



PRESS RELEASE

Westport Unveils Next Generation High Pressure Direct Injection (Westport™ HPDI 2.0) System

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New Release Provides Unparalleled Performance, Fuel Economy and Value

VANCOUVER, BC – Westport Innovations Inc. (TSX:WPT / NASDAQ:WPRT), engineering the world's most advanced natural gas engines and vehicles, today unveiled its next generation of high pressure direct injection technology platform dubbed "Westport™ HPDI 2.0."

This new generation of the class-leading natural gas technology will provide global vehicle and engine original equipment manufacturers (OEMs) with a vertically integrated natural gas solution with breakthrough price, performance, and fuel economy. Developed to the most rigorous OEM quality standards, Westport™ HPDI 2.0 system components will be manufactured in state-of-the-art, high-quality facilities, offer ready integration into OEM operations globally, and provide an attractive way to reach scalable volume deliveries as natural gas markets mature and grow.

"Where performance, emissions and efficiency matter, HPDI 2.0 offers benefits that will be irresistible to fleet customers shifting to natural gas in their operations," said David Demers, CEO of Westport. "As the potential for natural gas is now apparent in all global vehicle and off-road markets, HPDI 2.0 will allow OEMs to introduce high performance, fully integrated products that match state of the art diesel performance, but can be produced without expensive and challenging investments in facilities, product development, and testing."

Westport is now working with seven OEM applications with engine sizes ranging from trucks to trains at various stages of development with the goal of vertically integrated Westport™ HPDI 2.0 OEM product lines.

Background on Westport™ HPDI

Westport™ HPDI 2.0 is the only natural gas technology capable of delivering performance and fuel economy equivalent to that of current high performance diesel-fueled engines, but with diesel substitution of over 90%. This combination of high performance and high efficiency is critical for heavy-duty engines in demanding commercial applications.

Diesel engines have dominated commercial vehicle and heavy-duty off-road applications for decades, despite higher initial costs for diesel engines compared to gasoline engines, and the recent volatility and higher prices for diesel fuel. Energy efficiency, engine durability, high torque, low maintenance, and industry familiarity with the diesel engine mean that overall life-cycle cost of operation have kept the engine a mainstay in commercial vehicles.

However, Westport™ HPDI will allow diesel customers to switch to natural gas, which is much cheaper than diesel fuel in most parts of the world, without sacrificing performance or energy efficiency. Engines incorporating Westport™ HPDI 2.0 technology are engineered to be as similar to diesel-fueled versions as possible, minimizing capital investment and operational changes in the field.

Higher energy efficiency simply means less fuel burned, resulting in more money that the operator can save, and lower greenhouse gas emissions. The compression ratio of an engine with Westport™ HPDI is the same as the diesel engine on which it is based, which results in fewer changes to engine components and preservation of the fuel economy benefits associated with high compression.

Westport's proprietary, patented HPDI technology utilizes the same Diesel thermodynamic cycle used by diesel fuel. This Diesel cycle is inherently more efficient than the Otto thermodynamic cycle used by spark ignited (SI) gasoline and natural gas engines. Aside from the increase in efficiency, typical Diesel cycle engines—including engines with Westport™ HPDI—do not use a throttle to control the air-fuel ratio, as the gas directly injected into the combustion chamber at the end of the compression stroke can burn over a wide range of air fuel ratios. Current SI engines have to use a throttle to meter the air to control the air/fuel mixture resulting in more constricted air flow into the engine and reduced fuel efficiency.

Most current natural gas engines used in mobile applications require up to 30% reduction in compression ratio and 15% to 20% reduction in peak torque output to avoid the risk of engine-damaging knock, which reduces fuel economy and performance. Late-cycle direct injection of fuel—a principle fundamental to the Westport™ HPDI architecture—is the only combustion approach that eliminates the danger of engine knocking. In SI gasoline and natural gas engines, air and fuel are pre-mixed before entering the combustion chamber. Knock can occur when combustion of the [air/fuel mixture](#) in the cylinder starts off correctly in response to ignition by the [spark plug](#), but one or more pockets of air/fuel mixture explode outside the envelope of the normal combustion front. SI engines that run on natural gas need a lower compression ratio to reduce the chance of engine knock. The compression ratio must be low enough to ensure combustion events do not begin until after compression is complete and the spark plug is fired. Inevitably, lower energy

efficiency is the result, which means more fuel burned to achieve the same level of work.

