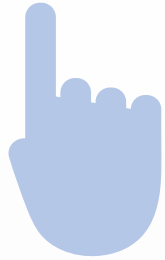


# HydraGEN™ Technical Overview

- HydraGEN™ reduces diesel GHG emissions
- HydraGEN™ improves diesel fuel economy
- [HydraGEN™ Technology Introduction Video](#)



# How HydraGEN™ Works



HydraGEN™ Technology uses electrolysis to turn distilled water into H<sub>2</sub> and O<sub>2</sub> gases.



The gases are fed into the diesel engine's air intake, creating a homogeneous air mixture prior to combustion.



The hydrogen gas acts as a combustion enhancer, creating a faster and more complete burn in the power stroke.



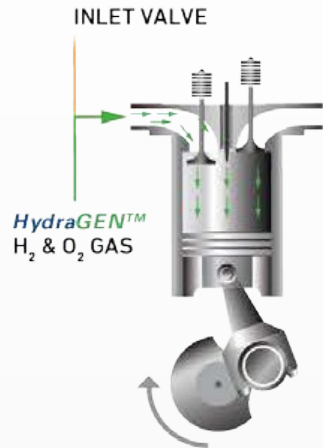
More complete burn means fuel is consumed more efficiently, resulting in less unburnt fuel exhausted as carbon emissions.



Smart ECU monitors unit and collects data for Carbon Credits.

# How HydraGEN™ Works (Detailed)

## INTAKE STROKE



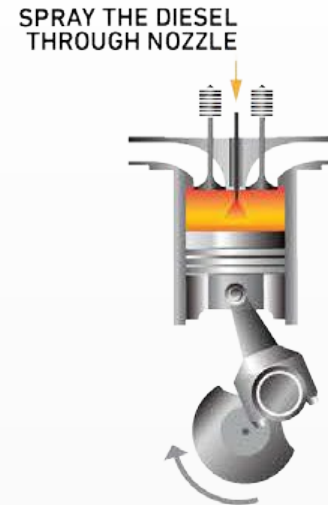
HydraGEN™ delivers the optimal ratio of H<sub>2</sub> and O<sub>2</sub> to the engine's air intake port during the intake stroke.

## COMPRESSION STROKE



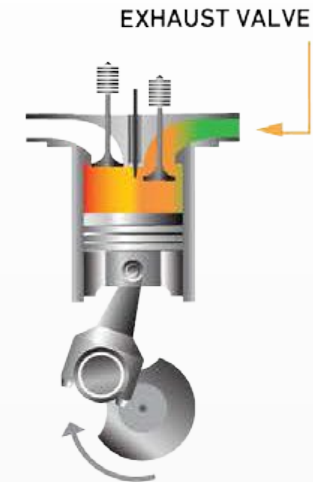
Diesel fuel is injected and mixes with the air and H<sub>2</sub> mixture. H<sub>2</sub> & O<sub>2</sub> mixture helps initiate the combustion sooner, just before the end of compression stroke.

## POWER STROKE



Combustion is sped up and lasts for a much shorter duration of the power stroke. In that duration, the fuel is consumed, a greater amount of work is generated, power stroke ends up being cooler and overall fuel efficiency is better.

## EXHAUST STROKE



Thermal efficiency is improved. Exhaust is cooler. Generated emissions are reduced – less CO<sub>2</sub>, CO, NO<sub>x</sub> and particulate matter.

# Why Hydrogen Works

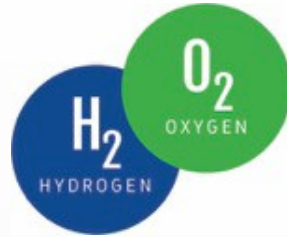
The hydrogen produced from the HydraGEN™ system does not replace or displace diesel fuel. Instead, it is used as a CATALYST to improve the thermal efficiency of the combustion of the diesel fuel by supplying a small percentage of hydrogen (H<sub>2</sub>) to the air mixture.

