



# AltWheels Fleet Day

September 19, 2016



# American Power Group Corporation

*(Integrated Alternative Energy Solutions)*

OTC:APGI



## Diesel + NG Dual Fuel Technology

## Trident NGL Services

### APG International

### Dual Fuel Stationary Power

### Dual Fuel Vehicular Power

### Flare Capture Services

### Methane Capture Flare to Fuel™

- Africa
- Australia
- Canada
- Caribbean
- Central America
- Mexico
- South America

- Drill Rigs
- Frac Trailers
- Pumps
- Primary Power
- Emergency Backup
  - Hospitals
  - Data Centers
  - Perishables

- CNG / LNG / RNG
- DF Gliders
- Severe-Duty DF Gliders
- DF Conversions
  - Class 8 Trucks
  - Cement Mixers
  - Transit Buses
  - Mine Haul
  - Port Stackers

- Stranded/Remote Sites
- Mobile Units
- Flare to Fuel Products
  - Y-Grade NGL
  - Emulsifiers/Dilutents
  - Frac Heater Fuel

#### Micro-Fractionation™

- On Well Site
- Purity Products
- E&P Cost Savings

- Methane to Natural Gas
- Pipeline Quality CNG
- APG Dual Fuel
  - Well Sites
  - Stationary Gensets
  - Pumps
  - Lighting
  - Severe Duty Trucks
  - Heavy Duty Trucks
  - Power Generation

- Flare Abatement Programs
- NOx Reduction Programs
- Grants/Tax Credit Assistance
- Lunch & Learn Sessions

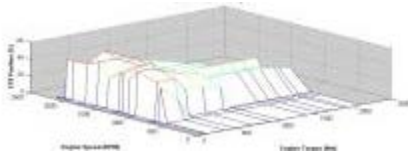


# APG's Patented Third Generation Designed By Power-Train Leaders in Detroit



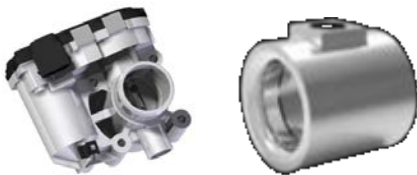
## Digital Dual Fuel Electronic Control Unit

- Non-Invasive Read-only access of OEM CANBus system
- Maintains OEM temperatures & pressures
- Dynamic fuel control system – no custom fuel injectors



## 3D Natural Gas Software Mapping System

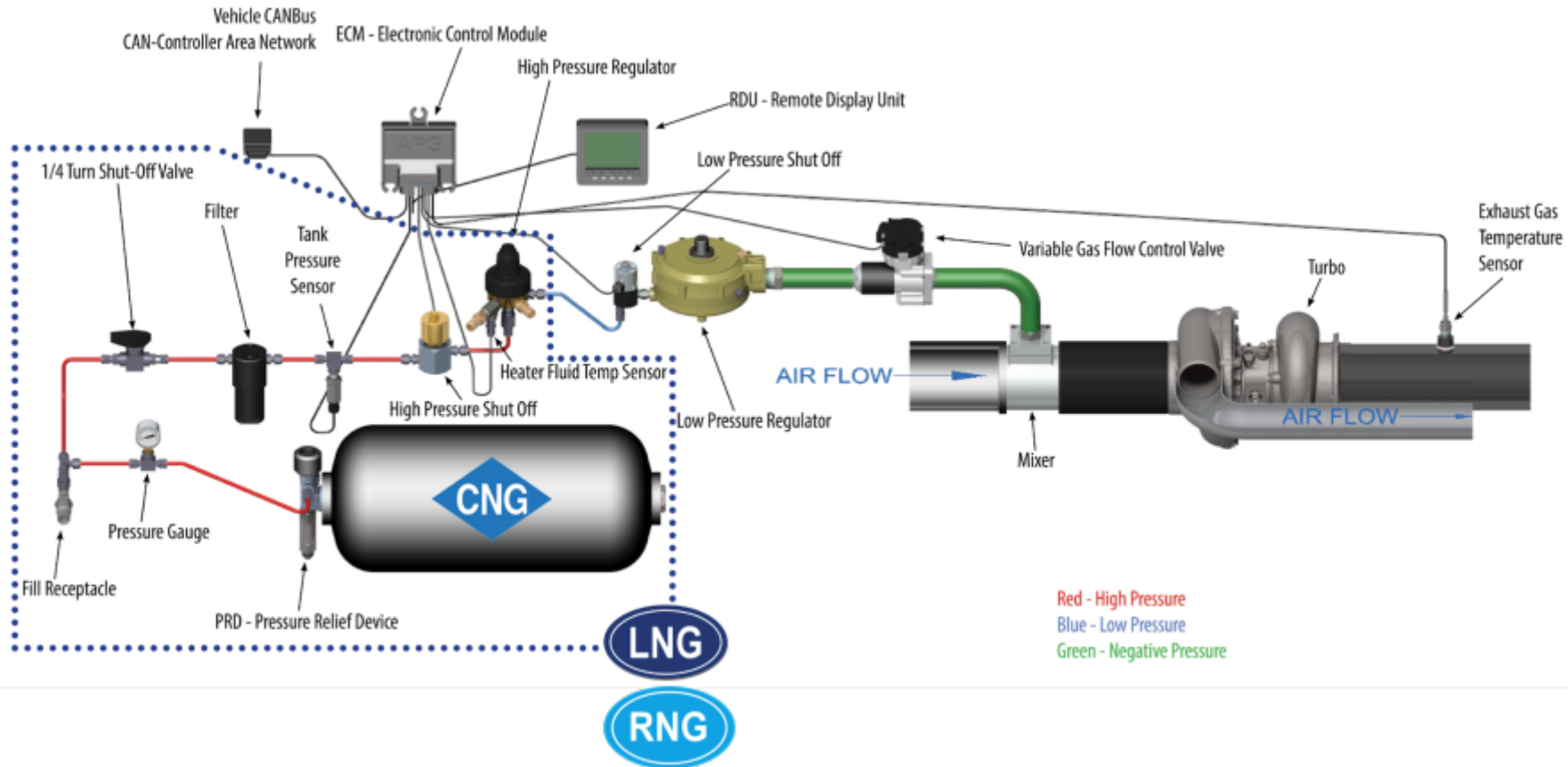
- Meet emissions – optimize displacement at all load ranges
- APG control strategies ensure seamless operation



