

Natural Gas – The Sleeping Giant in the Quest to Reduce Transport Related GHG Emissions

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The Problem

- Transport related GHG emissions increasing rapidly

The Solution

- 10 reasons why natural gas vehicles should be implemented to reduce emissions now...

1 - Range of Applications

- Motorcycles, Cars, Trucks, Buses
 - Mining trucks and everything in between.
 - Rail locomotives.
 - Ocean going ferries...
-
- No other 'alternative fuel' matches natural gas for diversity. Even gasoline doesn't match natural gas for diversity

2 – Up to 30% GHG reductions. 80%+ with biomethane



VW Passat TSI Ecofuel 1.4 Turbo	
Bi-Fuel	
CNG	124 g/km
Petrol	167 g/km
% Reduction	26%











Mercedes-Benz B 170 NGT	
Bi-Fuel	
CNG	135 g/km
Petrol	163 g/km
% Reduction	17%



Opel Zafira 1.6 Turbo	
Bi-Fuel	
CNG	138 g/km
Petrol	169 g/km
% Reduction	18%

LNG Heavy-Duty Truck 27% WTW GHG Emissions Reduction (British Columbia)

	Extraction	Processing	Fueling, transportation and storage	Emissions at end use	Total life cycle
Natural gas (LNG)	 78 g/km	 36 g/km	 150 g/km	 824 g/km	1088 g/km
Diesel	 227 g/km	 130 g/km	 12 g/km	 1114 g/km	1483 g/km

Source: NRCan GHGenius Model and Terasen (March 2008)

26.6% reduction

3 – Convert existing vehicles

- Light and heavy duty
- Diesel and gasoline
- More than 10 million converted vehicles operating on world's roads already

4 – Committed Vehicle Suppliers

- “Natural gas is the only real, immediate alternative to petrol.”
 Sergio Marchionne, CEO of Fiat Group & Chrysler Group.
- “Methane gas is by far the most accessible fuel as an alternative to diesel.”
 Lars Mårtensson, Environmental Director of Volvo Trucks....
- Maruti Suzuki (India) released 5 new OEM models in August (factory builds).



5 – Available NOW

- Proven technology
- No need to wait for ‘tomorrow’

6 – Marine Applications

- Extremely heavy polluters using ‘bunker fuel’
- 1 cargo ship = 50,000 cars

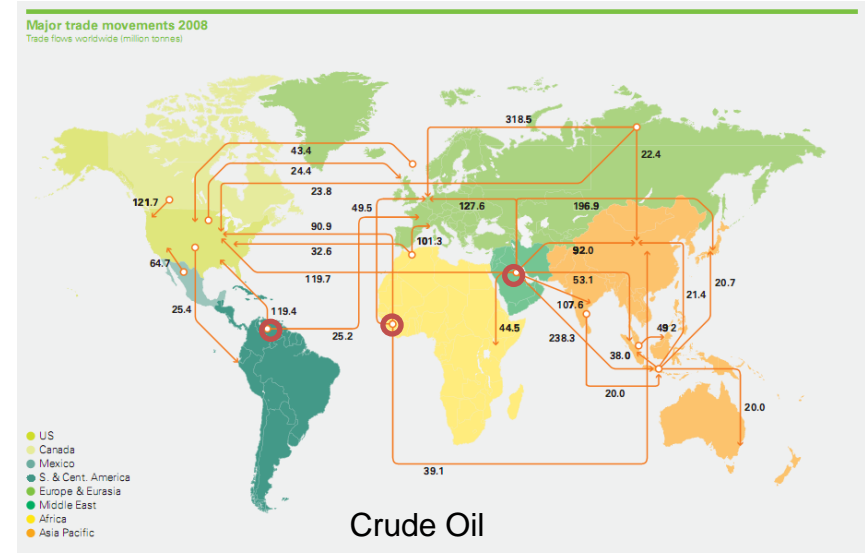
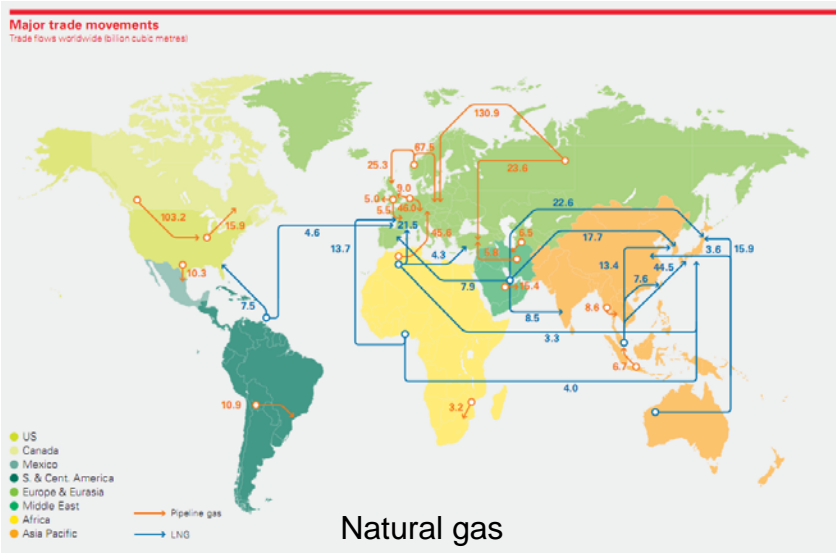


