Vehicle Technologies Program Planning

Introduction

The Vehicle Technologies Program’s strategic goal is to develop sustainable, cost-competitive technologies to reduce U.S. dependence on petroleum, increase fuel efficiency, reduce greenhouse gas emissions and improve the Nation's energy security. Even a 1% improvement in vehicle fuel efficiency would save consumers more than $2 billion annually. The Program’s Multi-Year Plans provide a high-level perspective of the goals of the Program and how they will be achieved. The following pages detail the elements of the Program’s planning process.

Drivers

The program’s planning process is driven by policy, as well as by stakeholder input, including industry, academia and the national laboratories.

Policy: The program is shaped by several Federal policies directing the Nation to decrease petroleum usage in order to increase the Nation’s security. Congress passed two such policies, the Energy Policy Act of 1992 and 2005, to reduce the Nation's dependence on imported petroleum. They required certain fleets to acquire alternative fuel vehicles, which are capable of operating on nonpetroleum fuels. The Energy Independence and Security Act of 2007 (EISA), revisited many of the requirements of both EPACT 1992 and 2005, and also provided additional direction. Also, the American Recovery and Reinvestment Act of 2009 (Recovery Act) is an unprecedented effort to jumpstart our economy and create and save millions of jobs, and includes measures to modernize U.S. infrastructure and enhance energy independence.

A chart detailing major energy efficiency policy milestones is found on the next page. For more information on the policy drivers, please visit http://www1.eere.energy.gov/vehiclesandfuels/epact/index.html.
Major Energy Efficiency Policy Milestones

Section 501: Implement fuel provider fleet mandate.

Section 703: Developed guidance for state and fuel provider waivers
Section 711: Accelerate efforts to improve hybrid vehicle technologies.

Section 136: Establish a direct loan program for costs associated with advanced vehicles manufacturing facility.
Section 652: Evaluate state of technological advancement of advanced insulation.
Sections 225, 226, 227: Optimization of alternative fuels in alternative fuel vehicles.

Develop domestic battery manufacturing
Deploy transportation infrastructure electrification development and education
Clean Cities FY09 Petroleum Reduction Technologies Projects for the Transportation Sector (Funding for the production of alternative fuel vehicles, infrastructure and education)

Stakeholder Input: The keystone of the Program’s strategy is to work with industry, national laboratories, and other stakeholders to develop the technologies and systems needed to cost-effectively develop more energy efficient and environmentally friendly light- and heavy-duty transportation technologies that enable America to use less petroleum and reduce greenhouse gases. The long-term aim is to develop "leap frog" technologies that will provide Americans with greater freedom of mobility and energy security, with lower costs and lower impacts on the environment.

Industry and academic stakeholders help guide and review the program plans through a bi-annual peer review process. Information on program partners is located at http://www1.eere.energy.gov/vehiclesandfuels/about/partnerships/index.html.
Portfolio Analysis

The program manages a robust R&D portfolio that will enable the Department to cost-effectively achieve its targets. The portfolio includes hybrid and vehicle systems technologies, energy storage technologies, power electronics and electrical machine technologies, advanced combustion engines technologies, fuels and lubricants technologies, materials technologies and educational activities. As part of its portfolio analysis activities, the program has developed multiple reports exploring specific technologies and the industry as a whole. One example is the 2008 report, *Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-Road Engines, Report 1*, which is located at [http://www1.eere.energy.gov/vehiclesandfuels/features/int_blends_rpt_1.html](http://www1.eere.energy.gov/vehiclesandfuels/features/int_blends_rpt_1.html).

Technologies:

- Hybrid & Vehicle Systems
- Energy Storage
- Power Electronics & Electrical Machines
- Advanced Combustion Engines
- Fuels & Lubricants
- Materials Technologies

Multiyear Program Plan

In order to address its goals and targets in a systematic and efficient way, the Vehicle Technologies Program develops and maintains its Multiyear Program Plan (MYPP), which works with the industry to identify the priority areas of research needed to develop advanced vehicle technologies. The planning includes goals, targets, tasks, milestones and outputs covering each of the technology areas. It is defined in the context of the challenges addressed, the necessity of the Federal role, the history of success, approaches and strategies, and the primary outcomes and benefits sought. Success in the research and development and intended outcomes will lead to petroleum savings, beginning significantly in 2015 and growing dramatically thereafter. The full MYPP is available online at [http://www1.eere.energy.gov/biomass/pdfs/mypp_feb2009.pdf](http://www1.eere.energy.gov/biomass/pdfs/mypp_feb2009.pdf).

Potential Barriers to Market for Vehicle Technologies: Technical and market risk are important to consider when estimating potential oil savings and GHG reductions.

- Lack of consistent market drivers
- Industry-set price for energy-efficient technologies
- Manufacturers’ and consumers’ risk aversion
- Lack of infrastructure
- Lack of understanding of environmental / energy tradeoffs
**Long Term Goals:**

- Hybrid Electric Systems subprogram (Power Electronics and Electric Motor R&D):
  
  By 2015, meet the same life and performance requirements at a cost of $12/kW

- Hybrid Electric Systems subprogram (Energy Storage):
  
  Reduce the production cost of a high energy and high power battery from $1,000/kWh in 2006 to $300/kWh by 2014, enabling cost competitive market entry of PHEVs

- Hybrid Electric Systems subprogram (Vehicle and Systems Simulation and Testing):
  
  Demonstrate market readiness of PHEV technologies by 2015

- Advanced Combustion R&D subprogram:
  
  Improve passenger vehicle engine efficiency 25%–40% and commercial vehicle engine efficiency at least 20% by 2014 while meeting emission standards by 2014.

- Fuels Technology subprogram:
  
  Complete testing to determine if gasoline blended with 15% and 20% ethanol can be used interchangeably with existing fuels in passenger vehicles and small, nonroad engines not specifically designed to run on these blends by 2010.

**Joule Milestones:**

- Hybrid-Electric Systems subprogram (Power Electronics and Electric Motor R&D):
  
  By 2010, develop an integrated electric propulsion system that costs no more than $19/kWh peak and can deliver at least 55kW of power for 18 seconds and 30kW of continuous power ($1,045 per system compared to the cost of $1,925 in 2004

- Hybrid-Electric Systems subprogram (Energy Storage):
  
  Reduce the production cost of a high power 25kW battery for use in passenger vehicles from $3,000 in 1998 to $500 by 2010, enabling cost-competitive market entry of hybrid-electric vehicles

- Advanced Combustion R&D subprogram and Fuels Technology subprogram:
  
  Improve the efficiency of internal combustion engines from 30% (2002 baseline) to 45% by 2010 for passenger vehicles

- Materials Technology subprogram (Vehicle Lightweighting):
  
  By 2010, develop material and manufacturing technologies which, could cost-effectively reduce the weight of passenger vehicle body and chassis systems by 50%

**Program Activities:** The Program’s current activities include Research & Development, Testing, Technology Validation, Demonstration, and Education. The Program activities and their outcomes support the Program mission and vision, which provides a framework for the Program’s strategy and multiyear plan. To learn more about the Program, visit [http://www1.eere.energy.gov/vehiclesandfuels/pdfs/mypp/1_prog_over.pdf](http://www1.eere.energy.gov/vehiclesandfuels/pdfs/mypp/1_prog_over.pdf).