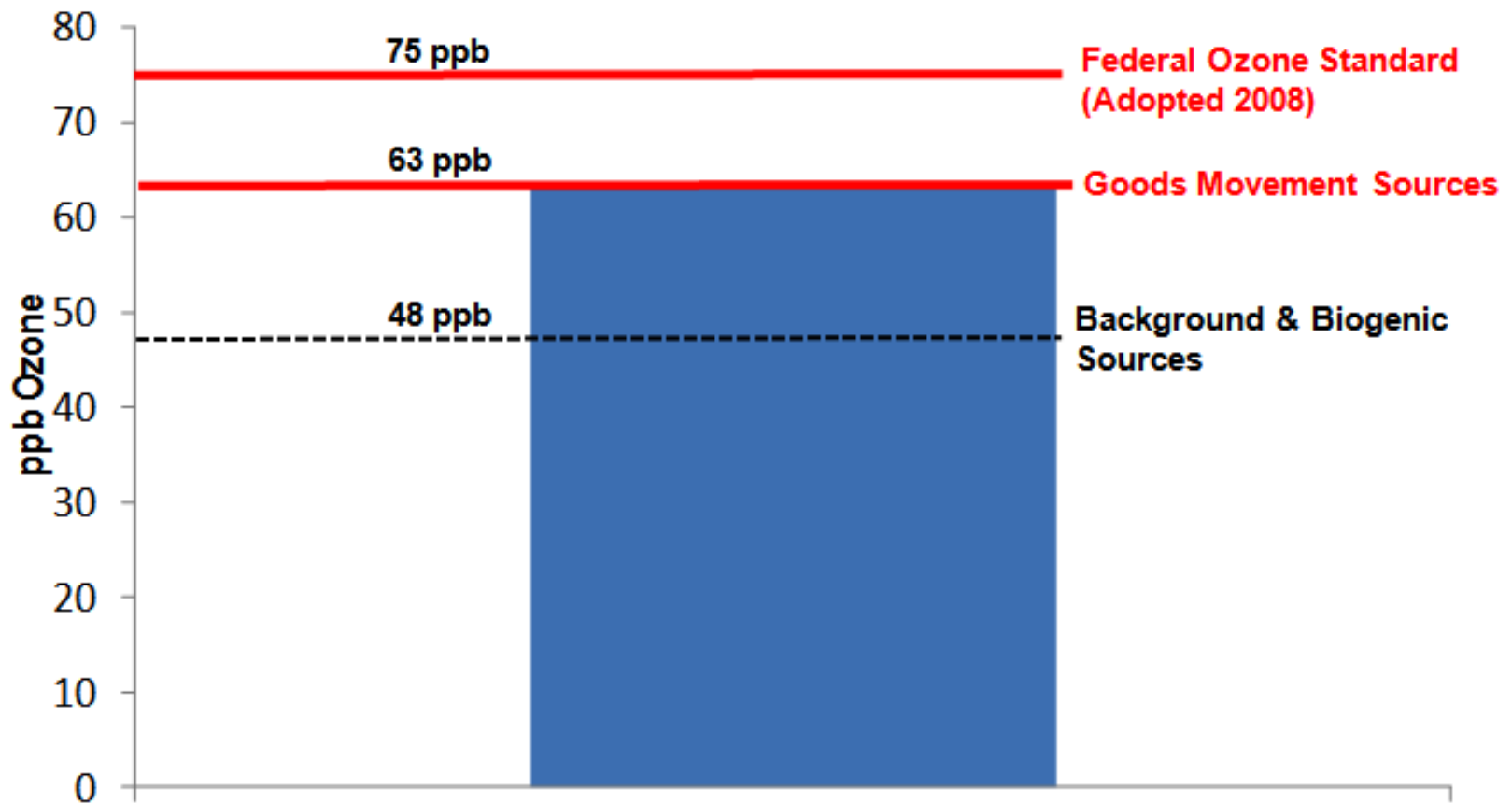
Additional Needed Emission Reductions



* Source: Ambient ozone modeling conducted by SCAQMD, 2012; final data



Goods Movement Contribution (2030)

