Delphi Technologies

News Release

Delphi Technologies cuts gasoline particulate emissions by up to 50 percent and reduces fuel consumption with industry-first 500+ bar GDi system

- *Presented at Vienna Motor Symposium (May 16-17)*
- *Advancement of current proven Delphi Technologies system*
- *Engine modifications are not required for the majority of applications*
- *Second paper presents latest innovations in the use of high pressure natural gas to reduce CO_2 from heavy duty vehicles*

VIENNA, Austria, May 15, 2019 – In a paper presented at the 2019 Vienna Motor Symposium (May 16-17), Delphi Technologies will reveal a new 500+ bar GDi system that can reduce particulate emissions by up to 50 percent compared to state-of-the-art 350 bar system without expensive engine design modifications. Reducing the number of exhaust gas particulates, including those smaller than 23 nm, will help manufacturers meet increasingly stringent future global emissions standards.

Reducing engine-out emissions cuts tailpipe emissions in the crucial period before catalyst light-off and reduces the need for costly aftertreatment systems. This reduces emissions in regulated testing including RDE (Real Driving Emissions). At the end of 2016, Delphi Technologies entered production with its industry first 350 bar GDi system, which reduces exhaust particulates by up to 70 percent compared with industry-standard 200 bar systems.

“The industry has long recognized that increasing injection pressure to 500+ bar could substantially cut engine-out particulates while improving CO_2 emissions and fuel economy,” explains Walter Piock, chief engineer, Gasoline Systems, Delphi Technologies.

The challenge has been to achieve such pressures without increasing the drive loads from the pump. As most engines power the GDI pump through the camshaft drive, a conventional approach would usually require a costly redesign and strengthening of the camshaft mechanism.

“By designing an innovative new internal sealing system for our GFP3 500+ bar pump, in some applications, we have designed a downsized plunger diameter which prevents increasing the loads in the drive mechanism,” reveals Piock.

With the new Delphi Technologies system, engine designers can benefit from 500+ bar injection pressures without having to make costly changes to the majority of existing camshaft drive systems.

With combined demands for improved urban air quality and lower greenhouse gas emissions, the fuel injection system is an important building block for meeting future legislative targets. Delphi Technologies’ 500+ bar system can help vehicle manufacturers meet both challenges.

According to Piock, “Our 350 bar GDi system reduces exhaust particulates by up to 70 percent compared with industry-standard 200 bar systems and we are going one step further with our new 500+ bar GDi system which further reduces these emissions by up to 50 percent compared to the 350 bar system”.

To complete the new 500+ bar system, Delphi Technologies has developed all system components including Multec 16 injectors, pumps, forged rail as well as the appropriate engine control system and software. These components, which further improve durability and reliability, also require no or only minor physical changes to existing engines because they match existing packaging constraints and interfaces. The 500+ bar system could be used in production from 2022 onwards.

High Pressure Natural Gas Injection for Heavy Duty Vehicles

A second paper at the symposium, co-authored by Westport Fuel Systems and Delphi Technologies, will describe the innovative Westport High Pressure Direct Injection HPDI 2.0™ system. This advanced system reduces tank-to-wheel CO_2 emissions in heavy-duty commercial vehicles through the use of high pressure natural gas.

The HPDI 2.0 system in the field today delivers a CO_2 reduction of up to 20 percent. In the case of renewable natural gas, the system can achieve a reduction of almost 100 percent.

Countries around the world are implementing strategies to reduce CO_2 emissions. In April 2019, new regulations were brought into force in the EU mandating heavy truck Original Equipment Manufacturers (OEMs) to provide a 15 percent reduction in average CO_2 emissions per truck by 2025 and a 30 percent reduction by 2030, both from a 2019 baseline.

The Westport HPDI 2.0™ system can be installed on current technology heavy-duty diesel engines and trucks with minimal change to these proven products. By providing an up to 20 percent CO_2 reduction, the Westport HPDI 2.0™ system provides OEMs with a path to make their current trucks compliant with the EU regulations through 2029.

Delphi Technologies' proprietary control valve strategy, enables the delivery of a small pilot injection of diesel followed by a larger main injection of natural gas through Westport's novel duel concentric needle nozzle. The individual diesel pilot sprays auto-ignite, providing multiple ignition sources that are spatially distributed, ensuring consistent ignition of the natural gas jets. The natural gas combustion then proceeds in a predominantly non-premixed fashion. As a result, engine knock is eliminated and the base diesel engine's compression ratio can be retained. Because the natural gas is not premixed, load control is achieved by simply reducing the fuel flow, as in a conventional diesel; part-load throttling is not required.

"Combustion of natural gas in a diesel cycle delivers equivalent power density and combustion efficiency to that of conventional diesel." said James Kewley, product engineering director, Diesel Fuel Injection Systems and ICE components, Delphi Technologies. "This enables the exploitation of the lower CO_2 potential of natural gas without the penalty associated with moving to the Otto cycle. It will help OEMs cope with the increasingly demanding regulations, particularly as pressure grows to further reduce CO_2 emissions from heavy duty trucks."

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At the symposium

Delegates at the symposium will also be able to see Delphi Technologies' latest vehicle propulsion systems for traditional, hybrid and electric light and commercial vehicles.

These include the latest technologies to support OEMs across the globe on their path to electrification, with automotive grade solutions, able to withstand a harsh and volatile environment, such as extreme temperatures, moisture, salt, vibration and all kinds of fluid, over the life of the vehicle.

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About Delphi Technologies

Delphi Technologies is a technology company focused on providing electric vehicle and internal combustion engine propulsion solutions, in addition to solving emissions and fuel economy challenges for the world's leading automotive OEMs. Delphi Technologies also provides leading aftermarket service solutions for the replacement market. With headquarters in London, U.K., Delphi Technologies operates technical centers, manufacturing sites and customer support services in 24 countries. Visit www.delphi.com.

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