

GTI BI-FUEL PRESENTATION

Liquefied Natural Gas (LNG) Fuel Supply Meeting



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HOERBIGER Engine Solutions

HOERBIGER

PRODUCT INTRODUCTION

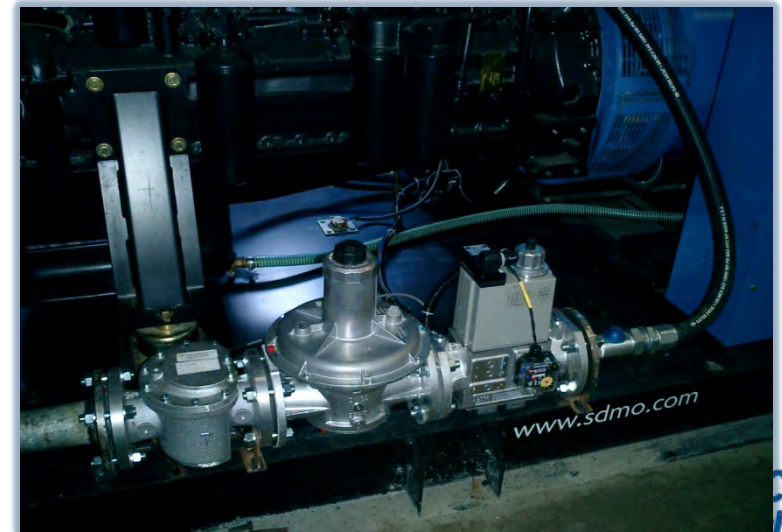


Moses Lake, WA

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What Is Bi-Fuel ?

- Bi-Fuel® is a “co-firing” of standard diesel fuel and natural gas (methane)
- It is designed for use on conventional, heavy-duty & light-duty diesel engines
- No engine modifications are required
- The GTI Bi-Fuel® Systems can be installed in the field or accomplished as an OEM up-fit
- Natural gas may substitute **up to 70% (max)** of the diesel fuel required to maintain a given speed and load



Primary Applications

- Prime Power
- Peak Shaving
- Standby Power
- Distributed Power Generation
- Pumping applications
- Drilling Rigs, Fracing & Well Service Units
- Market Bridge
- Data Centers



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Characteristics of GTI Bi-Fuel® System

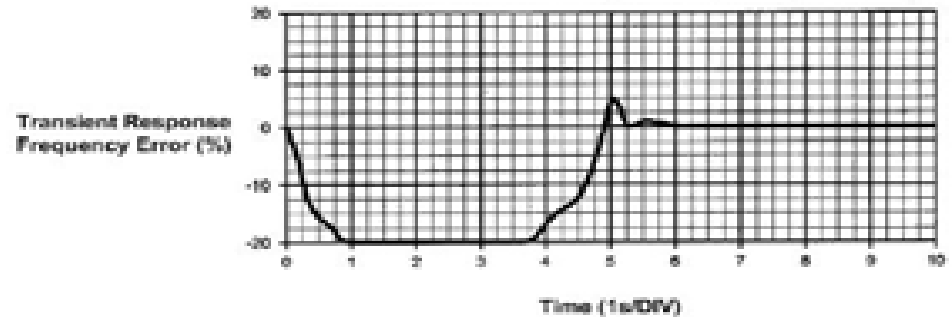
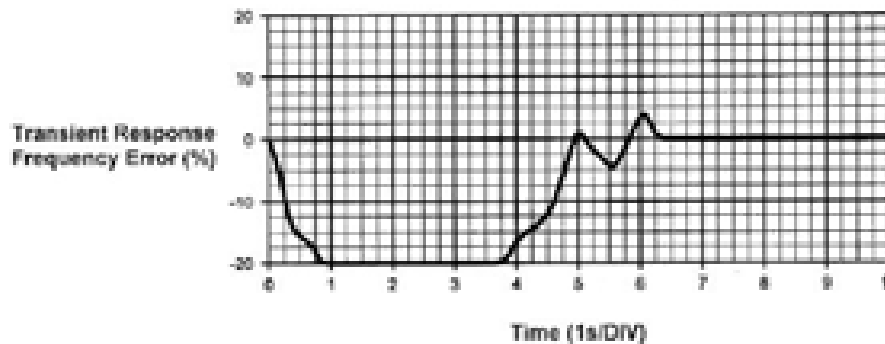
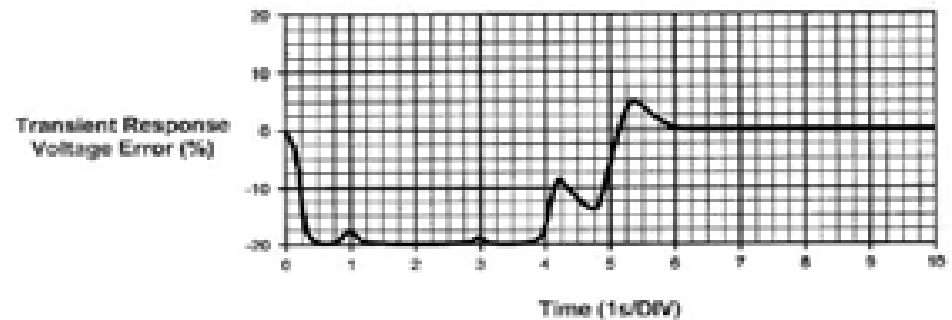
- Maintains diesel-like performance and efficiency
- Compression ignition
- Low gas supply pressure
- Sophisticated Altronic engine protection system
- Auto-switching of fuel modes
- Non-intrusive, simple installation
- Easy to operate