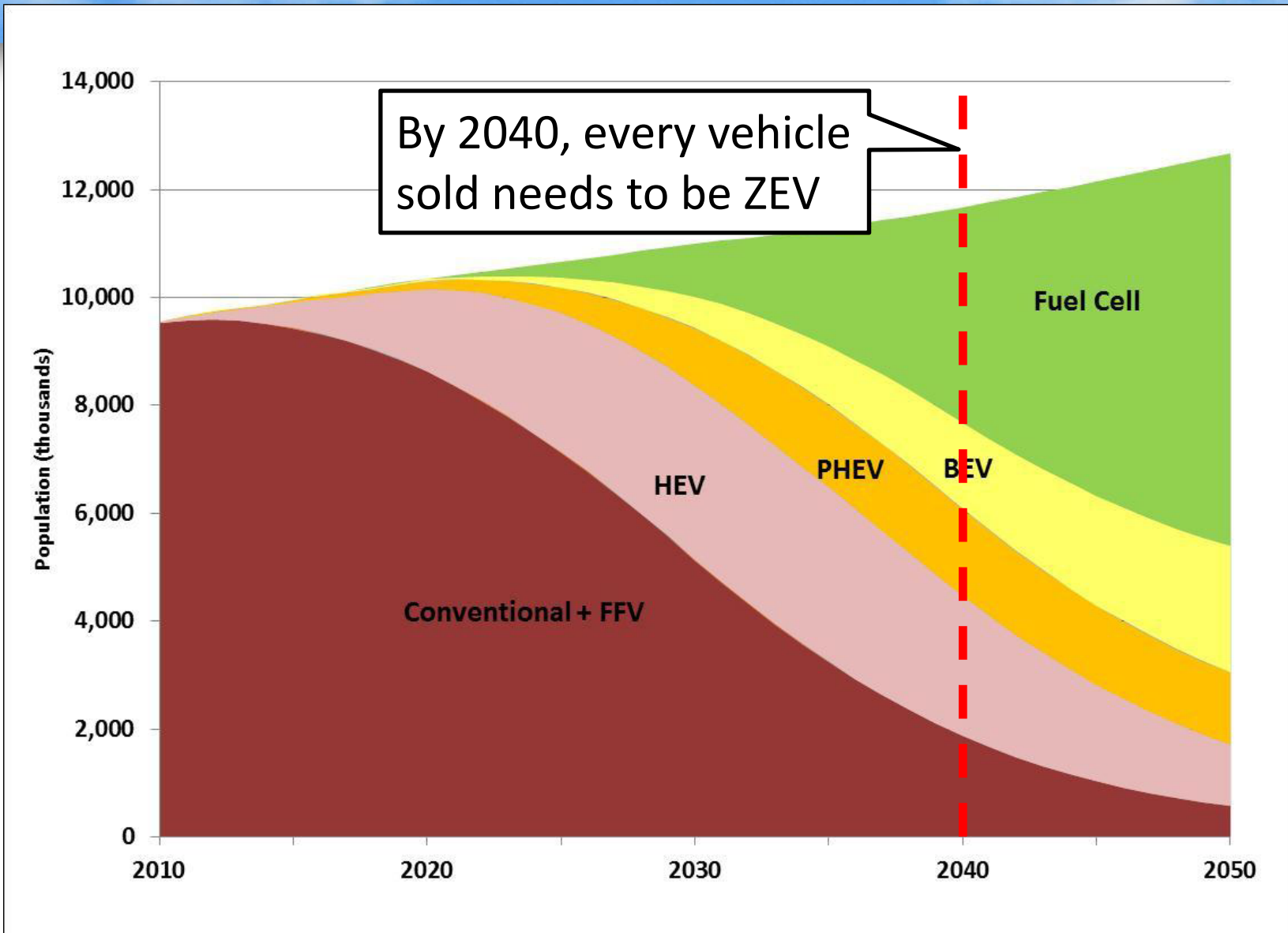


“One Size Doesn’t Fit All” Portfolio Needed!

- Differing Needs
 - Vehicle/Transportation Type & Purpose
 - Duty Cycle (Horsepower, Range, etc.)
 - Capital & Operating Costs
 - Durability
 - Other Factors



