

MEET THE VEHICLES

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Sustainable vehicles and fuel developments in Rotterdam and region

Peter Witvliet

Manager Roteb Lease







Roteb Lease purchases, manages, maintains and repairs a wide range of specialist vehicles and equipment (est. 5000 units)

- » Garbage trucks
- » Sweeping Machines
- » Sewing vehicles
- » Sky workers
- » Container vehicles
- » Ambulances
- » Firefighting vehicles
- » Trucks up to 3500 kg







Emissions in EU







Our area, one of the most polluted areas of The Netherlands Lots of traffic, industry and one of the biggest ports worldwide

NOX







2012





Particles (PM)









Clinton Climate Initiative



Target Rotterdam and region

- 50% CO_2 reduction in 2025 compared to 1990
- Sustainable reduction NOX en PM10 (RAL)
- 25% municipal vehicles (1500 units) elektric/hybrid 2014





Hybrid technology

Not only for Luxurycars but also for Trucks











Fuel cell







Hydraulic accumulation







Electric













Euro 6 for compact sweepers

- CNG/LNG : problem dimensions/weight
- Plug in Hybrid : energyrecovery (braking) too low
- Euro 4 industrial engines allowed
- This sweeper Euro 6 combined with GTL



Local Emissions (PM, NOx) Biodiesel Diesel Petrol LPG Petrol (HEV) E95 E85 Biogas Natural gas Η2, Electricity electricity (EU mix) (water power) Global effect (CO2)

Fuels

Fuel Developments

- Gas (CNG/LNG/LPG/GTL)
- B30 Biodiesel for trucks and lorries
- Bio-ethanol E85 (flexifuel vehicles)

Issues to solve;

- Tank infrastructure
- Vehicle adjustments retrofit/OEM
- Fuelspecifications / stability
- Warranty-issues
- Price related to consumption

Advantage for use GTL

- Reduction NOX (15%) and PM10 (50%)
- In any blending with normal diesel useable
- No vehicle-adjustments necesary
- Useable in existing tank infrastructure
- No extra truck maintenance needed
- Reduced noise (approx.)-3dba
- Possible argument for Euro 0-4 to enter low emission zone

Issues to consider

- OEM warranty
- Effects on Euro 6 engines
- Monitoring emmissions (also CO2 effect)
- Comparable prices to standard diesel fuels

LM Tracks Sweepers Garbage trucks

Aanbevelingen

- · Vanuit het perspectief luchtkwaliteit wordt het gebruik van Shell GTL Fuel aanbevolen;
- Met oog op het broeikaseffect wordt het gebruik van Shell GTL Fuel niet aanbevolen;
- Het gemiddelde geluidsniveau bij gebruik van Shell GTL Fuel daalt en wordt om deze reden aanbevolen;
- De financiële aanbeveling is negatief;
- · Het wordt aanbevolen de toekomstige beschikbaarheid en hoeveelheid van Shell GTL Fuel te waarborgen bij verdere investeringen;
- WEL Mobiliteit raadt aan om aanvullend technisch onderzoek omtrent interne motoronderdelen uit te voeren.

Brandstof vergelijkend onderzoek

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'CLEANING THE FLEETS' OF LOCAL AUTHORITIES

- Implementation Clean Fleets
- Embedded in EV Action program Rotterdam city region
- Goal is to stimulate local authorities in city region to incorporate EV's in their fleet
- How: showing the Total Cost of Ownership of EV's is cheaper than ICE vehicles

RESULT

10% of the total fleet of municipalities in city region of Rotterdam is already EV!

TCO calculations are an effective way to convince municipalities about the potential of EV

Thank you for paying attention

ELECTRIC AND CNG VANS AT JOULZ (ENECO GROUP)

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Reducing Co2 emissions without loss of quality to our costomers

Programme of the European Union

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ABOUT JOULZ

JOULZ IS PART OF THE ENECO GROUP. AS A SPECIALIST IN ENERGY INFRASTRUCTURES, JOULZ WORKS 24/7 TO GUARANTEE THE MAXIMUM, RELIABLE ENERGY SUPPLY FOR OUR CUSTOMERS.

