THE Truck Stop

The Latest in Truck News for

Hybrid Visions

Class 6 and 7 Electric-Diesel Commercial Trucks Are Helping Contractors See Green

The challenge of providing a cleaner world coupled with the demand for a dwindling energy source is fueling innovation in the truck world. Construction and landscape crews utilize machines and trucks all day long — often seven days a week — which means they invest heavily in diesel and gas products that affect their bottom line every month.

To help balance these increasing fuel costs with more economical products, truck manufacturers are now offering fleets a greener and more fuel-efficient alternative — Class 6 and 7 hybrid-electric commercial trucks. These trucks offer a significant improvement in fuel economy, ranging from 30 to 60 percent depending on application. In addition, they also feature reduced emissions and noise, which make the trucks more community-friendly.

"We believe that hybrid technology is a critical and necessary development for commercial work trucks," says Jim Williams, director of sales and distribution for new products at Navistar International. "A hybrid truck like the DuraStar Hybrid from International can deliver significant efficiency and cost-savings. This is especially true with today's high fuel prices where just one truck can save thousands of dollars in fuel costs annually."

In order to explain why hybrid trucks are so efficient and useful for delivery, utility, construction and many other applications, it's important to understand how the primary components of a hybrid drive system work together.

Primary Components

The hybrid drive system is comprised of four main components, which include the hybrid drive unit, the Power Electronics Carrier (PEC), the Motor Inverter/Controller and the DC/DC Converter.

The hybrid drive unit consists of a mechanical automated transmission and a hybrid motor/generator, which adds horsepower and torque to the powertrain. The PEC includes the control electronics for the hybrid system and the hybrid's lithium ion batteries. It also contains a cooler for the electronics system. The Motor Inverter/Controller includes the control system to make the hybrid system work.

Hybrid commercial trucks continue to put out good vibes. Some states and the federal government have funds available to help businesses offset the initial cost of a hybrid commercial truck. On a federal level, the Energy Policy Act of 2005 allows for tax credits of up to $12,000.

By Mike Elwell

The DC/DC Converter keeps the 12-volt system fully charged in any engine-off application. While the engine is off, the 12-volt electrical loads (lights, strobes, etc.) can deplete the 12-volt batteries. The DC/DC Converter eliminates this problem by using the hybrid batteries to charge the 12-volt battery system.

Putting it all together, a hybrid diesel electric commercial truck basically inserts a hybrid electric motor, powered by high-voltage batteries between the engine and the transmission. Along with starting the engine, the hybrid electric motor can operate the vehicle at low speeds on electricity only before the engine begins to help out at higher loads and speeds, saving precious fuel and lowering operating costs. In certain applications, it also has the capability of operating body equipment using the hybrid batteries to operate the power take off (PTO). This is different than a conventional truck where the engine must be running to operate the PTO.

Hybrid Applications

Hybrids are best suited for stop-and-go applications and applications that require the use of equipment without the engine running. Intercity and suburban pickup and delivery type applications provide the best opportunity to operate the truck under electric power, which is inherently fuel-efficient. They also allow for maximum use of the truck's regenerative braking capability, which replaces used energy to the hybrid battery.

When the operator needs to slow or stop the truck, he or she simply takes a foot off the accelerator and the hybrid motor/generator goes into a generation mode, which brakes the truck electrically. This replaces used energy to the hybrid battery instead of wearing out the brakes and wasting energy — it adds to the overall productivity of the truck.

"For applications that don't require engine-off operations like pickup and delivery or flat-bed stake trucks, Navistar's base system includes the Eaton Hybrid Drive System," Williams says. "In applications like these, customers can see fuel economy improvements of up to 30 to 40 percent."

For engine-off applications, where truck equipment can be run without the engine running, like tree aerial bucket trucks, cranes, service utility trucks and recovery trucks, fuel economy improves even more.

"In an engine-off application where the hybrid battery is operating the hybrid motor/generator and the PTO, fuel economy improves up to 40 to 60 percent," Williams states. "In the case of a hybrid utility bucket or aerial tree bucket truck, we measured the duty cycle and found it will operate the bucket for one to two hours with

The Economics of Fuel & Horsepower

Dodge re-entered the commercial truck segment in 2003 with its foot planted firmly on the accelerator. Last year alone Dodge sold 33,500 commercial vehicles, a 285 percent increase over 2003, making it the sixth largest manufacturer of commercial vehicles sold in the United States. The Chrysler company has done this utilizing the brand strengths of innovations like its HEMI engines, which it is again tweaking for 2009.