7 – Abundant Fuel Supply

- 63 years reserve/production (R/P) ratio for natural gas and growing
- Excludes North American shale reserves and biomethane sources
- Only 46 years for oil

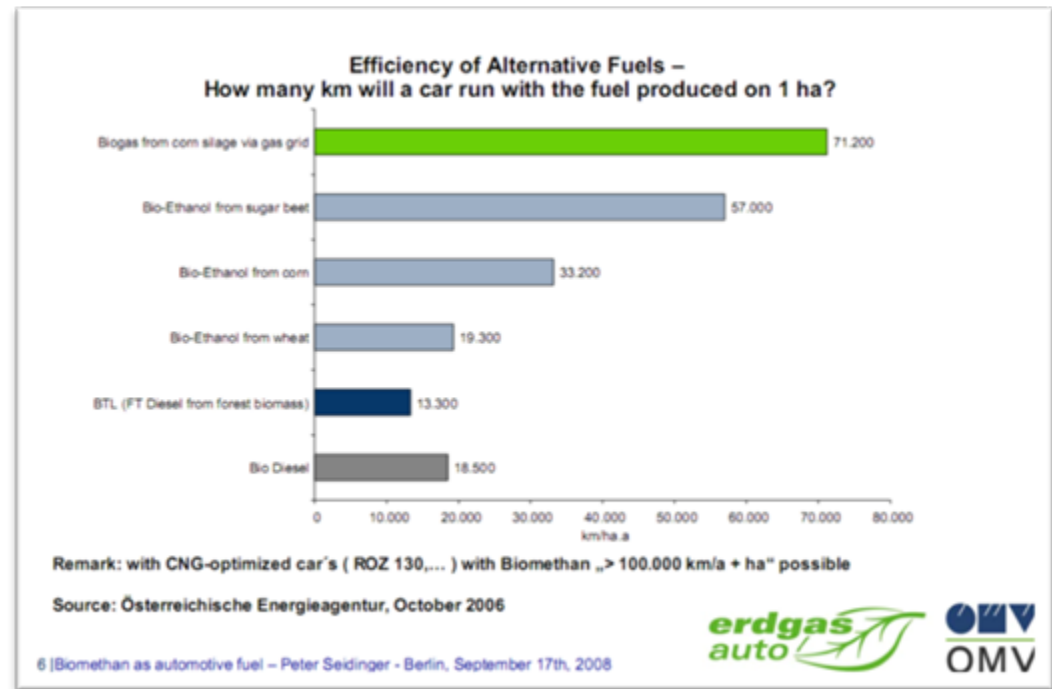
8 – Diverse Fuel Distribution