## Variable Fuel Metering

- Optimize displacement through full RPM & load ranges

# APG V5000 Turbocharged Natural Gas<sup>®</sup> Hardware Components



- Dotted area represents components not present in V5000LNG Systems (\*Tank Pressure Sensor is present in both V5000CNG & V5000LNG systems)
- APG's technology can use CNG, LNG, RNG & captured methane

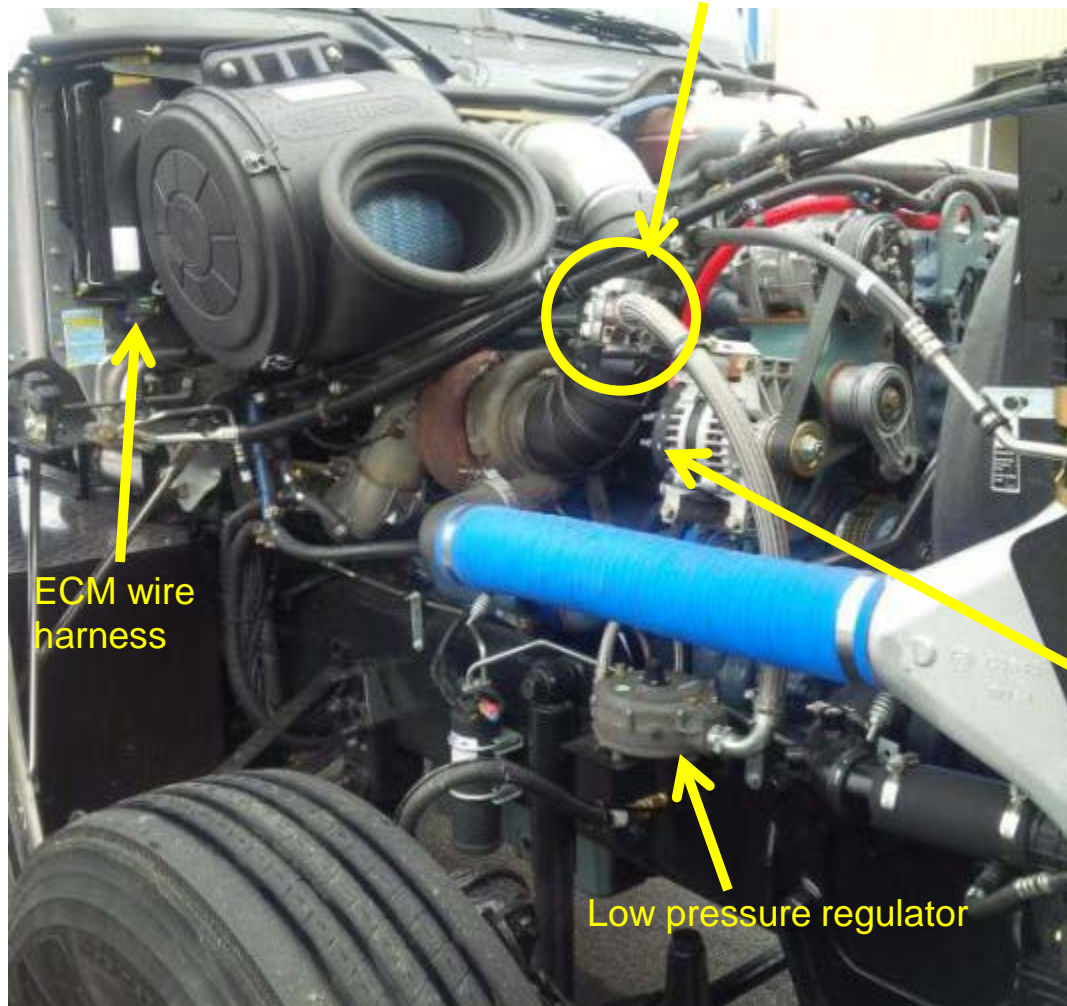


# V5000 Engine Kit Installed



Venturi/Throttle Body Configuration Controls NG substitution %

Remote Display Unit



ECM wire harness

Low pressure regulator

1-3% by volume of Natural Gas in the air induction system

LEL (Lower Explosion Limit requires 5-15% by volume)

# APG Vehicular Dual Fuel Progress



## EPA Approvals

### CARB Executive Orders

MY 2009 & Older	456 Engine Approvals
MY 2010 & Newer	41 Engine Approvals
CARB EO	7 Engine Certifications

## Dual Fuel Experience

500+ APG DF Conversions in operation  
100+ million road miles of DF experience  
Filling the 350HP – 600HP natural gas gap

## Customer Feedback

Fuel Savings of \$.05 to \$.20 per mile  
Reliable design with high uptime  
Standard oil & engine maintenance  
No loss of power or torque

## Sustainability

NOx & PM reductions of 30% - 50%  
Eligible for emissions reduction grants  
Increase market share with customer

# APG Customers: 100 Million Miles of On-Road Dual Fuel Experience



State	Application
Louisiana	Forest Services
West Virginia	Coal Mines
Ohio	Rolled Steel / Aluminum
Georgia	FedEx Ground Contractor
Virginia	For Hire: Double-Trailers
Colorado	State Trucks
Kansas	Logistics
Missouri	Ethanol

State	Application
Illinois	Food Grade Bulk Hauling
Oklahoma	Dairy & Ice Cream / C Store
Texas	Top 100 For-Hire Fleet
Idaho	Buses – National Research Lab
North Dakota	Oil & Gas Fields
Oregon	Refuse Transfer, Food
Nebraska	Tankers, Logistics
Others	In Test

