

**EVERY
ALTERNATIVE.**

Cummins Westport Inc.

**Demonstration of Cummins Westport's
B Gas International Engine in Delhi Bus Fleets**

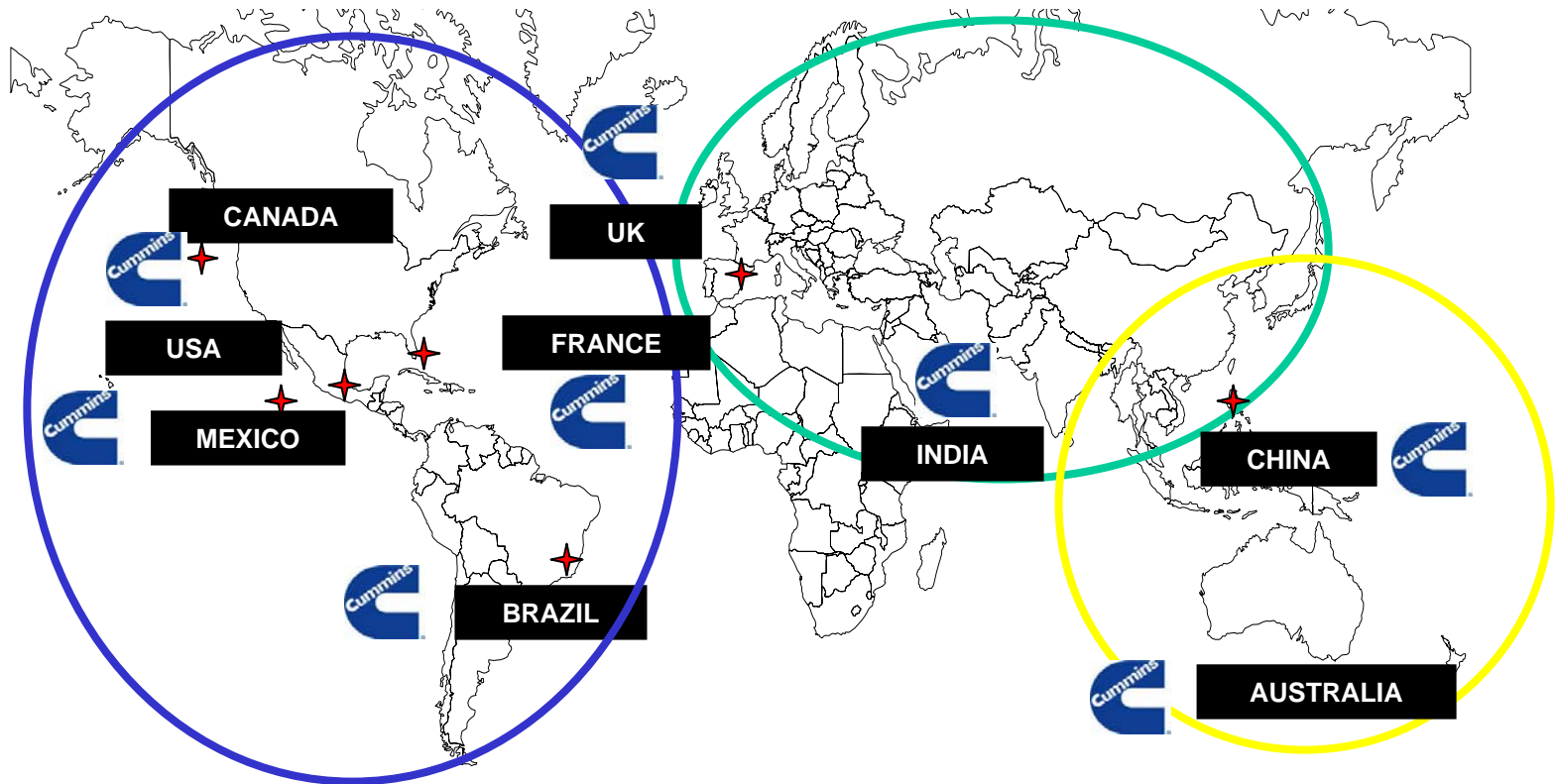
**GLOBE Conference
29-Mar-06**

Cummins Westport, a JV Company

- Cummins Westport Inc. (CWI) is a 50:50 joint venture company owned by Cummins Inc., the world's largest builder of commercial diesels, and Westport Innovations Inc., recognized as the world leader in gaseous fuel engine technology
- Cummins Westport focuses on 6 to 9 litre alternative fuel automotive markets on a global basis (CNG, LNG, HCNG, LPG)
- Cummins Westport is unique in its commitment and focus on global transit, school bus and truck alternative fuel markets

CWI- Worldwide Focus – Worldwide Support

*JV has a truly worldwide focus with specific target countries.
Cummins has the largest network of service providers.*



Universal parts availability & local service and support via the Cummins Global network of 550 independent and company-owned distributors and more than 5,000 dealer locations in over 160 countries and territories.

