

A NEW WAY TO PLAY THE NATURAL GAS GAME?



The 2014 Freightliner Columbia daycab was a glider kit fitted with a refurbished diesel engine that itself was retrofitted with an American Power Group natural gas fuel system.

In a *CCJ* exclusive, a road test and firsthand experience with natural gas retrofit fuel systems and glider kits reveal interesting possibilities for cost-minded truck fleets BY JACK ROBERTS

The first part of my test drive began westbound on Interstate 80 out of Salt Lake City, on the level desert run that leads to the Bonneville Salt Flats. The goal then had been to find flat ground and a little traffic to give me a feel for the truck. But now, we'd doubled back and were climbing the Wasatch Mountains east of the city on I-215 leading to I-80 East toward Park City. Here, I'd get a chance to pull some serious mountain grades and see for myself if a dual-fuel diesel-ignited natural gas truck engine was up to hauling 44,000 pounds in demanding terrain.

Starting up the first grade, the road suddenly began a series of winding S-turns at the same time that construction took a couple of lane options off the table. The truck was pulling well, but I grabbed another gear just to be on the safe side. It turned out to be the most remarkable thing that occurred during my test drive.

That's not a slam against the Freightliner Columbia I was driving, but rather a vindication that this rig – a glider kit fitted with a refurbished diesel engine that itself was retrofitted with an American Power Group natural gas fuel system – had performed exactly as the folks at APG, the Wheel Time Group and Smith Power, the manufacturer of the truck, had assured me it would.

WHAT LIES BENEATH?

I previously reported on the partnership among a team of glider kit builders, sales and support provider Wheel Time, natural gas supplier Blu and APG to introduce natural gas glider kits to the North American trucking industry (*CCJ* December 2013). Fleets wishing to find an affordable way to get into the natural gas game can spec glider kits with retrofit fuel systems and save as much as \$40,000 on the vehicle compared to purchasing a new,

dedicated natural gas truck. A further enticement is that fleets can spec older pre-exhaust gas recirculation emissions engines to power these trucks – and enjoy more reliable power and serviceability in the bargain.

My test rig was a gleaming white 2014 Freightliner Columbia daycab truck. On the outside, even seasoned industry veterans would be unable to tell that this truck was anything other than a new Columbia.

Climbing into the cab, that reaction was further reinforced: The interior still had a factory-fresh smell with modern instrumentation and gauges, mirrors and ergonomics. Because the truck had been spec'd as a regional-haul daycab, its interior appointments were basic. But if a fleet wanted to upgrade the interior with the latest Daimler diagnostic and telematics systems, it wouldn't be a problem.

For the life of me, I don't understand why everyone isn't trying this, because the numbers work.

– Brian Orr, president, Stewart Logistics

EQUIPMENT: NATURAL GAS GLIDER KIT

It was underneath the hood and cab where the real differences this tractor offered could be found. Pulling the hood forward didn't reveal the new selective catalytic reduction-equipped DD12 one would expect to see. Instead, I was greeted with a concrete-gray 1996-vintage Series 60 Detroit Diesel engine, complete with vibrant blood-red lettering scripted across the engine block.

Glider kits take advantage of a quirky loophole in truck manufacturing laws that allow fleets to purchase a truck with a new cab and chassis, fitted with a recycled or refurbished drivetrain. The additional twist – thrown into the mix by APG, Wheel Time and their partners – is that their rebuilt powertrains receive the further addition of a natural gas fuel and tank system. The system manages the flow of the two fuels to the engine, using diesel both as the ignition source in the combustion chamber and as a power boost in situations demanding higher torque from the engine.

So when the truck is just getting rolling or climbing a steep mountain grade, the system supplies larger amounts of diesel to the engine – up to 50 percent of the fuel supplied, depending on road and terrain conditions – and then dials that ratio back as engine load demands decrease.

So on my flat run heading west, the engine was using a minimum of diesel – only a little shot to initiate combustion – while the cheaper natural gas kept the wheels turning. Later in the mountains, the system delivered a significantly higher percentage of diesel to the combustion mix to make sure I had plenty of power to deal with the terrain.

On the road, the truck handles and drives exactly as one expects: it is, after all, a new truck. The only indications that something unusual is happening are an electronic fuel system monitor on the dash, which shows the driver the diesel-to-natural gas fuel ratio, and the noise level in the cab. Although the truck is new, it has a 20-year-old engine under the hood that – despite the technological upgrades it has received in its current incarnation – is louder than new ones that come out of factories today, so some more pronounced drivetrain noise is to be expected.

