

LNG for Road

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*Dany Lebrun
Nick Scheffer*



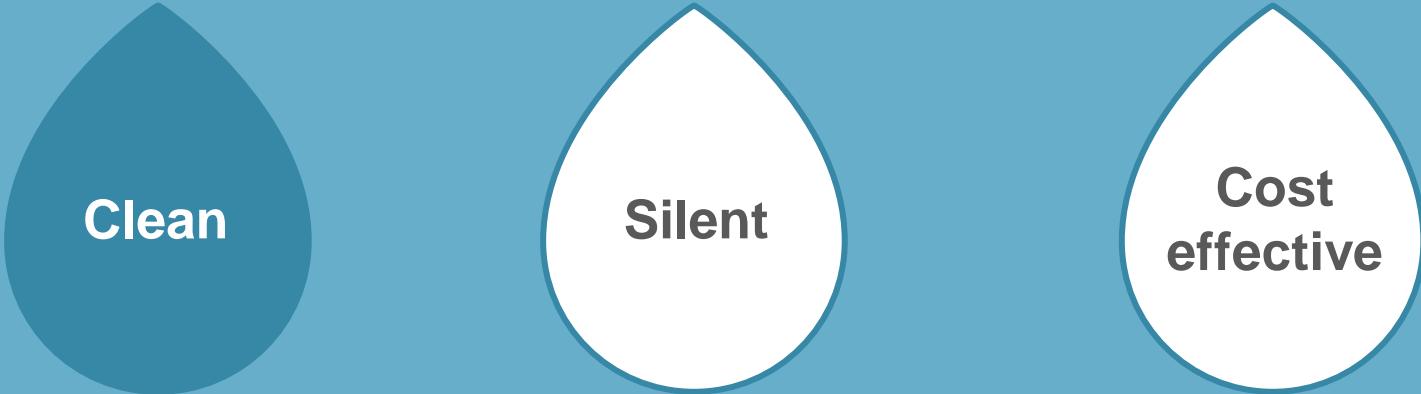
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- Type of transport?
- Supply of LNG
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Why?

The case for LNG in Road Transport



Clean

Silent

Cost
effective

Drive for CO2 reduction

Way's to reduce CO2 footprint by transportation companies and shippers

- Modernize fleet
- Increase payload and load optimization
- Use larger vehicles
- Fuel save driver programs
- Night distribution
- Platooning
- **Use a cleaner fuel**



LNG as an alternative clean fuel

Emissions

- CO2 reduction of 10 – 20%, when driving
Bio-LNG this will increase to 70-80%
- NOx reduction of 38% compared to EURO
6 limit
- Particle matter reduction of 93% compared
to EURO 6 limit

The case for LNG in Road Transport



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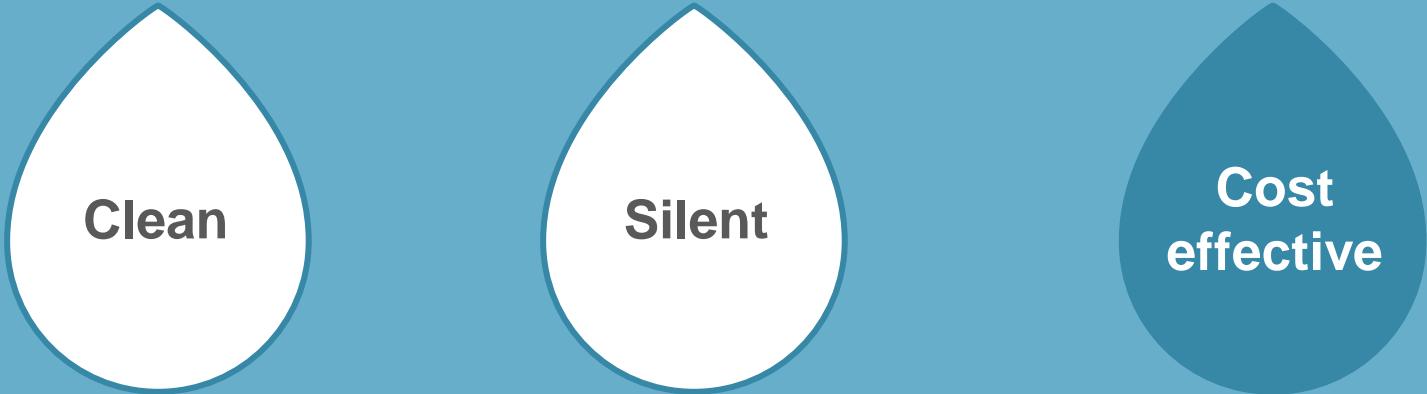
Cost
effective

