



Frito-Lay North America

Public-Private Partnerships Fuel Innovation in Medium- and Heavy-Duty Trucks

Federal investment in scientific discovery and technology is vital to maintaining U.S. economic leadership globally and in growing key emerging sectors such as clean energy

Overview

The nation's economy depends on shipping: As much as 80 percent of goods in the United States are moved by truck. So development of technologies that reduce fuel consumption and cut costs helps U.S. companies be globally competitive.¹ By combining government investment with national experts and facilities, the Department of Energy's Vehicle Technologies Office (VTO) facilitates public-private coalitions that provide technical and financial assistance to stakeholders interested in promoting the production, purchase, and installation of vehicle innovations. Leveraging these partnerships strengthens U.S. competitiveness in important industries such as clean energy, for which the global market is likely to reach \$7 trillion over the next two decades.² Transportation improvements, especially in medium- and heavy-duty trucks, are essential if the United States is to meet national emissions goals while saving businesses and consumers money.

Stages of Innovation

The introduction of advanced ideas, devices, or processes drives the emergence and creation of market sectors and supports the U.S. economy. The three stages of progression for discovery and invention are:

- **Basic science and early stage R&D.** Fundamental exploration to acquire new knowledge of materials and processes leading to novel theories and products.
- **Applied research.** Establishment of state-of-the-art concepts and prototype advancements, and exploration of the feasibility of scaling up these modern commodities.
- **Technology maturation and deployment.** Evaluation of materials, components, and efficiencies to optimize performance, demonstrate concepts, and support market adoption.

Applied research leads to technological deployment

Cooperative research and development agreements, licensing options, and access to state-of-the-art testing centers are reducing the time and cost required to move products to market. By supporting public-private partnerships, the VTO encourages deployment of products and processes that reduce the country's reliance on petroleum.

Applied research opportunities in the VTO are modernizing vehicles and their components, yielding industry-wide gains in operational efficiency for cars, trucks, and buses. The VTO's **SuperTruck** initiative, a five-year collaboration with four major manufacturers, aims for a 50 percent reduction in truck petroleum reliance by 2015.³ Progress has already been made: Leading manufacturers, including Cummins and Peterbilt, have achieved fuel improvements of 70 percent in freight transportation.⁴ These companies plan to integrate products refined through the SuperTruck alliance into their operations, giving the United States an early edge in production of these advanced technologies.

National laboratory helps speed products to market

In 2010, the vehicle component firm SmartTruck Systems partnered with Oak Ridge National Laboratory to use the lab's supercomputer, Jaguar, in an analysis of tractor-trailer parts to reduce drag and increase efficiency. By leveraging this resource, SmartTruck Systems cut from weeks to days the time necessary to move its add-on truck components from concept to a manufacture-ready design.*

Continued on next page

SmartTruck Systems' aerodynamic innovation demonstrated fuel mileage improvements of up to 10 percent for long-haul vehicles and in 2011 was named one of the top 20 products of the year by *Heavy Duty Trucking* magazine.[†] The products have since been installed by Frito-Lay, Swift Transportation, and Con-way Truckload. Mark Henderson, CEO of SmartTruck Systems, summed up the partnership with the lab by stating: "Without Oak Ridge and Jaguar, it would be impossible to be where we are today."[‡]

[†] Oak Ridge National Laboratory, "Smart Truck: Designing a Smart Truck With the Power of Jaguar," http://web.ornl.gov/info/ornlreview/v44_3_11/article06.shtml.

[†] Smart Truck, "Smart Truck Systems Portfolio," <http://smartrucksystems.com/undertray-Intro.php>.

[‡] Oak Ridge National Laboratory, "Smart Truck."

Advantages of DOE partnership opportunities

Collaborations between businesses and the public sector provide opportunities to develop and deploy cutting-edge technologies. The National Clean Fleets Partnership, which is part of DOE's broader Clean Cities program, unites over 20 large-fleet managers and industry representatives in an effort to reduce fuel consumption by providing resources, expertise, and networking opportunities.⁵ Major American companies, including Aramark, AT&T, Best Buy, General Electric, Johnson Controls Inc., Staples, and PepsiCo, have joined the initiative.

Members can participate in peer-to-peer exchanges of best practices and lessons learned and have access to a suite of tools to help them make cost-effective decisions in adapting petroleum alternatives and efficiency measures.⁶ In 2013, for example, Best Buy reduced its fleet carbon emissions by 16 percent and eliminated 560,000 empty-truck miles through the use of smaller vehicles and updated route-mapping procedures.⁷

The 21st Century Truck Partnership, launched in 2000, brings together major U.S. original equipment manufacturers and suppliers with the departments of Energy, Transportation, and Defense and the Environmental Protection Agency. The collaboration aims to improve the efficiency and safety of medium- and heavy-duty trucks and buses and to reduce emissions.⁸ Industry leaders such as Navistar, Volvo, and Cummins, working alongside staff from the federal agencies and national laboratories, produce technologies that will safely and cost-effectively move larger volumes of freight and greater numbers of passengers while emitting less pollution and consuming less gas.



National Renewable Energy Laboratory

FedEx, a member of the 21st Century Truck Partnership, uses electric delivery trucks to reduce emissions and petroleum consumption.

Federal partnerships reduce fuel consumption

Public-private partnerships leverage government funding for research activities that encourage businesses to reduce gas consumption, saving money and lowering operation costs while helping the nation meet its emission goals. With continued progress on fuel efficiency for medium- and heavy-duty trucks, the U.S. has the potential to save an estimated \$32 billion per year and to ensure that early adopters of new technologies in the freight transportation sector remain competitive as they make important investments.⁹ DOE's continued support of all stages of innovation is essential if the United States is to be successful in the global clean energy economy.

For more information on the role the Department of Energy plays in supporting fuel efficiency technology development and deployment, see the following links:

- [Office of Energy Efficiency and Renewable Energy—Vehicle Technologies Office](#)
- [21st Century Truck Partnership](#)
- [National Clean Fleets Partnership](#)

Endnotes

- 1 21st Century Truck Partnership, “Roadmap and Technical White Papers,” February 2013, http://energy.gov/sites/prod/files/2014/02/f8/21ctp_roadmap_white_papers_2013.pdf.
- 2 U.S. Department of Commerce—International Trade Administration, “Renewable Energy Top Markets for U.S. Exports 2014-2015,” February 2014, http://export.gov/build/groups/public/@eg_main/@reee/documents/webcontent/eg_main_070688.pdf.
- 3 U.S. Department of Energy, “SuperTruck Making Leaps in Fuel Efficiency,” Feb. 19, 2014, <http://energy.gov/eere/articles/supertruck-making-leaps-fuel-efficiency>.
- 4 Ibid.
- 5 U.S. Department of Energy—Energy Efficiency & Renewable Energy, “National Clean Fleets Partnership,” http://www1.eere.energy.gov/cleancities/national_partnership.html.
- 6 U.S. Department of Energy—Energy Efficiency & Renewable Energy, “National Clean Fleets Partnership,” September 2014, <http://www.afdc.energy.gov/uploads/publication/60619.pdf>.
- 7 Ibid.
- 8 U.S. Department of Energy, “Vehicle Technologies Office: 21st Century Truck,” <http://energy.gov/eere/vehicles/vehicle-technologies-office-21st-century-truck>.
- 9 Consumer Federation of America, “Paying the Freight: The Consumer Benefit of Increasing the Fuel Economy of Medium and Heavy Duty Trucks,” February 2014, 15, <http://www.consumerfed.org/pdfs/Paying-the-Freight.pdf>.

For further information, please visit:

pewtrusts.org/cleanenergy

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