Diesel vs. Bi-Fuel® Response Performance

**100% Diesel
100% Block Load**



**30% Diesel / 70% Bi-Fuel
100% Block Load**



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Benefits to the User

- Reduced energy costs
- Rapid payback
- Extended runtime for emergency operation
- Reduced exhaust emissions
- Fuel flexibility



Fuel Gases Compatible with GTI Bi-Fuel® System

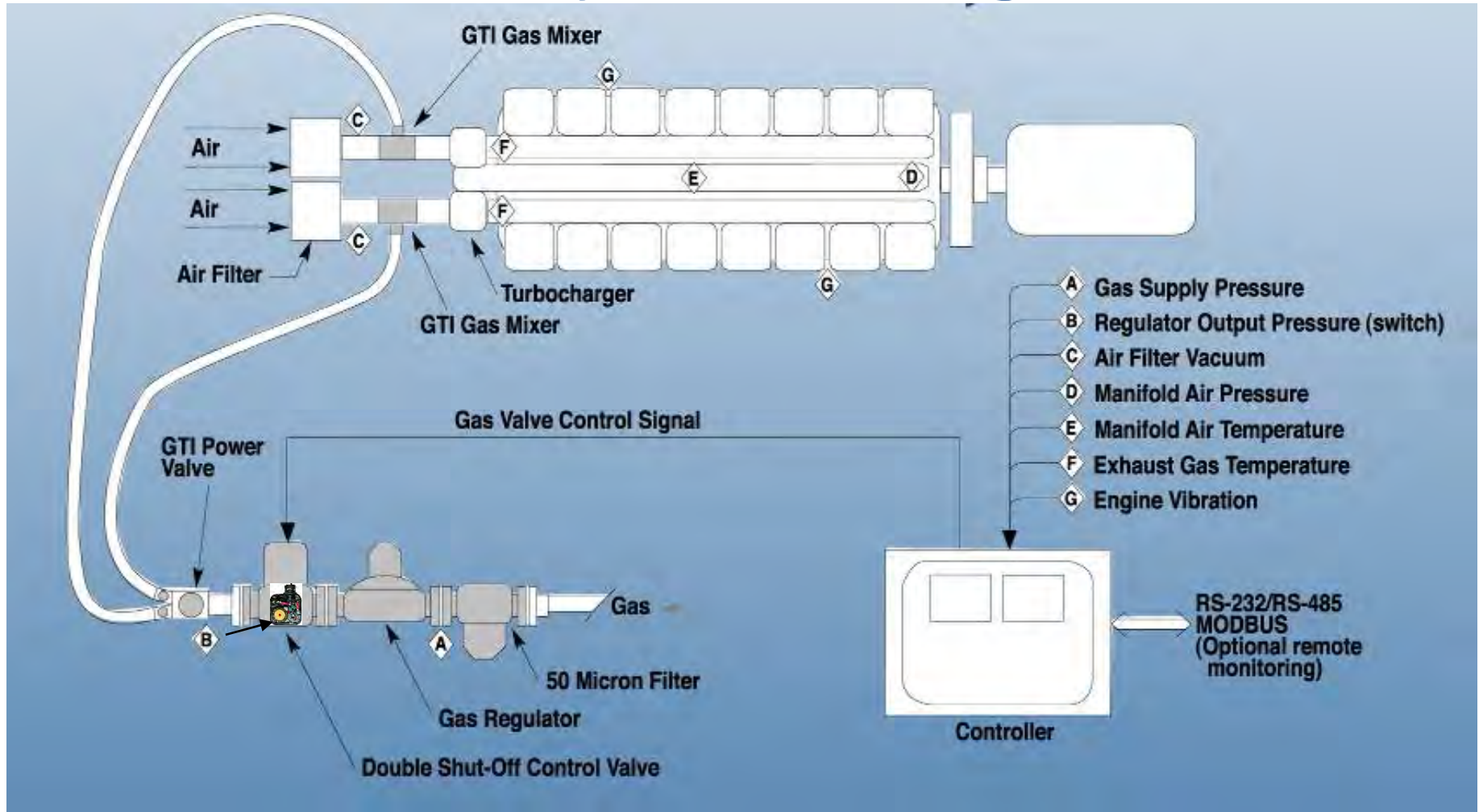
- Pipeline natural gas
- Liquid natural gas (LNG)
- Compressed natural gas (CNG)
- Wellhead gas*
- Bio-gas (landfill, wastewater, etc.)*
- Coal-bed gas*

