

Weight Issues with LNG Trucks



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Overview

- LNG project at Robert
- How does it work ?
- LNG vs Diesel
- LNG truck technical issues
- Conclusion
- Questions



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LNG Project at Transport Robert

- Why LNG ?
- Our partners
- Project planning
- Infrastructures
- Current status



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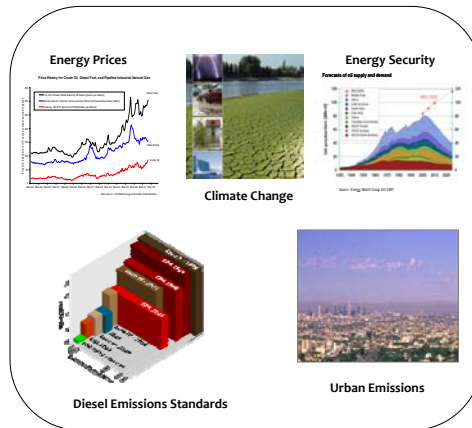
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Why LNG ?

- LNG Fuel benefits:
 - Energy security
 - Urban emissions reductions
 - GHG reductions
 - Economic lifecycle benefits
 - Petroleum price risk mitigation



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Our Partners

- Gaz Metro Transport Solutions
LNG and infrastructure
- Westport Innovations
GX Engine Provider
- Peterbilt of Canada
- Camions Excellence Peterbilt
LNG Truck Manufacturer



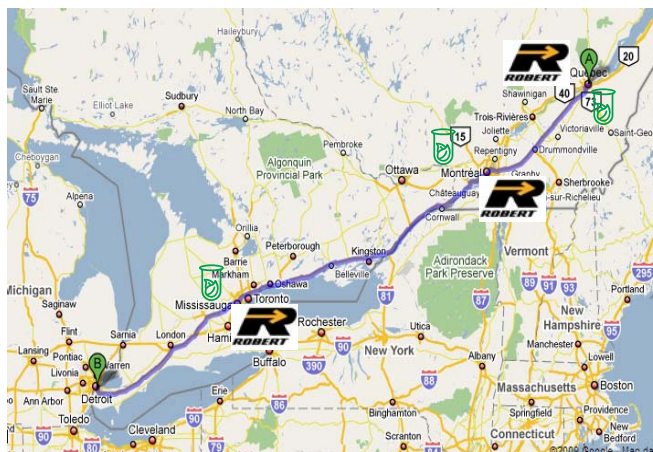
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Project planning

The Blue Road



LNG
Station



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Infrastructures



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Current Status

- LNG Stations:

Boucherville is operational

Mississauga will open in January

Lévis is scheduled for spring 2012



- Trucks:

8/180 new Peterbilt trucks received

8 Kenworth T800



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How does it work ?

The Westport GX LNG System

- Liquefied Natural Gas (LNG) Fuelled Heavy-Duty engine
- Compression Ignition Engine (no spark plug) - Pilot ignition using less than ~5% diesel
- Direct injection of both fuels into combustion chamber
- No internal changes to engine with exception of injectors
- Fully integrated LNG fuel system
- Factory installed – full warranty

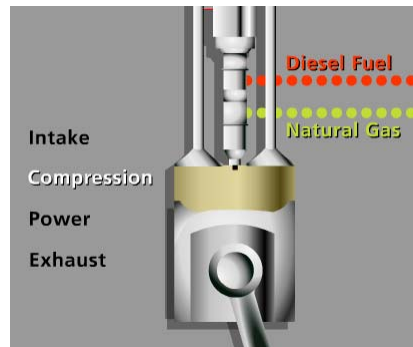


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GX Methodology

- Operates using diesel combustion
- Compression ignition – no spark plug
- Natural gas injected at high pressure at end of compression stroke
- Diesel Engine Performance:
 - Same power and torque
 - Same or higher efficiency



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LNG vs Diesel

- Cryogenic fuel
- LNG Tanks
- Methane detection system



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Cryogenic Fuel

- Liquefied Natural Gas
- Odourless and Colorless
- Stored at -250°F / -160°C
- Turns to vapour when warmed
- Non-corrosive / Non-toxic
- Vapour lighter than air
- Higher flashpoint than diesel



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LNG Tanks

- High grade stainless steel
- Double walled with vacuum space
- High quality standards
- 120 US gallons capacity per tank



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Methane Detection System

- Every truck is equipped
- 2 sensors for day cab (engine & cab)
- 3 sensors for sleeper (engine, cab & sleeper)
- Display monitor inside and outside



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LNG Truck Technical Issues

- Weight Distribution
- Electrical Demand
- EPA 2010 Regulations
- Keeping MPG Performance
- Going Greener
- Modifications



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Weight Distribution



New Truck
With
Driver & Fuel

↓
5562 kg
12251 lbs

↓
4091 kg
9005 lbs



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Weight Distribution

- Dry Weight (day cab with one LNG tank)
 - Diesel: 15,503 lbs / 7032 kg
 - LNG: 16,039 lbs/ 7276 kg
 - + 536 lbs / 243 kg
- Dry Weight (with two LNG tanks)
 - + 1149 lbs / 522 kg



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Electrical Demand

- Constant demand from methane detection system (450 mA)
- Need to add third and fourth battery to compensate (+ 100lbs / 46kg)
- Need CCAs for winter start
- APU to keep the batteries charged up (+ 425 lbs/ 193 kg)



