



2015 Natural Gas Vehicle Research Roadmap Public Workshop

March 8, 2016



Agenda

Time	Topic
1:00 PM	Welcome and Introductions
1:15 PM	Natural Gas Vehicle Research Roadmap
2:00 PM	Public Comment Session
3:00 PM	Next Steps and Closing
3:30 PM	Adjourn



California Energy Commission Research and Development for Transportation



Matt Fung, California Energy Commission

March 8, 2016



Policy Drivers

The following legislation and policy guide the ERDD Transportation subject area on meeting California's challenges:

Senate Bill 1250: *Enabled Natural Gas Research funds to be used for advanced transportation technologies that:*

- *Reduce air pollution and GHG emissions beyond applicable standards.*
- *Benefit electricity and natural gas ratepayers.*

State Alternative Fuels Plan: *Presents strategies and actions California must take to increase the use of alternative transportation fuels.*

ZEV Mandate: *Requiring automakers to produce a combination of zero emission and partial zero emission vehicles to meet air quality goals.*

Assembly Bill 32: *Calls for approximately 36% of the state's 2020 GHG reduction targets to come from the transportation sector.*



Goals

The goals of transportation-related projects are to:

- *Reduce carbon emissions*
- *Decrease reliance on fossil fuels*
- *Improve infrastructure capacity, reliability, and sustainability*
- *Improve air quality*
- *Increase the use of transportation renewable fuels*



Research Topic Areas

Transportation Topic Areas include:

- Plug-In Electric Vehicles
- Natural Gas Vehicles
- Energy Efficient Vehicle Components
- Renewable Transportation Fuel**

*** Transportation fuels research limited to Renewable Natural Gas*



General Approach

- Develop research initiatives consistent with California's energy and environmental policies and market need
 - ❑ Use stakeholder developed Research Roadmaps to identify and prioritize research opportunities
 - ❑ Participate in discussions with investor-owned utilities, government agencies, and stakeholders
- Conduct annual NGV Technology Forums
 - ❑ Communication and exchange of high-priority needs of natural gas vehicle end users
- Conduct Public Workshops
 - ❑ Scoping and Pre-bid
- Competitive Solicitations



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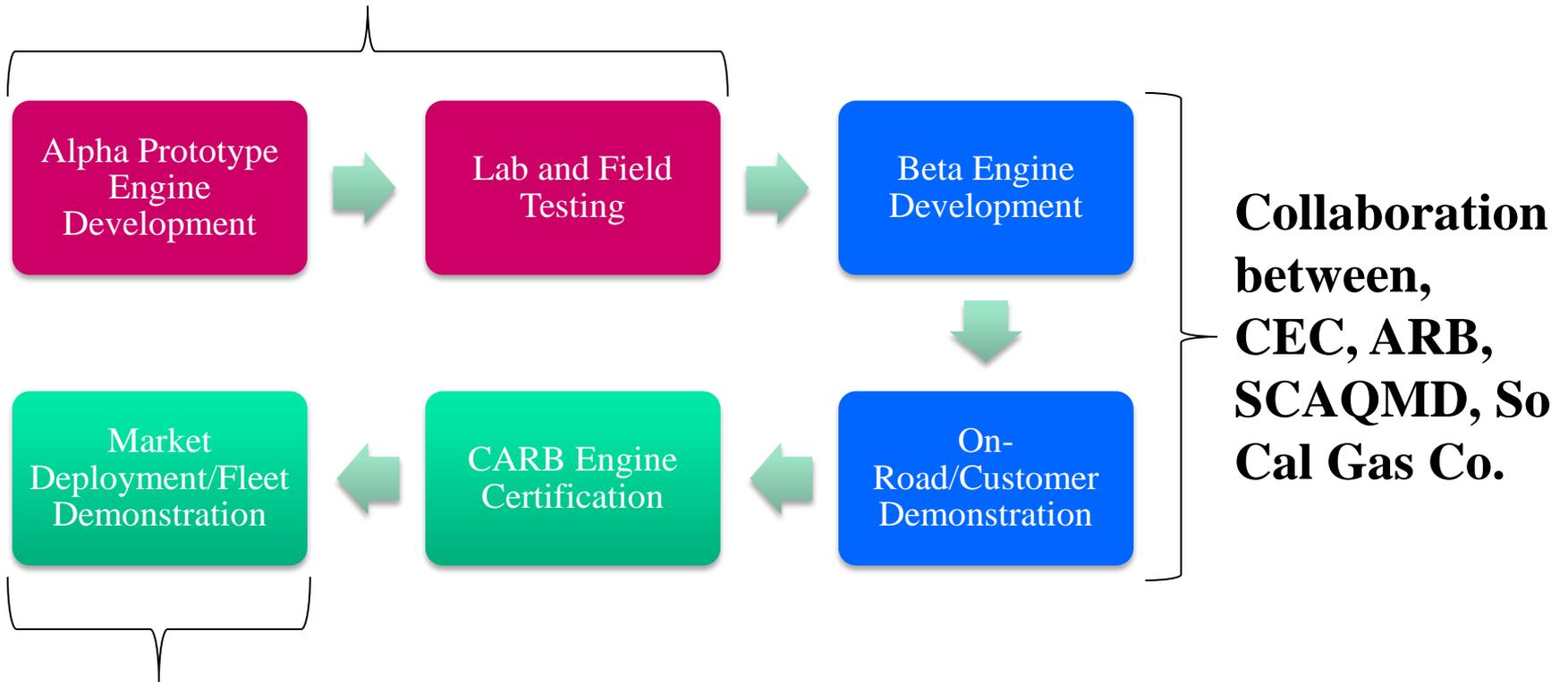
U.S. DEPARTMENT OF
ENERGY





