



## IN THIS ISSUE:

### Trillium Rebrands, Expands

Trillium debuted a new name & full-service offerings in the alternative fuels industry.

■ Page 4



### Meritor Keynote & Blue Horizon Brand Launch

New partnership with Peterbilt to supply electric drive train systems.

■ Page 6



### Fleet Takes Delivery of First NZE Truck

AJR Trucking receives the keys of first Kenworth 12L near-zero emission truck.

■ Page 8

### NACFE Sees EV Tech Advancing Rapidly

New report finds that electric truck tech is approaching maturity.

■ Page 11



### Shell Starship Makes Coast-to-Coast Voyage

New fuel-efficient truck to aim for 10 miles per gallon in the real world.

■ Page 15

### Dana Reveals Electric Axle for Class 5 Truck

Partnership between Dana and Workhorse for UPS delivery truck.

■ Page 20

## Roush Adds Electric Powertrain to its Clean Fuel Truck Offerings



Roush CleanTech has developed a medium-duty electric powertrain for Class 6 and 7 trucks, the first non-combustion offering from the Michigan-based company.

The prototype, a box truck on a Ford F-650 chassis, was unveiled Tuesday at the 2018 ACT Expo.

Roush CleanTech, an arm of engineering and product development specialist Roush Enterprises, of Livonia, Mich., has long been a proponent of propane auto-gas and compressed and liquefied natural gas engines as alternatives to diesel power for trucks.

The decision to develop a battery-electric system came as customer inquiries and requests grew, Rob Stevens, engineering vice president for Roush products, told Trucks.com.

Demand "is in the hundreds, not thousands, but we

■ Continued on page 3

## Major Announcements Today in the Expo Hall

- 12:40-1:00pm **Shell** to Announce New Efficiency Metrics for the Shell Starship, **Booth 2046**
- 1:00-1:20pm **California Air Resources Board** to Announce a Milestone Related to their School Bus Funding Program, **Booth 1027**
- 1:20-1:40pm Joint Press Conference with **BYD & US Hybrid** to Supply Fuel Cell Electric Buses to Honolulu-Hawaii Airport, **Booth 1935**
- 1:40-2:00pm **Agility** to Announce Partnership with **Romeo Power**, **Booth 1237**
- 5:30-7:30pm **ACT Expo Fleet Awards Cocktail Reception**, Promenade Foyer

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# California sues EPA to Protect Fuel Emission Standards

Gov. Jerry Brown on Tuesday, May 1, announced a lawsuit by California and 17 other states against the Environmental Protection Agency to protect national vehicle carbon emission standards from being rolled back by the federal government. The suit takes aim at a plan by the EPA to revise emission standards for vehicles manufactured between 2022 and 2025.

"My message to the EPA and Administrator Pruitt is simple: Do your job. Regulate carbon pollution from vehicles," California Attorney General Xavier Becerra said at the press conference Tuesday.

Mary Nichols, chair of the California Air Resources Board, was slated to speak at ACT Expo on Tuesday morning as part of the Global Trends Accelerating Advanced Transportation Innovation panel. She had to cancel at the last minute due to her involvement in the Tuesday press conference announcing the lawsuit. She sent Analisa Bevan, an assistant division chief at CARB, as her replacement, who read Nichol's press conference comments to the ACT Expo audience, followed by a loud round of applause for California's continued



Left photo: Governor Jerry Brown, Attorney General Xavier Becerra and CARB Chair Mary Nichols at the capitol press conference.

Right photo: Analisa Bevan, an assistant division chief at CARB, shared CARB Chair Mary Nichols comments from Tuesday's capitol press conference.

leadership in protecting air quality at a national level. In keeping with the theme of the panel, moderator Cliff Gladstein asked panelists from Cummins, Honda, Navistar, and UPS how their businesses might be impacted by the potential rollback of the emission standards. The representatives from each company agreed the best path forward is a united one, and reconfirmed their organizations commitment to innovation

and progress.

The lawsuit was filed in the United States Court of Appeals for the District of Columbia Circuit. Joining California are Connecticut, Delaware, Illinois, Iowa, Maine, Maryland, Minnesota, New Jersey, New York, Oregon, Rhode Island, Vermont, Washington, Massachusetts, Pennsylvania, Virginia and the District of Columbia.

Continued from page 1

## Roush Adds Electric Powertrain to its Clean Fuel Truck Offerings

expect it to grow," Stevens said.

Roush "has invested \$50 million in the last 10 years, building a foundation to help customers move away from diesel... This is the next



step," said Todd Mouw, Rosch CleanTech's president.

Electrified trucks are "what the market is

asking for," he said, noting that the price of diesel has risen by 54 cents a gallon in the past year to a national average retail pump price of \$3.06 a gallon.

In California, where many of Roush's EV-seeking clients are based, diesel averaged \$3.83 a gallon on Tuesday, up 88 cents from \$2.95 a year earlier.

Testing and regulatory certification demands mean it will be 18 to 26 months before a commercial version of the battery-electric powertrain is ready for market, Stevens said.

The initial powertrain can be used with Ford's F-650 and F-750 chassis, targeting the regional delivery truck and school bus markets, but Roush intends to develop battery-electric systems for other medium-duty classes as well, Mouw said.

The F-650 prototype is fitted with a mid-chassis electric motor driving the rear wheels via a short driveshaft. The motor draws power

from a series of four lithium-ion battery packs with total capacity of 150 kilowatt-hours. Peak output is rated at 335 horsepower – 250 kilowatts – and continuous operating power at 200 horsepower, or 150 kilowatts.

The truck has an estimated range of up to 120 miles per charge and a top speed of 75 mph.

Batteries are the costliest component in an electric vehicle. Roush believes that battery prices, which have fallen significantly in the past decade, will drop even further as more and more car and truck builders add electrified powertrains to their portfolios.

"We were paying around \$1,000 per kilowatt" when he was running Ford Motor Co.'s Think electric city car program, Stevens said. Now the cost is as low as \$200 per kilowatt, he said.

"Now is the time to jump in," Roush's Stevens said.