In late June, Dodge showcased its new 2009 Dodge Ram powertrain lineup at the company's proving grounds. Powertrain choices in all-new 2009 Dodge Ram models offer improved fuel economy plus more power, torque and refinement than ever before.

The big draw was the all-new 2009 Dodge Ram 1500 models, which include the all-new, best-in-class, 390-hp, 5.7-liter HEMI, flex-fuel 4.7-liter and 3.7-liter gasoline engines.

The 5.7-liter HEMI offers best-in-class horsepower and torque, said Dodge officials. While the all-new engine maintains many of the basic features that make "HEMI" synonymous with "power." Several technologies were added or improved: Variable Valve Timing (VVT), expanded operating range of the fuel-saving Multiple Displacement System (MDS); increased compression ratio; and active intake manifold with long runners for low-end torque and short runners for high-rpm power

The HEMI's new VVT improves fuel economy under some conditions in two ways. First, it reduces the engine's pumping work by closing the intake valve later. Second, it increases the expansion process of the combustion event. This allows more work to be transferred to the crankshaft instead of being rejected out of the exhaust port as heat. Essentially, VVT optimizes engine breathing, which improves engine efficiency and power.

HEMI has always been synonymous with power, and now — thanks to a host of technologies — Chrysler's new HEMI delivers more fuel efficiency and refinement, along with even more power.

Dodge's fuel-saving MDS system seamlessly alternates between smooth, high-fuel-economy four-cylinder mode when less power is needed and V-8 mode when more power from the new 5.7-liter HEMI engine is in demand. An expanded MDS operating range in the new-for-2009 HEMI — aided in part by the Ram's best-in-class aerodynamics — will allow customers to realize an even-greater fuel economy benefit. When MDS is operating, it is indicated by the fuel-economy-mode readout in the 2009 Dodge Ram's Electronic Vehicle Information Center.

Chrysler estimates that since its inception of MDS in 2005, nearly 100 million gallons of gasoline have been saved, along with reduced carbon dioxide (CO_2) emissions of close to a million metric tons.

Hybrid trucks are best suited for stop-and-go applications, which makes delivery trucks and refrigeration vehicles popular products for green technologies. Intercity and suburban pickup type applications provide the best opportunity to operate the truck under electric power, which is inherently fuel-efficient.

the engine off. This gives 100 percent reduction in fuel and emissions," Williams adds.

As energy is used in the operation of the bucket, the hybrid battery will eventually discharge to a point that a recharge is required. Then, the truck automatically starts the engine and operates the PTO from the engine while it's simultaneously recharging the hybrid battery. This is accomplished in five to seven minutes. When the battery is fully charged, the engine automatically shuts down and the truck operates the PTO using the hybrid battery once again.

What About Performance?

So, with an increase in efficiency comes a loss in performance, right? Wrong.

"Third party testing was done to quantify the performance improvements compared to a conventional vehicle, and part of that effort was to look at its acceleration in comparison to a base line unit," says Williams. "Loaded to 27,500-lb GVW, the hybrid truck proved to be nine seconds faster in accelerating from 0 to 60 mph."

The added electric power is more powerful at low speeds because of a basic difference in electric motor performance. Unlike an internal combustion engine, where torque and horsepower are increased as the engine's rpm increases, an electric motor provides 100 percent of its rated torque and horsepower at 0 rpm. Mating the two provides a great performing truck.

Federal and State Grants

"For companies that choose to buy hybrid trucks, there are government incentives at the state and federal level available," says Rob Durham, Lakeside International Trucks.

Some states and the federal government have funds available to help businesses offset the initial cost of a hybrid commercial truck. On a federal level, the Energy Policy Act of 2005 allows for tax credits of up to $12,000. The tax credit is dependent on the chassis gross vehicle weight (GVW) and the amount of fuel saved.

"More information about this federal funding can be found by talking to your local dealer," says Williams.

There are also a substantial number of states that provide incentives for the purchase of medium-duty hybrid trucks. Currently, California, Connecticut, Louisiana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon and Texas offer incentives. Legislation is under way to add more states to the list. For more information visit the Environmental Defense Fund Web site, *http://environmentaldefense.org/page.cfm?tagID=1123*.

