

# Dual Fuel Energy Conversion System for Diesel Engines

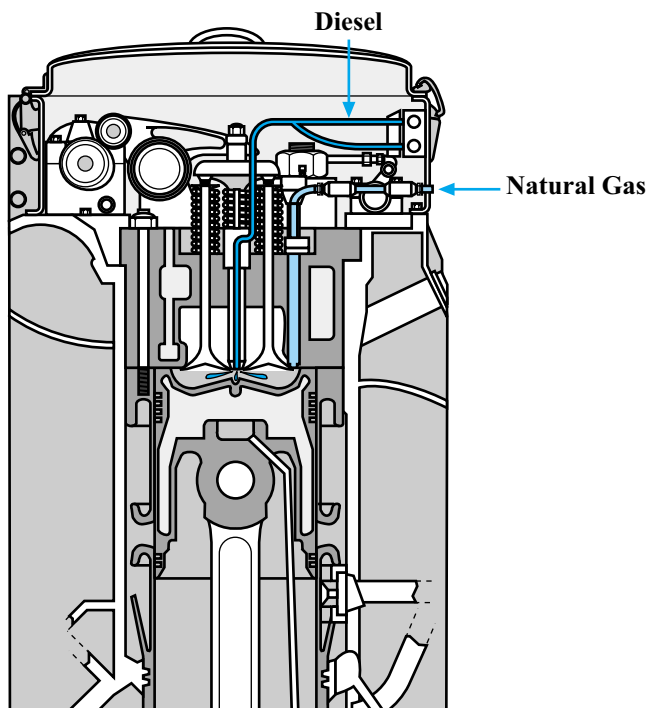


## A Fuel-Powered, Liquefied Natural Gas Conversion System for Diesel Engines Greatly Reduces Emissions

With assistance from the Department of Energy's Inventions and Innovation Program, Energy Conversions, Inc. (ECI) developed and tested a system to convert a large diesel engine to dual-fuel usage. The new engine uses 90% natural gas as efficiently as diesel fuel while greatly reducing emissions. In addition, a natural gas engine requires much less maintenance, emits fewer pollutants, and operates just as safely as a diesel or gasoline engine.

ECI dual-fuel engine systems consist of specifically engineered pistons and heads, patented gas injectors, a supplemental cooling system, and ECI engineered electronic controls. This system enables converted engines to operate on 90% natural gas while maintaining engine efficiency and fully rated horsepower. Dual-fuel operation is completely automated, requiring no user input. If a function falls out of normal operational limits, full diesel operation is activated instantly with no interruption of service.

ECI dual-fuel systems provide substantial emissions improvements over unmodified counterparts, reducing NO<sub>x</sub> emissions by 66% in locomotive applications, with further improvement in stationary installations. ECI conversion systems are currently saving one of their offshore drilling customers \$4,000 per day in fuel costs with additional savings as a result of the reduced cost of maintenance from burning a cleaner fuel.



*Dual-Fuel Engine*

## Overview

- ◆ Commercialized by Energy Conversions Inc. (ECI)
- ◆ Commercialized in 1992
- ◆ In 2002 there are 23 installations worldwide, 12 in the United States

## Applications

A fuel-powered, liquefied, compressed or pipeline natural gas conversion kit for General Motors EMD series industrial power engines used as stationary generators, drilling platforms, marine vessels and locomotives worldwide. ECI also produces a similar system for the Caterpillar 379, 398, and 399 series engines

## Capabilities

This conversion system, which uses a fuel with a readily available and abundant supply, results in a reduction of emissions released into the atmosphere, especially particulates and NO<sub>x</sub>.

## Benefits

### Energy Cost Savings

Provides increased flexibility in fuel use thus resulting in cost savings to users.

### Emissions

Reduces amount of emissions released into the atmosphere, especially particulates and NO<sub>x</sub>. NO<sub>x</sub> emissions are reduced by up to 66%.

### Maintenance Cost Reduction

Reduces engine maintenance because it burns a cleaner fuel.

### Operating Labor Reduction

Pipeline fuel supply reduces refueling labor, and liquefied natural gas systems have larger fuel storage so they need less frequent refueling.

### Waste Reduction

Reduces oil and filter replacement and disposal.