— John O'Dell | Trucks.com

## Trillium CNG Rebrands and Expands into New Fuels and Technologies

For 20 years, Trillium CNG has been one of the country's largest providers of compressed natural gas and CNG services. And until recently, CNG was the fuel of choice for many transit and fleet operators.

But times are changing. Just as CNG hit its stride as an alternative fuel in 2010, electric batteries and hydrogen fuel cells are expected to claim ever-growing pieces of the heavy-duty vehicle market in the years to come. And more infrastructure is needed to support those new vehicles.

Trillium CNG is dropping the CNG from its name.

"Our goal is to continue to support new alternative fuels, like CNG, and more recent alternative vehicles such as electric and hydrogen fuel cell vehicles," said Bill Cashmareck, managing director of Trillium, based in Houston.

The name change, he said, "is to leverage the brand equity that Trillium has with certain customer bases and expand into new fuels and services and solutions our customers are starting to demand."

Those customers include some of the largest transit agencies in the country, such as New York City Transit and Metropolitan

Transportation Authority and Orange County Transit Authority in Southern California, the latter of which will be incorporating battery electric and hydrogen fuel cell buses into its fleet. They also work with refuse haulers and trucking fleets, many of which are also exploring fuels other than CNG.

Cashmareck said his company is exploring ways to help its customers take care of life-cycle emissions, not just what's coming out of the tailpipe.

Renewable natural gas means "we have now taken a gas that would otherwise emit to the atmosphere and cleaned it up," he said.

Cashmareck said Trillium can help reduce lifecycle emissions for battery electric vehicles by using renewable natural gas, as well as solar panels, to generate electricity that can power BEVs. In the future, Trillium may also use reformed natural gas, as well as solar panels, to create hydrogen that can power fuel cell vehicles.

Trillium isn't currently creating electricity or hydrogen, but "it is our intent to play in all pieces of those value chains in all alternative fuels in the future," Cashmareck said.

Trillium is best known as a retail operator of CNG stations, many of which operate

under the Love's brand. Through a new partnership with EV Connect, Trillium is outfitting four Love's Travel Stops in California with a combination of DC and level 2 electric vehicle chargers. Each station, Cashmareck said, can charge up to six vehicles at once.

Love's stops in Tulare, Ripon and Coachella will get the new EV Connect stations, which are currently in the design and development stage. The location of the fourth station has not been announced.

Trillium is also partnering with the Orange County Transportation Authority to build its first hydrogen fueling station at an agency bus depot in Santa Ana. Like many hydrogen stations in California, the OCTA depot will truck in the liquid hydrogen. The station is expected to be under construction by summer and is being built in partnership with hydrogen outfitter Air Products.

— Susan Carpenter | Trucks.com



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# Fleet Owner Names UPS Green Fleet of the Year

United Parcel Service (UPS) dubs its fleet of 9,000 or so alternatively powered vehicles a “rolling laboratory”—and for good reason. In the words of Carlton Rose, president of global fleet maintenance and engineering at UPS, making investments in not one alternative form of vehicle propulsion, but several simultaneously, allows the parcel delivery company to “define excellence” in that space.

“If you are the one who defines excellence, you are the one who develops the expertise to get there,” Rose explained. “For example, in 2016 we bought 125 hybrid-electric Workhorse vans. In 2017, we bought 200 more. Why? Because they now get 400% better fuel economy than gasoline-only vans. Previously, we could only get 10 to 15% better fuel economy with hybrids.”

Those Class 5 delivery trucks offer an approximate range of 100 miles between charges, which UPS said is “ideal” for delivery routes in and around cities. UPS plans to test those vehicles primarily on urban routes

in several U.S. cities, including Atlanta, Dallas and Los Angeles.

Following real-world test deployments, UPS and Workhorse will fine-tune the design in time to deploy a larger fleet in 2019 and beyond. Since most of the maintenance costs of a vehicle are associated with the engine and related components, Rose noted, UPS expects the operating cost of the new plug-in electric vehicle to be less than a similarly equipped diesel or gasoline vehicle. The eventual goal of UPS is to make such all-electric vans the “standard selection,” where appropriate, and potentially replacing some 35,000 diesel or gasoline trucks in its fleet that are comparable in size to those all-electric vans.

UPS has more than 300 electric vehicles deployed in Europe and the U.S., along with nearly 700 hybrid electric vehicles. Last September, UPS took the lead in becoming the first commercial customer in the U.S. to start using three eCanter medium-duty, all-electric trucks built by Daimler Trucks North America’s



Fuso subsidiary.

UPS’s goal is to make one in four new vehicles purchased by 2020 an alternative fuel or advanced technology vehicle.

Rose noted that UPS invested \$90 million in natural gas vehicles and infrastructure alone last year. This investment included an additional six compressed natural gas (CNG) fueling stations, 390 new CNG tractors and terminal trucks, and 250 liquefied natural gas (LNG) vehicles.

“We like to think of ourselves as a technology company with trucks,” he said.

■ *Continued on page 17*

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\*Class is Full-Size Vans based on Ford segmentation (based on body type, body length, wheelbase and roof height).

\*\*Class is Full-Size Vans based on Ford segmentation.

†Based on total U.S. reported sales (2017 CY).

# Leading in Times of Paradigm Shift

Meritor Chief Executive Officer and President Jay Craig made several exciting announcements during the ACT Expo keynote presentation.



Meritor—a global supplier of axle, brake and suspension solutions for commercial truck, trailer, bus and coach and off-highway machinery manufacturers—has adapted its strategy to integrate EV components into its portfolio and is now developing a platform of electric drive axles and suspensions as well as supporting systems.

Electrification may be the future of commercial transportation, according to Meritor CEO and President Jay Craig, as he shared his outlook on the market during ACT Expo’s opening keynote presentation titled, “Leading in Times of Paradigm Shift.”

“In reality, we don’t know exactly where the industry will be in a decade—it could look very much the same, or it could look dramatically different. The pace of change is so rapid that it makes it challenging to make planning decisions,” said Craig. “But to quote Jack Welch—‘If the rate of change outside the organization exceeds the rate of change on the inside, the end is near.’”

