



## OptiBlend® System Overview

The OptiBlend® System from Eden Innovations India Pvt. Ltd. is an innovative retrofit technology developed for a wide range of diesel engine applications. This economical kit displaces diesel with natural gas or other alternative fuels without modifications to the internal components or the stock fuel management system. Since natural gas costs lesser than diesel, per unit power cost reduces in comparison to running with 100% diesel fuel. OptiBlend® System provides a safe, economical and environmental friendly alternative fueling option resulting in reduction of particulate matters (PM) CO<sub>2</sub> and NO<sub>x</sub> emissions. Displacement of diesel by natural gas results in increasing back up duration as well as improving engine life. Engine is tuned across the entire load range for optimized emission benefits and cost savings without compromising engine performance or safety and with adequate engine damage protection. The OptiBlend® System shuts off the gas if the genset runs out of diesel fuel.

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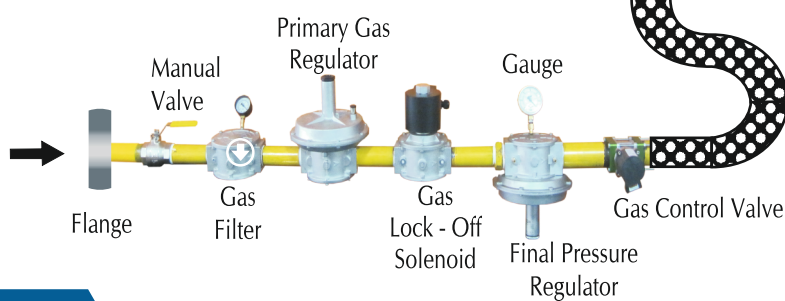
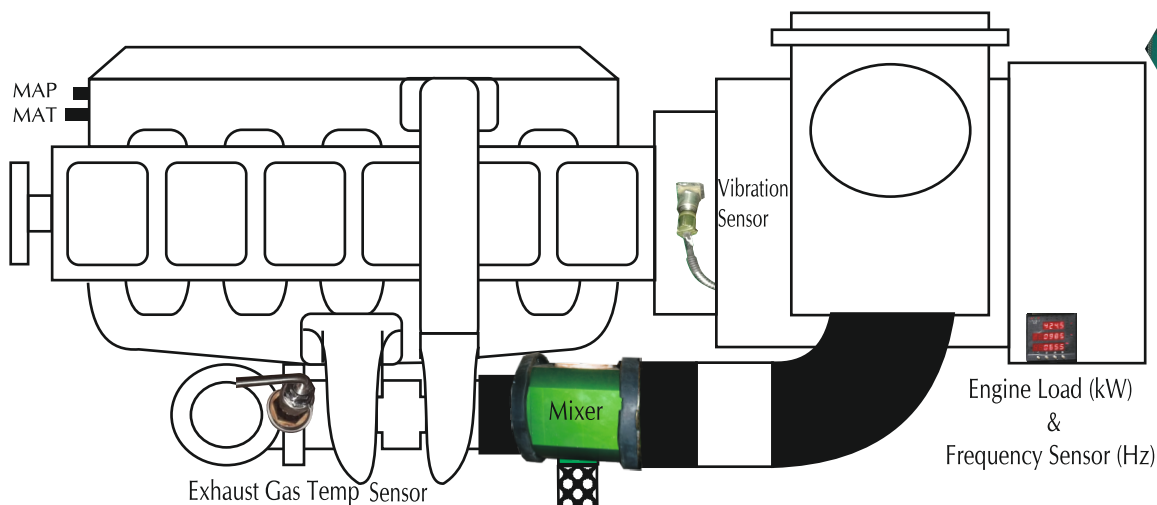
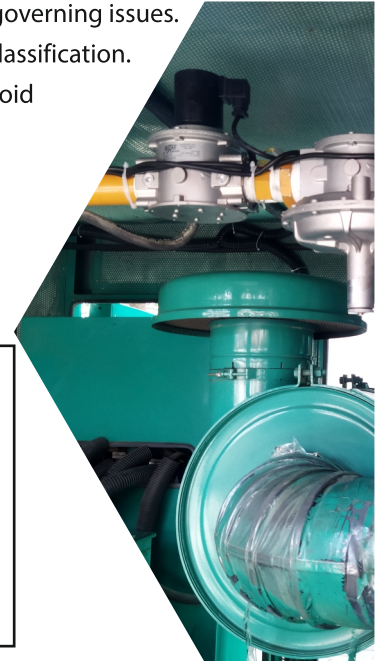
B L U E S K Y  C L E A N A I R

## OptiBlend® System Features :

- Installation of an OptiBlend® System by Eden innovations India Pvt. Ltd. offers numerous technical advantages, many of which are not found in other dual fuel systems.
- The OptiBlend® System uses a dynamic gas control valve that provides optimized displacement throughout the entire engine loads. Engine type, engine load and gas quality are major factors that decides diesel fuel displacement. In general, the system safely displaces up to 70% of the diesel consumed.
- In the event of loss of gas supply or other system fault, the OptiBlend® System allows the generator to revert to 100% diesel operation. However the DG set cannot run on 100% natural gas.

## The OptiBlend® System monitors :

- Exhaust gas temperature, protecting against overheating.
- Engine vibration, limiting gas injection in case of misfire and unstable combustion or speed governing issues.
- Generator frequency, allowing the generator to operate within the OEM's original governor classification.
- Generator load, protecting against overload conditions and turning off gas at low loads to avoid incomplete combustion.
- There is no DERATING on the engine. The OptiBlend® System does not effect engine rating, maintaining engine power equivalent to 100% diesel operation.
- Manifold air pressure (MAP) and Manifold air temperature (MAT) - balancing purpose.