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EPA 2010 Regulations

- GX engine is EPA 2010 certified
- Same systems as diesel truck (DPF & SCR)
- Need to carry 3 fuels onboard (LNG, Diesel & Urea)
- Spacing



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Keeping our MPG Performance

- Truck fairings
- Single wide tires
- Eliminate Idling
- APUs for cab heating and A/C
- Minimize gap with trailer
- Optimized driver behaviour



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Going Greener

- LNG trucks generate 25% less GHGs
- LCVs will generate 58% less GHGs
- Install electrical heating & A/C for sleepers (to replace diesel APUs)
- Install solar panel to supply electrical power for methane detectors
- Shorter trucks to reduce trailer gap



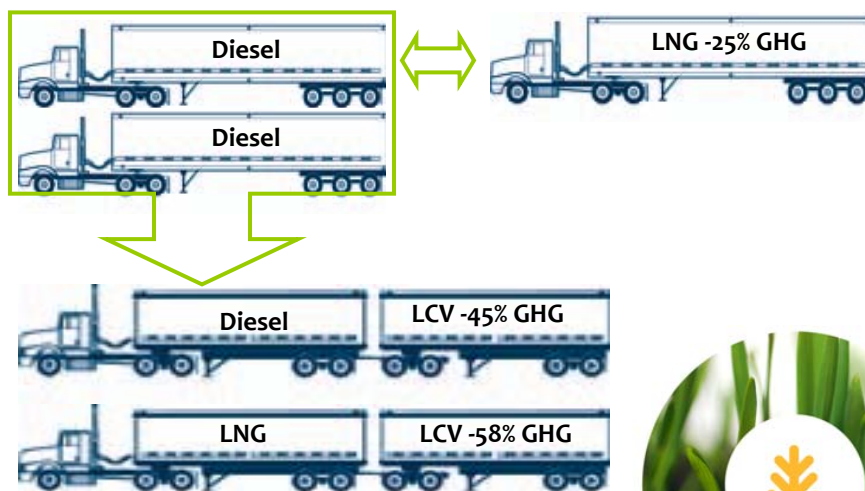
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GHG Reduction



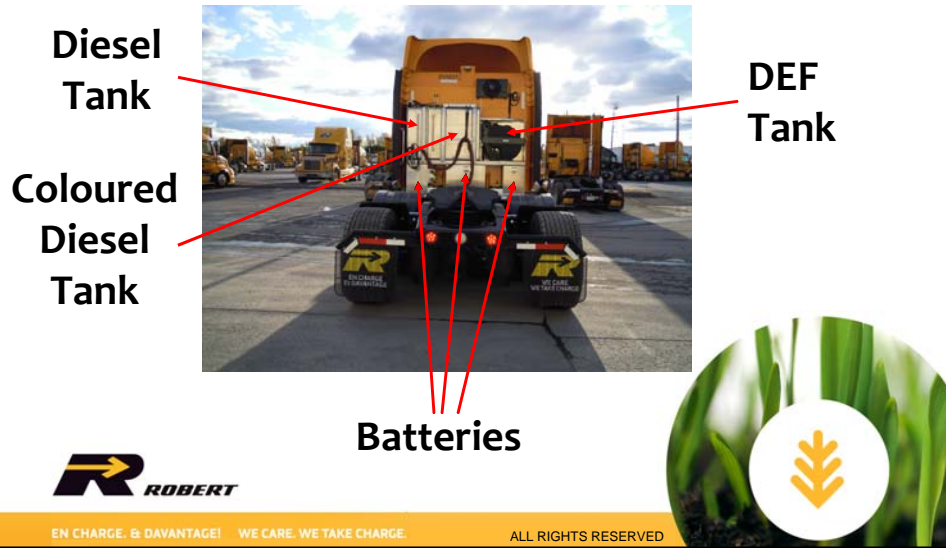
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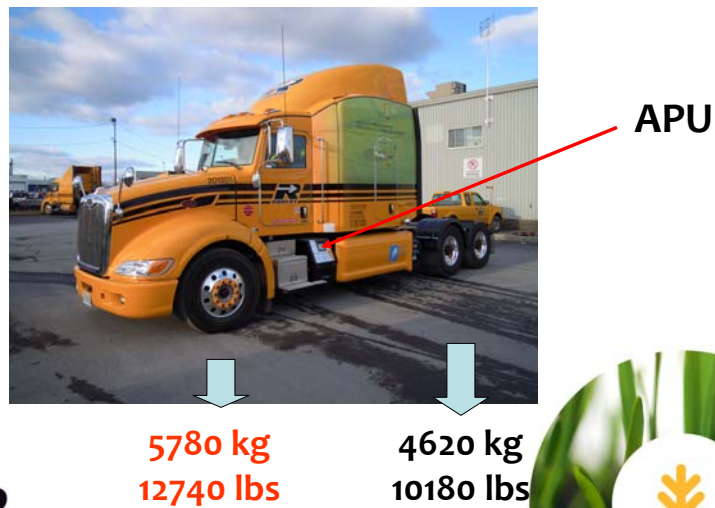
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Modifications (Ultimate Solution)



New Weight Distribution



Conclusion

- Create new regulations for LNG and/or CNG trucks for an easier integration.
- If we want to reduce GHGs, we need to adapt the current regulations.
- Need more weight allowance for LNG trucks, mainly on front axle (up to 635 kg/ 14,000 lbs) .



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Questions

Merci !
Thank you !



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