

Vos Logistics' experience with **LNG** in road transport: a pioneer's tale



IGRC TW 3-5
18 September 2014

Annemarie Timmermans
LNG Project Manager

Vos Logistics Company Profile & Strategy

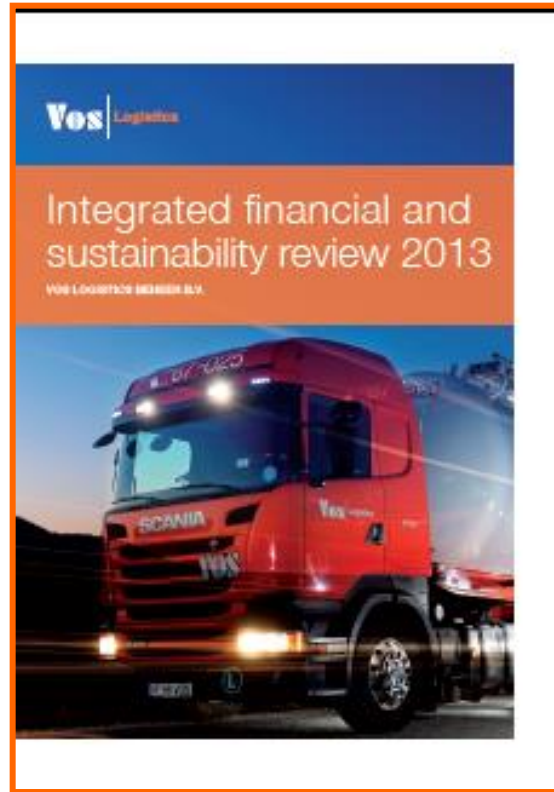
Facts & Figures



- Company founded in 1944
- 25 locations in Europe
- 1,900 employees
- 1,200 trucks (own and subcontractors)
- 3,000 transport units (palletized/dry bulk)
- 170,000m² European warehousing capacity
- International transport network (packed & bulk)
- Customized/dedicated logistic solutions
- State of the art IT infrastructure



Sustainability: Annual Integrated Reporting



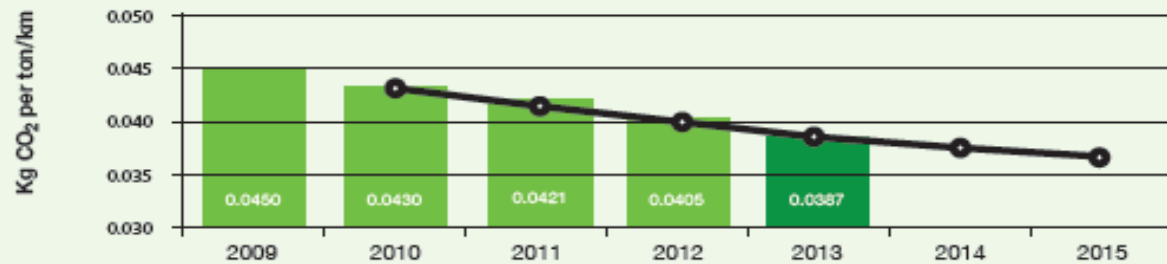
2010: sustainability targets set for 2015

8 KPI's, measured and reported every month through KPI dashboard

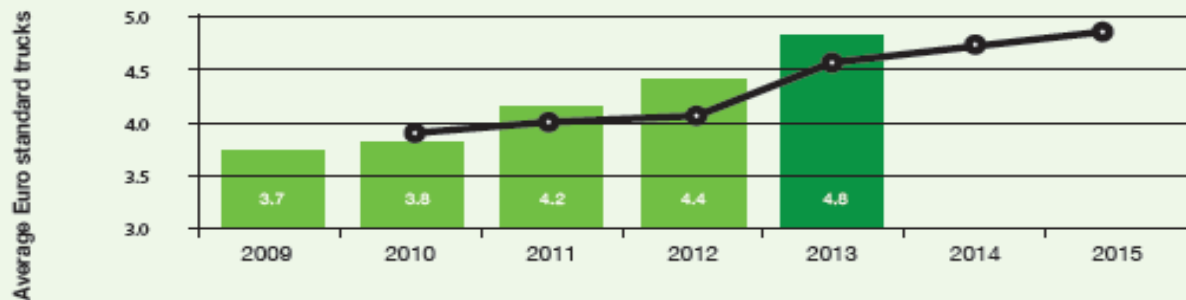
Download the full reports at www.voslogistics.com



Kg CO₂ emission fleet per ton/km



Fleet's average



Sustainability = “eco-safe-logistics”

Technology

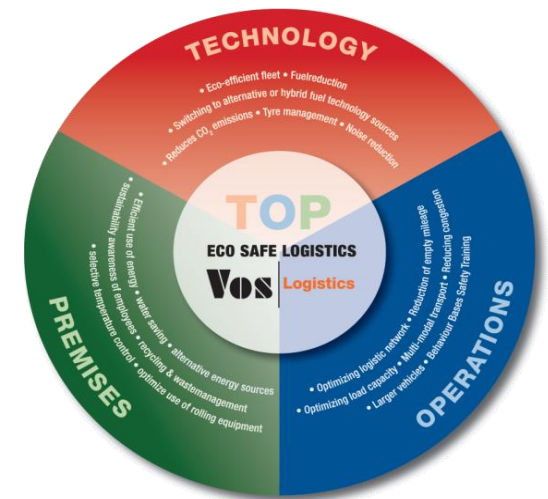
- CO2 reduction with 20% towards 2015
- Modernize fleet
- **Roll out distribution fleet with LNG**

