

Press Release

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May 9, 2010

FOR IMMEDIATE RELEASE



World's First Hydraulic Hybrid CNG Refuse Truck to Hit New York City Streets

New York City's Department of Sanitation to begin a 9-12 month in-field evaluation of Bosch Rexroth's Hydrostatic Regenerative Braking (HRB) system in a CNG refuse truck – to assess its ability to add torque, increase functionality, reduce emissions and deliver additional fuel economy.

(Rochester Hills, MI - www.boschrexroth-us.com, May 9, 2010) announced today that its [Hydrostatic Regenerative Braking \(HRB\)](#) parallel hydraulic hybrid system is being used for the first time in a compressed natural gas (CNG)-powered refuse truck by the New York City Department of Sanitation (DSNY). The truck will be part of the ride-and-drive at the Alternative Fuels & Vehicles National Conference + Expo 2010, being held May 9-12, at The Rio All-Suite Hotel in Las Vegas. Attendees will have the opportunity to ride in the truck and learn more about the benefits of hydraulic hybrid technology and speak to industry experts.

The project is being funded through [National Grid's](#) Technology and Innovation program.

"National Grid is proud to be a partner in the development of the first ever CNG Hydraulic Hybrid refuse truck in the world," said National Grid's Executive Vice President for US Gas Distribution Nick Stavropoulos. "This new hybrid offers the

Bosch Rexroth Corporation
Michelle DuHadway
2730 Research Drive
Rochester Hills, MI 48309
Telephone (248) 265-5217
Fax (248) 844-2698
Michelle.DuHadway@boschrexroth-us.com

Michael Coates
Mightycomm
(408) 399-9081
mcoates@mightycomm.com

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cleaner benefits of compressed natural gas while improving fuel efficiency and torque. We have long been committed to carbon reduction and energy efficiency, and the transportation sector and CNG can play a vital role in moving towards a greener economy."

The field evaluations are designed to authenticate the HRB system's ability to add needed low-end torque to the trucks' operation, replacing power lost by the use of CNG. The test will show the technical and economic benefits of the HRB system and provide real-world operating data DSNY will use to consider larger-scale deployment of the technology within the city's in-service and new vehicle fleets. In addition, the deployment demonstrates Bosch Rexroth's HRB technology is fuel-neutral, working with CNG vehicles applications, as well as with traditional diesel refuse trucks.

"The [HRB system](#) gives back some of the torque lost in the switch from diesel to CNG fuel, storing energy from the vehicles' frequent braking and deceleration," said Michelle DuHadway, manager of Parallel HRB accounts at Bosch Rexroth. "We're excited to see the system tested in a wide variety of settings, to obtain more real-world data that we expect will show the HRB system can provide more efficient operations." The trucks will be subjected to a variety of in-use testing, including braking tests, acceleration tests, route collection tests and dynamometer testing to evaluate increased capability and fuel efficiency.

"New York City Department of Sanitation is thrilled to be the first refuse fleet in the nation to field test the Bosch Rexroth HRB system on a CNG-powered vehicle," said Rocco DiRico, deputy commissioner of Support Services for DSNY. "This is

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an important step toward achieving the commercialization of heavy-duty hybrid hydraulic vehicles.”

The HRB system is installed in a [Crane Carrier Company](#) LET2 73,500 lbs. GVWR truck, and will be integrated with a [Heil Environmental](#) 5000 25 Cu. Yd. rear-loader refuse body.

The Rexroth HRB system uses a hydraulic pump/motor connected to the driveline, to capture kinetic energy during vehicle braking. When braking, the pump/motor acts as a pump, absorbing energy from the driveline and imparting a retarding force on the drive wheels, pumping hydraulic fluid into a nitrogen-pressurized accumulator. During acceleration, the pressurized gas pushes fluid out of the accumulator and the pump/motor then acts as a hydraulic motor, adding power to the engine while reducing the fuel required to launch the vehicle. This process is commonly referred to as regenerative braking.

Hybrid drivetrain technologies will become a “necessity” in the near future in the heavy truck market, said Glenn Pochocki, vice president of sales and marketing, refuse/chassis products, for Crane Carrier Company. “Bosch Rexroth’s hybrid HRB technology and system can be integrated into most medium and heavy duty truck vocations without impacting the vehicle’s configuration,” he said. “The HRB system on a CNG vehicle helps add critical power for operations while improving the vehicle’s fuel economy and extending brake system life.”

Hydraulic hybrids, due to their high power density, are well equipped to cope with the high power requirements of regenerative braking. Maintaining efficiency during energy conversion, hydraulic hybrid systems have the potential to capture a large portion of the braking energy and make use of it more effectively. Reduced brake

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maintenance costs and the associated vehicle downtime offer another significant system savings. Since it is possible to slow the vehicle without engaging the foundation brakes as often, the life of the vehicle's brakes is extended and the amount of brake dust released into the environment is reduced.

Hydraulic technology has been widely used in rugged, heavy-duty fleet applications such as refuse trucks and construction equipment. While its deployment as a hybrid application is new, the integration of HRB systems into existing commercial fleets is efficient, as hydraulic systems use conventional materials and processes and have established maintenance, repair and recycling protocols.

Bosch Rexroth AG is one of the world's leading specialists in the field of drive and control technologies. Under the brand name of Rexroth the company supplies more than 500,000 customers with tailored solutions for driving, controlling and moving machinery used in industrial and factory automation as well as in mobile applications. Bosch Rexroth is a partner for industrial applications, factory automation, mobile applications and renewable energy development. As The Drive & Control Company, Bosch Rexroth develops, produces and sells components and systems in more than 80 countries. In 2008 Bosch Rexroth AG, part of the Bosch Group, achieved sales of around \$8.3 billion (5.9 billion Euro) with 35,300 employees. Visit boschrexroth-us.com for more information.

The New York City Department of Sanitation (DSNY) promotes a healthy environment through the efficient management of solid waste and the development of environmentally sound long-range planning for handling refuse, including recyclables. The Department operates 59 district garages and manages a fleet of 2,022 rear-loading collection trucks and 450 mechanical brooms. Each day approximately 11,000 tons of household and institutional waste are collected. The Department clears litter, snow and ice from approximately 6,000 City street miles, and removes debris from vacant lots as well as abandoned vehicles from City streets. Press inquiries to Vito Turso, vturso@dsnyc.gov, (646) 885-5020

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The Crane Carrier Company is owned by Illinois Tool Works, (ITW) based in Glenview, IL., with \$17.1 billion in 2008 revenues, ITW is a multinational manufacturer of a diversified range of value-adding and short lead-time industrial products and equipment. The Company consists of 895 business units in 54 countries and employs some 59,000 people. Press inquiries to Glenn Pochocki, gapochocki@cranecarrier.com, (918) 832-7319

National Grid is an international energy delivery company. In the U.S., National Grid delivers electricity to approximately 3.3 million customers in Massachusetts, New Hampshire, New York and Rhode Island, and manages the electricity network on Long Island under an agreement with the Long Island Power Authority (LIPA). It is the largest distributor of natural gas in the northeastern U.S., serving approximately 3.4 million customers in Massachusetts, New Hampshire, New York and Rhode Island. National Grid also owns over 4,000 megawatts of contracted electricity generation that provides power to over one million LIPA customers. Press inquiries to Elizabeth Margulies, Elizabeth.margulies@us.ngrid.com, (516) 545-2495

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Hi-res photos also available.

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