LNG as a way to reduce noise

- Noise reduction is one other main advantage of driving with LNG.
- Low noise level allows best possibilities for night distribution. Which will save fuel since transporters can avoid traffic at congested times.
- LNG trucks comply with a max noise level of 72 dB(A)



The case for LNG in Road Transport



Clean

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Cost
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The business case for LNG

- Competitive range of Vehicles 600 – 750 km with one fuel tank, 1300 km with two large tanks
- Stable pricing of LNG
- No excise in Belgium! (Netherlands excise rate of 217 EUR per ton)
- Excellent consumption rates (25-28 kg per 100 km)
- Admittance in inner cities; environmental zones and during hours when there is a noise limit



Look at the total cost of ownership

Investment

- Purchasing costs
- Interest
- Depreciation
- Residual value

Fixed costs

- Driver salary
- Insurance
- Taxes

Variable costs

- Maintenance & Repair
- Breakdown costs
- Fuel costs
- Tyres
- Refuelling time

Type of transport

LNG for heavy duty and/or high utilization vehicles

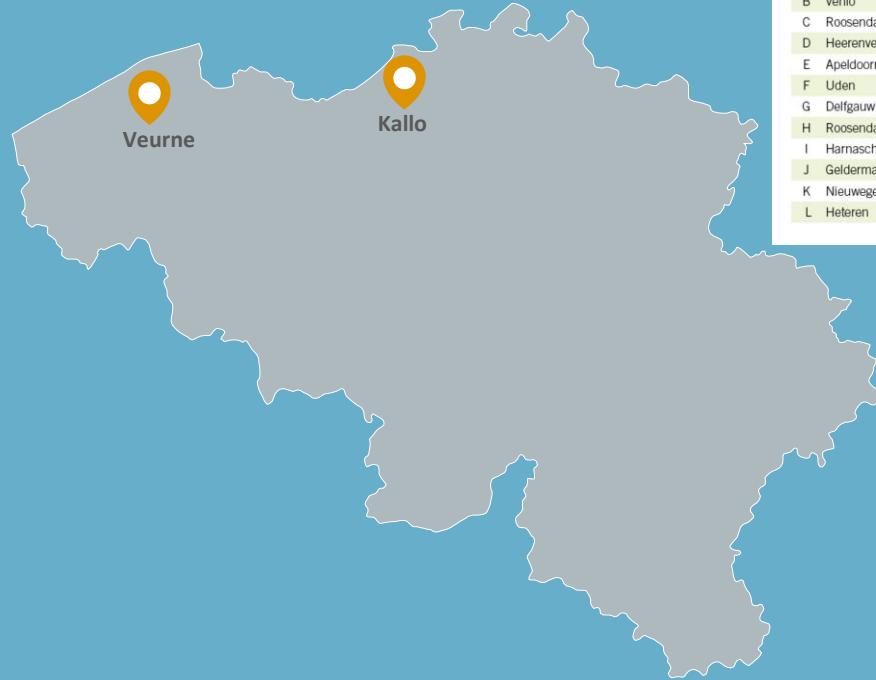
<i>Fuel</i>	<i>Light Vehicle</i>	<i>Heavy Vehicle</i>
Diesel	<----->	
Petrol	<----->	
Electric	<----->	
LPG	<----->	
CNG	<----->	
LNG		----->