Hydrogen (H<sub>2</sub>) gas is an ideal catalyst for improving the thermodynamics of internal combustion engines, especially diesel-powered engines because of its unique characteristics:

-  Carbon-Free, Petroleum-Free and Non-Fossil
-  High Flame Speed Propagation
-  Higher Combustion Temperature
-  Low Temperature / Energy Ignition
-  Easy To Produce by Water Electrolysis
-  Non-Toxic & Non-Poisonous

# Why HydraGEN™ Works Better

Patent pending system for separating gases. Enables optimal mixture of H<sub>2</sub> & O<sub>2</sub>.



Patent pending high output, low energy electrolysis system.

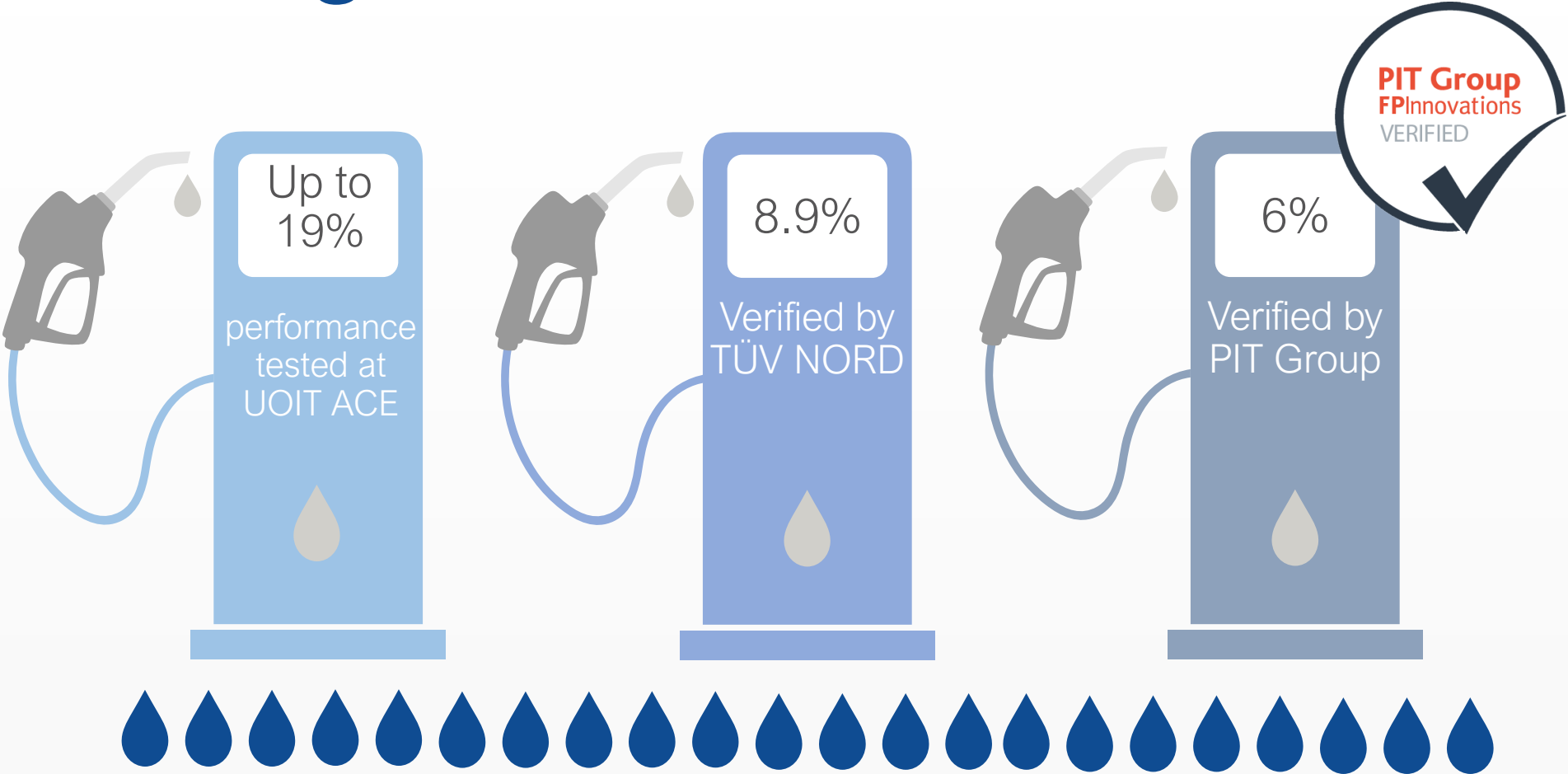
Patent pending Smart Electronic Control Unit (ECU).



