

Natural Gas Conversions for Drilling Rigs & Frac Spreads



BACKGROUND

HISTORY

- **In business since 1936**
- **Traditional Fuel Systems, C-Stores, Bulk Plants**
- **Design/Build, Engineering, Construction, Installation and Repair/Maintenance Services**

SERVICE AREA

- **San Antonio**
- **Dallas/Ft. Worth**
- **Midland/Odessa**
- **Lubbock**
- **Amarillo**
- **El Paso**
- **Albuquerque**

Alternative Fuels Services

INDUSTRIAL

- **Drill Rig Conversions**
- **Frac Fleet Conversions**
- **GenSet Conversions**
- **Aggregate Plants**
- **Mining Conversions**

FLEETS/RETAIL

- **CNG Facilities**
- **LNG Facilities**
- **LCNG Facilities**
- **Bio Diesel Systems**
- **DEF Systems**

Alternative Fuels Projects

- Private Fleet CNG Facility – Encinal, Texas (2013)
 - Phase I CNG Complete in 3rd Qtr 2013
 - Phase II CNG Planned for 3rd Qtr 2014
 - Phase III LNG Planned for 2015
- City of El Paso CNG Facility – El Paso, Texas (2014)
 - Completion in March
- Private LCNG Retail Facility – Seguin, Texas (2014)
 - Finalizing Funding
- Private LCNG Retail Facility – San Antonio, Texas (2015)
- Drilling Rig Conversions – (2 Complete 2013 with 4 more in 2014)
 - (1) Well-Head Gas Conversion & (1) LNG Conversion
- Frac Spread Conversion – (2104)
 - Test Program scheduled for Eagleford
- Asphalt Plant Conversions – (5 in 2014 & 2015)
 - Converting from Diesel to LNG



Dual Fuel Systems for Oil & Gas Drilling/Fracking Engines



What is Dual Fuel?

- Dual Fuel is a “co-firing” of diesel fuel and natural gas
- Conversion Gas Trains are designed for use on conventional, heavy duty diesel engines
- Conversion Gas Trains can be installed in the shop as well as in the field
- Natural Gas typically substitutes up to 60% of the diesel fuel required to maintain a given speed and load



System Overview and Description

- Dual Fuel Conversions are a retrofit technology
- Requires no major changes or modifications to the engine
- Engine can still be operated on 100% Diesel
- Designed to allow for switching of fuel modes during full or part load conditions
- Utilizes a fumigation gas delivery method



Characteristics of a Dual Fuel System

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



Fuel Gasses Compatible with Dual Fuel System

- Pipeline Natural Gas
 - Well-Head Gas
 - Liquid Natural Gas
- Compressed Natural Gas
- Bio-Gas (Landfill, Wastewater)
 - Coal-Bed Gas