- Increased energy security
- Less price/supply manipulation

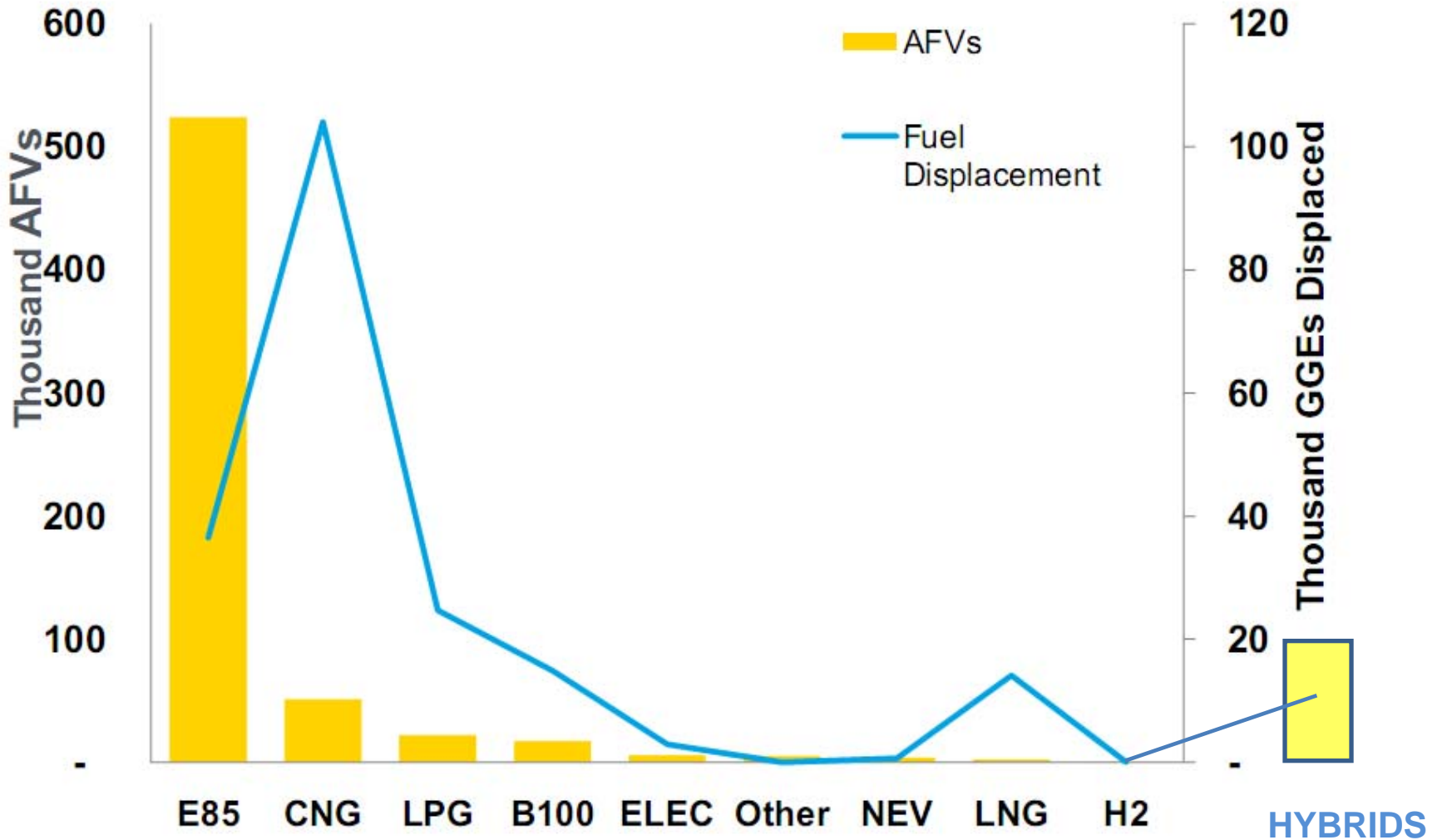


9 – Renewable Too!! Biomethane.

- Any waste or organic source
- Eunomia study – Biogas for vehicles has lowest carbon footprint.

