

## Current Goals and Activities

Reducing petroleum consumption has more potential to improve the Nation's energy security than any other action; even a one percent improvement in vehicle fuel efficiency would save consumers over \$2 billion annually.

VTP has five major strategic areas:

- [Vehicle Electrification](#): VTP is developing hybrid electric, plug-in hybrid electric, and fully electric vehicles and components that provide significant fuel economy improvements. VTP-funded researchers are making advanced batteries more affordable and recyclable while increasing battery range, performance, and life. This research supports President Obama's goal of 1 million plug-in hybrid vehicles by 2015. VTP is also working with industry and state and local governments to develop domestic battery and electric-drive component manufacturing plants.

Key Activities: Vehicle and Systems Simulation and Testing, Technology Validation, Energy Storage R&D, Advanced Power Electronics and Electric Motors R&D

- [High-Efficiency Engines](#): Although internal combustion engines have been used for more than a century, significant improvements in energy efficiency and emissions reduction are still possible. VTP is conducting R&D on advanced engine technologies such as homogenous charge compression ignition and variable compression ratio, which can increase a vehicle's fuel economy by 20% to 40% while reducing the need for expensive emission control systems. As hybrid and plug-in hybrid vehicles become cost competitive and gain market share, equipping these vehicles with advanced combustion engines will enable even greater fuel savings.

Key Activities: Combustion and Emission Control, Heavy Truck Engine, Solid State Energy Conversion, Health Impacts

- [Advanced Lightweight Materials](#): Reducing vehicle weight improves fuel economy. VTP researchers are identifying lightweight, high-strength materials and materials processing technologies that can reduce vehicle weight while maintaining or improving functionality, durability, reliability, and safety. Because cost is the largest barrier to widespread use of lightweight materials and components, VTP is leading efforts to reduce costs and improve manufacturability, with a focus on low-cost carbon fiber produced from alternative source materials.

Key Activities: Propulsion Materials Technology, Lightweight Materials Technology, High Temperature Materials Laboratory

- [Fuels and Lubricants](#): VTP funds the development of nonconventional fuels and lubricants that maximize engine efficiency and minimize emissions. VTP also tests the impacts of nonconventional fuels and lubricants on vehicle engines, emission control systems, fueling infrastructure, and human health. For example, VTP is evaluating the

impacts of intermediate blends of ethanol and gasoline (e.g., E15 and E20) on performance, emissions, and durability of the existing vehicle fleet and on small, non-road engines. This develop-and-test approach results in fuels and lubricants that are practical for real-world application, meet DOE's energy-efficiency and petroleum-reduction objectives, and provide vehicle users with high-performance, cost-competitive options.

Key Activities: Advanced Petroleum Based Fuels, Non-Petroleum Based Fuels and Lubricants

- [Deployment and Education](#): Integrating newly validated technologies is a multi-faceted challenge that requires student and consumer education, workforce training, early adopter support, as well as supporting relevant legislative and rulemaking activities. VTP manages Clean Cities, DOE's flagship advanced transportation deployment activity. Clean Cities partners with state and local organizations to accelerate the market penetration of alternative fuels and vehicles, advanced vehicles (such as hybrid vehicles), alternative fuel blends, high fuel economy strategies, and idle reduction technologies. VTP also partners with industry and universities to promote advanced vehicle education through its student automotive engineering competitions and Graduate Automotive Technology Education (GATE) program. Many students who graduate from the student vehicle competitions and the GATE Program, go on to take jobs in the auto industry, government, and academia, where they bring with them an unprecedented appreciation and understanding of advanced automotive technologies.

Key Activities: Vehicle Technology Deployment (Clean Cities), Graduate Automotive Technology Education, Advanced Vehicle Competitions, Education, Safety and Codes and Standards, Legislative and Rulemaking

These activities, among the other activities found in the VTP program's portfolio, will lead to a large reduction in the consumption of petroleum, significant reductions in carbon emissions, and secure the Nation's energy supply.

## **Partnering for Success**

VTP's success depends on its relationship with universities, vehicle and engine manufacturers, material suppliers, nonprofit technology organizations, energy suppliers, and the national laboratories. The FreedomCAR and Fuel Partnership and 21st Century Truck Partnership are designed to identify and select appropriate research and development objectives to achieve Program goals. Projects are conducted through a variety of mechanisms, including cooperative research and development agreements, university grants, subcontracts, and in-house research funded at DOE's national laboratories.