In our view

<i>Transport type</i>	<i>Character</i>	<i>Weight</i>	<i>Distance</i>	<i>Vehicle type</i>
Supply of Inner city	Low weight, lot of addresses	Limited	Limited	Electrical, CNG
Supply of region	Less addresses, multiple cities	7,5 – 20 ton	Regional	Hybrid, CNG
Supply retail stores	Multiple big cities per ride	> 15 – 30 ton	Provincial	LNG, Diesel
Supermarkets	1 city, 1 a 2 addresses per full trailer	> 30 – 40 ton	National	LNG, Diesel
International	Big distances	> 30 ton	International	LNG, Diesel

Supply of LNG

LNG truck network



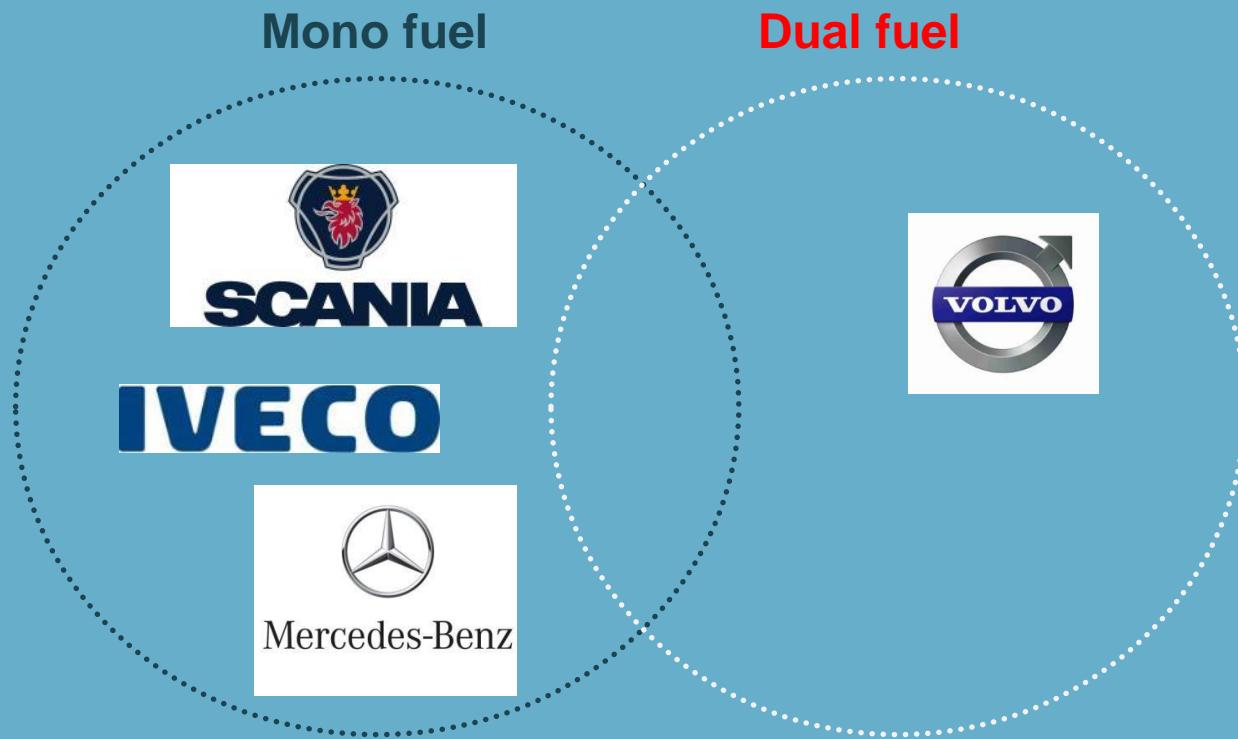
Waar kunnen trucks LNG tanken?

