



Fuel Forward: Propelling Transportation with Natural Gas March 21, 2012

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### Westport at a Glance

### market focus

Transformation from petroleum-fueled to alternative-fueled engines.



### position

The global leader in gaseous fuel engineering and technology.





### strategy

Leverage IP to penetrate markets through relationships with marketleading OEMs.





DELPHI













### What does Westport do?

- Recognized as the authority for gaseous fuels, with expertise in:
  - global market intelligence,
  - fuel storage, delivery, and combustion technologies,
  - product integration, and
  - sustainable products, fuel use, and business practices
- Partner with global OEMs to integrate our industry leading technologies with their established and successful products and/or create new products
- Cultivate new markets where our expertise can rapidly establish a leadership role

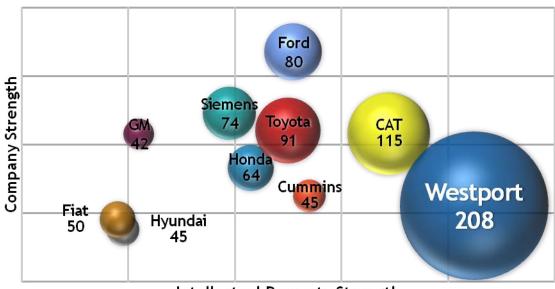
- natural gas
- propane
- hydrogen
- renewable natural gas (biomethane)

## Proprietary Technology Enables OEM NGVs

- Proprietary technology enables latest diesel and gasoline engines to operate on natural gas or other gaseous fuels
- Compatible with current and future engine technology; preserves and improves performance, efficiency, emissions
- Invested over \$250mm in R&D and commercialization since 1995
- Global patent portfolio pivotal to Westport's market leading position with OEM's
  - over 250 issued patents
  - includes over 65 issued US patents

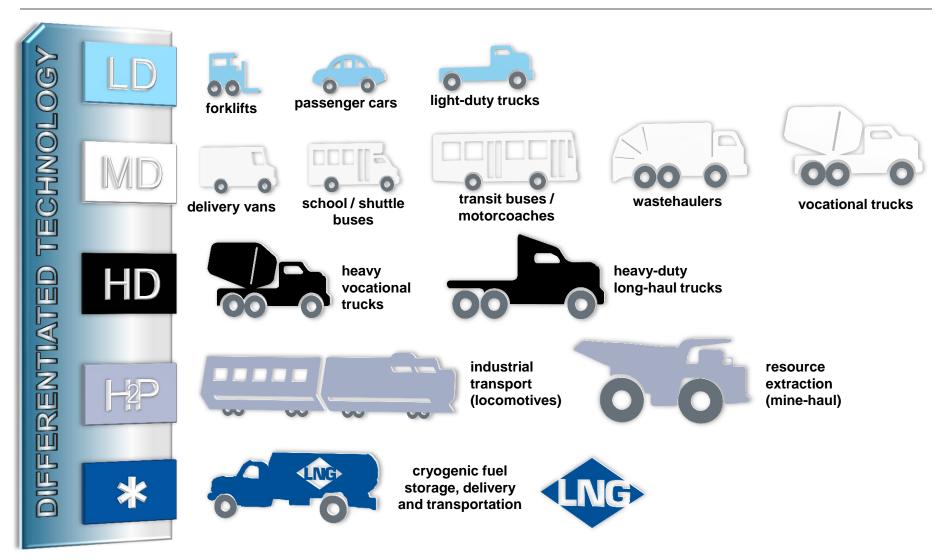
### **Top 10 Natural Gas Engine Companies**

(number of searchable\* natural gas related patents)