Results validated through both on-road & accredited 3rd party testing.

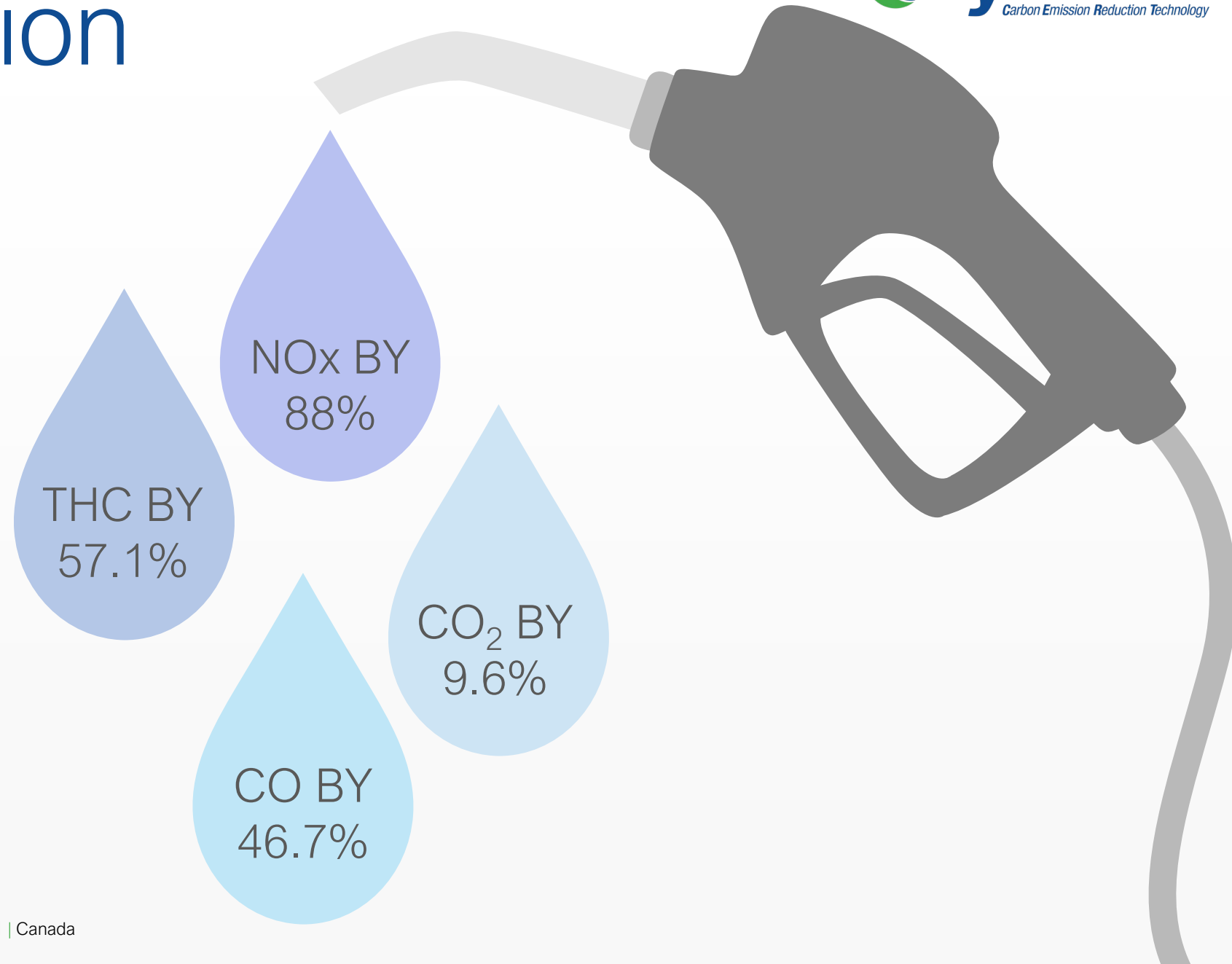


# Fuel Savings



# GHG Reduction

The following results have been acquired from accredited third party verification performed by PIT Group in Montreal, Quebec, Continental EMITEC