Natural Gas Technology Development Process

CEC Research & Development



ARFVT-P



R&D Initiatives

Research Topic	Initiative	Projects
<ul style="list-style-type: none">Natural Gas Vehicle	<ul style="list-style-type: none">Engine DevelopmentChassis IntegrationVehicle DemonstrationAdvanced HybridizationOn-Board Storage	<ul style="list-style-type: none">NG Engine Development of low NO_x, CWI 8.9L and Cummins15L (AB118, RDD, & SCAQMD funded)New CWI 6.7L Spark Ignited Stoichiometric NG EngineNG Hybridization - Class 4 to 8 vehicles with Transpower, Efficient Drivetrains Inc., and GTI/US HybridAdvanced NG adsorption on-board storage tank technology for light-duty vehicles



R&D Initiatives

Research Topic	Initiative	Projects
<ul style="list-style-type: none"> Energy Efficient Vehicle Components 	<ul style="list-style-type: none"> Advanced efficient truck technologies and systems Advanced Engine Ignition 	<ul style="list-style-type: none"> Completed California Hybrid, Efficient, and Advanced Truck Research Center project with CALSTART Pre-Chamber Advanced Plasma Ignition High Frequency Ignition (Corona)
<ul style="list-style-type: none"> Renewable Transportation Fuel 	<ul style="list-style-type: none"> Renewable Natural Gas Production Waste-to-energy technology Landfill gas purification 	<ul style="list-style-type: none"> RNG Production projects focusing on co-products and co-benefits Steam Hydrogasification technology development Landfill Gas production process for LNG Transportation Fuel



Completed Natural Gas Solicitation

- **Title:** Natural Gas Engine Integration and Demonstration for Medium-Duty Vehicles (GFO-15-503)
- **Research:** Research and Development to integrate natural gas engines for medium-duty vehicle applications. On-road demonstration will assess emission and performance benefits associated with medium-duty natural gas engines. Will support emission reduction, reduced fuel consumption and improved engine performance goals.
- **Funding Amount:** \$1,000,000



Upcoming Natural Gas Solicitation

- **Title:** Off-Road Natural Gas Engine Development and Demonstration
- **Research:** Natural gas engine research, development, and demonstration that integrate advanced natural gas technologies in off-road applications to reduce petroleum and improve air quality.
- **Funding Amount:** \$4M (\$1-\$1.5M max/project)
- **Proposed Timeline:**
 - Scoping Workshop: February 2016
 - Solicitation Release: Summer 2016
 - Deadline to Submit Applications: Summer 2016
 - Business Meeting: Q1 2017



2015 Natural Gas Vehicle Research Roadmap

- Updates research initiatives from 2009 Natural Gas Vehicle Research Roadmap
- 2015 Natural Gas Vehicle Research Roadmap (NGVRR) initiatives focus on:
 - Range, Storage, and Infrastructure
 - Vehicle and Engine Performance and Availability
 - Emission and Environmental Performance
 - Analysis and Information Sharing
- Industry stakeholders have reviewed and commented on the NGVRR.
 - U.S. DOE, CARB, CEC AB118 Program, Port of LA, GM, Cummins, Westport, and SCAQMD
- Draft Roadmap was posted in December 2015.

