The Case for Shorepower Truck Electrification

Reducing OTR Big Rig Emissions and Fuel Usage in the U.S.

Summary

Among medium and heavy-trucks, class 8 trucks are the largest CO2 emitters and fuel users, consuming two-thirds of all truck fuel, or 1.57 million barrels per day. In an effort to reduce emissions and foreign oil dependence, in 2004, the EPA launched SmartWay®, a program which offers incentives for the acquisition of approved emission and fuel reduction technologies to improve supply-chain fuel efficiency. With a grant from the U.S. Department of Energy, Cascade Sierra Solutions is able to offer truckers 20% off the cost of qualifying SmartWay equipment that can plug into the electric grid as an alternative to burning diesel fuel. This includes shorepower capable auxiliary power units (APUs). The EPA has determined that, when used as anti-idling devices, APUs reduce emissions on long-haul, class 8 trucks and locomotives when compared to the vehicles' baseline emissions from the main propulsion engine. APUs also benefit truckers in fuel savings and reduced vehicle maintenance costs.

Hodyon's SmartWay-certified Dynasys™ APU is an excellent choice for constituents participating in the grant program. The *Dynasys* APU reduces emissions, provides dependable comfort during down times and dramatically lowers fuel and other operating costs for truckers.

Introduction

Trucking is the backbone of our nation's freight transportation system. It is responsible for carrying virtually everything we eat, drink or buy. Total shipments of goods in the United States accounted for nearly $11.7 trillion in revenue and 12.5 billion tons in 2007[1], according to data released jointly by the Bureau of Transportation Statistics and the U.S. Census Bureau. Furthermore, according to the Federal Highway Administration's Office of Freight Management[2], freight tonnage moved in the United States is projected to nearly double over the next 30 years with trucks hauling 84 percent of the growth.

Problem

With 15.5 million trucks operating in the United States (two million of them tractor-trailers)[3], trucking also accounts for almost two-thirds of all petroleum consumed in the United States and about one-third of total carbon dioxide emissions.

In 2009, Lane Council of Governments prepared a report for Lane Regional Protection Agency funded by EPA titled "Tracking Diesel Idling Reduction Through The Use of Auxiliary Power Units (APUS)".[4] It states an EPA estimation of cross-

country, long haul truck idling (i.e., at truck stops, plazas, rest areas and distribution centers) as consuming over one million gallons of fuel annually. Furthermore, annual emissions from truck idling include 11 million tons of carbon dioxide (CO_2, a greenhouse gas), 180,000 tons of nitrogen oxides (NOX, a precursor to ozone formation), 5,000 tons of fine particulate matter (PM, a likely carcinogen) and other harmful air toxins.

In January 2001, the EPA finalized the Highway Diesel Rule (the "2007 Highway Rule"), a directive to make heavy-duty trucks and buses run cleaner. Beginning with the 2007 model year, diesel engine manufacturers and refiners are mandated to make the changes needed to meet the new emission limits. According to the EPA, these changes will reduce harmful pollution from heavy-duty highway vehicles by more than 90 percent. [5] For the existing fleet of over 1.2 million long-haul Class 8 trucks in the U.S., however, emissions are still a major concern.

The Public Policy Solution

In 2004, the EPA launched SmartWay®, a program that reduces transportation-related emissions by creating incentives to improve supply-chain fuel efficiency. A truck with SmartWay technology can save 25% of fuel consumed by long haul trucking operations – an average savings of 5,000 gallons per year per truck. The SmartWay Transport program identifies several technologies that help both to reduce emissions and save fuel, but only one is designed to reduce main diesel engine idling – the APU.

A Technical Solution

An APU is an onboard solution that provides driver comfort and convenience for trucks with sleeper cabs, which enables the main truck engine to be turned off during periods of vehicle down time. APUs contain small generators and climate control components that are mounted to the truck and provide heating, cooling, and 110v power (for other amenities that long haul truckers need), all without idling the main engine. The result is a dramatic decrease in a truck's non-driving fuel consumption (over 80%) and a corresponding reduction in diesel emissions.

Reducing truck idling conserves fossil fuels and benefits the economy, the environment, communities and the trucking industry. It reduces dependence on foreign oil, increases trucking profits, improves air quality (by reducing CO_2 emissions), keeps citizens healthier, provides safer and quieter driver living spaces and extends the life of trucks' main engines.