# APG: Emission Reduction Results



☑ APG's technology significantly reduces tailpipe **criteria pollutants** on Class 8 Heavy-Duty diesel engines

- Reduces NOx by 30%-50%
- Reduces Particulate Matter (PM) by 40% to 70%
- Reduces Non-Methane Hydrocarbons (NMHC) by 99%
- Reduces Carbon Monoxide (CO) by 80%-99%
- Reduces GHG Carbon Dioxide (CO2) by approximately 10%-13%



☑ APG's Turbocharged Natural Gas<sup>®</sup> technology used on Selective Catalyst Reduction (SCR) engines (2010 & newer) has achieved record low levels for NOx emissions (Detroit Diesel & Cummins ISX):

- **FTP-HDT** **Average NOx 0.098g bhp-hr**      **Lowest NOx 0.089g bhp-hr**
- **RMC 13** **Average NOx 0.078g bhp-hr**      **Lowest NOx 0.065g bhp-hr**
- 50% - 60% lower than the current 2010 NOx standard of 0.200g bhp-hr
- Test results from West Virginia University (WVU) certified emissions lab



# The Void in Low-NOx Engines Now Has an APG Solution



- CWI JV
- 6.7 Liter
- Spark Ignited
- 200 – 250 HP



- CWI JV
- 8.9 Liter
- Spark Ignited
- 250 – 300 HP



- CWI JV
- 11.9 Liter
- Spark Ignited
- 300 – 350 HP



- APG / SCR Retrofit
- 13 – 16 Liter
- Compression
- 350 – 600 HP

Future Low NOx Solutions

0.02 Near Zero (2016)

0.02 Near Zero (est. 2018)

0.10 Low NOx (est. 2017)

0.05 Low NOx (est. 2017)

0.02 Near Zero (TBD)

# Meeting United States & California Air Quality Objectives



- ☑ APG can reduce diesel usage on Class 8 Heavy-Duty trucks by 50%-60% with no loss of power.
- ☑ Dramatic & cost effective reduction of criteria pollutants for legacy on-highway Class 8 diesel engines (350 – 600HP) that can happen now.
- ☑ Provides an alternative low-cost method to accelerate and beat the mandated 2010 NOx emission standard for legacy diesel engines.
- ☑ Immediate air quality benefits in highly-impacted communities around ports and trade corridors.
- ☑ Substantial increase in the use of Renewable Natural Gas (RNG).



# Thank You



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