

Natural Gas Vehicle Research Roadmap Program and Policy Context

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PIER Transportation Research Subject Area

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About PIER Transportation Research Area

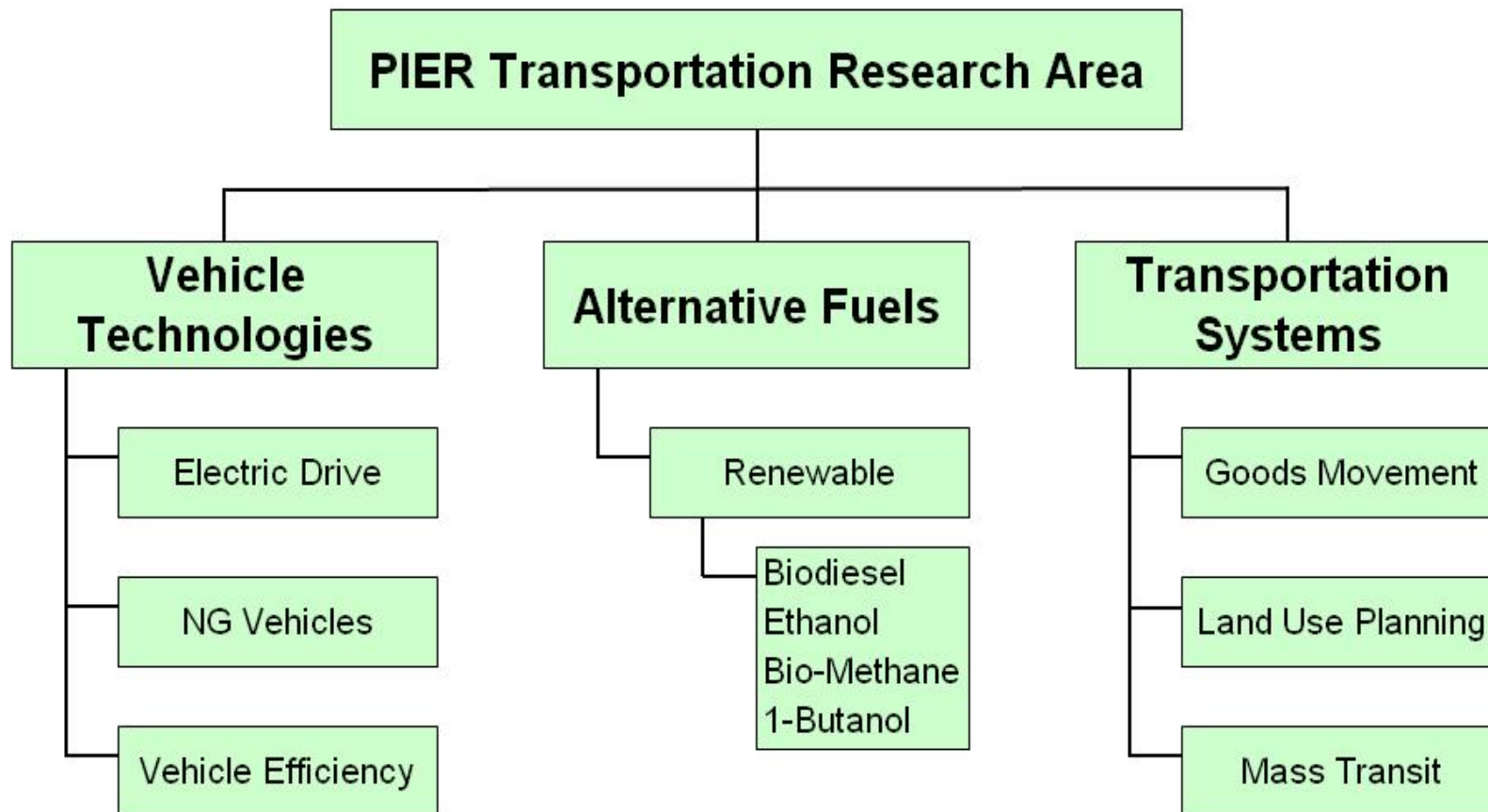
The PIER Transportation Research Area conducts research, development and commercialization in support of State transportation policy's three elements:

- **Vehicles:** Improve the efficiency of California's vehicle fleet.
- **Fuels:** Reduce petroleum consumption and the carbon content of transportation fuels through diversity of supply.
- **Land use and Sustainability:** Reduce VMT through better land use and community design decisions.

The program has a FY 07/08 budget of 9 million. Of the 9 million, 3 million has been allocated to Vehicle Technologies research.



