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**PowerLINE® Generator Sets for Container Refrigeration Units  
Enhance Fuel Economy and Emissions Compliance**

AMSTERDAM, The Netherlands, Nov. 27, 2012 – Helping shippers meet the challenge of rising diesel prices, Carrier Transicold’s newest PowerLINE® generator sets have been enhanced with ecoFORWARD™ technologies, resulting in a platform capable of reducing fuel usage by approximately one third compared to prior standard units. The enhanced generator sets deliver improved performance and run cleaner, all while achieving compliance with 2013 Tier 4 emissions standards from the U.S.

Environmental Protection Agency. Carrier Transicold helps improve global transport and shipping temperature control with a complete line of equipment for refrigerated trucks, trailers and containers, and is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp. (NYSE: UTX).

“Taking a holistic view of the system to achieve emissions compliance, Carrier developed a suite of technologies known as ecoFORWARD, resulting in a significant overall performance boost,” said Charu Mahajan, generator set business manager, Carrier Transicold. “In short, the generator sets do much more, while consuming less fuel.”

Carrier Transicold’s PowerLINE diesel generator sets provide uninterrupted power to operate 460-volt ISO container refrigeration systems when used over land in intermodal applications, and are available in models that either mount underneath a container chassis or clip onto the front of a refrigerated container unit.

The 2013 models introduce:

- **Standard implementation of enhanced FuelWise™ functionality**, a fuel-saving technology that automatically switches the generator set between two speeds via a simple black box controller.

## Carrier Upgrades Generator Sets – 2

- **A new ultra high-efficiency permanent magnet generator (PMG)** that pushes efficiency well beyond conventional generators.
- **An optional engine emissions system** for compliance with the ultra-low emissions standard of the California Air Resources Board (CARB).

The new PowerLINE units also weigh about 14 kg (30 lbs) less than the previous units.

Common to PowerLINE systems with ecoFORWARD technologies is a 2.2-liter diesel engine based on Carrier Transicold's established engine line with its well-accepted speed sensor and electronic governor.

"Emissions compliance was a given," Mahajan said. "Providing customers with a familiar, reliable large displacement engine while increasing system efficiency was key. Equally so, was improving fuel economy to reduce total operating costs for our customers."

While actual fuel consumption depends on real-world conditions, cargo and the specific refrigeration unit used, Carrier's preliminary testing shows that the fuel savings on the new models ranges from 32 to 34 percent, in test situations at 38 degrees Celsius (100 degrees Fahrenheit) ambient, resulting in relatively short payback periods.

With diesel fuel prices hovering around U.S. \$4.00 per gal., a fleet of 250 new PowerLINE generator sets, each operating 2,000 hours, could save in excess of \$300,000 per year. The savings comes in large part from standardization of FuelWise functionality, the proven dual-speed capability that was first introduced as an option in 2008. Incremental efficiency gains also come from the 15 kW custom-designed generator. Unlike conventional generators, the ultra-high efficiency PMG provides approximately 94 percent efficiency, reducing the engine power required and further contributing to the overall fuel efficiency of the generator set.

## Carrier Upgrades Generator Sets – 3

Performance gains from the application of ecoFORWARD technologies means 20 percent less engine power is required, which puts the engine within the scope of EPA's Tier 4 standard for non-highway engines rated at 8 to 19 kW (11 to 25 horsepower). As carbon footprint is commensurate to fuel consumption, the new PowerLINE units offer greenhouse gas reductions of up to 34 percent relative to previous standard units.

Carrier's new emissions system option reduces emissions well beyond EPA Tier 4 requirements for the engine class and provides compliance with CARB's ultra-low diesel emission requirement, which affects units operating in or through California beyond seven years.

For more complete information about PowerLINE generator sets, turn to the experts at Carrier Transicold or visit [www.container.carrier.com](http://www.container.carrier.com).

### **About Carrier Transicold**

Carrier Transicold helps improve transport and shipping temperature control with a complete line of equipment for refrigerated and commercial transport. For more than 40 years, Carrier Transicold has been the industry leader, providing customers around the world with container refrigeration units, generator sets and global aftermarket service and parts. Its truck / trailer business offers a complete range of the industry's leading direct-drive and diesel-drive truck units as well as the most advanced trailer refrigeration systems available today. Carrier Transicold is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp., a leading provider to the aerospace and building systems industries worldwide. Visit [www.transicold.carrier.com](http://www.transicold.carrier.com) for more information.



*Carrier Transicold's PowerLINE<sup>®</sup> generator sets now offer enhanced fuel-saving performance and compliance with 2013 EPA Tier 4 emissions requirements.*