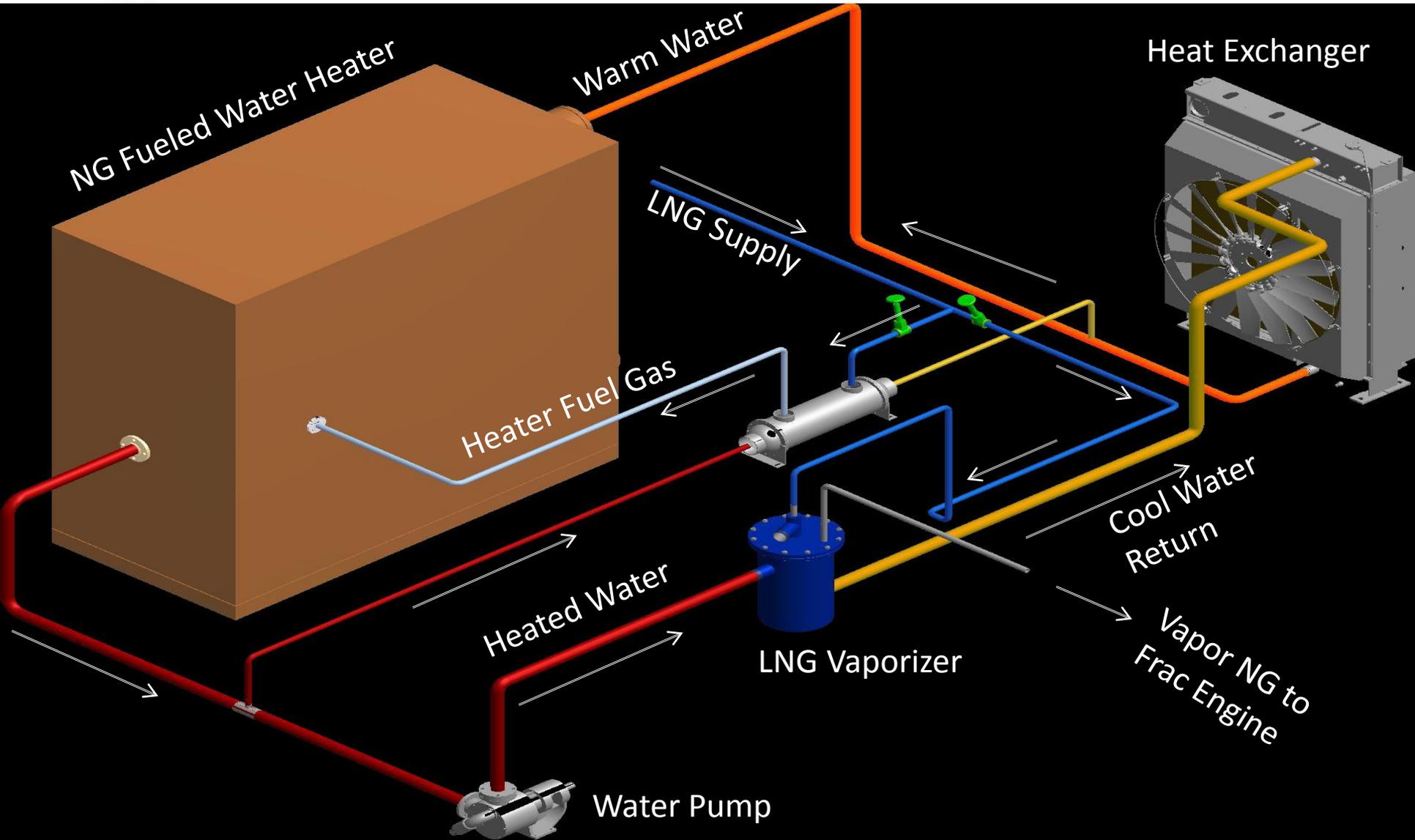


GAS SUPPLY SOLUTIONS FOR RIGS & FRAC SPREADS



- **CNG Tube Trailer**
 - Approx. 155 MCF
 - Approx. 1200 DEG
- **LNG Transport Trailer**
 - Approx. 830-900 Mcf
 - Approx. 6300 – 7000 DEG
- **LNG Regasification Queen**
 - Approx. 12,000 Mcf
- **LNG Vaporization Trailer**
 - Used for Frac Spreads due to high continuous demand

LNG Vaporization Skid





Benefits to the User

- Reduced energy cost
 - Fuel flexibility
 - Rapid Payback
- Reduce environmental impact
 - Simple to install
 - Reduced exhaust emissions



Dual Fuel Emissions

Dual Fuel Systems will typically reduce production of:

- Nitrogen Oxides
- Sulfur Oxides
- Reactive Hydrocarbons
- Carbon Dioxide
- Carbon Monoxide*
- Particulates
- Visible Emissions

*with installation of oxidation catalyst



Dual Fuel Cost Analysis Components

- Cost of diesel fuel per gallon
- Cost of natural gas per thousand cubic feet
- Average Load
- Hours of Usage
- Costs to “clean” Well Head Gas
- Costs to transport CNG/LNG



PARTNERS

– LNG Merchants

- Developer and Supplier of LNG

– LNG Energy Resources

- Transportation of CNG and LNG
- Providing Conversions as part of their Fuel Program

– L&S Cryogenics

- Design, Engineering & Fabrication of Cryogenic Equipment
- UPS Shipping Corridor – Salt Lake to Los Angeles

Any Questions?