As part of its change management program, Meritor holds an annual two-day intensive executive strategy meeting, where they bring

in experts to discuss and analyze current and upcoming trends, developing technologies, stock market performance, shifts in culture—both domestic and abroad, and other influences that could impact their business.

Craig shared the five core areas that Meritor’s executives focus on when setting their strategy—resource allocation, product portfolio, core competencies, partnerships, customer integrations.

Quoting a recent Forbes study, Craig discussed how business leaders often hesitate to make major shifts in their business, even when there are clear indications that it’s what the market is demanding. As a leader, it’s vital to ensure that the organization has the right resources to navigate change effectively, including proper capital, research and development efforts, employee talent, executive-level commitment, and operating budgets.

Craig’s keynote included several exciting



announcements, including the launch of its Blue Horizon electric brand, which reflects Meritor’s commitment to innovation and advanced technology for the commercial trucking industry. Craig also announced their new partnership with Peterbilt where they will supply all-electric drivetrain systems for two Peterbilt vehicle platforms—the model 579 Class 8 day cab tractors and model 520 refuse trucks—through an alliance with TransPower. Peterbilt will equip 15 total vehicles with eOptimized Meritor drivetrain components and TransPower electric systems to test/prove market viability and durability.

To learn more about Meritor and its products, stop by [booth 1913](#) in the expo hall.



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# AJR Trucking Takes Delivery of First Kenworth Near-Zero CNG Truck

Kenworth Truck Co. delivered the first near-zero emission 12-liter natural gas truck to a commercial fleet at the ACT Expo green transport conference in Long Beach, Calif., Tuesday.

The truck, equipped with the new Cummins Westport ISX12N engine, will be used by AJR Trucking, a port drayage and mail delivery trucking fleet operator in Southern California.

The California Air Resources Board has certified the engine to meet its toughest nitrogen oxide, or NOx, standards. The board has certified that the engine is 90 percent cleaner than the federal Environmental Protection Agency standard.

"This new truck, which is the cleanest heavy-duty truck commercially available on the market today, is the first of many that will hit the road this year," said Todd Campbell, chairman of the California Natural Gas Vehicle

Partnership, an alliance of private and public entities.

California is home to seven of the nation's 10 most polluted cities, making the role of green trucks crucial to improving air quality throughout the state, Campbell said.

Bringing to market a 400-horsepower engine for vocational and regional use "is a game changer" for the industry, said Kurt Swihart, Kenworth marketing director.

The transportation sector is responsible for about 40 percent of California's greenhouse gas emissions and more than 80 percent of the state's NOx, or smog-forming, emissions.

The truck was purchased with funds from

an incentive pool managed by the South Coast Air Quality Management District. It provides up to \$100,000 toward the purchase of a new clean-burning natural gas truck.

"AJR Trucking is a prime example of a fleet who leveraged available incentives to clean up the environmental impact of its operations," said Dwight Robinson, a governing board member of the SCAQMD.

— Jerry Hirsch | Trucks.com



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## AVM Electric Bus Recharges in 10 Minutes

Advanced Vehicle Manufacturing (Booth 1803) unveiled an electric shuttle bus yesterday that can recharge in just 10 minutes.

The 27-foot all-electric AVM EV27 bus takes about the same time to recharge as it does to fill a gas tank on a similar vehicle.

"That gives operators an advantage because they can spend more time driving and less time charging," said Larry Brennan, chief executive for Advanced Vehicle Manufacturing, or AVM.

A different chemistry is behind the rapid charging time. The cells have forsaken the traditional lithium ion composition of cell-

The first batch of AVM shuttle buses will be made in Zhuhai, China. But Brennan said AVM can accommodate customers that are required to buy American by building at partner facilities in Atlanta and Fort Worth, Texas.

The EV27 is the result of a five-year joint venture with the Chinese company, Yinlong Energy. Yinlong has used LTO batteries on a range of

commercial vehicles in China. AVM is Yinlong's exclusive North American partner.

AVM is part of the Los Angeles Cleantech Incubator project. Brennan said AVM already has purchase commitments for more than 250 vehicles, some of which will be in its Los Angeles home market.

— Susan Carpenter | Trucks.com



phone, laptop and electric vehicle batteries for lithium-titanate. So-called LTO batteries are less energy dense than lithium ion, but they can withstand faster charge rates and last longer—for more than 20,000 charge cycles.

Fast charging means the bus can use a smaller battery. The one powering the EV27 is less than 50 kilowatt hours—only slightly larger than the battery pack on a typical all-electric passenger car like the Nissan Leaf.

In addition to the EV27, AVM will also offer the electric shuttle bus in 21- and 33-foot lengths.

The buses are designed for loop-based routes on corporate and school campuses, and at hotels and airports—applications "where charging for 10 minutes every few hours makes the range of the vehicle functionally unlimited," Brennan said.

Brennan prefers measuring efficiency in miles per minute rather than miles per charge. By that metric, an AVM shuttle could travel a couple of hours, stop for a quick recharge and keep going. That reduces the number of charges required compared with an overnight or multiple-hour charging scheme.

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# Lion Deploys Electric School Buses, Plans Truck Line

An electric bus maker wants to leverage its technology by offering a line of battery-powered trucks later this year.

Lion Electric Co., maker of the electric “eLion” school bus, told Trucks.com it plans to unveil a range of electric trucks in the Class 5-8 weight segments, ranging from ambulances or service trucks, to cranes and delivery trucks. The first, a Class 8, will make its appearance in December, said Marie Bedard, business relationship manager for the Montreal-based manufacturer.

Peter Rego, Lion’s Chief Commercial Officer USA, also shared that “we are excited to announce that we are now taking pre-orders for all Lion products. The vehicles demonstrate our commitment to cleaner air, a healthy population and overall quality of life, not only for us but also for our future generations.”

The company currently has its manufacturing operations in Canada, but Bedard said it plans to open a factory in the U.S. for electric trucks and buses. Lion has narrowed its site selection to three unnamed cities, she said.