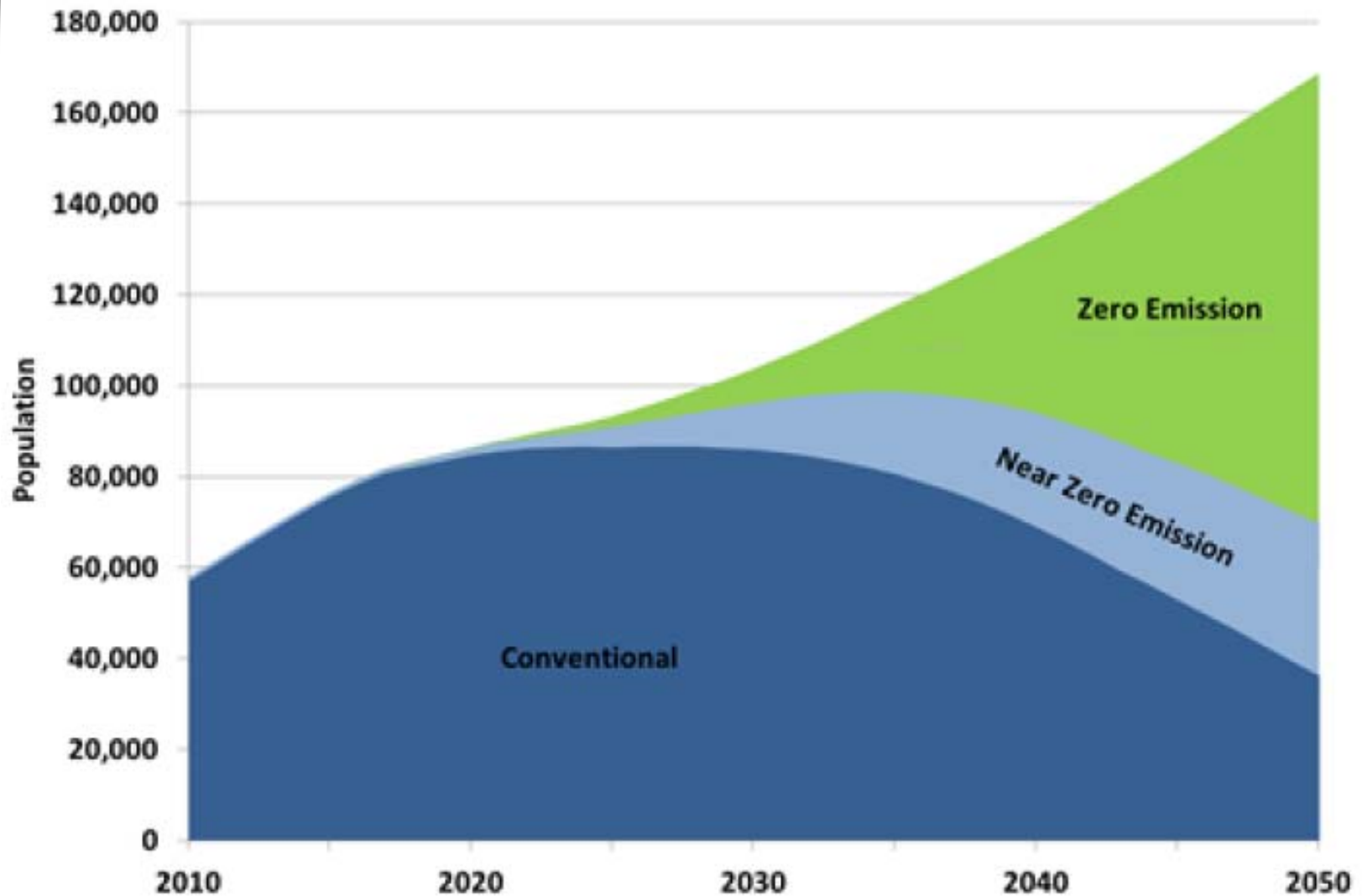
Vision for Clean Air Light-Duty Scenario



Vision for Clean Air, Figure 11 (June 27, 2012)



Vision for Clean Air Heavy-Duty Scenario



Plug-in Electric Vehicles Available Now

Chevy Volt



Ford Focus Electric



Nissan Leaf

Mitsubishi iMiEV



Toyota RAV4-EV



Toyota Plug-in Prius



Tesla Model S



Smart EV



Honda Fit EV



BMW Active-E



Chevy Spark EV



Ford Fusion Energi



Heavy-Duty Electric Trucks Being Demonstrated

- Class 7-8 trucks
- All-electric miles
- Challenges
 - Range
 - Infrastructure
 - Cost



Wayside Power and Hydrogen



Vision Fuel Cell Truck



Siemens Catenary Truck

Heavy-duty Natural Gas Applications

- Economics driving turnover to NG
- Domestic fuel supply
- Develop power-plant equivalent tailpipe emission technologies
 - “Electric Vehicle Equivalent”



How to best tap market forces?

