

Natural Gas Trucks - Weights & Dimensions

Task Force on Weights & Dimensions Policy
November 26, 2014 – Montreal, QC



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Agenda

1. North American context
2. Factory-built engines & vehicles
3. Energy density challenge
4. Canadian fleets using natural gas tractors
5. LNG & LNG fuel systems – weight impacts
6. Weight allowance considerations
7. Ongoing technology improvements

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North American Context (1)

- Natural gas has been used as a vehicle fuel in North America for more than 30 years
- In North America today:
 - Estimated 155,000 vehicles & 1,515 stations
 - < 1% of onroad vehicles are natural gas
 - Natural gas = 1% of energy used in transportation
- For use as a vehicle fuel, natural gas must be:
 - Compressed to 3,600 psi = CNG
 - Liquefied at -162° Celsius = LNG

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North American Context (2)

- Renewed natural gas vehicle interest driven by:
 - Supply outlook > 100 years at current demand
 - Lower emission fuel
 - Simpler technology with no DPF or SCR system required
 - Fuel cost savings compared to diesel
 - Ability to operate on renewable natural gas from waste sources for near zero emissions
 - > 50 models of factory-built trucks, buses

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FACTORY BUILT ENGINES



ISB6.7G
2016

6.7 Litre


Spark Ignited
SEGR
Three Way Catalyst



ISL G

8.9 Litre

Spark Ignited
SEGR
Three Way Catalyst





ISX12 G

11.9 Litre






Spark Ignited
SEGR
Three Way Catalyst

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9 Liter Engine Availability

OEM	Freightliner	Peterbilt	Kenworth	Volvo	Navistar
					
Model	M2 - 112 SD - 114	320 384 365	T800SH W900S T440 T470	VNM	TranStar
Engine	ISL G 320 ISL G 300	ISL G 320	ISL G 320	ISL G 320	ISL G 320
Application	6x4 Tractor 4x2 Tractor 4x2 Truck 6x2 Truck Vocational	Tractor Vocational Mixer	Tractor Vocational Mixer	Tractor	Tractor

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12 liter Engine Availability

OEM	Freightliner	Peterbilt	Kenworth	Volvo	Mack	Autocar
						
Model	Cascadia Day Cab, Sleeper *	320 384 365 579 * 567*	W900S T660 T800 SH T680 *	VNL	Pinnacle	Xpeditor
Engine	ISX12 G	ISX12 G	ISX12 G	ISX12 G	ISX12 G	ISX12 G
Application	Tractor	Refuse Tractor Vocational	Tractor Vocational	Tractor	Tractor Vocational	Refuse

* New chassis for 2014



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Energy Density Challenge



Diesel Fuel



Liquefied Natural Gas (LNG)
1.7 x volume



Compressed Natural Gas (CNG)
> 3.8 x volume

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LNG Highway Tractors in Canada



**Robert Transport
LNG Highway Tractor
Boucherville, QC**

- Total of 280 LNG highway tractors including:
 - Robert Transport – 120 LNG tractors Montreal to Mississauga
 - Vedder Transport – 50 LNG tractors in Abbotsford, BC
 - Ferus – 21 LNG tractors in Grande Prairie, AB
 - Bison Transport – 15 LNG tractors in Calgary, AB
 - Loblaw – 5 LNG tractors in Mississauga, ON

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LNG Fuel System ~ 140 DGE System



2 X 70 DGE Frame
Mounted System: 2,200 lbs
Full

~700lbs incremental weight difference when factoring diesel deletes

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LNG Highway Tractors in Canada



Minimax LNG Tractor
Cornwall, Ont.

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- Two saddle tanks for 120 DGE (450L) system;
- 90" frame rail needed 195" WB
- Quebec City to Cornwall

CNG Highway Tractors in Canada



ColdStar Solutions
CNG Highway Tractors
Langford, BC

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- Vancouver Island-based
- 10 Mack CNG tandem axle tractors out of fleet of 45
- Twin, 45 DGE tanks; 191" WB; 250 km return daily
- 80,000 lbs GVWR
- ~ 1,000 lbs (450kg) more than comparable diesel truck
- 335 diesel litre equivalent

Ongoing Technology Improvements

- 160 DGE (up from 155 DGE) and weighs 500 lbs. less than the previous model (3,000 lbs full/ 1,400 kg)
- four cylinders (Type 4) for a total weight of 3,000 pounds and requiring 31 1/4" of frame rail
- Carbon-fibre tanks 70% lighter than steel
- stand-alone system or packaged with up to 126 DGE side-mounted systems for a total of 286 DGE
- 3,000 lbs (BTC)+ 2,000 lbs (frame rail) = 5,000 lbs CNG system



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Weight Allowance Considerations



**Saddle Creek CNG Highway Tractor
(155 DGE BTC)
Florida**

- Weight allowance increase to 1,000 kg would cover most configurations
- Removes barrier for natural gas use for certain types of fleets
- British Columbia allowance of 1,500 kg on heavy haul routes

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US Weight Allowance Considerations

➤ The Natural Gas Long Haul Truck Competitiveness Act

➤ Bypartisan bill introduced in late July, would let the Department of Transportation permit natural gas trucks to exceed the 80,000-pound Interstate limit by the additional weight of their tank and fueling system.



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