



Hydrogen mobility

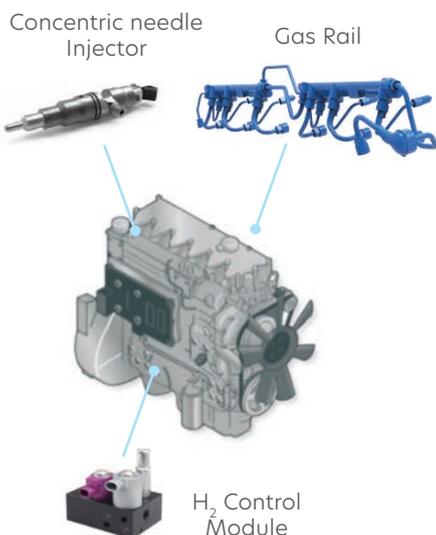
Fully Integrated H₂ HPDI™ Fuel System Truck Solution

Westport's H₂ HPDI fuel system is developed for heavy duty hydrogen engines. Fuel injection relies on late cycle direct injection of hydrogen at high pressure. A small quantity of pilot fuel injection at a similar pressure precedes the injection of hydrogen and supports ignition source.

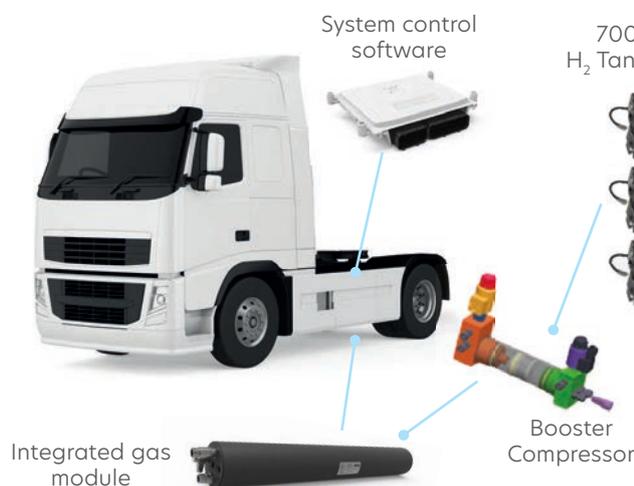
The hydrogen burns with a traditional diffusion flame. The injection of both fuels is accomplished via Westport Fuel Systems' proprietary dual concentric needle HPDI injector design.

By utilizing Diesel Cycle thermodynamics, the HPDI fuel system operating on hydrogen exceeds the already high thermal efficiency and power density of the base diesel engine, and in a typical heavy duty truck drive cycle will likely exceed the efficiency and performance that can be delivered by fuel cells.

ON ENGINE



ON CHASSIS



ON H₂ TANK





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Westport Fuel Systems has examined the combustion properties of hydrogen as an alternative, zero-carbon fuel for internal combustion engines for heavy duty applications.

Combustion modelling has demonstrated that H₂ combustion in an H₂ HPDI fuel system equipped engine, offers the highest power density and efficiency and is the most robust system for using hydrogen in an internal combustion engine for heavy duty applications. In its current configuration, an H₂ HPDI fuel system equipped engine provides near-zero CO₂ emissions, with further CO₂ reduction opportunities identified for future studies and development.

H₂ HPDI will deliver near-zero CO₂ emissions combined with excellent performance, better-than-diesel thermal efficiency, low total cost of ownership, and a relatively short time to market, thus providing an extremely compelling de-carbonization option for a broad range of mobile applications.

H ₂ HPDI - Technical Specs	
Engine displacement	Suitable for compression ignition engine applications in a broad range of mobile applications
Fuel type	Hydrogen, with renewable pilot
Peak power/torque	Up to 30% higher than diesel demonstrated
Fuel tank size / Range	80 kg H ₂ storage will give approx. 800 km range on a long haulage truck
Efficiency	Up to 5% improvement over the base Diesel engine
CO ₂ Emissions	94% on the WHTC cycle
Aftertreatment	Same as Diesel

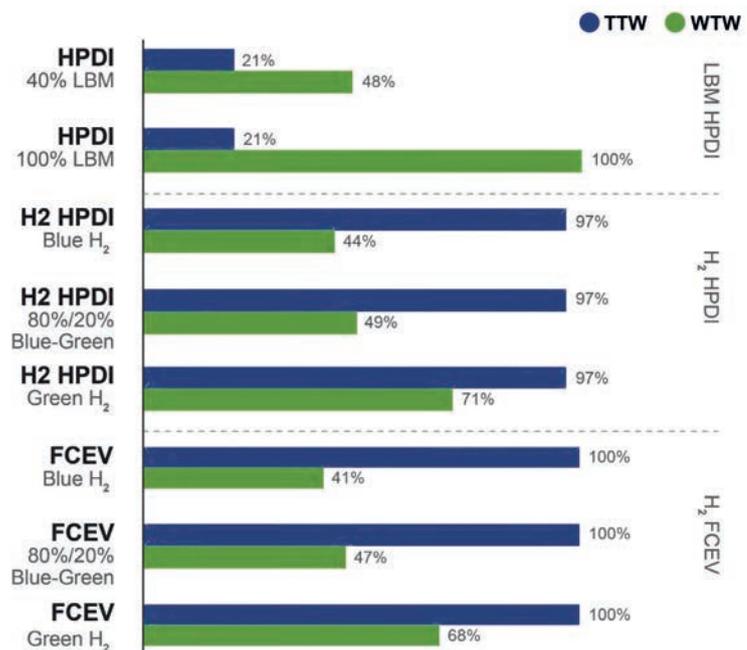
CO₂ EMISSIONS



H₂ HPDI™ fuel system technology, delivers industry leading CO₂ reductions for long road freight.

● TTW - Tank To Wheel

● WTW - Well To Wheel, including fuel source and manufacturing emissions



Source: Frontier Economics based on JEC WTW v5 for WTW emissions and a literature review for manufacturing emissions