"Our network of International dealers is up-to-speed with current and upcoming legislation regarding hybrid incentives on a federal and state level," says Williams. "Dealers are an excellent resource for companies looking to learn more about hybrid trucks and the tax incentives that are available."

Going Green

The trend to go "green" has been on the rise over the last few years. Companies that are concerned about reducing their carbon footprint and increasing their fuel economy are starting to think about adding hybrid trucks to their current fleets.

"Hybrid trucks produce significantly lower emissions," says Durham. "In some cities, the air coming out of the exhaust pipe is actually cleaner than the air going in."

"Navistar has been producing hybrid commercial trucks for the last few years, and in October 2007 it became the first company to offer line assembly of hybrid commercial trucks," says Williams. "To date, we have hundreds of hybrid trucks in the field, a number that will rise as we continue to educate potential adopters like the utility, tree care and landscape and construction industries about the benefits of hybrid technology."

Mike Elwell is director, marketing, medium for Navistar International Corp., based in Warrenville, Ill.

The Price Is Right

Toyota Announces MSRPs for the 2009 Tacoma Pickup Product Line

In 2007, the midsize Toyota Tacoma was one of the best-selling pickup trucks in its segment. Ready to roll its newest chore trucks onto dealer lots, Toyota Motor Sales (TMS) announced in June the manufacturer's suggested retail prices (MSRP) for its 2009 Tacoma pickup trucks, which range from $15,170 to $27,075.

This is the ninth generation of Toyota compact pickups, which was first launched in 1964; last year it accounted for nearly 10 percent of Toyota sales in the United States. The Tacoma is assembled at the New United Motor Mfg. Inc. production facility in Fremont, Calif., and Toyota Motor Mfg. de Baja California production facility in Tijuana, Baja California, Mexico.

Tacoma is plugging a greatly enhanced overall value with the addition of several new features. All Tacoma models will now feature Vehicle Stability Control (VSC) and Traction Control (TRAC) as standard equipment, making Tacoma the latest model to feature Toyota's STAR Safety system consisting of Anti-Lock Brakes, Electronic Brake Force Distribution, Brake Assist, VSC and TRAC. Additional new standard features include an automatic limited slip differential, roll-sensing curtain and seat side airbags and front active headrests.

Exterior styling has been freshened with an argent painted grille, LED tail lamps and four new colors that include Barcelona Red, Pyrite, Timberland and (our favorite) Magnetic Gray. Inside, Tacoma features a new and enhanced standard equipment audio system. All Tacoma audio head units feature AM/FM radio, an auxiliary audio input, an MP3-capable CD player and satellite radio capability. Standard audio on Access and Double Cab models have been upgraded to two ceiling-mounted speakers for a total of six and will be satellite radio ready. An optional JBL six-disc CD changer with satellite radio that includes a three-month free subscription to XM Satellite Radio and Bluetooth is available for Tacoma Double Cab models.

Additional interior enhancements include a new front door trim panel on all Tacoma models. Access Cab models receive power windows and door locks as standard equipment and a new rear seat design that features a center storage area and under-seat storage. Other enhancements include a stylish new seat fabric pattern for models equipped with the optional SR5 package, and all Regular Cab models are equipped with bench seats. A new backup monitor is offered as an option on Access and Double Cab models.

2009 Tacoma 4x2 models carry a base MSRP that ranges from $15,170 for the Regular Cab with a four-cylinder engine and five-speed manual transmission to $25,285 for the X-Runner Access Cab V6 with a six-speed manual transmission. For PreRunner models, base MSRP ranges from $16,055 for the Regular Cab with a four-cylinder engine and five-speed manual transmission to $24,000 for the Double Cab Long Bed V6 with five-speed automatic transmission.

The base MSRP for Tacoma 4x4 models range from $19,130 for the Regular Cab with a four-cylinder engine and five-speed manual transmission to $27,075 for the Double Cab Long Bed V6 with a five-speed automatic transmission. The overall average MSRP for all Tacoma models increases $1,104 or 5.1 percent.

The 2009 Tacoma is available now at Toyota dealerships. Enhancements include Toyota's STAR Safety system, stylish new exteriors and interiors and a new backup monitor on the Double Cab models (pictured).