*With proper pre-treatment



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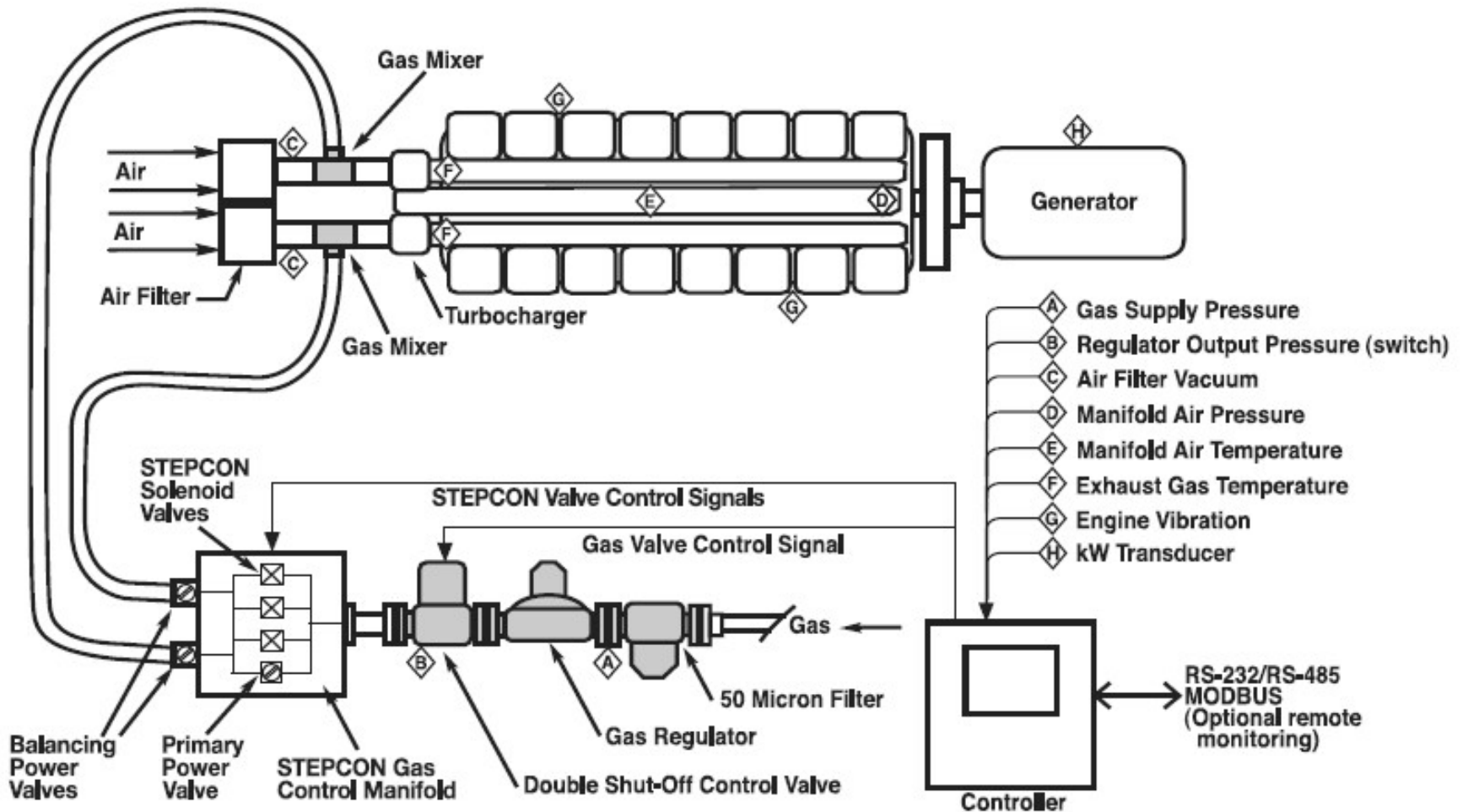
GTI Bi-Fuel® System Diagram



