

Transportation accounts for 2/3 of U.S. petroleum use, and on-road vehicles are responsible for 80 percent of this amount. This dependence affects the national economy and our wallets. Vehicle Technologies develops and deploys advanced highway transportation technologies that reduce petroleum consumption and greenhouse gas emissions while meeting or exceeding vehicle performance expectations.

What We Do

Vehicle Technologies uses an integrated portfolio approach and relies on strategic partnerships to accelerate the movement of technologies from lab to showroom and onto the road:

- ✓ **Research and Development (R&D)** seeks to reduce the cost and improve the performance of a mix of near- and long-term technologies, including advanced batteries, power electronics and electric motors, lightweight and propulsion materials, advanced combustion engines, advanced fuels and lubricants, and other enabling technologies.
- ✓ **Modeling, Evaluation, and Demonstration** provides objective, publicly-available data to identify pathways for technology improvements and lessons learned for cost-effective future deployment.
- ✓ **Outreach and Deployment** provides technical assistance, tools, and resources to help consumers and fleets understand their options for saving money on fuel.
- ✓ **Partnerships** leverage technical expertise, accelerate progress, and catalyze action to enable the widespread use of advanced technology vehicles – at no additional cost to the government.

Program Goals/Metrics

- Save 1.8 million barrels per day of highway vehicle petroleum by 2020 (compared to EIA’s Annual Energy Outlook-projected baseline of 11.2 million barrels per day in 2020).
- Develop technologies to enable a corporate average fuel economy (CAFE) of 144 gCO₂/mi (61.6 miles per gallon [mpg]) for cars and 203 gCO₂/mi (43.7 mpg) for light trucks by 2025 (54.5 mpg light-duty average).

FY 2014 Priorities

- **EV Everywhere Grand Challenge** seeks to make the United States the first country to provide a wide array of plug-in electric vehicle (PEV) models that are as affordable and convenient as gasoline vehicles by 2022. A companion Workplace Charging Challenge will encourage private-sector leadership in the build-out of convenient PEV charging for consumers.
- **SuperTruck Initiative** will develop and demonstrate technologies that improve heavy-duty, class 8 vehicle fuel economy by 50 percent by 2015 (relative to a comparable 2009 vehicle) through increased engine efficiency, reduced aerodynamic drag and weight, and hybridization.
- **Alternative Fuel Vehicle Community Partner Projects** will greatly accelerate the adoption of natural gas vehicles, PEVs, and other alternative fuels through highly-leveraged community partnerships to introduce alternative fuel and advanced vehicles at scale.
- **Grid Integration**, coordinated with EERE’s Building and Solar Energy Technologies Programs, will develop and advance the platform of technologies needed to fully integrate PEVs and other clean energy technologies into the distribution system in a safe, reliable, and cost-effective manner.

(Dollars in Thousands)	FY 2012 Current	FY 2013 Request	FY 2013 Annualized CR	FY 2014 Request
Batteries and Electric Drive Technology	117,740	210,000	--	240,200
Vehicle and Systems Simulation & Testing	47,198	57,000	--	70,000
Advanced Combustion Engine R&D	58,027	57,000	--	59,500
Materials Technology	40,830	50,000	--	59,500
Fuels and Lubricant Technologies	17,904	12,000	--	17,500
Outreach, Deployment and Analysis	39,267	34,000	--	126,300
NREL User Facility	-	-	--	2,000
Total, Vehicle Technologies	320,966	420,000	330,819	575,000

*FY 2013 amounts shown to reflect the P.L. 112 175 continuing resolution level annualized to a full year. These amounts are shown only at the “congressional control” level and above; below that level, a dash (—) is shown.

- **Vehicle Technologies Incubator** will enable the rapid “on-ramping” of new, high-impact, potentially transformational energy technologies into the Vehicle Technologies portfolio, dramatically increasing the rate of technology innovation.