Challenge

According to an article in *U.S. News & World Report*[6], an APU can save 1,900 gallons of diesel fuel each year for long-haul drivers who experience considerable idle time.

With diesel fuel at $4 per gallon, that represents $7,600 a year saved by not idling the truck.

Although the savings are real, the initial outlay for an APU is several thousand dollars. This capital cost continues to be a major barrier for many drivers and fleets.

The Program

In 2009, the Department of Energy (DOE) created the Shorepower Truck Electrification Program (STEP) as part of the American Recovery and Reinvestment Act (ARRA).

Under this program, the DOE provided a grant funding commitment of $22.2 million for the development of approximately 1,250 electrified truck parking pedestals at 50 locations along the busiest freight movement corridors nationally, and approximately 5,000 idle reduction equipment rebates for qualifying upgrades (called "shorepower") that allow long-haul trucks to plug into the nation's power grid while at rest. This project is the first nation-wide idle reduction program available to the trucking industry.

The rebate program for idle reduction equipment provides truckers with a 20% rebate for any APU purchased that is shorepower compatible. Upon application approval, they then have 120 days to install their APU.

Cascade Sierra Solutions administers all aspects of the idle reduction equipment rebate program and coordinates with the DOE and infrastructure partner, Power Technologies.

Shorepower Technologies is developing truck stop partners interested in project participation. It also coordinates the building of the electrified truck parking pedestals and provides the delivery of services at the pedestals.

With its official launch in January 2011, the STEP project identified Hodyon, the developer and manufacturer of the *Dynasys* APU and a certified "SmartWay" Partner, as a STEP-approved rebate equipment supplier.

The Company / The Technology

According to Cascade Sierra Solutions, the *Dynasys* APU is a popular option as truckers utilize STEP rebates for installation of anti-idling equipment on their trucks.

Hodyon designs, builds, finances, supports, and guarantees its APUs, thus providing the benefits of a "one company" approach for customers. Hodyon, an American company backed by 26 years of manufacturing excellence, builds the *Dynasys* APU in an ISO-certified factory in Cedar Park, Texas.

Dynasys engineers and product managers spent years in development and testing to provide truck drivers and fleet operators with the best combination of product design and features.

The *Dynasys* APU, which is rated as the number one APU by TruckAPUReview.com, offers the power that truckers need in a compact package. The lightweight *Dynasys* APU is designed to be easy to install and maintain, offers significant fuel savings – an average of one gallon per hour compared to idling the truck's main engine – and enables driver compliance with non-idling laws. The *Dynasys* APU offers 6kw of power, more than enough to support both HVAC and other electrical appliances in the cab. The *Dynasys* APU is also available with shorepower, which provides the additional flexibility of allowing the HVAC to be plugged into any 110-volt outlet and to work independently from the APU engine for optimum performance and fuel savings, with minimal noise. It is this shorepower option that allows the *Dynasys* APU to be compliant with the STEP idle reduction equipment rebate program.

The Participants

In order to accommodate the STEP project, Hodyon increased production of its *Dynasys* APU and engaged its dealer network to support demand for its anti-idling solution. In its efforts to uniquely serve the needs of independent owner-operators, company drivers and fleet managers, Hodyon interviewed STEP constituents to gain trucker perspectives on the grant program and its equipment:

Dealers:

> Cantwell Power Solutions has been an authorized sales and service dealer in the electric power generation industry for 35 years. "Were it not for the grant program, far fewer end users would have purchased APUs," said Manager Jason Wells. "The grant money was a powerful incentive for people to come in for *Dynasys* APUs. The program worked great. If I were to design a program from scratch, I wouldn't change a thing. I hope another one is implemented soon."
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> Boomer Diesel Engine & Generator Company considers itself an auxiliary power superstore for trucks across the country. It dedicates its business to sales, installation and service of APUs. Boomer co-owner Linda Norris said, "The STEP project gave us a great boost in business. It is designed so drivers are not saddled with a big down payment when buying their APUs, which drives business for us. We have a customer who is a big fan of APUs. He recently purchased 15 new trucks and is waiting for them to come in to get his *Dynasys* APUs installed. Overall, this is the best program we've seen for increasing business and getting more APUs installed on more trucks."

Owner-operators:

Owner-operator Dave Billinger talks about his experience with the STEP project and his *Dynasys* APU. "I learned about the program through Boomer Diesel Engine & Generator. I had a [competitor's] APU, but hated it …Once I was approved and the grant paid for a portion of my APU, I purchased a *Dynasys* APU. I've had it for ten months now and it has paid for itself. It's smaller, easier to work on, easier to use than my old one and it provides consistent temperatures so I'm more comfortable. Given the opportunity to do it again, I would buy another *Dynasys* in a heartbeat."

