

# Cummins Westport Inc.

### **DOCKET**

09-ALT-1

**DATE** 

RECD. 9/24/2009

September, 2009



## Cummins Westport Inc. (CWI)

A Cummins JV Company

- CWI is a 50:50 joint venture company based in Vancouver, BC
  - Cummins Inc. world's largest builder of commercial diesels,
  - Westport Innovations Inc. world leader in gaseous fuel engine technology
- CWI offers 6 to 9 litre alternative fuel automotive engines. (CNG, LNG, LPG)
- Engines are manufactured by Cummins.
- Over 20,000 engines delivered worldwide
- Local parts and service support through Cummins Distributor network.





## Customer Experience-Diesel vs. NG

Just Like Cell Phones, Natural Gas Engines have Continued to Improve



	L 10 G	C 8.3	C Plus	′07 ISL G
Emissions	Better	Better	Better	Better
Reliability	Worse	Worse	Similar	Similar
Fuel Cost/Mile	Worse	Worse	Similar	Better*
Durability	Worse	Worse	Similar	Similar
LCC	Worse	Worse	Worse	Better*
Timeline	1989	1996	2001	2007

<sup>\*</sup>Must Have Fuel Price Differential to be lower



# Market Drivers Natural Gas Engines for Buses

### **Emissions Leadership**

- Meets Regulated 2010 EPA/Euro EEV
  - Lower greenhouse gas emissions



#### **Economic Benefits**

- Improved Reliability
- Improved Efficiency
- Lower total fuel costs

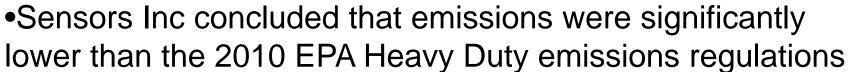
### **Energy Security**

- Reduced reliance on oil
- Biomethane capable
- Pathway to hydrogen



# ISL G & 2010 Regulated Emissions In-Use Results (equipment loaded on bus)

- Sensors Inc tested Sacramento Bus
- Used EPA in-use test procedure
  - Tests full load and speed combinations
  - •Followed bus on city and highway routes

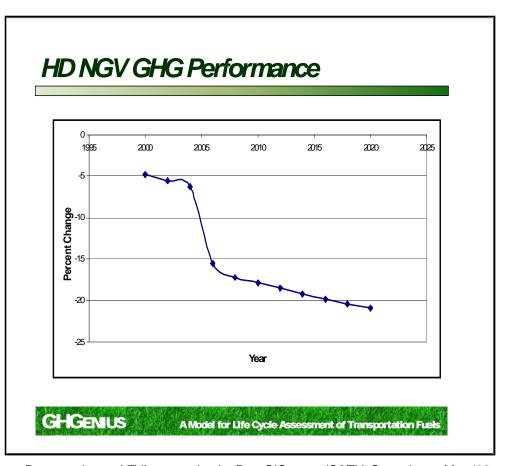






### Up to 20% Lower Greenhouse Gas Emissions

- As natural gas fuel economy improves, CO2 emissions are reduced
- CH4 emissions, adjusted to consider GHG impact are less than 10% of total GHG emissions.
- Well to Wheel analysis with GHGenius modeling tool predicts up to 20% WTW GHG emissions for natural gas vs. diesel.
- Using landfill gas or anaerobic gas as a biomethane fuel increases GHG difference to ~90%.
- Cummins Westport approves the use of biomethane that meets fuel specifications.



Source: Presentation to AFVI convention by Don O'Conner (S&T)2 Consultants May '08



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### Biomethane Profile: Hilarides Dairy - Lindsay, California

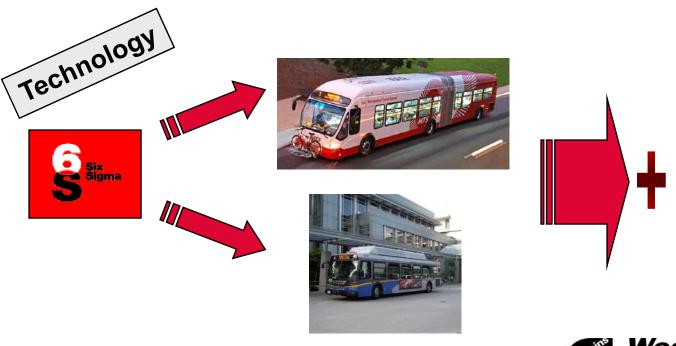
- Hilarides Dairy uses manure produced by 10,000 cows to generate 226,000 cubic feet of biomethane daily — enough to reduce the Central Valley farm's diesel fuel consumption by 650 gallons a day
- Two 18 wheel tractor trailers powered by ISL G 320 operating on compressed biomethane
- Project financed with a \$600,000 grant from the California Air Resources Board Alternative Fuel Incentive Program.





### Improved Fuel Economy

- 6 Sigma project measured percent fuel economy improvement between ISL G and C Gas Plus products at Orange County Transit Authority (OCTA)
- Demonstrated +5% improvement with measurement method agreed upon by Customer Focused Six Sigma (CFSS) team including customer
- In-use OCTA ISL G fleet data supports project findings





# 2010 Natural Gas Engine





### 2010 ISL G Natural Gas







#### **Aftertreatment:**

**Three Way Catalyst** 

### **Benefits**

- Passive device
- Maintenance Free

#### **Combustion:**

**Stoichiometric Cooled EGR** 

#### **Benefits**

- •30% more torque at idle
- •5% Better Fuel Economy

### Warranty - Every Coverage

- •Base Warranty for Bus/Shuttle, School Bus and Truck are the same as diesel
- Extended Coverage options are available for Truck and Bus Customers
  - •5 yr 200,000 mile or 300,000 mile Transit
  - •4 yr / 5 yr 150,000 mile Vocational -Truck
  - •4yr / 5 yr 150,000 mile Turbocharger -Truck
  - 6 yr, 300,000 mile Major Component All applications
- •All warranty programs administered per Cummins Standard Policies





# Natural Gas Applications

**TRUCK** 



BUS

**REFUSE** 

























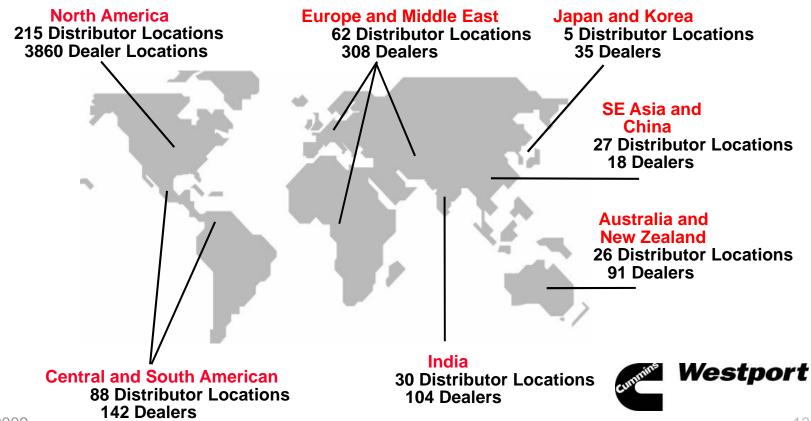






# CWI Natural Gas Engines Work Supported under same structure as Cummins Diesel

- •Cummins has the largest network of service providers in North America, with 50 percent more locations than the nearest competitor
- •Local service and support for CWI Products is available at any authorized Cummins facility



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