

Gas Vehicle Workshop

Vehicle Technology Introduction

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Introduction to Cenex

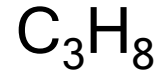
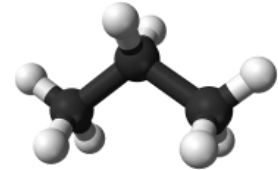
- Independent, not-for-profit low carbon vehicle technology experts
 - Program Management
 - Consultancy
 - Research
 - Annual Low Carbon Vehicle (LCV) Event



What Kind of Gas?

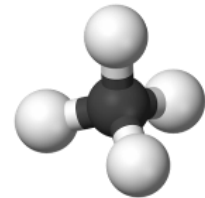
LPG (Liquefied Petroleum Gas)

- Propane/Butane (Camping / off grid gas)
- Stored on the vehicle as a Liquid
- Carbon intensity 64gCO₂/MJ (14% saving from diesel)
- BioLPG available from 2017



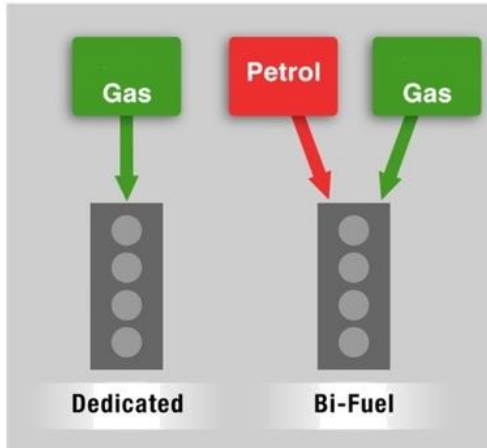
Natural Gas

- Methane (national grid gas)
- Stored as Cryogenic Liquid or Compressed Gas
- Carbon intensity 57gCO₂/MJ (24% saving from diesel)
- BioMethane available directly or through Green Gas Certificates



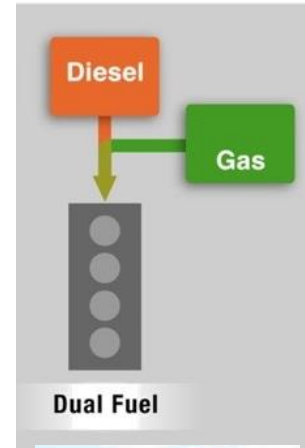
And What Vehicles Do They Go In?

Spark Ignition Engine
(e.g. Petrol Engine)



- ~ 20% reduction in engine efficiency compared to diesel
- Up to 100% bio

Compression Ignition Engine
(e.g. Diesel Engine)



- Maintain better efficiency (~1 – 10% reduction from base diesel)
- Alt. fuel limited by sub. ratio
- Know you eff. loss

LPG Vehicles

- Vehicle Availability
 - Retro-fit petrol cars and vans (bi-fuel)
 - Retro-fit trucks (dual fuel)
 - UKLPG approved systems
- Infrastructure
 - Good, over 1,500 stations in the UK
 - Back to base infrastructure for trucks
- Environment
 - Good for air quality
 - Good for noise
 - Cars and vans
 - ❖ CO2 emission savings vs petrol (up to 15%)
 - ❖ No CO2 savings vs diesel
 - Dual Fuel Trucks
 - ❖ CO2 savings up to 5% (WTW)
 - Savings increased through the use of BioLPG



Methane Vehicles

- Vehicle Availability (Euro VI)
 - OEM Dedicated gas vans
 - OEM Dedicated gas trucks up to 340 hp
 - Buses
 - Limited retro-fit dual fuel trucks to 500 hp
- Future Market Offerings
 - 2016/17 OEM dedicated gas truck > 400 hp
 - ???? Volvo HPDI dual fuel engine
 - 2017 Retro-fit dual fuel trucks (*methane slip solutions required*)
- Infrastructure
 - Growing in the UK
 - Very limited in Scotland



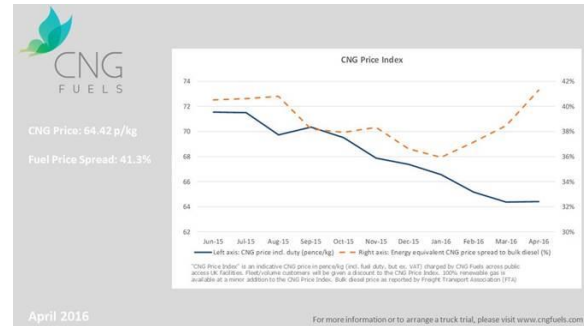
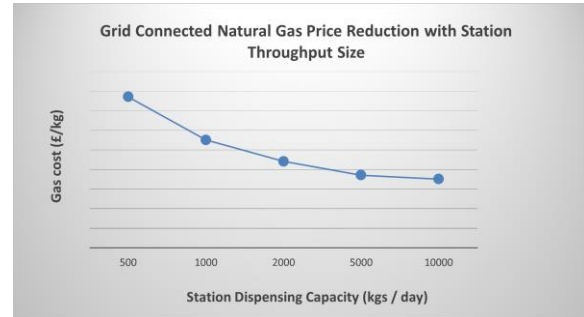
Methane Vehicles

- Environment
 - Dedicated Trucks (26t Urban Delivery Truck)
 - 86% reduction in NOx (Euro 5)
 - 97% reduction in PM (Euro 5)
 - Urban noise reductions (4 to 10 dB)
 - 60% reduction CO2 (using biomethane WTW)
 - Limited savings on natural gas only



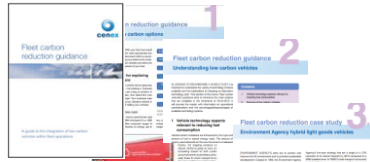
- Quiet and good AQ performance for heavy city vehicles (buses and RCVs)

- Dual Fuel Trucks
 - ❖ Lower NOx, mixed PM results
 - ❖ Urban noise savings (1 – 3 dB)
 - ❖ Up to 15% on natural gas, 30% on bio-methane (WTW)
 - ❖ Euro VI methane slip TBC



Help is at Hand

- Cenex Fleet Carbon Reduction Guidance
- Cenex Biomethane Toolkit
- Low Emission Van Guide and online Vehicle Cost and Carbon Tool
- UK LPG trade association
- Gas Vehicle Hub



Available at www.cenex.co.uk/resources



Available at www.lowcvp.org.uk/lev



www.gasvehiclehub.org

www.uklpg.org

Closing Remarks

- LPG and Natural Gas can be used to reduce the carbon intensity and improve air quality from transport.
- Carbon reductions limited from fossil fuels. Use / develop policy for bio-fuel use.
- Good opportunity for city vehicles which can't easily be electrified (RCVs, urban delivery).
- Think big – large scale low cost public infrastructure required



Tailpipe shots



Thank you for listening

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