Most importantly is the performance of the fuel system in actual driving conditions, which was why my Salt Lake hosts were so eager for me to drive the truck in the nearby mountains. The dual-fuel system delivered in spades; the glider kit pulled as well as any truck on the highway. The truck was loaded with about 44,000 pounds in the box and had no problem dealing with any grades – up to 6 in percent in some areas. This is clearly a system that works on the driver's behalf to get the job done.

DO THE NUMBERS ADD UP?

I was impressed enough with the dual-fuel glider concept to ask a couple of APG customers to talk about their experiences at the *CCJ* Fall Symposium in December in Scottsdale, Ariz.

Brian Orr – president of Stewart Logistics, a FedEx

Ground contractor out of Atlanta – said he was attracted to natural gas a couple of years ago due to its low price and his belief that he could use it to add \$1 per gallon burned by his fleet to his bottom line.

Looking at acquisition costs, Orr calculated he could buy a new diesel tractor for his runs for about \$128,000. A similarly spec'd new natural gas tractor would cost between \$180,000 and \$200,000.

But a retrofitted glider kit could be had for \$110,000. Based on those calculations, Orr opted to try a glider kit built by Fitzgerald and took ownership of his first vehicle in October 2013.

Today, Orr is running two Series 60-powered dual-fuel glider kits five days per week on a dedicated route between Atlanta and Meridian, Miss. The trucks burn the diesel gallon equivalent of 71 gallons a day. Orr typically buys the fuel for about 96 cents a gallon cheaper than diesel.

The result, he said, has been a 65 percent displacement of diesel fuel burned for a cost savings of \$68.16 a day per truck. "This works out to \$340.80 in fuel cost savings a week, or a total of \$17,721.60 in yearly fuel cost savings, per truck," Orr said.

Mike Pope – president and chief executive officer of Racine, Wis.-based Pope Transport – was pleasantly



The Series 60 Detroit Diesel engine was refurbished and retrofitted with a bi-fuel natural gas kit from APG and Wheel Time before being dropped in a Freightliner Columbia glider.

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surprised upon comparing notes with Orr in Scottsdale to discover that the numbers both fleets were seeing essentially were identical. Pope's story differed slightly from Orr's in that he initially opted to retrofit his existing older diesel trucks with the dual-fuel natural gas system, although he said he will be purchasing new glider kits with the system in the future.

Pope's first run with a natural gas retrofit truck in July 2013 – with himself behind the wheel – was from Sturtevant, Wis., to Gary, Ind. Using a conventional diesel truck, Pope expected to see an average of 5.62 miles per gallon on that 210-mile trip. But with an initial 50 percent displacement of diesel fuel used, that average – for diesel only – jumped to 12.35 miles per gallon. Pope calculated that his total fuel cost per mile for both natural gas and diesel was 54 cents a gallon – a savings of 17 cents per mile over his diesel-only trucks.

Today, Pope has expanded his fleet of dual-fuel gliders and completed no less than 16 separate fuel tests with the trucks to get a handle on his costs and savings. His fleet today includes eight dual-fuel trucks; two trucks have 450-horsepower Mercedes-Benz MB 400 engines, and six trucks are running 500-hp Detroit Series 60 engines.

Pope said he's invested \$210,000 in retrofitting his trucks, with payback coming in 14 to 16 months at fuel savings between 10 and 20 cents per mile.

Looking ahead, Pope said he expects to overhaul and convert his remaining trucks to the dual-fuel natural gas system between 700,000 and 900,000 miles. Once the entire fleet is converted, his long-term projected fleet savings numbers – based on his current fuel test numbers – indicate fuel cost savings for 25 trucks running 50,000 miles a week at \$10,000 per week, or \$500,000 per year. Those numbers don't consider other potential cost savings, Pope said. As a farmer, he already has a natural gas line running to his farm to dry his corn harvest. By adding his own fueling equipment for his trucks, Pope said he can extend his fuel cost savings further as much as \$822,500 per year.

For both Orr and Pope, the natural gas numbers are adding up nicely in the real world. "I got into this business to make money," Orr said. "For the life of me, I don't understand why everyone isn't trying this, because the numbers work."

It's a sentiment shared by Pope. "Today, we once again have the opportunity to control our costs and make a profit," he said. "For me, trucking just got fun again." **CCJ**
