Decarbonising Commercial Vehicles

Central London Freight Quality Partnership
Tuesday 3\textsuperscript{rd} May 2016
Westminster University

Gloria Esposito
Head of Projects
Introduction to LowCVP

Mission – To stimulate the take up of low carbon fuels and vehicles in the UK

Work focused on evidenced based & collaborative policy research & development.

Public-private partnership c200 members
LowCVP Commercial Vehicle Activity

Actively involved in TfL’s LoCity programme to stimulate the market for low emission commercial vehicles in London

HGV Emissions Testing
Dedicated gas, duel fuel trucks, hybrid truck (partnership with TfL)

http://www.lowcvp.org.uk/lev.htm
Multitude of Fuels and Technologies to Decarbonise Commercial Vehicles

- Duty cycle
- Vehicle capital cost
- Maintenance costs
- Reliability / performance
- Infrastructure
- Fuel savings
- Air pollution – NOx, PM
- GHG emissions – CH4, CO2, N2O
- Sustainability / supply – biofuels
- Market availability

Range of options to consider when selecting low carbon fuels and technology for truck operations
Future Roadmap For Trucks

3000 low carbon buses operating in the UK – electric, diesel hybrid, plug-in hybrid, biomethane, biodiesel, hydrogen fuel cell. >£1m in Government subsides to kick start the market over 6 years.
Future Fuels Roadmap

LowCVP Fuels Roadmap, 2014
Hybrid Trucks

Mercedes - Fuso Canter Eco Hybrid
Geopost, DHL, Royal Mail, Tesco

DAF Hybrid Truck

Magtec - Hybrid Truck Conversion
DHL demonstration trial

TEVVA Motors Plug-in hybrid
UPS demonstration trial

Urban Duty Cycle
Lower GHG/AQ
Zero emission capable
c25% fuel savings
High capital cost,
lower for conversions
Battery replacement
Limited models
Niche market- demos
Electric Trucks

E Power Trucks Flex L3 – Newcastle University

ePower Trucks – Braeheads Shopping Center

Magtec – DAF conversion to electric truck – DHL fleet

Urban Duty Cycle
Zero emission
Lower fuel cost
High capital cost, lower for conversion
Range limitation
Battery replacement cost
Limited model availability
Payload constraints
Niche market
Plug-in Hybrid And Electric Vans

**BEV - Nissan eNV-200, Renault Kangoo, BD Otomotiv eTraffic, Mercedes–Benz Vito E-Cell, Peugeot ePartner**

British Gas, Dundee Council, Camden Council, Gnewt Cargo, Fruit 4 London

**PHEV - Mitsubishi Outlander Environment Agency**

Early market – c200-300 in operation
Model availability mainly sub 2.5T
Numerous incentives lower TCO
Highest cost savings in city operations
Barriers - range, residual value, battery life

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### Whole Life Cost Example

<table>
<thead>
<tr>
<th></th>
<th>Nissan NV200 1.5dCi Acenta (Diesel)</th>
<th>Nissan e-NV200 Acenta (Electric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle</td>
<td>£14,695</td>
<td>£21,720</td>
</tr>
<tr>
<td>Plug-in Van Grant</td>
<td>£5,158</td>
<td></td>
</tr>
<tr>
<td>Discount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel costs</td>
<td>£6,301</td>
<td>£1,911</td>
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<tr>
<td>Road tax</td>
<td>£900</td>
<td>£0</td>
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<tr>
<td>Maintenance costs</td>
<td>£1,716</td>
<td>£1,158</td>
</tr>
<tr>
<td>Resale value</td>
<td>£2,718</td>
<td>£3,728</td>
</tr>
<tr>
<td>Life time cost</td>
<td>£21,290</td>
<td>£15,904</td>
</tr>
<tr>
<td>Cost per mile</td>
<td>35.2p</td>
<td>26.5p per mile</td>
</tr>
<tr>
<td><strong>Whole life cost savings</strong></td>
<td><strong>£5,215</strong></td>
<td></td>
</tr>
</tbody>
</table>

If used in the London Congestion Zone (5 days/week)