in Germany and performance testing at the UOIT ACE in Toronto, Ontario.



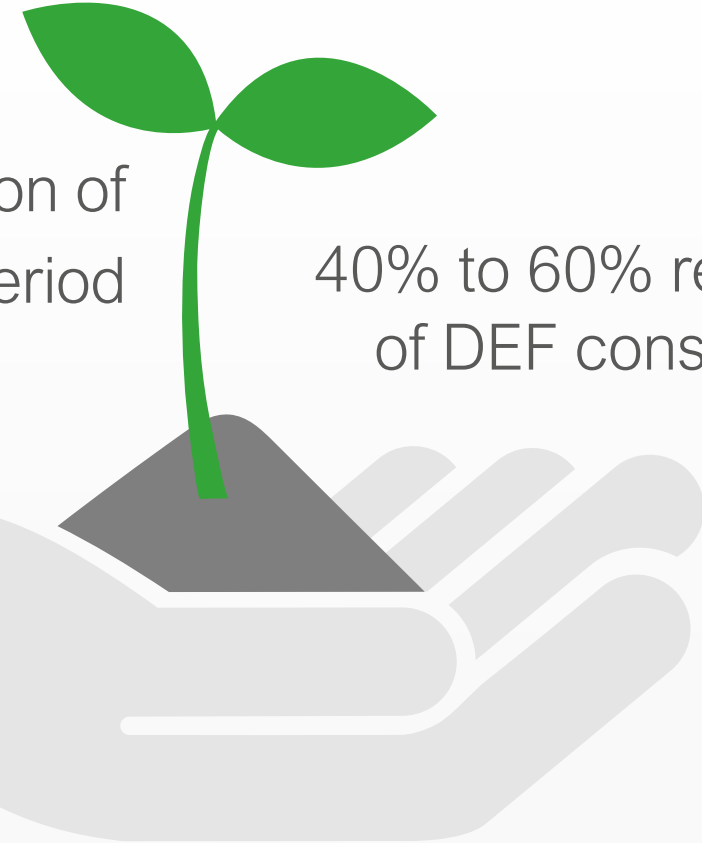
# Additional Benefits



Up to 55.3% reduction of particulate matter (black smoke)



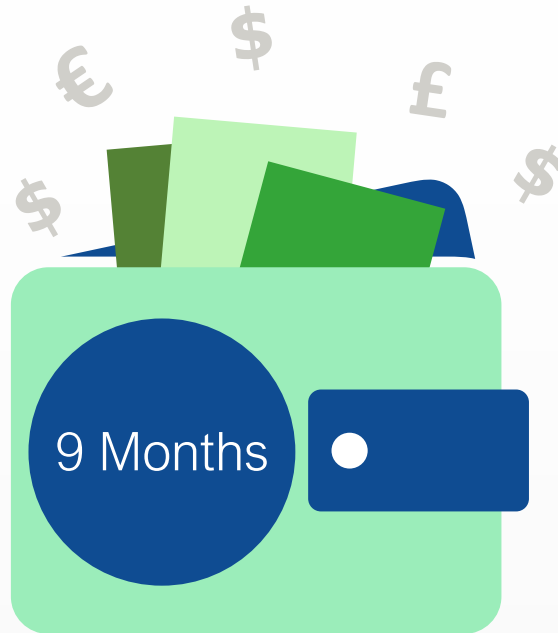
at least 33% reduction of DPF replacement period