NEW GTI TECHNOLOGY - 2011

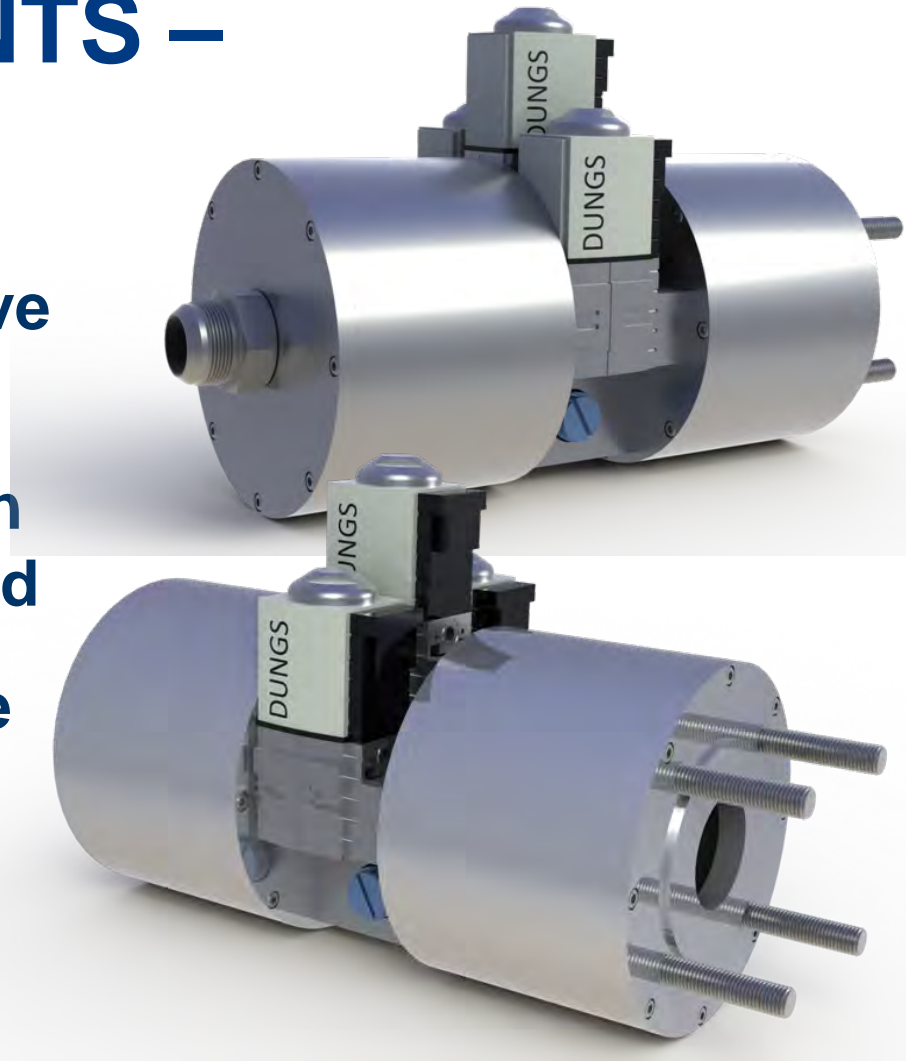
The STEPCON® System

GTI Bi-Fuel STEPCON System Diagram

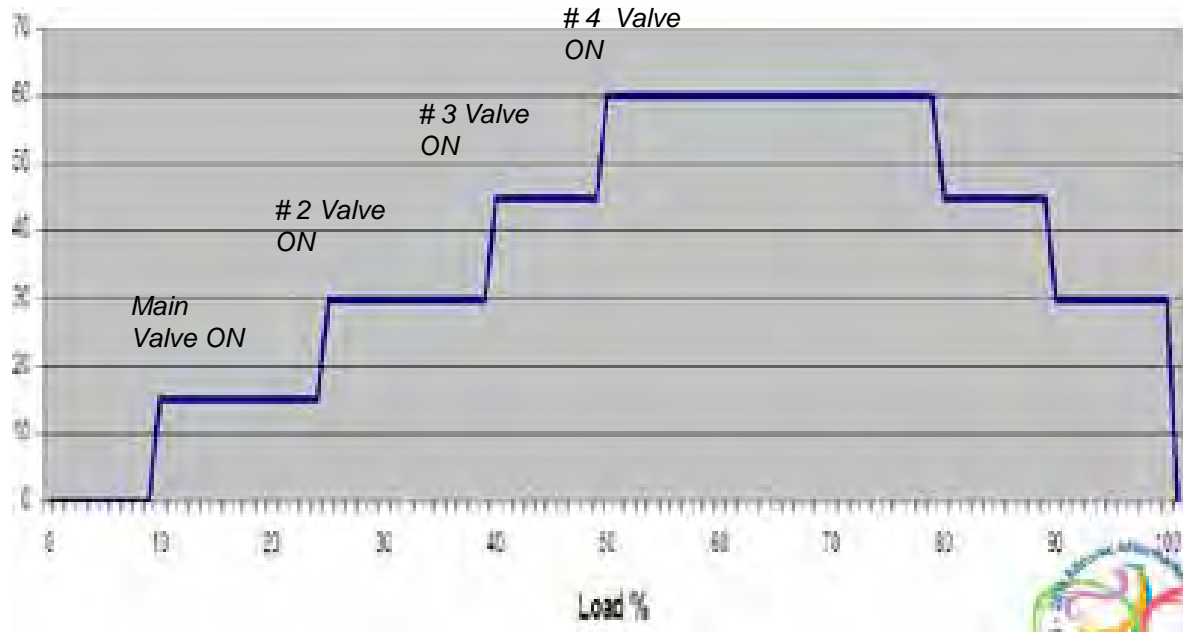
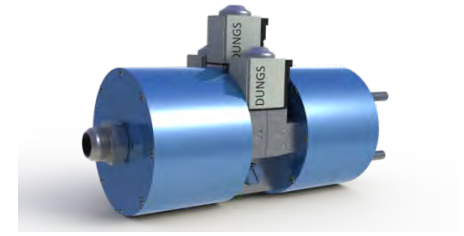


SYSTEM COMPONENTS – *STEPCON® Valve*

- Up to 4 individual power valve setpoints.
- Maximizes substitution within widest loadband when needed
- Ideal for rapid widely variable loads such as drilling rigs