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Life time cost</td>
<td>£34,244</td>
<td>£15,904</td>
</tr>
<tr>
<td><strong>Whole life cost savings</strong></td>
<td><strong>£18,340</strong></td>
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</tbody>
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LowCVP Low Emission Van Guide

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Iveco Daily
Hydrogen Vehicle Demonstrations

**ULEMCo EV + HFC range extender**
Fife Council

**Renaul Kangoo ZE + HFC range extender**
- La Poste France

**Revolve H2 ICE**
Aberdeen City Council, Commercial Group

**Duel Fuel H2 RCV - ULEMCo**
Fife Council

**Urban Duty Cycle**
- H2 ICE & HFC
- Lower AQ/CO2
- HFC- Zero emission
- H2 generation +/- CO2
- High vehicle capital cost
- H2 Infrastructure – high £
- Mainly demonstrations
Howard Tenens - Dual Fuel Trucks

- Company operates 23 dual fuel HGV, 16 of which run on biomethane.
- Operate 3 refuelling stations - two dispense CNG via the grid, third dispenses biomethane stored as LNG.
- Benefits:
  - Reduced CO₂ emission by 7% in 2011
  - Quieter vehicle operation
  - Reduced carbon footprint of customer supply chain
  - Generation of new business

Source: Howard Tenens

Dedicated	- All Duty Cycles
CNG/LNG - Scania, Iveco, Mercedes Benz
Run on natural gas & biomethane
Lower fuel costs c20%
Euro VI
Higher vehicle cost
Tail-pipe CO₂ same diesel
Lack of refuelling infrastructure

Dual Fuel Conversion - Long Haul
Lower CO₂ and fuel costs BUT
Efficiency of highly variable
Methane slip (GHG impact)
Challenge meeting Euro VI

Biomethane
- renewable methane produced from organic waste
- >80% lower WTW GHG emissions than diesel

DfT - Low Carbon Truck Trial
- Demonstrating financial and environmental case for dedicated & dual fuel trucks.

Early market development (500 HGVs)
Fleets - Howard Tenens, Tesco, Sainsburys, Tesco, Argos, Eddie Stobbard, DHL, Waitrose, Wiseman Diary
Biodiesel Trucks

Duel fuel biodiesel Used Cooking Oil
United Biscuits (Low Carbon Truck Trial)

Conventional diesel vehicle or dual fuel
Drop in fuel – B20/30 or B100
Up 85% lower WTW GHG emissions using waste feed stocks eg UCO
Tail-pipe CO₂ same as diesel
Lower PM, possibly higher NOx

Barriers – limited supply UCO, vehicle warranty

Ford Transit using B20 UCO
Environment Agency

London Borough of Hackney running 42 trucks on biodiesel UCO. TfL plans to run 1/3 London buses on B20 UCO.
Vision For The Next Decade

Near term - Increasing requirement to improve air quality will help stimulate take up low emission commercial vehicles, coupled with operators need to reduce fuel costs, lower carbon footprint and enhance corporate image.

Longer term - diesel will continue to be play a key role, on going improvement in ICE efficiency + portfolio of low carbon fuels and technology options – no silver bullet!

• Increased blending with sustainable biodiesel. Introduction of advanced biodiesel beyond 2020.

• Long haul / regional delivery - biomethane trucks have a clear role, requires stimulating supply and increasing gas infrastructure. Role of natural gas and dual fuel under review.

• Cities - hybrid and electric vans & truck market will grow. Opportunities for a range of EV & hybrid architectures. Innovations in EV infrastructure could enable the range of EV vans and trucks to increase.

• Hydrogel vans continue to be a niche market, numerous challenges. Possible growth in cities with hydrogen production opportunities. Demonstration of small fuel cell trucks likely to appear.

• Variety of Government policy mechanisms, fiscal and non-fiscal, are required (vehicles, infrastructure, fuels) to help grow the low carbon truck and van market. Communicating the financial, performance and environmental credentials of low carbon commercial vehicles to fleet operators is also important to kick start the market.
THANK YOU FOR LISTENING

FOR MORE INFORMATION OR JOINING LOWCVP

Gloria.esposito@lowcvp.org.uk

http://www.lowcvp.org.uk