40% to 60% reduction of DEF consumption



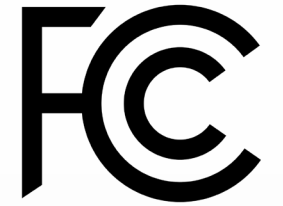
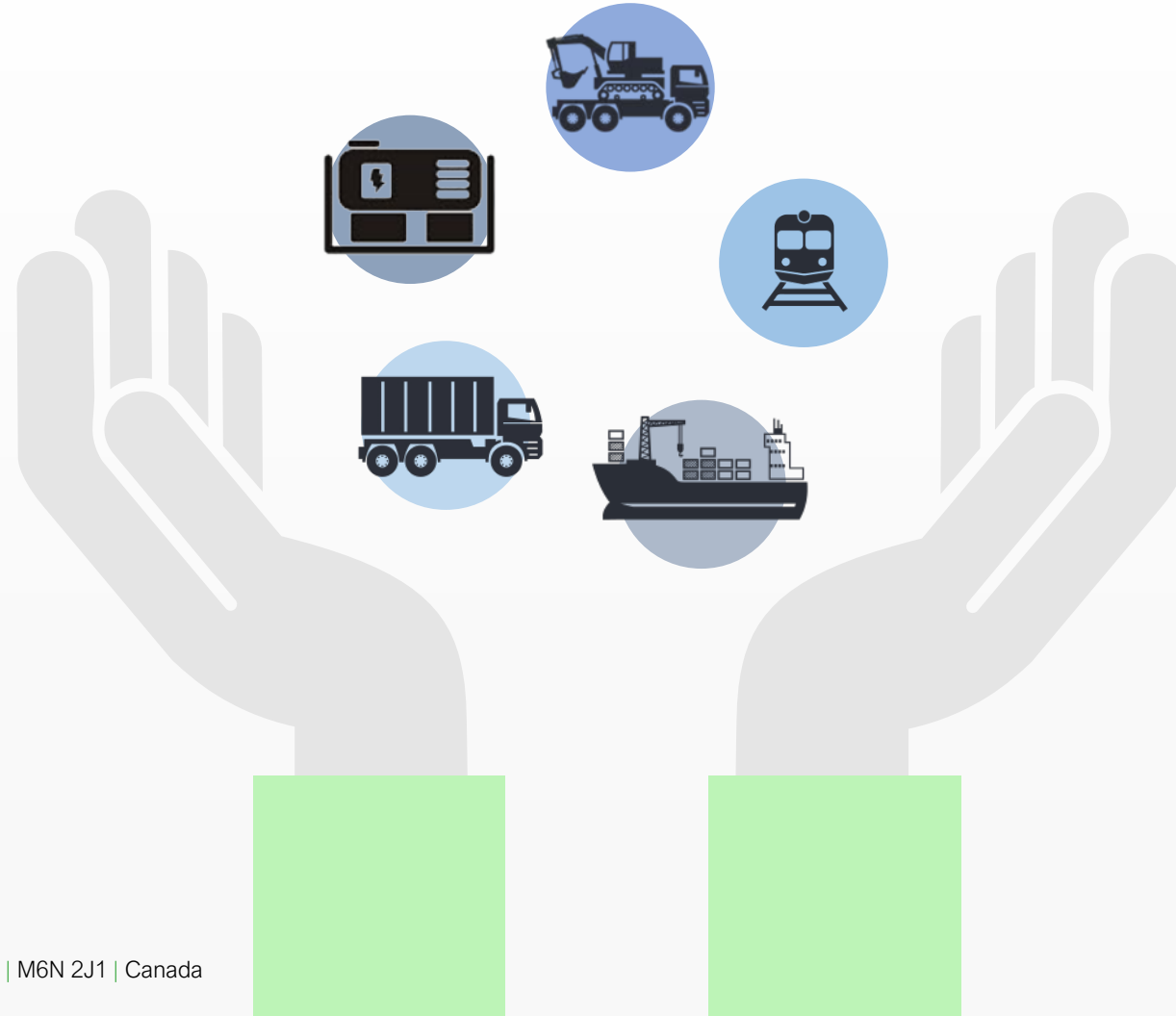
# Return on Investment (fuel only)