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State Energy Policy Context

AB 2076 (2003)

This law directed the ARB and CEC to develop and adopt recommendations for the Governor and the Legislature on a California strategy to reduce petroleum dependence; recognizes role of CNG and LNG fuel.

EAP II (2005, R&D Recommendation 6)

Support RD&D to improve the efficiency of petroleum-fueled vehicles and to reduce the cost and promote the availability of non-petroleum fuels.

2005 IEPR (June, 2006 Update)

Develop and demonstrate alternative fuels, vehicles and fueling infrastructure.

AB 1007 (2006)

Joint ARB/CEC plan to implement alternative transportation fuels in California.

Low Carbon Fuel Standard (2007)

Proposed regulatory structure designed to reduce the carbon intensity of California's transportation fuels by 10 percent by 2020.

Natural Gas Vehicle Research

CPUC Natural Gas Public Purpose Surcharge Fund

CPUC Decision 04-08-010 designated the CEC as administrator of the Natural Gas Research Program. The Program began with \$12 million total funding in 2005. The funding level increases by \$3 million per year to a maximum of \$24 million.

SB 76 (2005)

Allows PIER to fund transportation research. Allows for up to one third of the yearly budget for natural gas research to be used for transportation research.

- Transportation research must be co-planned with the ARB
- Prohibits hydrogen fuel research using natural gas funds
- Research must benefit natural gas or electricity ratepayers

Benefit parameters are

- Increased energy efficiency
- Reduced air pollution and GHG emissions
- Increased use of alternative fuels

Discussion of approach to identifying benefits is in the appendix of the long term investment plan for natural gas research

Project Summaries

Project Title	Focus Area	Funding Source	Funding Amount
Using Gasoline, Diesel, and CNG Vehicles, Characterize the Significance of Lube Oil in PM Formation	Alternative Fuels	NG	\$ 100,000
Using the California Fleet, Conduct Physicochemical and Toxicological Assessment of PM Emissions	Alternative Fuels	NG	\$ 225,000
Heavy-Duty Emissions and Fuel Consumption Improvement	Alternative Fuels	NG	\$ 150,000
Determining the Volatility of UF PM Emissions from CNG Vehicles Control Technologies	Alternative Fuels	NG	\$ 350,000
Improved Efficiency of NG Refueling Stations	Alternative Fuels	NG	\$ 500,000
Advanced NG Tank and Storage Research and Development Project	Alternative Fuels	NG	\$ 500,000
Effects on Engine Performance and Emissions Using LNG as a Replacement Fuel	Alternative Fuels	NG	\$ 400,000
Field Demonstration of 0.2 g/hp-hr NO _x NG-Fired Engine	Vehicle Technologies	NG	\$ 225,000
Development Work for Westport's HPDi Fuel System to Demonstrate EPA 2010 Emissions	Vehicle Technologies	NG	\$ 500,000
Brown Grease Recovery and Biofuel Production Demonstration	Alternative Fuels	Electric	\$ 995,791
Demonstration of an Integrated Biofuels and Energy Production System	Alternative Fuels	Electric	\$ 996,093
California Lignocellulosic Biorefinery Project	Alternative Fuels	Electric	\$ 995,938
PHEV Research Center	Vehicle Technologies	Electric	\$ 3,000,000
TOTAL			\$ 8,937,822



Roadmap Development

A research roadmap is prepared at the topic level and involves a broad literature review, identification of institutions conducting relevant research, and evaluation of the relevancy of other ongoing research. Generally, PIER Transportation Research Roadmaps will...

- 1) define the “state of the art” and gaps in existing and planned research;
- 2) determine the degree to which other research initiatives are addressing the perceived need in California;
- 3) identify other possible co-sponsors capable of leveraging relatively scarce research funding.
- 4) identify research topics/initiatives/projects
- 5) establish overall timeframes, goals and funding levels

Research Roadmaps Under Development

- Alternative Fuels
- Plug-in Hybrid Electric Vehicles
- Natural Gas Vehicles

NGV Research Roadmap Development

Activity	Timeframe
BKl Work Authorization Initiated	June 2006
Individual Stakeholder Meetings	April – June 2007
Draft Strawman Document for Stakeholders	July 12, 2007
Stakeholder Forum (Group Meeting)	August 24, 2007
Review by Stakeholders	September, 2007
1 st Draft of Roadmap	October, 2007
2 nd Review by Stakeholders	November, 2007
2 nd Draft of Roadmap	November, 2007
Placeholder for second stakeholder group meeting	Early December, 2007
Completed R&D Roadmap Final Report	December 28, 2007