At ACT Expo on Tuesday, Lion announced they had accomplished the biggest all-electric school bus deployment in North American history made by a single Original Equipment Manufacturer (OEM). To accomplish this, Lion

partnered with First Priority GreenFleet (FPGF), a leading clean transportation solutions provider and dealer, to roll out approximately 40 all-electric school buses in California to more than 15 districts over the past 12 months – that’s more electric school buses than all the other OEMs and dealers combined. Together, Lion and FPGF have deployed more than 150 all-electric school buses in the last two years, with more than a million miles driven.

“We believe that electrifying school buses is the only environmental, social and economical solution that makes possible protecting our most precious capital, our children,” said Marc Bedard, Lion’s founder and chief executive. “We don’t pretend that electrifying school buses is an easy task because it isn’t. That’s why we spent the last eight years designing our vehicles and the past three years commercializing it. We are by far the only OEM with this kind of experience and track record.”

Lion plans to expand its bus line. The company will introduce the eLion M paratransit

minibus this summer. It’s a shuttle equipped to transport people with disabilities. The vehicle will have a range of between 75 and 150 miles depending upon its configuration. It can be



modified for a variety of functions.

“It is very popular already and can be used in so many different ways that we’re calling it our ‘Swiss Army knife,’” said Marc Bedard.

— Carly Schaffner | Trucks.com



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# NACFE Releases Report: Sees Electric Truck Technology Advancing Rapidly

Electric vehicle technology is advancing rapidly and will make battery electric trucks a viable freight and logistics tool in the near future.

That's the assessment of a technology analysis by the North American Council for Freight Efficiency, or NACFE (Booth 1760). The group has previously examined how to squeeze more miles out of fossil fuels. But the organization is expanding its mission to encompass emerging trucking technologies.

"We could not think of a better place to start than with electric trucks," said Mike Roeth, executive director of NACFE. "No subject is more fraught with confusion than commercial battery electric vehicles, and changes and developments in this space are happening at a rapid pace."

But like other technologies, electric trucks will have the most utility for certain uses, such as local package delivery, short-haul operations and transporting goods on a 200- to 300-mile route with charging infrastructure at each.

The freight and logistics industry is rife with assumptions and myths about battery electric trucks that are incorrect, Roeth said.

At the top of the list is the idea that electric trucks can't haul the same weight as their diesel counterparts. Diesel vehicles require a slew of heavy components — including engines, transmissions, emissions systems, exhaust systems, cooling systems, fluids and mountings — that electric trucks don't have. Removing them helps level the playing field, even with the heavy weight of the batteries required for electric transport, he said.

New companies, including Workhorse Group, Tesla and Thor as well as legacy truck makers such as Daimler, Volvo and Navistar, plan models across the full range of commercial vehicle weight classes and are currently developing trucks, Roeth said.

"Battery capacities are expected to increase with time, cost and weight to decrease," Roeth said.

Charging remains a challenge. Electric trucks work for local delivery where they can return to a depot for off-shift charging. But fleets with variable routes and no guaranteed return trip will need growth in remote charging infrastructure before they can replace diesels with battery electric trucks.

"The challenge is high-speed charging," Roeth said. What's needed is sub-30-minute charging speed, still largely in the conceptual stage for heavy vehicles.

The proliferation of electric vehicles likely won't be a problem for the electric grid, the report said.

"The market penetration rate of battery electric commercial vehicles will be on a decades time scale. The U.S. has energy production capacity for significant volumes of electric cars and trucks," Roeth said.

He compared adding vehicle charging stations to connecting a new warehouse or factory, a process that utilities regularly perform for commercial sites.

**10 ARGUMENTS FOR AND AGAINST ELECTRIC TRUCKS**

Argument FOR Electric Trucks	VS.	Argument AGAINST Electric Trucks
1 Commercial battery electric vehicle (CBEV) weight is not an issue	<b>WEIGHT</b>	1 Vehicle tare weight is too high to support my freight needs
2 CBEV technology is proven and here now	<b>TECHNOLOGY</b>	2 Technology is not ready
3 Maintenance will be less costly		3 Maintenance may not be less costly
4 CBEVs will last beyond 10 years		4 Vehicle life is too short
5 CBEVs will be competitively priced	<b>COST</b>	5 Vehicle purchase price is too high for a positive ROI
6 CBEVs will be less expensive to operate		6 Vehicle operating costs are too great for positive ROI
7 CBEVs will command a premium at resale		7 Vehicle residual value is questionable
8 Trust the market to provide CBEV charging solutions	<b>CHARGING</b>	8 Charging infrastructure is not ready
9 Trust the market to provide CBEV charging solutions		9 Charging Infrastructure is not fast enough
10 The grid and market will evolve with CBEVs		10 The electric grid cannot support growth in electric vehicles

NACFE's findings on these 10 arguments are discussed in detail in its Electric Truck Guidance Report

**NACFE**  
NORTH AMERICAN COUNCIL FOR FREIGHT EFFICIENCY

Pricing looks like an issue for now, but will become competitive with diesel trucks, especially when total cost of ownership is calculated. Getting beyond prototype and low volume production also should make battery electric truck pricing more attractive. For now, potential buyers have to consider factors such as grants, tax breaks and incentives, and a largely unknown residual or salvage value.

Fleet managers should also expect that electric trucks will be less costly to operate. The lack of a combustion engine and mechanical systems such as pumps, valves, transmissions and belts should reduce the cost of maintenance and servicing, Roeth said.

"The electric drives are more energy efficient than diesels," he said.

The resale value—an important consideration in purchases of diesel trucks—is unknown for electric vehicles because "the used electric vehicle is in its infancy," Roeth said.

The full *Guidance Report: Electric Trucks—Where They Make Sense* can be accessed at [nacfe.org](http://nacfe.org).

— Jerry Hirsch | Trucks.com

# Biodiesel and Renewable Diesel Mixed to Make “Ultra Clean Diesel”

Renewable Energy Group, Inc. (REG) plans to start selling a blend of biodiesel and renewable diesel that the Iowa-based company said will cut greenhouse emissions and improve truck engine performance.