Product Line

B GAS
INTERNATIONAL

B GAS
PLUS

B LPG
PLUS



5.9 Litre

195–230 hp

420–500 lb-ft

C GAS
PLUS



8.3 Litre

250-280 hp

750 – 850 lb-ft

L GAS
PLUS



8.9 Litre

320 hp

1000 lb-ft

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BGI Engine Demonstration in India

- Introduction of CWI's B Gas International (BGI) engine to the Indian market
 - Modified version of 5.9 litre B Gas Plus for India
 - 150 hp, 195 hp, 230 hp
 - Bharat Stage III emissions (similar to Euro 3)
- Delhi bus fleets demo - 6 BGI engines
 - 2 x advanced, low floor transit buses
 - 2 x standard transit buses
 - 2 x intercity buses/coaches
- Partners
 - Cummins India Ltd
 - Tata Motors
 - Dynetek
 - ATFCan

BGI Engine Demonstration Overview

- Superior performance, fuel economy and emissions
 - BGI engine uses Lean Burn Spark Ignition (LBSI)
 - Compared to stoichiometric combustion engines:
 - Typically lower capital cost for stoich engines but
 - Lower performance and
 - Durability limitations in heavy duty applications
- Minimum one year demonstration
 - Buses to begin service late 2006/early 2007
- Next Steps
 - Vehicle integration engineering (Tata)
 - Demonstration fleet selection

B Gas International vs. B Gas Plus

Similarities

- Lean burn spark ignition
- 5.9 litre displacement
- 230 hp peak rating
- Bus & truck applications
- Same low-emissions capability

Differences

- Cost reductions for BGI
 - Mechanical throttle linkage (BGI) vs. “drive by wire” (B Gas Plus)
 - Eliminate certain fuel system sensors and on-engine fuel pressure regulator
- BGI to be manufactured in India by Cummins India Ltd, a subsidiary of Cummins

Indian Natural Gas Market Opportunity

- **India Supreme Court Mandate (July 1998)**
 - Lawsuit filed in 1985 to protect the environment
 - Not an uncommonly long legal process
 - Conversion of selected vehicle fleet in Delhi (New Delhi) to natural gas by March 2001
- **NGV Program Implementation**
 - Further mandates issued on natural gas conversion orders
 - Favourable CNG prices (more than half of gasoline price and one third of diesel price)
 - Acceleration of NG fueling station construction

NGV Use Worldwide

Top Ten Users of Natural Gas Vehicles		
	<i>NGVs</i>	<i>Fueling Sites</i>
Argentina	1,200,000	1,105
Brazil	600,000	600
Pakistan	410,000	423
Italy	400,000	463
India	200,000	185
US	140,000	1,300
China	69,300	270
Venezuela	50,000	140
Egypt	49,111	79
Ukraine	45,000	130

Source: International Association for Natural Gas Vehicles, 2004

- Surpasses US NGV population
- New Delhi converted more than 13,000 buses to natural gas
- New Delhi has largest NGVs per capita of any city in the world

Indian Natural Gas Market

DTC to replace fleet with luxury buses

HT Correspondent
New Delhi, June 13

ORDINARY CNG buses will no longer be registered in Delhi for intra-city routes. The State Transport Authority has decided that only modern low-floor luxury buses will replace the existing fleet. "The rule will



A high-capacity bus.

High-capacity bus corridor gets PWD approval



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icated corridor
een Ambedkar

- Mandate for NG buses in Delhi, Mumbai
 - Delhi has the largest fleet of NG buses in the world
 - Delhi to invest further in clean transportation technologies in preparation for the Commonwealth Games in 2010
 - Delhi Transport planning for Complete fleet replacement of present 3,500 buses
- Delhi Airport will procure CNG Buses for terminal service

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Natural Gas - A Sustainable Transportation Fuel

- Government involvement in a sustainable transportation policy
- Environmental protection - reduces emission levels
- Pathway to hydrogen - natural gas usage accelerates the transition to hydrogen fuel use in the future
- Energy security

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**Cummins Westport gratefully
acknowledges the support of TEAM and the
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A scenic landscape photograph showing a range of snow-capped mountains in the background, with green hills and valleys in the foreground under a blue sky with scattered clouds.