Plaats	Bedrijfsnaam
1 Duijven	Engie
2 Leeuwarden	Engie
3 Zaandam	ENN
4 Oss	ENN
5 Zwolle	LNG24
6 Borculo	Lng Achterhoek
7 Rotterdam	Linde Gas
8 Tilburg	Rolande LNG
9 Veghel	Rolande LNG
10 Utrecht	Rolande LNG
11 Rotterdam	Shell
12 Waalwijk	Shell
13 Pijnacker	Shell
14 Amsterdam	Shell



Proven technology

LNG Truck availability



Scania and Iveco have a EURO 6 LNG truck available

LNG Truck availability

Camions Euro VI au LNG

- IVECO Stralis Hi-Road



- Scania P-serie



LNG Truck availability

Business case (NL)

IVECO Stralis LNG

- 10x IVECO Stralis LNG Distribution en Supermarchés
- 2 ans > 2 millions de kilomètres
- Consommation de carburant: 28 kg/100 km
- Camion Diesel comparables: 31L/100 km



LNG Truck availability

Coût d'utilisation (source Iveco)

Distribution Supermarché	Diesel Euro VI	LNG Euro VI
• <u>Consommation/ 100 km</u>	31 L	28 kg
• <u>Investissement net</u>	+ € 35.000,-	
• <u>Km total(7 ans)</u>	750.000 km	
• <u>Quantité de Diesel</u>	232.500 L	
• <u>Quantité de LNG</u>	210.000 Kg	
• <u>Economie de carburant avec LNG</u>	Différences quantités* prix du Diesel + diff. de prix LNG <-> Diesel	
• Exemple Belgique:	$22.500 * 1.14 + 210.000 * 0.15 = €57.150$	

LNG Truck availability

Coût d'utilisation (source Iveco)

Distribution locale FR	Diesel EEV	LNG EEV
• Conso. carburant/ 100 km	30 L	25 kg
• Investissement net		+ € 35.000,-
• Distance totale (7 ans)	750.000 km	
• Quantité de Diesel	225.000 L	
• Quantité de LNG	187.500 Kg	
• Economie de carburant avec LNG Différences quantités* prix du Diesel + diff. de prix LNG <-> Diesel		
• Exemple FR: $37.500 * 1.07 + 187.500 * 0.27 = €90.750$		

LNG Truck availability

Coût d'utilisation: Conclusion

- **Un IVECO Stralis LNG offre:**
 - 20-40% d'économie de carburant
 - 6-8% de réduction des coûts d'utilisation
 - Economie suppl. Avec l'IVECO Stralis au LNG car livré d'origine ex-usine IVECO
 - Rayon d'action: 750 - 1400 km autonomie

Source Iveco

LNG Truck availability

Scania: Average LNG consumption

Summary results of demo vehicles Allison

Summary demo activity 10/11/2014 - 20/08/2015

Total distance during demo period: 70.371 km

Total amount of LNG fuel during demo period: 20.677,54 kg

Average LNG consumption: 29,38 kg/100km

Summary results of demo vehicles Manual

Summary demo activity 26/11/2014 - 14/10/2015

Total distance during demo period: 27.949 km

Total amount of LNG fuel during demo period: 7.206,07 kg

Average LNG consumption: 25,78 kg/100km

Vision d'avenir du LNG pour le transport.

- En 2020 en Europe:
 - 10.000 camions au LNG
 - 100 stations LNG
 - Blue corridor
- Evolution camions:
 - Iveco fin 2016 Camion 400cv (maintenant 330cv)
 - Scania fin 2017 Camion 400cv (maintenant 280 et 340cv)



Technology

Examples of station service.



Examples of station service.



Examples of station service.



Examples of station service.



Examples of station service.



Examples of station service.



Examples of tank for truck.



The End

Thank you for your attention

Questions/Remarks?

Un projet LNG Industrie et / ou transport?

N'hésitez pas à me contacter pour faire l'étude

Dany Lebrun

Business Developer Industry Wallonie

Primagaz Belgium

Mobile: +32(0)478880300.

dlebrun@primagaz.be