The blend of the alternative fuels cuts total hydrocarbons, carbon monoxide, particulate matter and nitrogen oxides (NOx) emissions, according to company data. REG’s Ultra Clean™ Diesel does not require fleets or drivers to make modifications to vehicle engines.

The fuel blend is approved by the California Air Resources Board (CARB) as part of the Alternative Diesel Fuel regulations.

A 100 percent biodiesel fuel on its own may slightly increase nitrogen oxide emissions, CARB said. But those emissions are offset by renewable diesel, which significantly reduces NOx. The net reduction is about 10 percent versus conventional diesel, according to REG.

“We put this regulation together in order to ensure that when biodiesel is used, it’s done in a way that does not increase smog,” said CARB spokesman Alexander Mitchell.

The approval from CARB allows REG to introduce the product to the market

**“We continue to invest in downstream integration to ensure our products are not only being offered at terminals, but also being offered directly to end-users and customers.”**

— Todd Ellis, a regional sales director for REG

without any additional need for NOx mitigating additives.

The REG blend of renewable diesel and biodiesel also yields a “high” reduction of particulate matter, according to CARB. REG’s product data shows the decrease in particulates is by about 40 percent.

Hydrocarbon and carbon monoxide emissions are 20 and 25 percent less than conventional diesel fuel, the company said.

REG’s data is derived from test cycles developed by CARB. The company said it has conducted about a year of testing.

In a regulatory environment such as

California’s, transportation companies are tied to stringent standards that require the reduction of tailpipe carbon emissions. With REG’s Ultra Clean Diesel, the alternative fuel provider is targeting fleet customers looking to meet and exceed regulatory expectations.

“We continue to see a growing demand, not just in California, but other west-coast markets due to the low-carbon fuel standard policies and regulations in those states,” said Todd Ellis, a regional sales director for REG.

Ellis said the company has long aspired to produce this kind of blended diesel as interest in a wider range of alternative fuel options has grown. REG sees a competitive advantage in being among the first to blend the two types of fuel. That promotes the company’s image as a bellwether for alternative fuels, he said.

— Dalton LaFerney | Trucks.com

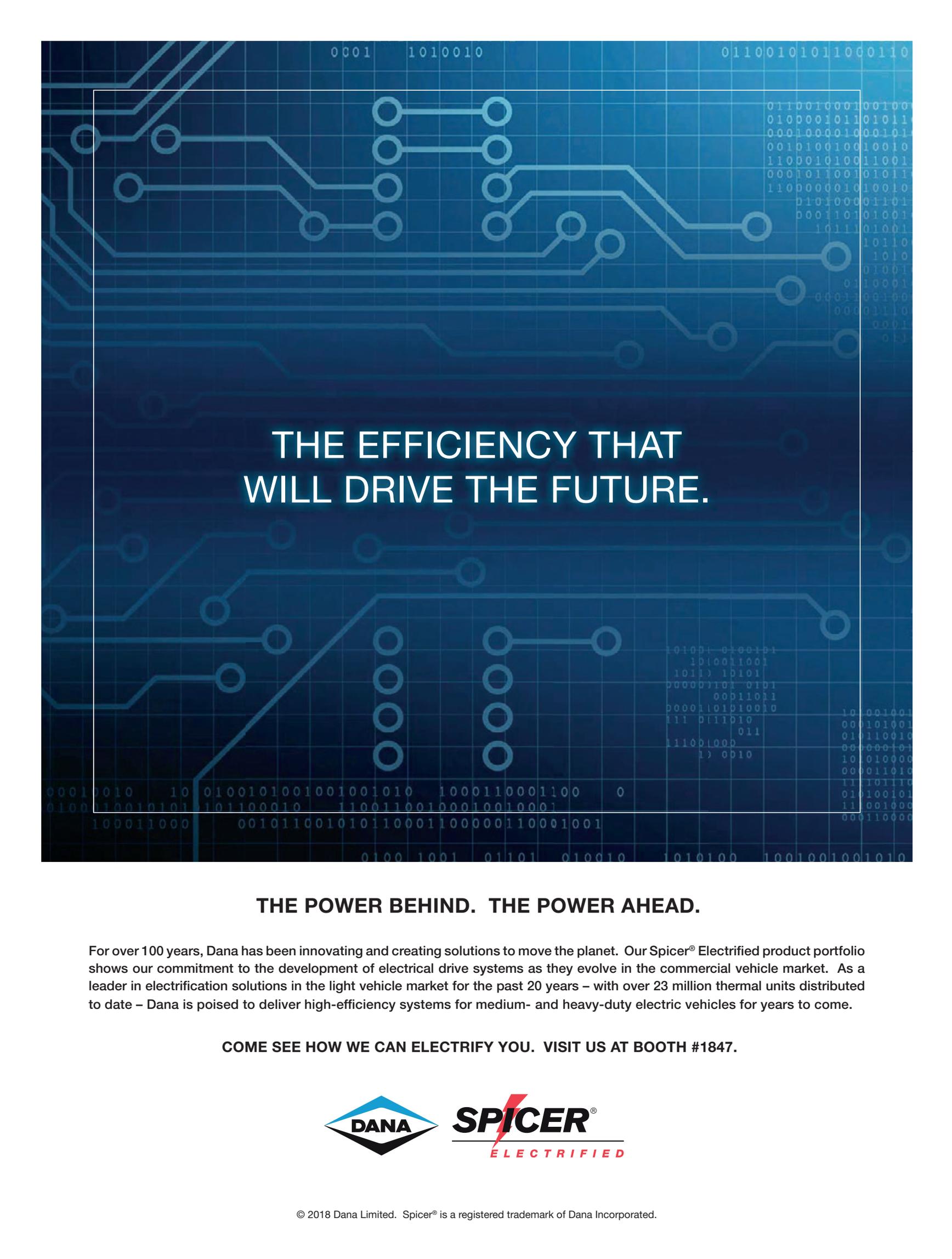


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# BSR Study Library Provides Apples-to-Apples Comparisons of Alt Fuel Vehicles

Say you're a big company in the market for a new alternative fuel vehicle. You're considering renewable natural gas. Maybe battery electrics. Or hydrogen fuel cells. But you just aren't sure how they stack up in terms of emissions, performance and cost.

