

## Making the case for hybrid and electric trucks and buses

### Why are these technologies important?

The new wave of hybrid and electric passenger cars have captured the public spotlight. However, the replacement of conventionally-powered trucks with hybrid or battery-electric vehicles may offer an even bigger immediate payoff in terms of significant fuel savings and public co-benefits. One efficient truck can cut 24 times the fuel use and carbon emissions that a passenger car can.

Other benefits include:

- ✓ Improved energy security and the reduction of imported oil.
- ✓ American leadership, jobs, and economic growth
  - One recent study found that the strong expansion of high-efficiency trucks can generate \$24 billion in net economic benefits and grow 124,000 jobs in the U.S. by 2030.
- ✓ Reductions in criteria air pollution and related healthcare costs.
- ✓ Reductions in global warming pollution.
  - Nationwide, medium- and heavy-duty vehicles account for 18 percent of all global warming emissions from the transportation sector.
- ✓ Reduced noise pollution.
- ✓ Greater freight efficiency and reduced long-term operating costs.

Electric trucks use NO petroleum; have no tailpipe emissions, and studies show significantly reduced emissions (even including power plant emissions needed for recharging). In many cases, using electricity as a fuel can be much cheaper than using oil, depending on the electricity rate.

From a policy perspective, there is a large push to develop technology that improves fuel efficiency and reduces carbon emissions from the transportation sector. New national air quality (ozone) rules will double the number of regions not meeting health standards, potentially resulting in more restrictions for trucks and goods movement.

### The business case for advanced trucks

Advanced truck production volumes are still too low in the early market to realize price reductions, and the current payback period is long even with large fuel and maintenance savings. However, modest volume increases can help move prices to levels easily justifying purchase. HVIP facilitates this market increase by providing incentives to bridge the gap between today's price and the lower prices expected in the future at higher volumes.

As hybrid and battery-electric truck offerings expand in body/chassis combinations and truck maker production, most work truck applications *can* benefit from a hybrid. Placed in the right application, hybrids and battery-electric vehicles can result in substantial fuel savings over vehicle life. Today's hybrid trucks are already delivering these results. The National Renewable Energy Laboratory found that United Parcel Service (UPS) hybrid-electric delivery vans have achieved fuel economy gains of 29 to 37 percent [LINK the words National Renewable Energy Lab found to <http://www.nrel.gov/docs/fy10osti/44134.pdf>]. In addition, utilities using hybrid-electric bucket trucks have documented fuel use reductions of 14 to 58 percent and reduced brake wear in CALSTART testing performed for the Hybrid Truck Users Forum (HTUF) program and other projects.

The table below illustrates how hybrid trucks can more than pay for themselves through annual fuel cost savings multiplied over a typical ownership period, particularly using the HVIP voucher.

Example Fleet Cost Savings from Hybrid Truck Purchase				
	Incremental Hybrid	HVIP Voucher	Net Hybrid Cost After	Annual Fuel Cost Savings

	<b>Cost</b>		<b>Voucher</b>	
<b>Package Delivery Truck</b>	\$35,000	\$15,000	\$20,000	\$2,800
<b>Beverage Tractor</b>	\$45,000	\$25,000	\$20,000	\$3,500
Assumes diesel price of \$3.50 per gallon.				

## How HVIP helps

HVIP was designed to help fleets buy cleaner trucks faster and help manufacturers sell advanced trucks that are still in low production. High incremental cost is the primary barrier to widespread adoption of efficient truck technologies. HVIP offsets about half of the incremental cost of eligible hybrid medium- and heavy-duty vehicles, and a large portion of the cost of battery-electric trucks and buses, using a simplified purchase voucher. HVIP is designed to assist fleets by reducing this cost right at the time of purchase. In this way, HVIP reduces capital costs for fleets at the point of purchase with minimal delay, uncertainty, or administrative burden.