REDUCING EMISSIONS IS KEY FOR THE ENECO GROUP, CLASS LEADING SUPPLYER OF SUSTAINABLE ENERGY IN THE NETHERLANDS.

THE JOULZ FLEET TODAY:

- 1200 CARS AND VANS
- 12 CNG VANS

3

LESSONS LEARNED

120 CNG RETROFIT SMALL VANS 1995-2005

- TECHNICAL PROBLEMS
- SHORTAGE OF FILLING STATIONS
- RANGE

35 ELECTRIC RETROFIT SMALL VANS 2008-2014

- TECHNICAL PROBLEMS
- RANGE (ANXIETY)

4-12 OEM CNG SMALL VANS 2013-YTD

- NO TECHNICAL PROBLEMS
- GROWING AMOUNT OF FILLING STATIONS

4 OEM PASSENGER CARS

• RANGE (ANXIETY)

JOULZ 2015

EVERY NEW, SMALL VAN WILL BE A CNG VAN, IF POSSIBLE (RANGE, AVAILABILITY OF FILLING STATIONS)

UNSUFFICIENT LOAD CAPACITY AND POOR TOWING POWER FOR LARGE VANS MAKES THESE VANS UNSUITABLE FOR JOULZ.

RET and sustainable mobility

RET, facts & figures

Company origins date back to 1878

RET N.V. - Integral company

- > approx. 3,000 employees
- Integral Public Transport network
- Public transport services and maintenance PT infrastructure

Operation

- 600.000 passengers/day; 185.7 mio passengers/yr
- Passengers: bus 38.7 mio; tram 59.9 mio; metro 87.7 mio
- ≻50 stations (metro, light rail)
- Punctuality: metro 95%; tram/bus 75%

Public transport in and around Rotterdam

5 subway lines, 160 vehicles

10+1 tram lines, 113 vehicles

36+13 bus lines, 256 vehicles

1 ferry line, 1 vessel

Drivers for sustainable measures

Gemeente Rotterdam

| Nieuw veiligheids- plan | Meer beleving op stations | |
|---|------------------------------|--|
| Klantgerichte inzet personeel | Producten op maat | |
| ICT voor klantgemak (wifi, schermen in voertuigen etc.) | Duurzaam Ondernemen | |
| | De Perfecte Reis met de 127 | |

1 Optimale reizigersbeleving

ROTTERDAM.CLIMATE.INITIATIVE

Context sustainability Rotterdam City Region

- SRR: Rotterdam city region
- Aim reduction GHG: 1990 2025 40%
- General aims sustainable mobility:
 - Increase use PT 60%, use bike: 30%
 - Decrease congestion
 - Use of clean, silent vehicles, using less energy

SRR (Rotterdam)

Consessiegebied

Streekvervoer Voorne-Putten / Rozenburg

Bus- en Nachtnet Rotterdam

Metro/tram Rotterdam, Randstadrail

Streekvervoer Regio Rotterdam

Treindienst Rotterdam - Hoek van Holland

Target Rotterdam Climate Initiative

Without Rotterdam Climate Initiative

RET: Sustainable business in public transport

Improve sustainable performance

Park & Ride roo

piles

Enerav

Light (inside and outs

Solar energy

Sustainable measure RET: Tramstore21

Goal:

Sustainable and efficient tram depots build for cities of the 21st Century

Reasons for cooperation:

depot is vital for a tram network; Foundation depot:
cities have little experience in the construction of depots;

> great impact on the immediate area;

Construction of new depots in Brussels (Be), Dijon (Fr), Blackpool (UK) and Rotterdam;

> total EU funding for RET: € 1.17 million.