BSR now has a case study library for just that.

It's part of the San Francisco nonprofit's Future of Fuels program, which helps companies incorporate more sustainable, clean transportation into their fleets and logistics operations by giving them the information they need to make the right decisions.

**“Our members are looking for a guide to using more clean transportation technologies.”**

— *Nate Springer, manager of BSR.*

Those members are household names, including Amazon, Walmart, PepsiCo and Coca-Cola.

“These are the companies that buy trucking services, freight services, but they didn't want to take on sustainability risks and impacts,” Springer said.

They do, however, need an apples-to-apples comparison in order to compare two trucks with two different vehicle technologies. Only then can they set their direction for fleet planning three, five or 10 years into the future.

The BSR case study library creates a peer-sharing platform that allows members “to publish in a standardized way the results of their pilots, to share usable data,” Springer said.

The goal is to turn “what was historically the one-off, high-investment test of a new technology into a growing library of information that reduces the barriers to adoption and allows suppliers to prove the value of their clean technology,” he said.

At ACT Expo, companies often make product announcements, “but there was a need in the marketplace to find out how these perform from a peer, from another company,” Springer said.

— Susan Carpenter | Trucks.com



Nate Springer, manager of BSR, speaks at ACT Expo during the Future of Fuels' Buyer Supplier Roundtable

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# Shell-AirFlow Venture to Launch Starship Hyper Fuel-Efficient Truck

Fuel efficiency and freight transport typically exist at opposite ends of the spectrum, but a new Class 8 truck hopes to change that. It's called the Starship.

It's a fitting name for a tractor-trailer that looks unusually futuristic and seeks to break the bounds of fossil fuel efficiency, said Megan Pino, global brand manager for Shell Rotella (Booth 2046) — the heavy-duty lubricant division of Shell.

**“We're fully aware that we have a global energy challenge in front of us with increases in population, increases in urbanization and with that the rise of carbon dioxide emissions”**

— Megan Pino,  
Global Brand Manager for Shell Rotella

“We're fully aware that we have a global energy challenge in front of us with increases in population, increases in urbanization and with that the rise of carbon dioxide emissions,” Pino said. “To meet those challenges is going to be difficult, so we believe a collaborative effort is necessary.”

Long-haul trucks in the heaviest Class 8 weight segment get about 6.5 mpg. Improving efficiency flows directly to the profits of a motor carrier. Fuel is the second highest cost after labor for trucking companies, according to the American Transportation Research Institute.

There are many ways to increase fuel economy, according to Mike Roeth, executive director of the North American Council for Freight Efficiency. Readily available methods include better driver training, deploying available tractor aerodynamics, optimizing vehicle speed, adopting more efficient transmissions, and using low rolling resistance tires.

“There's no disputing it, 10 mpg is a realistic achievement for commercial vehicles carrying real loads in the real world,” Roeth said.

The Starship—a Shell partnership with the truck maker AirFlow—incorporates currently available technologies with fledgling concepts to create what they call “a hyper fuel-efficient truck.”

“Those technologies fall into three general categories: aerodynamics, efficiency and Shell Lubricant technologies,” said Dan Arcy, global OEM technical manager for Shell Global Solutions.

The windswept profile of the lightweight carbon fiber cab “cuts through the wind with the least amount of resistance possible,” Arcy said. The front of the cab also uses active shutter grilles that close when it isn't necessary to cool the engine, directing air around the truck instead of through it.

The gaps between the tractor and trailer are also filled with cab extenders that deploy as the truck goes down the road, reducing drag by creating a smooth surface for the air to flow over. The Starship uses side skirts and a tail at the back of the trailer to prevent a fuel-wasting vacuum from forming in the truck's wake.

To lower the base weight of the vehicle so the Starship can haul more freight, the trailer uses a tag axle that's just as capable of carrying a full load; it's just lighter weight, Arcy said.

Up top, the trailer is outfitted with solar panels capable of generating 5,000 watts of energy. It downloads to the Starship's 48-volt battery system, powering air conditioning for the cab and trailer. While down below, automatic inflators that keep the tires at the right pressure aren't only on the trailer tires but the drive axle on the tractor.

Under the hood are MPG-boosting Shell Lubricants, including a high-tech, low-viscosity 5W30 full synthetic engine oil that is so new it isn't yet available in the market, as well as low-viscosity, high-durability axle oil and transmission fluid.

The Starship isn't just a concept. It's a demonstration vehicle that has already been built and will be making its maiden voyage from coast to coast, leaving from San Diego on May 18 and, if all goes as planned, arriving in Jacksonville, Fla, six days later. The truck will be fully loaded and measured along its route for freight ton efficiency. The results will be verified by the North American Council for Freight Efficiency and shared with the public June 5. The Starship is on display this week at ACT Expo.

Transport accounts for more than a quarter of the world's total energy use and one-fifth of global energy-related carbon dioxide emissions, according to Shell. And trucks are a significant contributor.

But Shell isn't predicting how much fuel savings will be logged by the Starship.

“We don't feel that any one specific number means success or failure,” Pino said. “We're looking to improve upon the average truck we get today, and we're confident we will, but this is about furthering the conversation. We're looking for people to get behind these efficiency technologies.”

— Susan Carpenter | Trucks.com



# WHERE INNOVATION BEGINS



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## Xing Mobility Selects Clean Wave Technologies for Next Generation Electric Super Car

Taipei-based electric powertrain system supplier, XING Mobility has selected Clean Wave Technologies (Booth 1223) to provide electric motors and drive control units as part of a rally-inspired supercar. "Miss R", the world's first electric supercar with on-road and off-road capabilities, will deliver 1 Megawatt of power. The vehicle will utilize four Clean Wave traction motors, one for each wheel. The supercar will provide four-wheel torque vectoring and be capable of staggering speeds. Powered by four independent 225kW electric motors, XING's prototype supercar has projected performance of 0-100km/h in 1.8 seconds, 0-200km/h in 5.1 seconds and a max speed of over 270km/h.