Westport™ HPDI uses natural gas as the primary fuel along with a small amount of diesel as an ignition source. The two fuels are not pre-mixed with the intake air before they enter the combustion chamber so there is no risk of engine knock and therefore no need to lower the compression ratio and peak torque output. As compared to diesel fuel, directly injected natural gas burns with a lower adiabatic flame temperature and has a low propensity to the formation of carbon particles and therefore offers inherent nitrous oxide (NOx) and particulate matter (PM) emissions benefits that provide more product engineering flexibility to allow powertrain designers to increase potential performance and customer value.

[Animation of how Westport™ HPDI combustion works can be found on Westport's website.](#)

Equally important to vehicle performance and operability, fuel storage and delivery is often ignored or treated as an afterthought when converting engines to use natural gas. Westport vehicles and technology have logged millions of miles over the past few years, and it is clear that high performance natural gas engines will need sophisticated fuel delivery and storage systems to fully exploit the potential of natural gas as a primary fuel.

HPDI 2.0 continues the evolution of Westport natural gas storage and delivery systems with a new generation of proprietary fuel tank, fuel pump, and system controls that can match the vehicle range, performance, and driveability of diesel whether the vehicle is a long-haul truck, a locomotive, or a ship.

Westport™ HPDI 2.0 is a complete architecture, offering OEMs flexibility to differentiate their natural gas product lines easily while also maintaining maximum commonality with their conventional diesel fueled products. We think it's the future of natural gas. With the development of Westport™ HPDI 2.0 we have captured many significant new proprietary technologies that will extend the reach of our HPDI patent portfolio for the next 20 years. HPDI 2.0 is protected by global patents. Westport has filed 42 patent applications for new inventions related to Westport™ HPDI since 2007. Westport remains committed to continuous innovation and improvement.

Westport™ HPDI 2.0 Features

Exclusive Westport™ HPDI 2.0 systems features include:

- **Optimization of combustion and higher efficiency:** Provides improved fuel economy, which results in faster payback compared with Westport's first generation HPDI product and compared to spark-ignited natural gas engines. Westport™ HPDI engine efficiency under highway operations is approximately 44% compared with spark ignited natural gas engines at approximately 37%. This means approximately 15% to 20% fuel economy improvement compared to spark ignited natural gas engines under typical operating conditions.
- **Proprietary HPDI 2.0 dual common rail fuel injector:** Designed for adaptability and multiple OEM engines ranging from 10-liter to 100-liter displacement (typically, over 50 kW per cylinder output) featuring higher performance and controllability, greater reliability, and longer life, and much lower cost. Unique concentric dual-needle design with electro-hydraulic actuation and control.
- **Proprietary on-engine gas fuel conditioning module:** Designed for more precise pressure control for even lower engine emissions and better fuel economy. New sealing designed for longer durability. Smaller size for ease of packaging on the engine.
- **Redesigned electronic control systems:** Allows full integration with existing engine and vehicle controls.
- **Improved components:** Completely reorganized supply chain allows for reduced production costs and increased scalability for manufacturing alongside existing diesel-based components for multiple OEMs. For example, the new gas control module (GCM) has been reduced in cost by approximately 60%.
- **System performance:** High transient performance with integrated fuel storage and delivery systems that ensure proper fuel flow under all driving conditions, improving performance, driveability, and safety at lower cost.
- **Got brakes?** By using the same high compression ratio as diesel engines, Westport™ HPDI engines deliver engine braking power equivalent to that of diesel engines which is critical in many trucking applications. The reduced compression ratio used in SI engines results in an approximately equivalent reduction in engine braking performance.
- **Compatibility:** Westport™ HPDI 2.0 is designed for complete compatibility with state of the art commercial vehicles today. For example, by injecting fuel precisely into each cylinder, HPDI provides the same responsiveness and fast torque achievement as diesel engines, resulting in benefits such as an easier ability to be matched to automated manual transmissions (AMT).
- **Improved emissions profile:** Westport™ HPDI 2.0 is designed to meet the latest in stringent emission regulations including Euro VI and EPA 2014 and is the only natural gas technology that can control methane emissions in-cylinder avoiding costly methane aftertreatment. As an added benefit, the significant increase in efficiency of HPDI over traditional SI engines affords Westport™ HPDI 2.0 dramatically lower greenhouse gas (GHG) emissions than conventional natural gas or diesel engines.
- **Compliance and certification:** In addition to the emissions certification for HPDI 2.0 engines, OEM's vehicles built with Westport™ HPDI 2.0 technology will comply with applicable safety standards in North America—such as relevant Federal Motor Vehicle Safety Standards (FMVSS), National Fire Protection Association (NFPA), and Society of Automotive Engineers (SAE) standards—and their equivalents in Europe such as Regulation No. 110 of the Economic Commission for Europe of the United Nations (UN/ECE).
- **Heat rejection:** While the higher compression of Westport™ HPDI 2.0 engines provide the heat necessary to auto-ignite their fuel, combustion in the Diesel thermodynamic cycle is more efficient, with more power and less heat produced than with the Otto thermodynamic cycle prevalent in SI engines. Westport™ HPDI engines operate at similar engine temperatures as diesel