PLC PANEL



## Theory of operation :

Diesel engine retrofitted with OptiBlend® System subsequently use natural gas as the alternate fuel. The advantages are both economical and environmental. Typically 50% - 70% of the diesel can be safely displaced with natural gas. This greatly reduces the NOx formation due to lower combustion temperature than diesel fuel; NOx emissions reductions of 60% or more are achieved. In addition, due to the lower carbon content in natural gas, less CO<sub>2</sub> is generated.

The OptiBlend® System is designed to allow for fuel switching during full or part load conditions, without interruption of engine speed or power. The natural gas is fumigated to the engine cylinders using the stock air intake system. When the diesel fuel is injected into the combustion chamber, it acts as a pilot ignition source for the air-gas mixture. The gas control valve adjusts the fuel flow to the engine based on the generator load (kW).





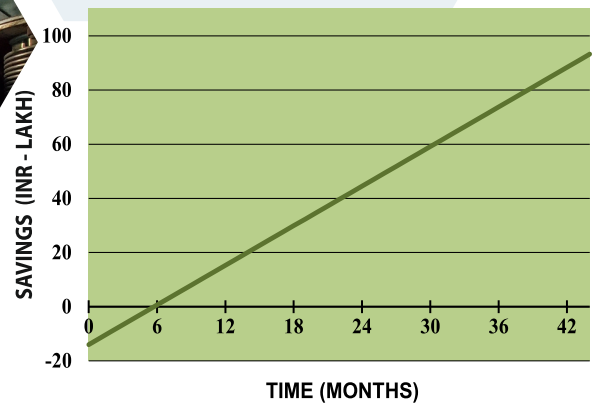
The flow of gas is controlled by a gas control valve, through a robust industrial PLC. If the following parameters exceed the set limits, the PLC will give command to the gas control valve to reduce the flow of gas :

- ⊗ Exhaust gas temperature too high
- ⊗ Vibration too high
- ⊗ Frequency out of range
- ⊗ High engine Load
- ⊗ Manifold air pressure (MAP) out of range
- ⊗ Manifold air temperature (MAT) out of range
- ⊗ Boost imbalancing

The PLC will disable the gas flow by de-energizing the gas lock-off solenoid under the following conditions :

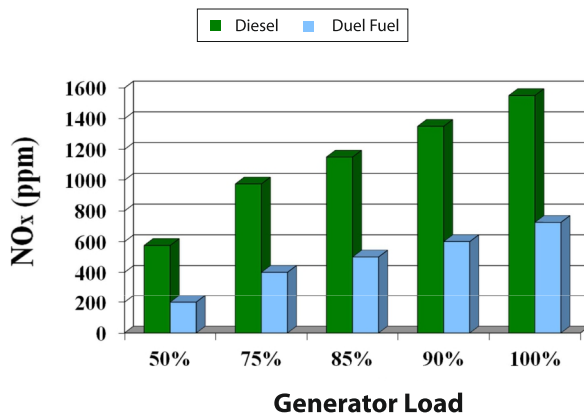
- ⊗ Any parameters exceeding the shutdown (SD) limit
- ⊗ Emergency stop switch is open
- ⊗ OptiBlend® system enable switch is open

### Typical Savings/ROI

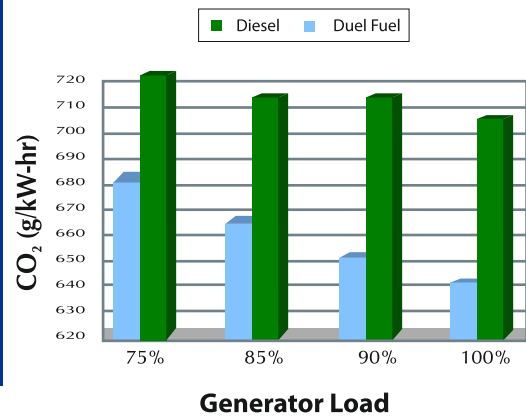


(1010 kVA DG Set, INR 95/ltr HSD & INR 55/sem PNG, 2 hours/day running)

### Typical NOx Emissions



### Typical CO<sub>2</sub> Emissions

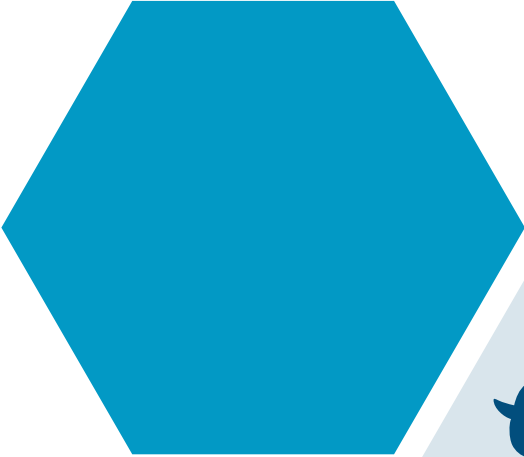


(Cummins K19, 500 kVA DG set)



## Why OptiBlend® System is the best choice?

- ⊕ Operates DG set from 10-100% engine load (subject to engine conditions) on dual fuel mode operations.
- ⊕ Fast response time in milliseconds to changing engine load conditions
- ⊕ PLC control allows optimum amount of gas to be used
- ⊕ Constantly monitors vibration, exhaust temperature, engine load, frequency, MAP, MAT and valve position
- ⊕ Increases run-time on dual fuel mode
- ⊕ Remote monitoring System (Optional)



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