XING Mobility selected Clean Wave because of its unique product features including high efficiency, compact design, low weight and the use of no rare earth metals, explained XING Mobility's co-founder and chief technology officer, Azizi Tucker.

XING Mobility is already working with commercial and industrial vehicle makers from around the world to apply technology from Miss R in city buses, ride-sharing scooters, construction vehicles and special-purpose boats. Most recently, integrated technology derived from Miss R has been deployed in a 3.5

ton converted multipurpose transit vehicle, which debuted in Taipei in April 2018.

"We are pleased to supply and partner with an innovative company such as XING Mobility. They offer a scalable and modular powertrain that is well suited for the global electric vehicle market. Many of our customers want turnkey solutions that include the electric drive, transmission, cooling and battery system," stated Manoj Karwa, vice president of sales and marketing for Clean Wave Technologies.



Continued from page 5

## Fleet Owner Names UPS Green Fleet of the Year

Since 2009 alone, UPS said it has invested more than \$750 million in alternative fuel and advanced technology vehicles and fueling stations globally.

Last November, UPS forged a seven-year agreement with Big Ox Energy, a wholly owned subsidiary of Environmental Energy Capital, to purchase 10 million gallon equivalents of renewable natural gas (RNG) per year. That's in addition to a five-year deal made earlier in 2017 with AMP Energy for 1.5 million gallon equivalents of RNG per year from the Fair Oaks Farms in Indiana. UPS said these RNG agreements will help it reach its 40% "alternative fleet fuel" goal by 2025.

The company noted that RNG can be derived from sources that include decomposing organic waste in landfills, wastewater treatment, and agriculture. It is then distributed through the natural gas pipeline system, making it available for use as CNG or LNG.

UPS added that it used 61 million gallons of natural gas in its ground fleet in 2016, which included 4.6 million gallons of RNG, increasing its RNG consumption to 14 million gallons of RNG by the end of 2017.

"All of those efforts are a critical part of our strategy for the future," Rose noted.

— Neil Abt | Fleet Owner



## Agility Selling Fuel-Efficiency Comparison Tool

Agility Fuel Solutions (Booth 1237) will begin offering a service that helps fleet owners pin-point which fuels and engines are most efficient for their operations.

The software, called FAST—which stands for Fuel Alternatives Selection Tool—will allow customers to determine which alternative fuel will offer the best return on investment for their vehicles and drive cycles.

It works something like a calculator. FAST will compare and contrast whether diesel, liquid or compressed natural gas, hydrogen, gasoline or electricity will save fleet owners the most money for their normal business operations. The results are supposed to help fleet owners make decisions on what products to buy for the long-term.

In the beginning, Agility will not make the software publicly available. Instead, Agility's sales team will meet with potential clients and conduct an analysis for them. The client will get a report from Agility's sales team. Eventually, the product could be rolled out for wider use.

—Dalton LaFerney | Trucks.com

# Freightliner Announces New CNG Models

Freightliner (Booth 947) showcased one of their new Cascadia CNG vehicles at ACT Expo that was developed in collaboration

with UPS. The new Cascadia day cab is equipped with a Cummins Westport ISX12N Near Zero Emission (NZE) NOx natural gas



engine and Eaton Fuller Advantage Series automated manual transmission. The powertrain, in conjunction with the model's aerodynamic design, can result in fuel efficiency gains of up to 3% compared to similarly spec'd original Cascadia CNG truck models, the company said.

The ISX12N meets the California Air Resources Board Low NOx standard of 0.02g/bhb-hr, a 90% reduction from engines operating at current U.S.

Environmental Protection Agency (EPA) NOx limit of 0.2 g/bhb-hr.

"By partnering with companies like UPS to pilot innovations such as the new Cascadia CNG truck, we can continuously evaluate and enhance our products," said Kelly Gedert, director of product marketing, Freightliner Trucks and Detroit Components. "Our proven experience in developing alternative fuel technologies for applications ranging from long hauls to vocational jobs demonstrates our commitment to environmentally sustainable solutions that increase productivity and efficiency for our customers."

A Freightliner M2 112 was also on display, featuring a Cummins Westport L9N Near Zero Emission (NZE) NOx natural gas engine, as well as a Tymco CNG sweeper.

Also showcased at ACT Expo were the propane-autogas S2G chassis from Freightliner Custom Chassis Corporation and the Thomas Built Buses first generation Saf-T-Liner C2 all-electric school bus. Referred to as Jouley, named after the joule unit of energy, the C2 is the first electric bus from TBB.

## ACT Expo Honors Bob Carrick's Leadership in the Advancement of Clean Trucks

In a surprise ceremony on Tuesday afternoon, ACT Expo organizers presented Bob Carrick of Freightliner with a retirement plaque featuring a miniature CNG cylinder—a nod to his leadership role in the development and implementation of Freightliner's Natural Gas Truck Program. Carrick worked in a variety of roles at Freightliner for 33 years, in addition to spending 13 years in fleet management.



**Erik Neandross, CEO of GNA and Bob Carrick, Vocational Sales Manager - Natural Gas, Freightliner**

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# First Hydrogen-Electric Street Sweeper Makes Debut at ACT Expo

The world's first hydrogen fuel cell powered street sweeper was unveiled yesterday at ACT Expo before making its debut on the freeways of Southern California.

The sweeper, built by San Bernardino, Calif.-based Global Environmental Products, uses a fuel cell system from U.S. Hybrid (Booth 1827) and will be used by the state's transportation agency, Caltrans, as part of its freeway

sweeping fleet.

U.S. Hybrid, a Torrance, Calif., developer of electrified commercial vehicle powertrains, displayed the sweeper. The sweeper will be delivered to Caltrans when ACT Expo ends, said Abas Goodarzi, U.S. Hybrid's chief executive.

The fuel cell system makes electricity from compressed hydrogen gas to power

the sweeper and its brushes, blowers and vacuum.

The 80-kilowatt fuel cell can produce enough power from the sweeper's 20-kilogram hydrogen supply to operate for 10 hours. It will be refilled at any of the nearly two dozen hydrogen stations in the Los Angeles Basin, typically in under 10 minutes.

