



GUARDIAN

HYDROGEN-DIESEL SYSTEMS

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EQUIPMENT

Injecting Hydrogen Intelligently

The **Guardian Hydrogen Diesel System (HDS)** will include fully integrated Guardian HDS hydrogen storage vessels. The on-board H2 storage vessels and mounting frame will be engineered to ensure the minimal amount of weight is added to the vehicle. This will ensure minimal displacement to paid freight. Our Guardian HDS technology will be supporting fleet operators with the energy transition and ensuring competitiveness and economics for their fleets.



The Guardian Hydrogen Diesel System Tablet

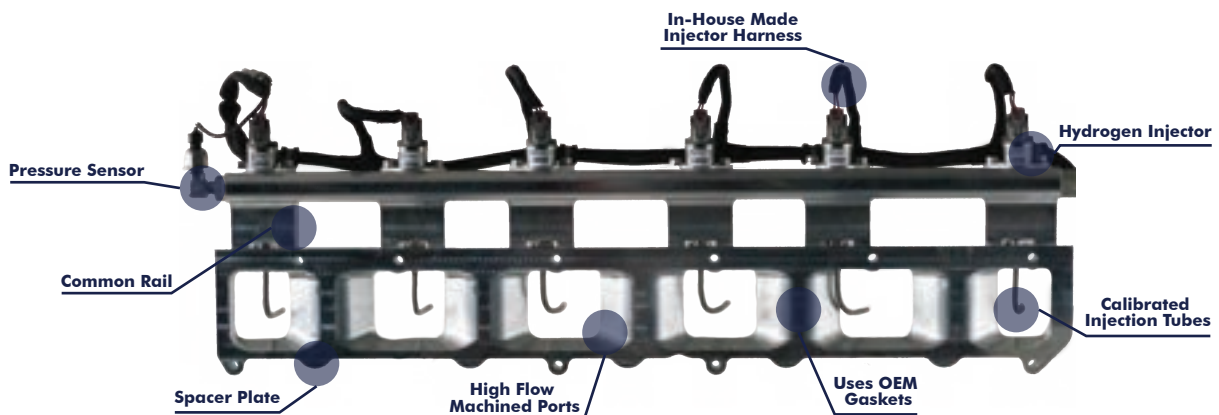
Objective

Diesel Tech Industries is developing the Guardian Hydrogen-Diesel System, our latest technology innovation as a solution to this challenging market. After talking with numerous clients and partners, our solution provides a dual fuel hydrogen blending solution with our new proprietary multi-port injection system, paired with our own full ECM integration and control system.

Why choose us?

Diesel Tech Industries is a trusted and well established company with over 20 years in the transport industry Technology field. Our in-house engineering and real world expertise is backed up by the best customer service. Our mission is rooted in driving innovative technology to the transportation industry, with focus on diesel engine applications.

All of the Guardian products are based on the same principles. Gathering engine data, interpreting it, and providing an action. In this case adding hydrogen as a second fuel source into the combustion engine. This same base technology is being used on the Guardian Hydrogen Diesel System, making us once again, a leader in the transportation technology industry.



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EQUIPMENT

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Injecting Hydrogen Intelligently

In-house Engineering

The Guardian Hydrogen Diesel System is being developed and engineered in-house by our technical experts. We are working alongside people with practical industry expertise.

Secure Data

Your device is backed up through a secure cloud based system and also physically stored on the device. Data is accessible 24/7 on multiple platforms and uploaded automatically.

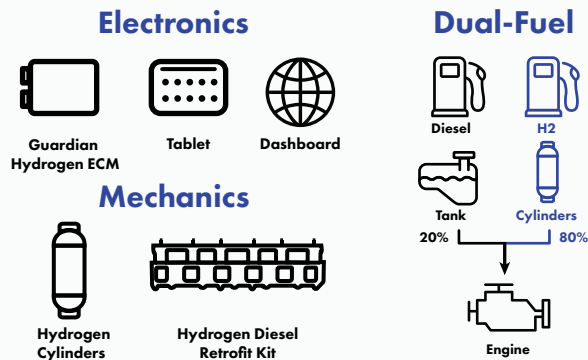
Sustainable

Low Carbon Intensity Hydrogen - this is a key part of the economics so we are ensuring that Hydrogen is being blended at optimal ratios for performance and emissions.