Intellectual Property Strength

# Leverage Technology Across Broad End-Market Applications



### Natural Gas Vehicle Market at a Tipping Point\*

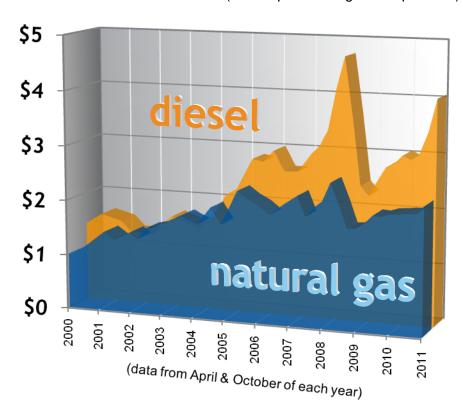
### **Global NGV Population**

(millions of natural gas vehicles)

#### average annual growth rate

### **U.S. Retail Fuel Prices**

(dollars per diesel gallon equivalent)



In Economics, the point at which a dominant technology or player defines the standard for an industry —resulting in "winner-take-all" economies of scale and scope.

# Natural Gas Vehicle Challenges

LNG	CNG	
Prolonged storage can result in boil-off	<ul><li>Compression of gas</li></ul>	
Limited to heavy duty and vocational vehicle uses	Requires access to pipeline	
Availability of current refueling stations	<ul> <li>Current refueling stations can have gas compression issues</li> </ul>	
Public misperceptions about safety	Slower refueling times	
Weight of on-board storage tanks	Bulk and weight of tanks for range	
Higher cost of materials used in tanks	■Cost of tanks	
Requires access to LNG liquefier	■Vehicle Range	



## Infrastructure Corridors - A Leap Forward





Innovative Co-Marketing Program to Develop North American Market for LNG Vehicles & Fuels

Consolidating key value chain components such as:

- fuel supply
- customer support
- comprehensive maintenance

into a single, user-friendly package.

Initial launch in North America centered in Alberta.





# Thank You

Les Markiewicz

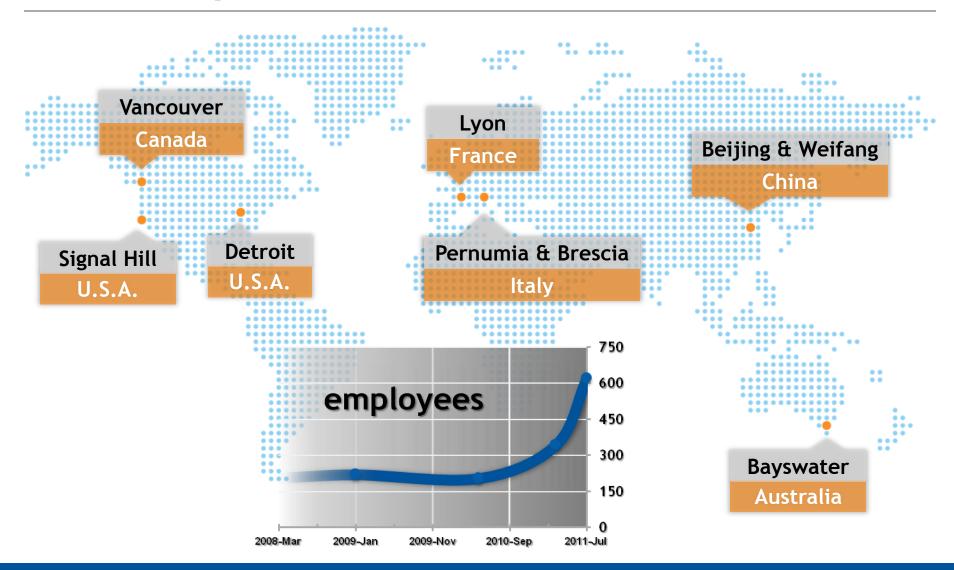
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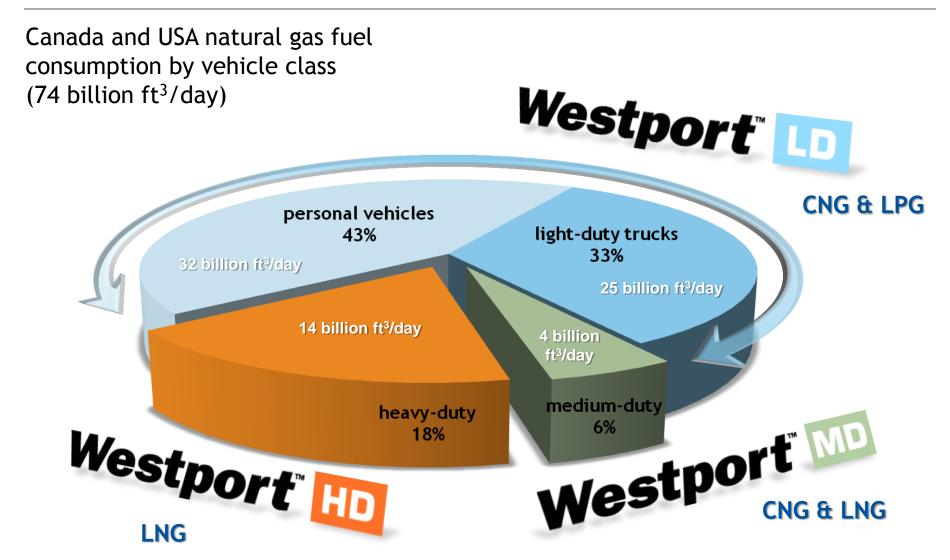