- ❖ Cost of HG145B = CAD 8,350
- ❖ Average distance traveled by a long-distance truck per year = 161,000 km
- ❖ Cost per km at 40L/100km and CAD 1.20 per L = CAD 0.48/km
- ❖ Savings of 15% on fuel at CAD 0.48/km = CAD 0.072 savings/km
- ❖ Based on savings of CAD 0.072/km and cost of CAD 8,350 for HG145B = Payback in 116,000 km or 9 Months

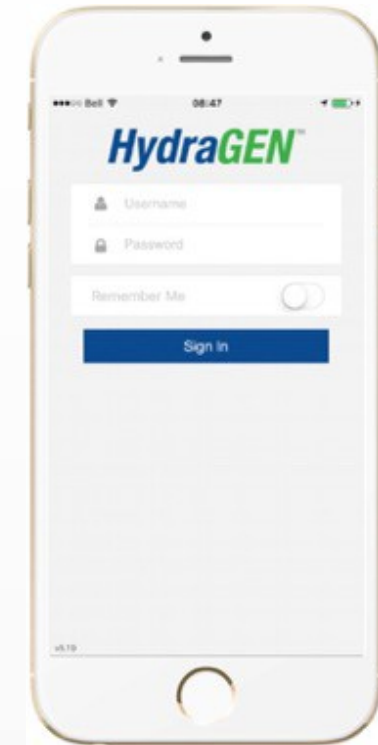
# Industries We Serve

- ❖ Trucks
- ❖ Tractors
- ❖ Refrigerated trailers
- ❖ Vans
- ❖ Glider kits
- ❖ Buses
- ❖ Off road
- ❖ Construction
- ❖ Pumps
- ❖ Compressors
- ❖ Light stands
- ❖ Power generation
- ❖ Ships and ferries
- ❖ Tugboats
- ❖ Fishing vessels
- ❖ Locomotives



# My HydraGEN™ App

- ❖ Mobile & desktop app enables remote access to all end user emissions and fuel data
- ❖ Input historical fuel consumption records
- ❖ Track and monitor individual vehicle or fleet data
- ❖ Track and report all Carbon Credits per install
- ❖ View all single or multi installs in single web interface or mobile
- ❖ Report per install or by truck type, engine type, location etc.
- ❖ View all data & notifications in real-time dashboards
- ❖ Trend and report fuel efficiencies in real-time
- ❖ Receive notification of service required i.e. low water level
- ❖ Request service or maintenance on unit directly to dynaCERT



# The HG145B



- HG1 Engine: 4.5L
- Internal Water Reservoir: 4.7L
- KOH: 4.7L
- Communication: GPRS, Bluetooth, GPS
- Unit size (h x w x d): 61 x 51 x 25 cm
- Unit weight: 23 kg
- Power Usage: 180-240W
- Electrical Supply: 12VDC / 24VDC
- Current: 15-20A at 12VDC  
7.5-10A at 24VDC



DURABLE



WEATHERPROOF



VIBRATION  
DAMPENED



LIGHT WEIGHT

# The HG145R



- HG1 Engine: 4.5L
- Internal Water Reservoir: 4.7L
- KOH: 4.7L
- Communication: GPRS, Bluetooth, GPS
- Unit size (h x w x d): 61 x 51 x 23 cm
- Unit weight: 35 kg
- Power Usage: 180-240W
- Electrical Supply: 12VDC / 24VDC
- Current: 15-20A at 12VDC  
7.5-10A at 24VDC