- Anodized for corrosion resistance



STEPCON® Technology



The STEPCON™ is designed to enhance the basic GTI bi-fuel system allowing its application over a wider load range, adjusting the optimal substitution rate based on load with the capability to make substitution level adjustments in response to rapid load changes.

STEPCON® Installed on Drilling Rig



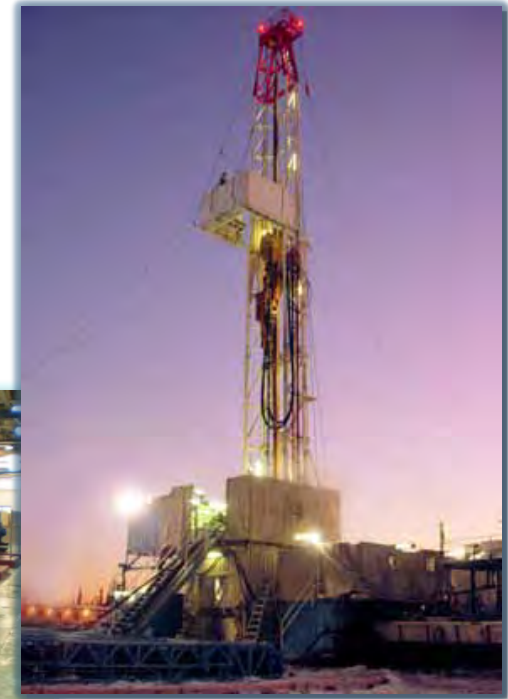
<http://www.ecoafs.com/CaseStudyVideo.aspx>