**Appendix Slides** 

## **Global Operations**



# **Transportation Energy Demands**

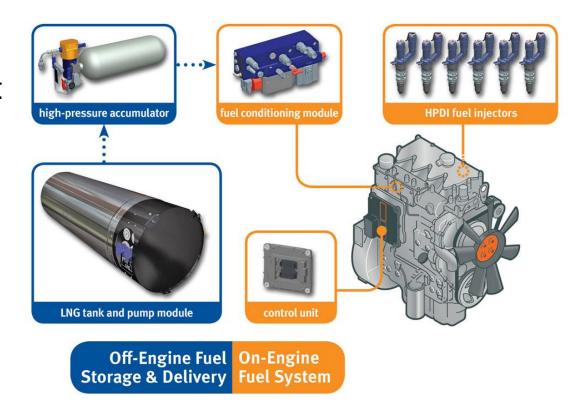


Westport source: 2007 EIA, NRCan



### The Westport HD System

- Natural gas engines with diesel-equivalent performance, range and efficiency
- Proprietary High
   Pressure Direct
   Injection technology
   (HPDI)
- Fuel injectors only change to engine



Complete LNG fuel solution including proprietary tanks/fuel



### Leading Global Market Position

Heavy-Duty Truck Manufacturers (working with Westport)			
North America	Europe	China	India
<ol> <li>Daimler Group         (Freightliner, Western Star) (34%)</li> <li>International (25%)</li> <li>PACCAR (Peterbilt, Kenworth) (23%)</li> <li>Volvo Group (Volvo Truck, Mack) (18%)</li> </ol>	1. Volvo + Renault (24%) 2. Daimler (21%) 3. MAN (16%) 4. DAF (16%) 5. Scania (14%)	1. FAW (22%) 2. Sinotruck (19%) 3. DongFeng (18%) 4. Shanxi Automobile (11%) 5. Beijing Automotive (10%) 6. Others (27%)	1. Tata (70%) 2. Ashok Leyland (19%) 3. Force Motors (5%) 4. Asia Motor Works (4%) 5. Volvo Global Trucks (1%)
source: NADA, Class 8 trucks for 2010	source: www.acea.be, HCV-Heavy Commercial Vehicles (Trucks) over 16t for 2010	source: Morgan Stanley Truck & Engine Chartbook, September 30, 2010	source: Morgan Stanley Truck & Engine Chartbook, September 30, 2010

Broad Set of Relationships Creates Global Footprint

















Volvo