Owner-operator Carl Stanoyvic talks about the STEP grant. "I received an email message about *Dynasys* and available grant funds. I didn't act upon it immediately. As a matter of fact, I didn't call Hodyon until about a year later. I completed the paperwork and received a substantial discount on my APU, provided I purchase an accompanying electrical unit. I purchased the D*ynasys* APU on Dec 16, 2011. It hasn't paid for itself yet, but saves me $300 a month on idling. I am what you call a raving fan of my *Dynasys* APU. I would absolutely do it again. I refer all my friends to Hodyon. I think everyone should have one."

Ed Prince, owner-operator of a truck leased from Swift Transportation, makes runs in all 48 states. When asked about the STEP project and his *Dynasys* APU, he said, "I can't imagine how I ever lived without one. I learned about STEP through Hodyon at a truck show. I knew there were grants, but most had stringent qualification standards. I lease a truck, so the title and registration were not in my name. In speaking with Cascade Sierra Solutions, I learned they only needed the VIN number and my name on the lease agreement. The grant provided 20% of the purchase of price of my *Dynasys* APU, which meant no money down."

Continued Prince, "As an owner-operator, I worry about tires and fuel and emergencies; but not my APU. My *Dynasys* APU saves wear and tear on the truck engine. I love it that I can service a $3,000 engine (the APU) rather than a $30,000 engine (the truck). I've had my *Dynasys* with shorepower for six months. It is definitely the way to go. I can plug it in and everything runs without having to worry about anything."

Wand Freer also learned about *Dynasys* and STEP through OOIDA. She commented, "I had checked out Hodyon and the *Dynasys* APU, but I found the down payment too high. While at the Mid American Trucking Show last year I learned from OOIDA that the government had a program to help finance APUs. Receiving the down payment in the form of a rebate made *Dynasys* affordable. I've owned my *Dynasys* APU since April 2011. It paid for itself within a couple months. I now experience no idle time at all. It powers my TV, computer, refrigerator, and I even use it to charge my truck battery when necessary. I've referred several friends to Hodyon."

Program Progress / Results

The STEP project's two-pronged program includes the development of an infrastructure of Electrified Parking Spaces (EPS) for Truck Stop Electrification (TSE), and the installation of idle reduction technologies. The program is funding 50 sites along five major highway corridors. Seven are open now. The remaining 43 have been identified and are under construction, with all 50 scheduled to be completed in the third or fourth quarter of 2012.

The integrated TSE technology program is a convenient, cost-effective solution for drivers, owners and truck stop operators.

In addition, the program allocated $10 million in rebates and purchase incentives for the installation of eligible equipment on trucks. These incentives have benefitted truckers, who received discounts on their *Dynasys* APUs; dealers, who saw an increase in business through sales and installation of *Dynasys* APUs; as well as Hodyon, who received the subsidy.

Investment in the *Dynasys* APU results in direct cost savings to truckers, reduced reliance on fossil fuels and an overall cleaner environment.

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[1] United States Census Bureau press release, "Nationwide Movement of Goods Reached 12.5 Billion Tons in 2007", December 22, 2009 http://www.census.gov/newsroom/releases/archives/economic_census/cb09-196.html

[2] U.S. Department of Transportation Federal Highway Administration, Freight Management and Operations, Publication Number: FHWA-HOP-12-002 http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/index.htm

[3] Trucking Statistics, TruckingInfo.net, http://www.truckinfo.net/trucking/stats.htm

[4] TRACKING DIESEL IDLING REDUCTION THROUGH THE USE OF AUXILIARY POWER UNITS (APUS), EVERYBODY WINS, June 2009, http://www.lcog.org/documents/ira/LARAPA_Report0709.pdf

[5] United States Environmental Protection Agency, Introduction of Cleaner-Burning Diesel Fuel Enables Advanced Pollution Control for Cars, Trucks and Buses, October 2006 http://www.epa.gov/otaq/highway-diesel/regs/420f06064.pdf

[6] U.S. News & World Report, Getting Past the Cost of Saving Fuel, April 4, 2008, http://money.usnews.com/money/blogs/beyond-the-barrel/2008/04/04/getting-past-the-cost-of-saving-fuel