Key Accomplishments

Vehicle Technologies’ achievements are helping transform the U.S. transportation sector, saving families and businesses money through reduced fuel costs and by expanding the range of vehicle and fuel choices.

- **Developed Better-performing, Lower-cost Advanced Battery Technologies:** Vehicle Technologies continues to build on its history of successful R&D.
 - Most hybrid electric vehicles sold in the United States today use EERE-developed battery technology.¹ Vehicle Technologies’ efforts to improve nickel-metal hydride (NiMH) batteries resulted in efficiency improvements of up to 50 percent compared to similar non-hybrid vehicles, and R&D to discover and optimize new lithium-ion battery technologies led to battery size and weight reductions of 25 to 35 percent compared to NiMH technology. These lithium-ion battery technologies are entering the market.
 - Vehicle Technologies-supported R&D helped reduce the high-volume production cost of high-energy, high-power batteries from \$1,200/kWh in 2008 to \$500/kWh in 2012,² with a goal of reaching \$300/kWh by 2014 and \$125/kWh by 2022. Achieving this goal would enable a wide range of PEVs to be directly cost-competitive with conventional vehicles over the next 5 to 10 years.
 - Innovative mixed-metal cathode material invented at DOE’s Argonne National Laboratory through a decade of sustained Vehicle Technologies support enables 50 percent more energy storage capacity. This material has been licensed by several companies, including a start-up that announced it has achieved a breakthrough enabling twice the energy density of current lithium-ion batteries that, as a result, could reduce cost by more than half.
- **Increased Fuel Economy for Heavy-Duty Trucks:** Vehicle Technologies’ SuperTruck Initiative demonstrated a 20 percent engine efficiency improvement in the laboratory, and one awardee has shown a 54 percent improvement in fuel economy and a 61 percent improvement in freight efficiency. SuperTruck is on track and expects to exceed its 50 percent freight efficiency improvement goal by 2015 with on-road demonstrations. Reducing fuel costs for heavy-duty trucks will help U.S. businesses save money.
- **Generated Billions in Fuel Savings and Health Benefits:** Vehicle Technologies’ combustion engine R&D generated \$70.2 billion (2008 dollars) in total benefits due to fuel savings for heavy-duty diesel truck users as well as from associated monetized health benefits, based on \$931 million invested from 1986 to 2007.
- **Decreased Oil Dependence for Local Transportation:** Since 1993, the Clean Cities Initiative has grown to a national network of nearly one hundred local coalitions that have collectively displaced more than 4.5 billion gallons of gasoline. These coalitions have helped deploy thousands of alternative fuel vehicles and the fueling stations needed to serve them, aided in the elimination of millions of hours of vehicle idling, and helped accelerate the entry of PEVs into the marketplace.
- **Accelerated Advanced Transportation Technologies through Public-Private Partnerships:** Vehicle Technologies has worked with stakeholders to identify critical needs and establish partnerships that accelerate progress by leveraging expertise and catalyzing action – at no additional cost to the government.
 - The **National Clean Fleets Partnership** collaborates with large, private vehicle fleets to reduce their fuel use and save money. To achieve the highest impact, the partnership focuses on the nation’s largest corporate fleets and has grown from less than 10 partners at its launch to include 21 partners as of March 2013.
 - The **Workplace Charging Challenge** calls upon America’s employers in all sectors of the economy to provide PEV charging access at worksites across the country. Launched in January 2013 with 13 partners and eight ambassador stakeholder groups, the challenge more than doubled its participation in its first two months.

¹ “Linkages of DOE’s Energy Storage R&D to Batteries and Ultracapacitors for Hybrid, Plug-in Hybrid and Electric Vehicles.” U.S. DOE, February 2008

² Based on high volume manufacturing projection of prototypes that meet or exceed performance requirements using a peer-reviewed cost model, and on proprietary data from battery companies participating in the U.S. Advanced Battery Consortium