DURABLE



WEATHERPROOF



VIBRATION  
DAMPENED

# The HG145-4C



- HG1 Engine: 4 x 4.5L
- Water Reservoir: 70L
- KOH: 4 x 4.7L
- Communication: GPRS, Bluetooth, GPS
- Unit size (h x w x d): 153 x 92 x 41 cm
- Unit weight: 182 kg
- Power Usage: 720-960W
- Electrical Supply: 12VDC / 24VDC / 240VAC
- Current: 60-80A at 12VDC  
30-40A at 24VDC



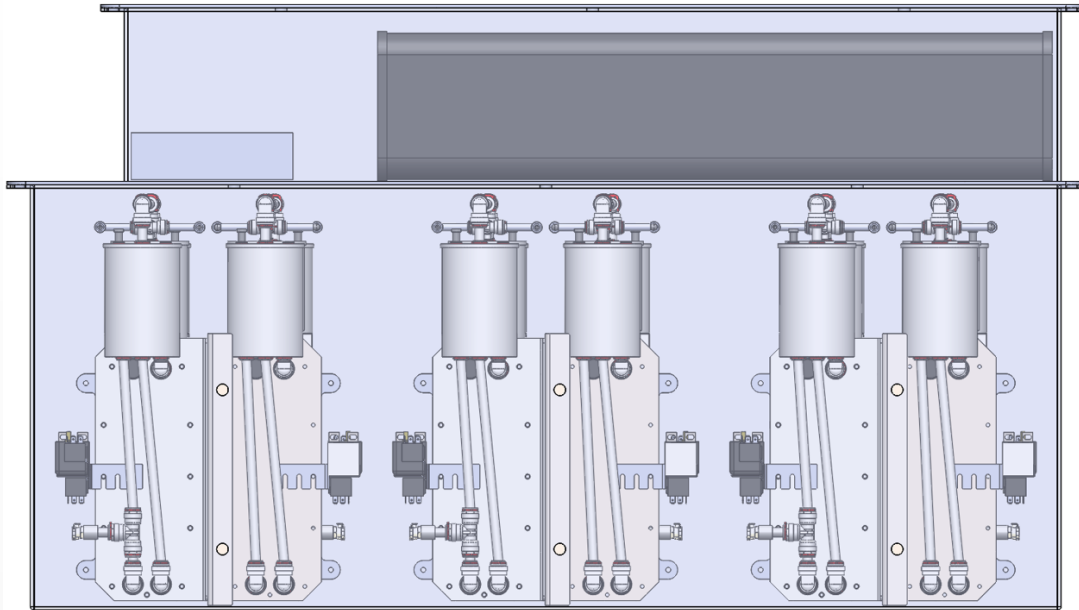
DURABLE



WEATHERPROOF



# The HG145-6C



- HG1 Engine: 6 x 4.5L
- Internal Water Reservoir: 70L
- KOH: 6 x 4.7L
- Communication: GPRS, Bluetooth, GPS
- Unit size (h x w x d): 84 x 146 x 56 cm
- Unit weight: 250 kg
- Power Usage: 1080-1440W
- Electrical Supply: 12VDC / 24VDC / 240VAC
- Current: 90-120A at 12VDC  
45-60A at 24VDC



DURABLE



WEATHERPROOF

# OEM Warranty Statements

Letter or communication received from the following OEMs supporting warranty exemptions when using an aftermarket part and/or additive:

- ❖ Caterpillar
- ❖ Cummins
- ❖ Detroit Diesel / Mercedes
- ❖ Electromotive Diesel
- ❖ John Deere
- ❖ Hitachi
- ❖ Komatsu America
- ❖ Navistar
- ❖ Volvo Trucks North America



# Recognition and Awards



**GERMAN  
INNO  
VATION  
AWARD '19  
WINNER**



**PIT Group  
FPInnovations  
VERIFIED**



**EDISON AWARDS  
GOLD  
2018 WINNER**



**ESQR's Quality Choice Prize 2019  
WINNER**



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