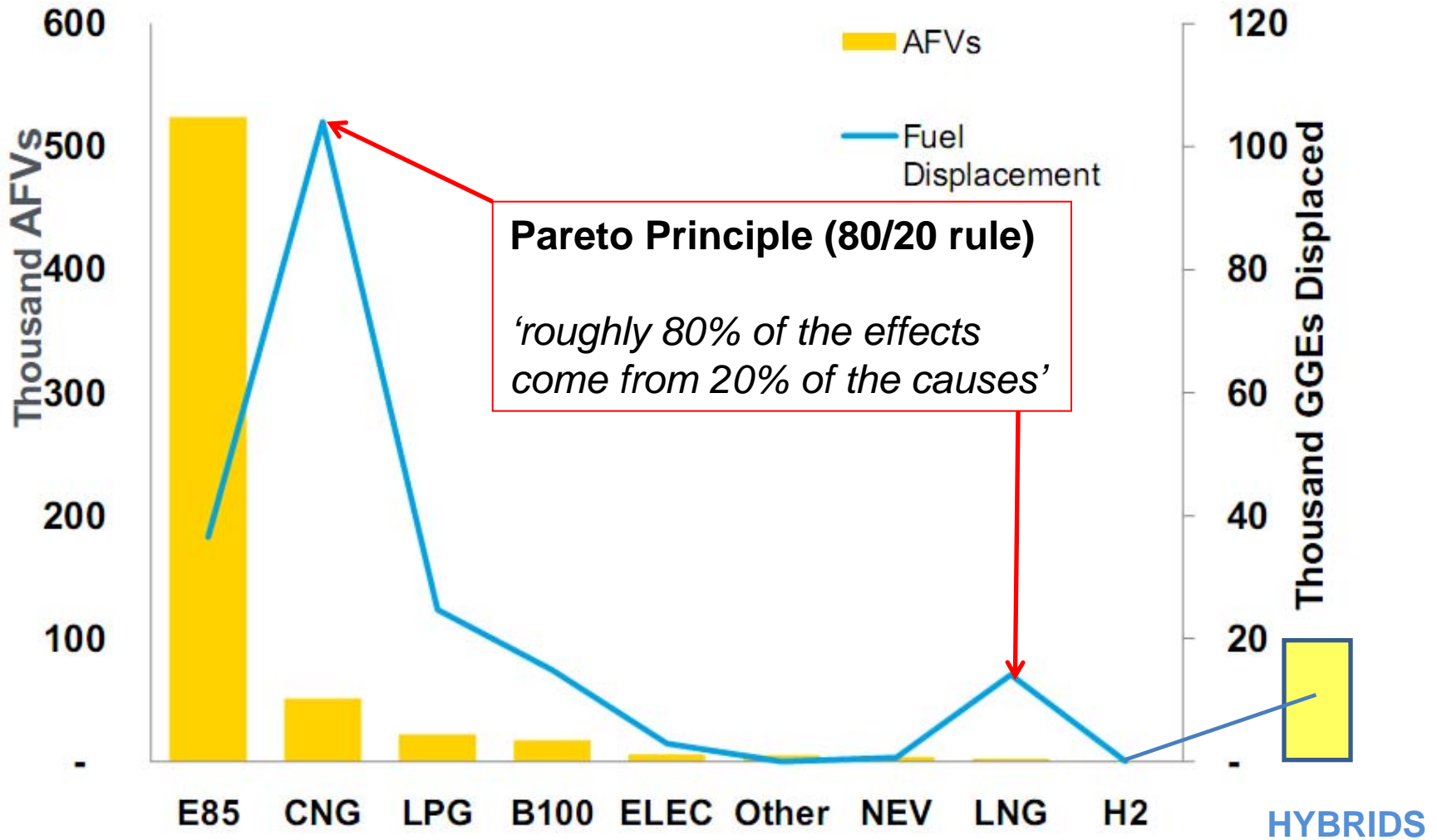


10 – Maximum Crude Oil Displacement



Source: Clean Cities Annual Metrics Report 2008, August 2009

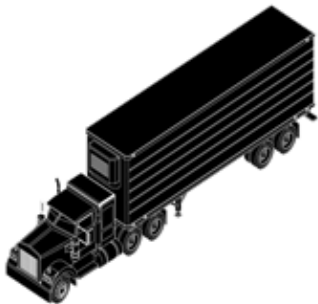
10 – Maximum Crude Oil Displacement



Source: Clean Cities Annual Metrics Report 2008, August 2009

Voluntary Carbon Credit Program

1. Vehicles from global fleets “bundled” into the WCP
2. Customers required to sign emission transfer agreements transferring ownership of emissions to Westport
3. Westport verifies emissions data via annual survey
4. Carbon is monetized and rebate cheques are issued to customers annually
5. Customer retains carbon glory, has evidence of certified emission reductions



40 tonnes per year x \$20 per tonne = ~\$800 per vehicle*

* Carbon rebate per vehicle dependent on carbon price per tonne and vehicle operating data collected via annual survey

Westport™

Creating a Better World.

Total estimated reductions over ten years (tonnes of CO_{2eq})

10,651,461



Established markets

- Top ten nations accounted for 89% of total NGV population at end of 2009 (10.01) million)
- Where are the
OECD
Countries?

Dec 2009	NGVs	Stations
Pakistan	2,300,000	3,068
Argentina	1,807,186	1,851
Iran	1,665,602	1,021
Brazil	1,632,101	1,704
India	975,000	560
Italy	628,624	730
China	450,000	1,339
Colombia	300,000	460
Ukraine	200,000	285
Bangladesh	177,555	500

Increased Political Commitment Will Lead To...

- Lower GHG emissions
- Improved Air Quality
- Increased Energy Security
- Reduced Oil Imports
- Better Control of our Economies



NGV Global

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- Web sites
www.iangv.org (Industry Info)
www.ngvglobal.com (Weekly News)
www.ngvglobal.org (Association Info)
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