engines, reducing cooling challenges and reducing stress related reliability and durability challenges for other SI-based engine systems including turbochargers and exhaust treatment systems.

- **Proprietary liquefied natural gas (LNG) tanks:** Westport™ HPDI 2.0 LNG tank solutions range from 70 to 150 US gallons and up to 20,000 gallons for off road applications. The new tank configurations feature lower costs, high-quality testing and validation, and new designs for structures enabling several vehicle-mounting configurations including behind-the-cab gantry and frame-rail packages to simplify vehicle design and production. Westport has invested over \$1 million in HPDI 2.0 LNG tank testing and validation under extreme conditions to simulate the toughest environments for natural gas products.
- **New proprietary intelligent LNG fuel pump:** Our redesigned cryogenic fuel pump is hydraulically driven and uses a single-stage, slow reciprocating architecture. This provides significantly lower cost, higher performance, and longer life and allows the use of fuel stations that deliver cold LNG, which improves vehicle range, and reduces station cost. The HPDI 2.0 fuel system is rated for delivering warm high pressure gas to truck engines with ratings up to 600 hp and to large off-highway engines up to 4,500 hp. Unlike traditional LNG systems, the full maximum flow rate is sustainable from the moment the truck is refilled to the moment the tank is empty. Because the pump is integrated into the tank module, there is no pump cool down time.
- **CNG capability:** Every natural gas engine burns compressed natural gas (CNG). Ultimately, the customer will decide which form of natural gas they wish to carry—either high pressure CNG or cold cryogenic LNG—based on a number of variables including but not limited to: weight of the load; weight of the fuel storage system; range required by the vehicle; and availability of CNG and LNG. The HPDI 2.0 system is architected to be compatible with LNG and CNG allowing the market to decide which storage method it prefers. Given the energy density of LNG compared with CNG, and Westport™ HPDI's ability to haul heavier loads over longer distances as compared with traditional natural gas engines, in most cases we expect HPDI applications will select LNG fuel storage.

Overall, Westport™ HPDI 2.0 will provide a compelling combination of diesel-like power, torque, fuel efficiency, and engine braking performance in a natural gas engine—making it ideal for almost all commercial freight applications.

Migration Path for HPDI 1.0

Westport first generation HPDI systems have been delivered on more than 1,200 Peterbilt and Kenworth trucks since its first wide-scale introduction in 2010. As noted in previous news releases and customer communication, Westport is committed to the continuation of its class-leading support for all our existing customers with the first generation of HPDI.

In partnership with Peterbilt and Kenworth dealers, Westport will be able to offer compatible next generation system features to our existing customers, as some HPDI 2.0 components are applicable to first generation HPDI. The benefits are expected to be reduced costs, improved components, and increased durability and performance. For customers, further information is available from your Westport representative.