## Some Background

### What is a Hybrid Truck?

In plain terms, a hybrid truck differs from a conventional truck in that it uses two or more distinct power sources, rather than one, to move the vehicle. There are several different types of hybrids, including hybrid-electric and hybrid-hydraulic systems. They work in similar ways. As an example, the most common type in the market today is the hybrid-electric variety which combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system. The presence of the electric powertrain is intended to achieve better fuel economy than a conventional diesel-powered truck. The two systems can work independently or in conjunction with each other, merging seamlessly as one, and provide very good results in driving cycles with stop-and-go delivery and high idling times by capturing and re-using energy usually lost while braking, and by shutting down the ICE at idle and restarting it when needed.

### What is an Electric truck?

A battery-electric truck is, very simply, a truck powered by electricity stored in rechargeable battery packs. It uses an electric motor instead of an internal combustion engine for propulsion. Battery-electric trucks are well-suited for urban fixed-route, return-to-base delivery fleets since they generally travel relatively short distances and would ideally have access to charging stations. When compared to hybrid trucks, battery-electrics are more efficient and cleaner (with zero tailpipe emissions), but are also more expensive and have a shorter range.

### How real are these technologies?

Hybrid trucks are now in real, low-volume production and America is the world leader in developing and producing these vehicles. Every major U.S. truck maker has a hybrid truck in production or near production. Vehicles are available in multiple body and chassis sizes for a range of applications, from Class 4 parcel vans through Class 8 delivery tractors. Those now in production with multiple products include Navistar, Freightliner, Kenworth, Peterbilt and Azure Dynamics.

Electric trucks are just entering early production and include products from multiple companies, including Navistar, Freightliner, Smith, and EVI.

See the current list of HVIP eligible vehicles. [LINK the words HVIP eligible vehicles to <http://www.californiahvip.org/eligibleveh.asp>]

## **Who is using these trucks?**

Fleets! Both public and private.

**Coca-Cola** operates North America's largest fleet of hybrid electric trucks. "We made a choice to reduce CO<sub>2</sub>, fuel consumption as part of our commitment to Live Positively. No other program has helped our effort more than HVIP to make hybrid trucks an easy choice to deliver the world's most popular beverage brands to our consumers," said Steven Saltzgeber, Director, Fleet Operations, Coca-Cola Refreshments, USA.

According to the **United Parcel Service (UPS)**, it has deployed over 250 hybrid electric vehicles nationwide since 2000 and recently purchased 130 new hybrid vehicles in September 2010. These vehicles promise a 35 percent improvement in fuel economy over the vehicles they are replacing. The vehicles are expected to collectively reduce fuel consumption by 220,000 gallons and CO<sub>2</sub> by 2,243 metric tons annually.

As part of **PepsiCo's** "Performance with Purpose" mission -- to deliver sustainable growth by investing in a healthier future for people and the planet -- Pepsi Beverages Company is also committed to reducing fleet carbon emissions. "We proudly partner with CALSTART to leverage and promote new vehicle technology, ultimately contributing to a cleaner environment," said a company spokesperson. "With CALSTART's help, PBC has grown its hybrid fleet."

Public fleets are also operating hybrid trucks. In 2010, several municipal fleets in California used HVIP vouchers to transition their fleets to hybrid technology, including the **City of Santa Rosa**, the **City of Gardena**, the **City of Torrance**, and the **City of Napa**.

In 2011, two million dollars of HVIP funding will be set aside for seven months for public fleet purchases. If not used after 7 months, it will be returned to the general funding pool. Public fleets are highly encouraged to commit to purchasing a hybrid truck, request a voucher and even leverage other public funding to match the HVIP voucher.

**Please see the 2011 HVIP Implementation Manual for more details about how the program works.**

[link to imp manual [http://www.californiahvip.org/docs/HVIP\\_ImplementationManual\\_2011.pdf](http://www.californiahvip.org/docs/HVIP_ImplementationManual_2011.pdf)]