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Proper Application

- The STEPCON™ is designed to enhance the basic GTI Bi-Fuel system
- It allows Bi-Fuel application over the widest load range
- It adjusts for the optimal substitution rate based on near real-time load
- It makes substitution level adjustments in response to rapid/drastric load changes.
- *The majority of applications will continue to be satisfied by the application of the standard kit*

MARKETING & TYPICAL INSTALLATIONS



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Publix Supermarkets

- **Location:** Southeast US
- **Units Installed:** over 600 from 2007 to 2009
- **Size:** 500kw
CAT C15
- **Driver:** Emergency Power to avoid loss of perishable food



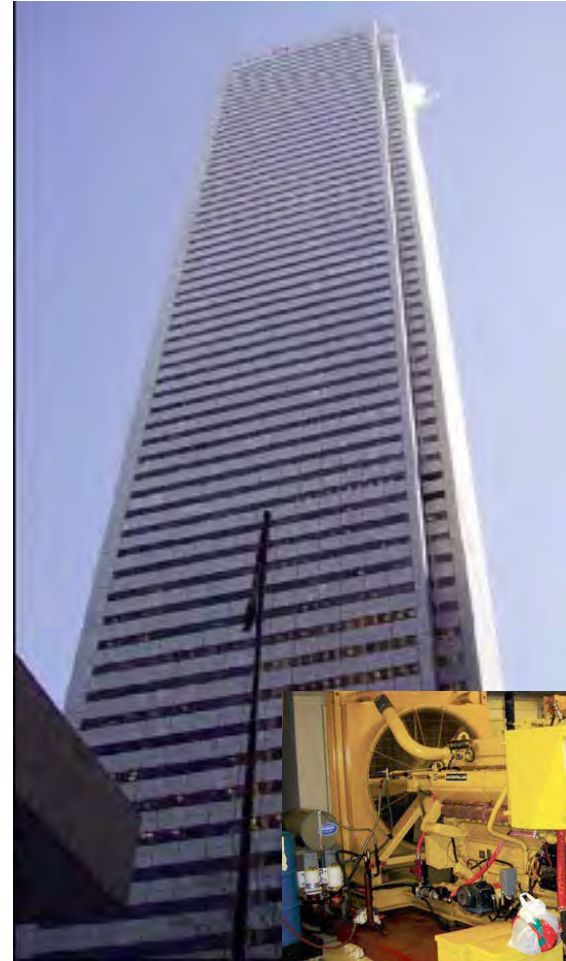
Hospitals & Healthcare

- **Location:** Fort Myers, FL
- **Units Installed :** (2) CAT 3516 bi-fuel systems 2004
- **Size:** 2,000kw x 2
- **Driver:** Extended runtime up to 300% for emergency standby power in critical care application.



High-Rise Office / Retail Bldgs.

- **Location:** Toronto, Canada
- **Units Installed :** Cat D349 in 2005
- **Size:** 800 kw
- **Driver:** Extended runtime up to 300% . Emergency back-up power for elevators, lights, computers, etc.



Water Treatment Plant

- **Location: Wichita, KS**
- **Units Installed: 2010**
(4) Cat 3516C's -paralleled
- **Size: 2,000kw – ea.**
- **55% Substitution**
- **Drivers:**
 - a. Emergency Standby Power**
 - b. Extended runtime**
 - c. Emissions**



Irrigation Pumping

- **Location:** Amarillo, TX and New So. Wales, Australia
- **Units Installed:** 2009
 - DDC Series 60
 - Cummins M11C
- **Size:** 350kw & 300kw
- **70% Substitution on both**
- **Driver:** Prime power cost savings on diesel fuel. - Agriculture



Textile Manufacturing

- Location: New Delhi, India
- Units Installed: 2005
Cummins
- Size: 350kw
- Driver: Prime Power cost savings to operate small factory
- Rapid Payback – **16 days !**



Oil & Gas – Drilling Rigs

- **Location:** Various locations in U.S., Canada, and China
- **Units Installed:** Approx. 350 bi-fuel systems installed on drilling rigs. Hundreds more projected 2012 – 2013
- **Size:** Average 1500kw x 3 engines per rig
- **Driver:** Huge cost savings on diesel fuel with rapid payback



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Oil & Gas – Fracing Trucks

- **Location:** Western Canada and various locations in U.S.
- **Units Installed:** 11 Units to date. More companies ready to start bi-fuel testing on large fracing fleets
- **Size:** 1500kw - 2,000kw per engine @ 124 gph. Each frac job may require 10 – 20 engines.
- **Drivers:** (1) Huge Cost savings with rapid payback. (2) Reduce truck traffic to jobsite. (3) Reduce fire potential from diesel refueling.