Operations

- Load planning optimization
- Increase load efficiency per load
- Using larger vehicles
- Increase multimodal solutions to 20% towards 2015

Premises

- CO2 reduction in buildings with 15% towards 2015
- Alternative energy options
- Focus on recycling and waste management



Variety of certificates

- ISO 9001:2008
- ISO 14001
- SQAS
- GMP
- ISO 22000 + Kosher
- AEO
- Responsible Care
- Green Freight Europe
- Lean and Green Star
- Green Care Transport

Quality Management System

Environmental

Safety Quality Assessment System

Feed industry

Food Industry

Authorised Economic Operator

ECTA

European Initiative

Dutch Initiative

Initiative SCA



- **why look at alternative fuel?**
 - ❖ oil reserves decrease / diesel price fluctuates
 - ❖ sustainability
 - ❖ innovation

- **available alternatives**
 - ❖ compressed Natural Gas (CNG)
 - ❖ electricity
 - ❖ Liquefied Natural Gas (LNG)



Focus on LNG: ratio (ii): LNG versus diesel



- ❖ sustainable fuel: CO2 emission reduction 15% (over 70% with bio LNG); low fine particles emissions
- ❖ noise reduction 50% (71dB)
- ❖ competitive range (650 km single tank; 1300 km with two large tanks)
- ❖ stable and low price level
- ❖ favourable consumption of average 25,25/100
- ❖ admittance in inner cities; environmental zones and during limited access windows
- ❖ demonstration of sustainable and innovative character

- LNG is natural gas cooled down to minus 162 °C; making it extremely compact: 3.5 times more compressed than CNG and 600 times more compact than gas in its natural state
- LNG consists largely of methane (> 90%) and for the rest of ethane, propane, butane and nitrogen
- CO₂ emission of fossil LNG compared to diesel is around 15% less, the difference will be over 70% once bio-LNG becomes available
- Safety: LNG is a cryogenic substance: it has no color, no odor and it is not flammable or toxic. It is lighter than air. Safety measures (gloves, glasses) are important when refueling

history: a pioneer's tale

- 2005 → start of initiative
- 2007 → first LNG Truck RAI (Amsterdam)
- 2009 / 2010 → development & opening refueling station
- technical testing vehicles
- registration with Dutch authorities (RDW)
- start pilot with three MB Econic trucks
- 2011 → evaluation pilot phase
- 2012 → expansion fleet to 10 MB Econic trucks
- 2013 → expansion fleet by 10 Iveco Stralis LNG trucks
- 2014 → first LNG truck on Polish license plate; two additional Iveco Stralis LNG trucks in fleet



❖ trucks

- limited power (MB Econic: 280 hp; Iveco Stralis LNG: 330 hp)
- knowledge level service centers; spare parts management
- current truck price requires extra investment compared to diesel trucks

❖ refueling stations

- number of LNG stations (NL and Europe) is limited

❖ operational usage

- average consumption of 25,25 kg LNG to 100 km (compared to an average of 28 liter diesel to 100 km)
- range of around 650 km on a single LNG tank (maximum with two large tanks is 1300 km)
- restrictions on weight of load due to limited power

operational findings: monofuel LNG trucks on the market

Mercedes Econic LNG Euro 5



Scania P310 LNG Euro 5



Iveco Stralis LNG Euro 6



dual fuel LNG trucks on the market

**Volvo FM
MethaneDiesel
(460hp) Euro 5**



Retrofitting:

- ➔ Costs? Diesel substitution%?
- ➔ Service/maintenance? Warranties?
- ➔ Residual value?

Operational findings: refueling stations

Actieve LNG pompen per
Q3 2014



Developments NL:

10 stations open in NL-B in Q3 2014

Another 15 stations to be built in 2014-2015 in the Netherlands

Shell announced to open 7 stations in the Netherlands in 2014-2015

Operational findings: refueling stations



Europe:

Currently no European refueling network; mainly national networks (Sweden, UK, Spain, NL and Belgium)

Germany and France: 0 LNG refueling stations

European Directive aims at an LNG station every 400km along the corridors

Blue Corridor project: 14 stations to be built along corridors in 2014-2015

Operational findings: distribution customers/business

Dutch/Benelux distribution:

- ❖ IKEA
- ❖ Desso
- ❖ Osse Overslag Centrale (inland container terminal)
- ❖ Various distribution customers



International:

Daimler: daily run Bunschoten (NL) – Bremen(D) – Bunschoten (NL)

Scania: daily run Oss(NL) – Eschweiler(D) – ColmarBerg (LU) – Oss(NL)

High level summary: operating costs

Type of truck	DIESEL	DIESEL2	LNG	LNG2
Km/Year	90,000	130,000	90,000	130,000
Consumption L/100Km	28 liter	28 liter		
Consumption Kg/100Km			25,25 kg	25,25 kg
Initial investment	€ 75,000	€ 75,000	€ 75,000	€ 75,000
Extra investment			€ 40,000	€ 40,000
Running costs p/year*	€ 37,000	€ 57,000	€ 30,000	€ 47,000
Financial advantage/year			€ 7,000	€ 10,000
Break even point			6 years	4 years

*fuel costs plus R&M costs

The future of LNG within Vos Logistics

- Increase customer base around LNG: target and serve customers with strong sustainability profile
- Increase distribution fleet on LNG and increase km's per LNG truck in distribution
- Build-up of LNG Cargo fleet to serve customers on LNG internationally
- Introduce LNG Bulk fleet
- Increase internal and external awareness of the benefits of LNG



Thank you for your attention!



Please visit us at www.voslogistics.com