Sustainable measure RET: Ticket to Kyoto

Goal:

Introducing the principle of low CO₂ emissions as the new standard for public transport providers

Five partners: GMPTE (UK); moBiel (Ger); RATP (Fr); RET (NL); STIB (Bel)

≻Total EU funding for RET: € 1.2 million

State Att Ticket to KYOTO

Innovative busprojects in The Netherlands

Status innovative bus projects The Netherlands

- All busses as shown still in full operation
- Fuel Cell Phillias in Amsterdam in operation now
- Pilots finished, financial support stopped
- Busses remain with the operators
- Partly supported by warranty extension of manufacturers

National Perspective in NL

- Zero Emission City Buses 100% reached by 2025
- Supported by NL Ministry of Infrastructure & Environment (I&M) and EU (ELENA)
- Already started in 2 provinces: Brabant and Limburg
- It concerns 5.000 buses in total by 2020-2025

RET Busfleet 'regular'

| Citaro | | | | | |
|---|-----------------|----------------------|--|--|--|
| Fabrikant Mercedes-Benz / EvoBus, Mannheim (D) | Mercedes-Benz / | Lengte | 11,95 meter | | |
| | Massa | 11,2 ton (200-serie) | | | |
| Aantal voertuigen | 89 (200-serie) | | 11,7 ton (300-serie) | | |
| 76 (300- | 76 (300-serie) | Capaciteit | 34 zitplaatsen, 64 staanplaatsen – totaal 98 passagiers (200-serie) | | |
| Bouwjaar | 2006 - 2008 | | 30 zitplaatsen, 68 staanplaatsen – totaal 98 passagiers (300-serie) | | |
| Technische levensduur | 12,5 jaar | Bijzonderheden | De voertuigen uit de 200-serie verschillen op een aantal punten van de voertuigen uit de 300-serie. | | |

| Fabrikant | MAN, Ankara (Turkije) | lengte | 11.86 meter | | |
|-----------------------|-----------------------|----------------|---|--|--|
| Aantal voertuigen | 89 (1000-serie) | Massa | 11.5 ton | | |
| Bouwjaar | 2008 | Capaciteit | 43 zitplaatsen, 45 staanplaatsen – totaal 88 passagiers | | |
| Technische levensduur | 12,5 jaar | Bijzonderheden | De voertuigen uit de 1000-serie zijn eind 2012 overgenomen van QBuzz. | | |

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405 -

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elBUSZ

BX-JT-71

RET

Hybrid buses at RET

Experiences RET – MB Citaro G Hybrid (18m)

- The 2 buses are running very reliable
- 2 updates (including modified software, a new type of generator engine and new axles, but same battery pack!) for improvement
- RET Operation (especially drivers) satisfied with the concept
- Energy (Diesel) consumption in recent twin test:
 - Around 23 % fuel-saving, first test in 2011 showed only 9 %
 - New result reached mainly by better adjustments of the energy usage of the auxiliaries
- Beyond that the advantages of pollution, noise reduction and smoother driving of these busses should be respected

Experiences RET – NEMS e-Busz (12m)

- The 2 busses have driven less kilometers, due to:
 - Small software problems
 - Mechanical problems (cooling, generator engine, etc.)
 - But improved as well
- As they were unique, also many demonstrations and testing have reduced their deployment for PT services in Rotterdam
- The Dutch bus manufacturer VDL launched the Citea Electric, with the same drive line (ZA Wheel)
- This VDL bus is designed as an electric vehicle, the expectations about reliability are much higher

Results – passengers and staff

Drivers: comfortable, silent, fast in 'start off', interested in fuel use, want to drive more frequently

Maintenance: extra + specific knowlegde, technology not yet proven new technology takes a lot of capacity

Passengers: positive for image RET, but not a big difference compared to conventional buses

Long term approach for more sustainable bus operation

Short term plans for more sustainable bus operation

- H2 busses
- Fuel Cell buses (2015-2019)

- Purchase of 2 vehicles
- Experiment togheter with other European cities
 - Consortium: 3Emotion
 - Co-funding by Ministry of Infrastructure, SRR & the local government
- FCH-JU study for commercialization of H2 buses
- - The extending of the e-Busz
 - Funding by Ministry of Infrastructure and environment & SRR
 - Zero emission busses
 - \rightarrow 100% Electric

Introduction of FC buses

Starting purchase proces by market consultation

- introduction end 2015
- in daily operation 2016-2019

Planning busroute

- Green busroute
- Environmental zone
- Better air quality in the city of
- Rotterdam

Monitoring en evaluation

Reports to funding bodies
Air Liquide station

Rhoon: Groene Kruisweg / A15

Remarks and questions

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