Identified Problem

- Regulatory requirements to reduce greenhouse emissions by 2030 and down to net-zero by 2050.
- Existing fleet economics, or sunk capital, before looking at replacement of their engines or tractors.
- DTI will help fleets with the energy transition and ensure competitiveness for themselves and their clients.



Competitive Advantages

1. Utilizes hydrogen at optimal ratios with ECM integration.
2. Economic retrofit for existing engines.
3. Lower Emissions of GHG, SO_x, NO_x, and Particulates.
4. Cleaner engines and Lower operating costs.
5. Reducing diesel fuel consumed by diesel combustion engines.
6. Designed for ease of installation.

Cloud Dashboard

An online database where report can be viewed for several purposes such as:

- Greenhouse Gas Emission Reports
- Fleet Management
- Budgeting
- Regulatory Bodies

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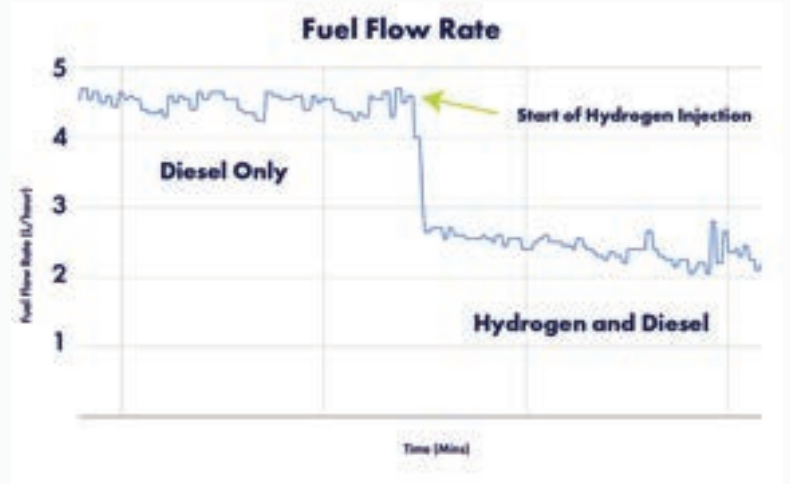
Efficiency of Engine

The data beside is based on a Volvo D13 in a Long Haul Class 8 application, traveling 300,000 km per year.

There are two different numbers at play when DTI talks about the efficiency of the engine.

Mass Replacement - This is referring to the actual amount of diesel that is being replaced by hydrogen. If the target mass replacement is 20% per 100L of diesel, then 20L of diesel would be replaced with 6.2kg of hydrogen

Efficiency of Engine - The addition of hydrogen in a diesel engine allows for a more complete combustion of diesel and reduces the build up of carbon in the engine. Replacing diesel with hydrogen will allow the engine to travel the same distance while consuming less diesel.



Volvo D13 operating at 1400 RPM at 11% engine load. The information from the diagrams above is received directly from the Volvo factory ECM.

Fleets Operations and Maintenance Cost

The beside data is based on a Volvo D13 Tier 4 Engine in a Long Haul Class 8 application, traveling 300,000 km per year. In 2012, Canada started using T4 engines. These engines have emission systems installed to decrease the Greenhouse Gas (GHG) output of the engine. Hydrogen gas that is added to a combustion engine will essentially steam clean the engine and after treatment systems. We expect this will reduce the carbon buildup and in turn increase the life expectancy of the engine. Typically an engine will need an overhaul after approximately 15,000 hours, this would increase replacement or rebuild engine hours to 25,000, which cost around \$28,000.

Description	Cost	Interval
Exhaust After-treatment Replacement	\$17,500	Every 3 years
Exhaust After-treatment Cleaning	\$1,400	6 Months to 1 year
Revenue Downtime (on average a week)	\$5,600	6 Months to 1 year
Other Maintenance Emission System Cost	\$2,100	Cost per year
DEF Fluid (would still use a very small amount)	\$9,800	Cost per year
Total Estimate Cost savings using Guardian Hydrogen-Diesel System over 5 years		\$129,500