- Technology ↔ Market
- Vehicles ↔ Stations
- Regulation ↔ Incentives



Improving Affordable Access to Cleaner Technologies

- First and foremost – need a product (low risk)
- “Waterfall” effect
- Address finance gaps:
reliable loan guarantees and incentives;
reduced “first-cost” investment barriers
- Two-way education process : recognize and address mainstream consumer priorities
(e.g., carpool lane eligibility, family-size vehicles, fuel efficiency, fueling flexibility)
- Sustained effort, support, and lines of communication



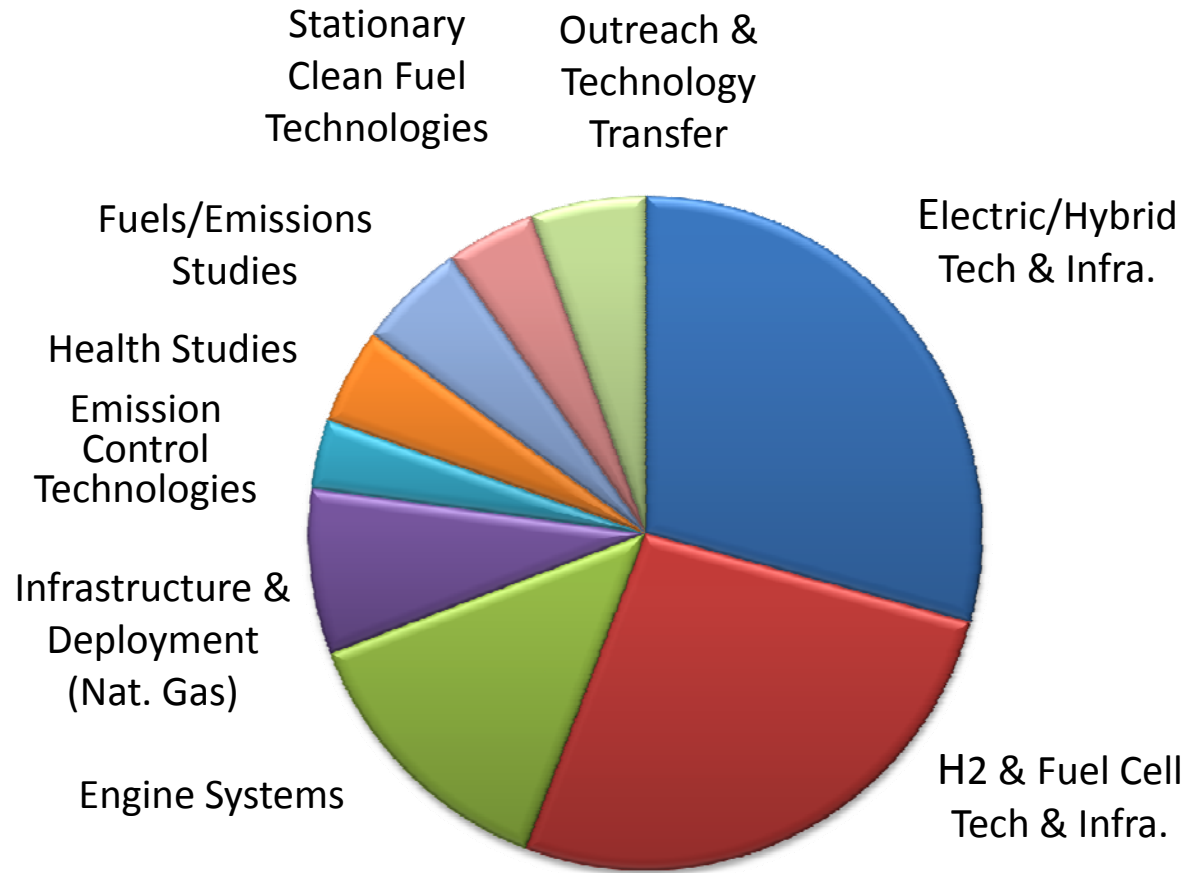
2014 Update – Portfolio Approach

Technology
Advancement
Office



Clean Fuels Program
2013 Annual Report
and 2014 Plan Update

Key: Where can Program have greatest impacts?



\$16.4M Total



What is needed?

- Maximizing co-benefits
- Policy and incentive certainty
- Infrastructure – Clean generation as well as electricity, NG & H2
- Business incentives for CA
- Leadership





Carpe Diem

Sunrise over Back Bay, Newport