Oil & Gas – Well Servicing Nitrogen & Foam Units

- Location: Colorado
- Units Installed: 5 units
- Size: 350kw Cat & DDC
- Average Substitution : 65%
- Driver: Huge Cost savings and rapid payback



Oil & Gas – Rental Generators

- Location: Williston, ND
- Units Installed: 40 Units
- Size: Various
- Picture: 200kw Cummins with 15,000+ hours on bi-fuel with no downtime !
- Average Substitution : 55 - 65%
- Gas : Using wellhead gas
- Driver: Temporary power to run wellhead pumps. Also, uses flaring gas !



GTI Bi-Fuel® on Drilling & Fracing Rigs

40 GTI Bi-fuel
systems running on

CNG

Xinjiang Province

CHINA



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GTI Bi-Fuel® on Drilling & Fracing Rigs

40 GTI Bi-fuel
systems running on
LNG

Xinjiang Province
CHINA



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GTI Bi-Fuel® on Drilling & Fracing Rigs

Total Bi-fuel units sold:

2,900

Total installed on Drilling Rigs & Frac Units:

350 (12%)




ARE DIESEL COSTS SQUEEZING YOUR PROFITS?

If your diesel engines are in continuous or peak shaving operation, GTI Bi-Fuel® delivers the power to reduce your fuel costs—substantially.

This patented system draws low-pressure, clean burning, natural gas into the engine, substituting it for a large portion of the diesel fuel, lowering costs, and reducing the need to haul diesel fuel to the site.

Proven in thousands of installations, GTI Bi-Fuel® is an easy retrofit requiring no engine modification.

Find out more about the benefits of GTI Bi-Fuel® at www.gti-altronic.com, or call 330-545-9768.



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GTI Bi-Fuel® on Drilling Rig

ACTUAL COST SAVINGS

with (3) STEPCON® Systems

	DIESEL		BI-FUEL		
6.5 Drlg	0	1585	5.5 Drlg	49.7	864
17.0 Drlg	0	1999	16.0 Drlg	49.5	1046
13.0 Drlg	0	2050	13.5 Drlg	101.3	933
12.0 Drlg	0	2400	13.5 Drlg	101.3	933
Total Drlg Time	48.5 Hrs		48.5		
Gals of Diesel		8034		301.8	3776
Cost of fuel		\$3.50		\$4.00	\$3.50
Cost of Fuel		\$28,119.00		\$1,207.20	\$13,216.00
Total Cost of Fuel		\$28,119.00			\$14,423.20
Saving		\$13,695.80	(SAVINGS)		
		ACTUAL SAVINGS:			
		\$ 6,848 PER DAY			

MARKETING of BI-FUEL

- ***COST SAVINGS – Rapid payback and huge savings on prime power applications***
- ***EXTENDED RUNTIME – Increase runtime by 300% or more on standby power applications***
- ***MARKET BRIDGE – Flexible means of building LNG/CNG customer base while taking advantage of a growing infrastructure***
- ***REDUCED EMISSIONS – Typical installations reduce many toxic emissions***

Bi-FUEL & LNG / CNG

Bi-Fueled engines are creating opportunities all over the world for LNG & CNG

- ***Marine – Inland Waterways, Coastal, and Open Water – propulsion or auxiliary***
- ***Flexible use of existing assets that “pay” for new dedicated equipment***
- ***Areas without gas pipeline infrastructure – stationary or mobile, remote or otherwise***
- ***Areas without natural gas resources***

EERC / GTI Research Efforts



PROMOTING CNG / LNG

“Demonstration of Gas-Powered Drilling Operations for Economically Challenged Wellhead Gas and Evaluation of Complimentary Platforms”

***Thank You
For
This Opportunity !***



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