Pricing

Westport HPDI 2.0 has been designed for simplicity, performance and a reduction in overall system costs. For the first time, Westport expects OEM Westport™ HPDI vehicles to be competitively priced with SI-based systems. The increased performance in torque and related power in Westport™ HPDI, combined with the best fuel economy and related emissions profile and the fully integrated engineered Westport™ HPDI 2.0 products will give OEMs and their customers the ultimate natural gas engine and vehicle performance and reliability, and strong economic value particularly in high fuel use applications.

Westport™ HPDI 2.0 is in development now with a number of global OEMs and Westport anticipates first availability of customer products in late 2014 and 2015.

Market Opportunity for HPDI Natural Gas Vehicles

According to the International Energy Agency, world oil demand for commercial road freight and other heavy-duty transport modes, including rail, totalled approximately 273 billion gallons in 2012. The U.S. Energy Information Association predicts that the price of LNG will remain below the price of petroleum diesel for at least the next two decades and be approximately 33% below in 2035, with a gallon of diesel expected to be selling for \$4.55 compared to a diesel gallon equivalent of LNG at \$3.05. At these rates, if the world changes the way it moves goods by shifting to natural gas, these transport modes could save over \$400 billion per year. The market for natural gas in transportation in China is burgeoning. According to the International Energy Agency, natural gas demand in China's commercial road transport sector will reach around three times higher than today's levels by 2035.

About Westport Fuel Systems

At Westport Fuel Systems, we are driving innovation to power a cleaner tomorrow. We are a leading supplier of advanced fuel delivery components and systems for clean, low-carbon fuels such as natural gas, renewable natural gas, propane, and hydrogen to the global automotive industry. Our technology delivers the performance and fuel efficiency required by transportation applications and the environmental benefits that address climate change and urban air quality challenges. Headquartered in Vancouver, Canada, with operations in Europe, Asia, North America and South America, we serve our customers in more than 70 countries with leading global transportation brands. At Westport Fuel Systems, we think ahead. For more information, visit www.wfsinc.com.

Cautionary Note Regarding Forward Looking Statements

This document contains forward-looking statements. Forward-looking information is typically identified by words such as “anticipate”, “estimate”, “expect”, “forecast”, “may”, “will”, “could”, “plan”, “intend”, “should”, “believe”, “outlook”, “project”, “potential”, “target” and similar words suggesting future events or future performance. In particular, this press release contains forward-looking information which includes statements regarding the launch date, availability and pricing for the Westport HPDI 2.0 systems, place of Westport’s HPDI technology in the future natural gas technology ecosystem, demand for our products, the future success of our business and technology strategies, intentions of partners and potential customers, the performance and competitiveness of our products and expansion of product coverage and future market opportunities. These statements are neither promises nor guarantees, but involve known and unknown risks and uncertainties and are based on assumptions that may cause our actual results, levels of activity, performance or achievements to be materially different from any future results, levels of activities, performance or achievements expressed in or implied by these forward looking statements. These risks and assumptions include risks and assumptions related to our revenue growth, operating results, industry and products, the general economy, conditions of and access to the capital and debt markets, governmental policies and regulation, technology innovations, fluctuations in foreign exchange rates, the availability and price of natural gas, global government stimulus packages, the acceptance of and shift to natural gas vehicles in fleet markets, the development of competing technologies as well as other risk factors and assumptions that may affect our actual results, performance or achievements or financial position discussed in our most recent Annual Information Form and other filings with securities regulators. Readers should not place undue reliance on any such forward-looking statements, which speak only as of the date they were made. We disclaim any obligation to publicly update or revise such statements to reflect any change in our expectations or in events, conditions or circumstances on which any such statements may be based, or that may affect the likelihood that actual results will differ from those set forth in the forward- looking statements except as required by National Instrument 51-102. The contents of any website, RSS feed or Twitter account referenced in this press release are not incorporated by reference herein.

More Information

Westport Fuel Systems (Investor Inquiries)

Christine Marks

Investor Relations

T 604-718-2046

invest@wfsinc.com

<https://www.wfsinc.com>

Westport Fuel Systems (Industrial & Automotive)

Angelique Berden

Manager, Marketing

automotive.marketing@wfsinc.com

www.wfsinc.com

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