— John O'Dell | Trucks.com



## Kenworth Nat Gas Electric Hybrid T680

Looking to grab a slice of the growing market for ultra clean heavy-duty drayage and regional hauling trucks, Paccar's Kenworth unit has developed a prototype natural gas-electric hybrid version of its Class 8, T680 day cab tractor.

Kenworth (Booth 939) is showing the truck at ACT Expo and says it will put the unit to work in a demonstration project this summer as part of Total Transportation System Inc.'s drayage and regional cargo hauling fleet at the Ports of Los Angeles and Long Beach.

The truck was developed "to evaluate potential alternatives to diesel power for commercial vehicles," said Stephan Olsen, Kenworth's product planning director. The project is part of the ongoing Hybrid Emission Cargo Transport program, funded by \$4.2 million in Department of Energy grants and \$4.8 million in grants from the SCAQMD.

Kenworth engineers teamed the newly developed Cummins Westport ISL G near-zero emissions natural gas engine with an electric powertrain. The 8.9-liter engine is used as a generator to provide electricity to power the electric drive motor after the initial battery charge is depleted.

Kenworth says the T680 hybrid can travel up to 30 miles on its initial charge before the natural gas engine-generator kicks in. Maximum range on a tank of compressed natural gas and fully charged lithium-ion battery pack is estimated at 250 miles.

— John O'Dell | Trucks.com

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## Dana and Workhorse Reveal Electric Axle for Class 5 Truck

Commercial vehicle supplier Dana Inc. and Electric truck manufacturer Workhorse Group unveiled a Class 5 van powered by a jointly-built electric axle.

The companies made the announcement on Tuesday, May 1, at ACT Expo.

The fully electric vehicle is a combination of the chassis and battery pack from a Workhorse E-Gen van, the body of a Morgan Olson UPS delivery truck and the new Dana axle. The truck has a gross axle rating of 13,500 pounds and a gross vehicle weight rating of 19,500 pounds. It can travel up to 67 mph on the highway.

The concept vehicle is not slated for production. However, interest from potential customers could bring it to market, said Duane Hughes, president of Workhorse.

The axle itself could be made ready for production if desired, said Steve Slesinski, director of product planning at Dana.

Workhorse and Dana developed the new axle in tandem, through the supplier's Spicer Electrified brand. Spicer produces electric axles called e-Drive for smaller commercial vehicles.

The new axle, called the e-Drive eS9000r, is the largest application of the technology. It is a 400-volt system designed for Class 4, 5 and 6 vans, trucks and buses.

"The integrated e-Drive axle solution leverages proven competencies that will enhance the Workhorse electric vehicle architecture to deliver maximum efficiency at a reduced system weight," said Mark Wallace, executive vice president of Dana.

The eS9000r is made of an integrated motor,

transmission and axle power system. All components are housed in the center section, between the two hubs that drive the vehicle's wheels.

This packaging allows the eS9000r to save 388 pounds compared with a conventional electric axle linked to an external motor, according to Dana.

The sole purpose of the internal motor is to generate power to charge the batteries, fitted into the truck's frame rails, when they run low. Spicer engineered the motor to turn in the same direction as the wheels in order to reduce efficiency loss.

The result is 220 kilowatts of peak power and 700 newton meters of torque. The figures are the equivalent of approximately 295 horsepower and 516 pound-feet of torque.

The new e-Drive axle improves the efficiency of the E-Gen van by at least 14 percent, Hughes said. That creates opportunity for the new axle to reduce the vehicle's total cost of ownership.

When fitted with the eS9000r axle the truck contains 60 kilowatt-hours of energy, or about twice that used by the average U.S. home each day, he said. If the vehicle is more efficient then it requires less investment in infrastructure and electric power during charging.

"Over the gasoline equivalent, this vehicle over 20 years will cost \$200,000 less," Hughes said.

Both Workhorse and Dana expressed a desire to work together on future products.

"We'd certainly like to have further collaboration," Slesinski said.

— Ryan ZumMallen | Trucks.com

## RIDE & DRIVE

### Join Us Thursday for the ACT Expo Ride & Drive

Thursday, May 3 - 9:00am to Noon | Pine Street in Front of the LBCC Promenade

Get behind the wheel and test drive advanced clean vehicles spanning all alternative fuels and vehicle applications. Check in on the Promenade Concourse (on Pine Street) to sign a waiver and pick up a wrist band so that you can participate. Ride and drive vehicles include:

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**US Hybrid**

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**Workhorse Trucks**

N-Gen Low Floor Electric Delivery Van

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# Vehicle & Equipment Showcase



Envision Solar has its solar electric vehicle charging unit on display in [booth 1819](#).



Electric delivery truck maker Chanje has teamed with leasing giant Ryder to develop an electric truck acquisition process for an array of vehicles, including the all-electric panel van on display in [booth 1719](#).



Green4U is debuting its Surge NEV (Neighborhood Electric Vehicle) in [booth 1503](#).



Visit [booth 1127](#) to see a Peterbilt refuse truck with a CNG fuel system from Momentum Fuel Technologies operated by the city of Los Angeles.



Workhorse Trucks has its N-Gen low floor electric delivery van on display in [booth 18](#).



GreenPower Bus has Porterville Transit's all-electric EV350 transit bus on display in [booth 1635](#).



Effenco is showcasing its hybrid-electric yard tractor with active stop-start technology in [booth 1333](#).



Hyliion is showcasing its hybrid-electric Freightliner Cascadia CA125SLP in booth 1427.



Hino Trucks is showcasing its hybrid-electric box truck in booth 1727.



Visit Kenworth in booth 939 to see its hybrid-electric cargo transport chassis



See one of the most popular low-emission school bus options—the Blue Bird Vision Propane—in the Propane Education & Research Council booth 1027.



Check out the ET-One all-electric semi-truck from Thor Trucks in booth 1517.



The North American Council for Freight Efficiency is showcasing the Run on Less Volvo VNM Day Cab with Efficiency Technologies in booth 1760.

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