



DYNEVOR ARMS

Renewable Energy “Centre of Excellence”

Presented By: Tony King

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Today

- Hardstaff remains a family company with family values
- Currently run by the 5th generation.
- Employing approximately 250 staff





Road Transport & Distribution



Natural Gas Vehicle Technology



Natural Gas Fuel Supply & Infrastructure



Truck Dealership & Support Services



Concrete Safety Barriers for Highway & Security Application

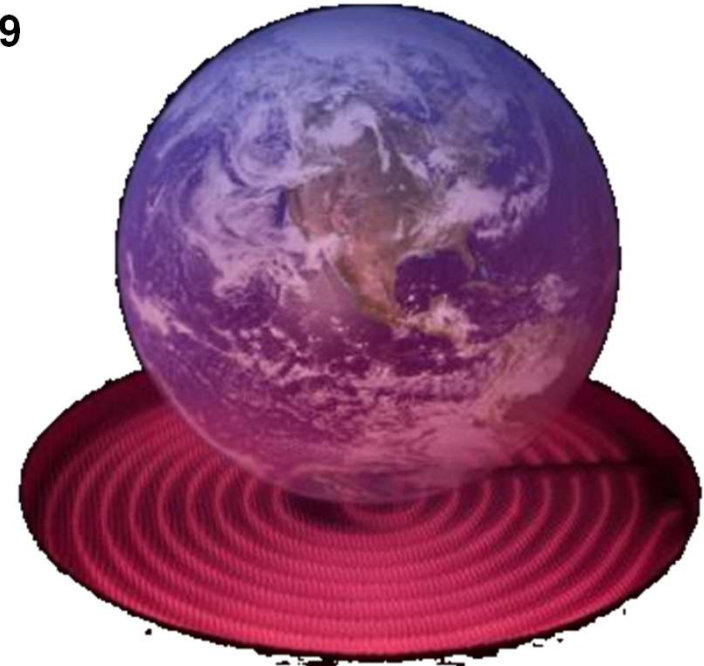


Registered Training School

“Founded in 1861.....5th generation company”

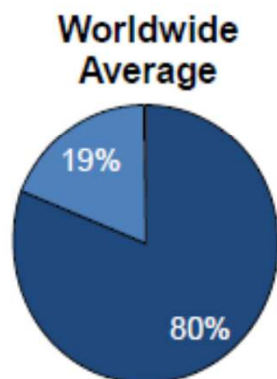
There is an urgent demand to replace petroleum as a vehicle fuel

- Oil production has peaked in many oil producing countries
- World demand keeps growing - **China's car sales reached 10.9 million (+53%) in 2009 including trucks and buses 13.6 million (+46%)**
- Escalating oil prices
- The need to combat air pollution
- Political Influence
- Government objectives for air quality

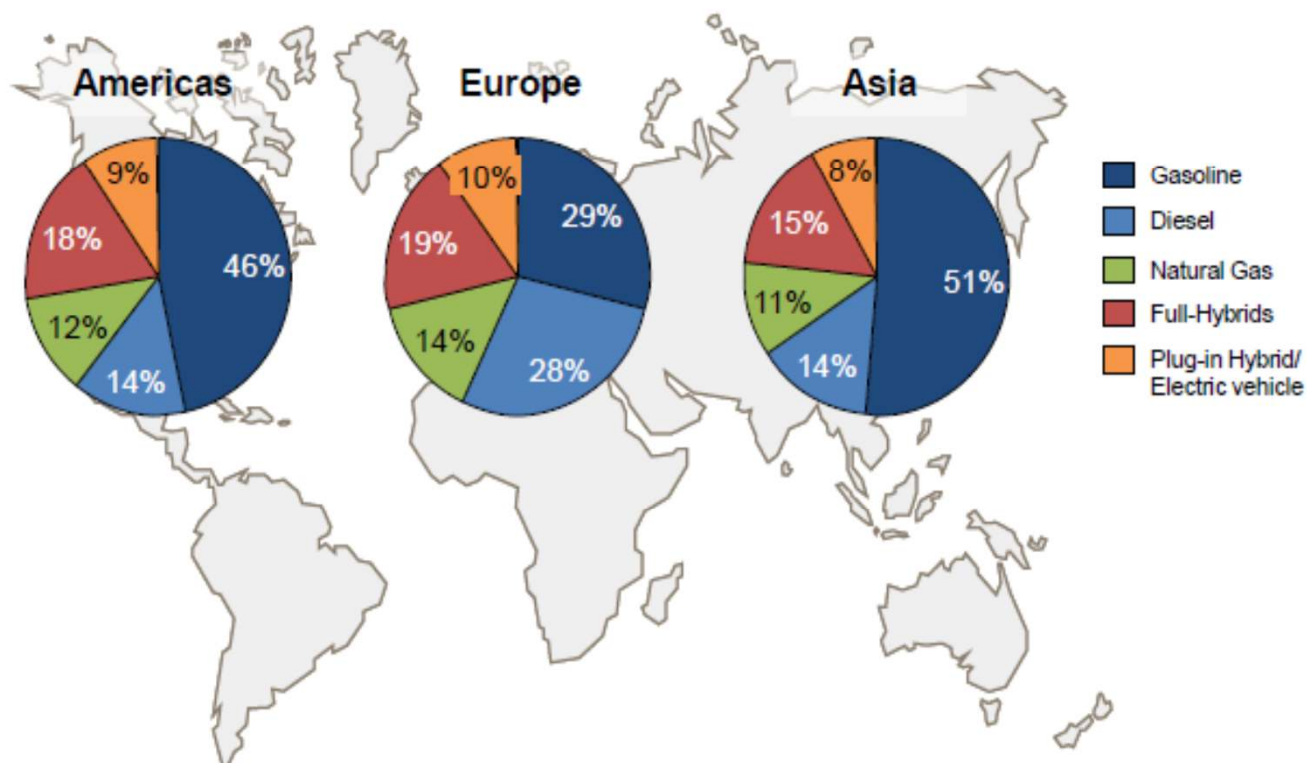


NGV Statistics

Powertrain Landscape
2007



Powertrain Landscape
2020



Note: "Moderate drive for change" scenario
Source: A.T. Kearney study "Powertrain of the future"

Alternative Fuels

BIO-DIESEL

Agricultural crops, rape seed (7% CO₂ Saving)

ETHANOL

Fermentation - sugar

METHANOL

Chemically produced

DME

Ethanol Process

BIO-METHANE

Biologically produced from waste organic material

HYDROGEN

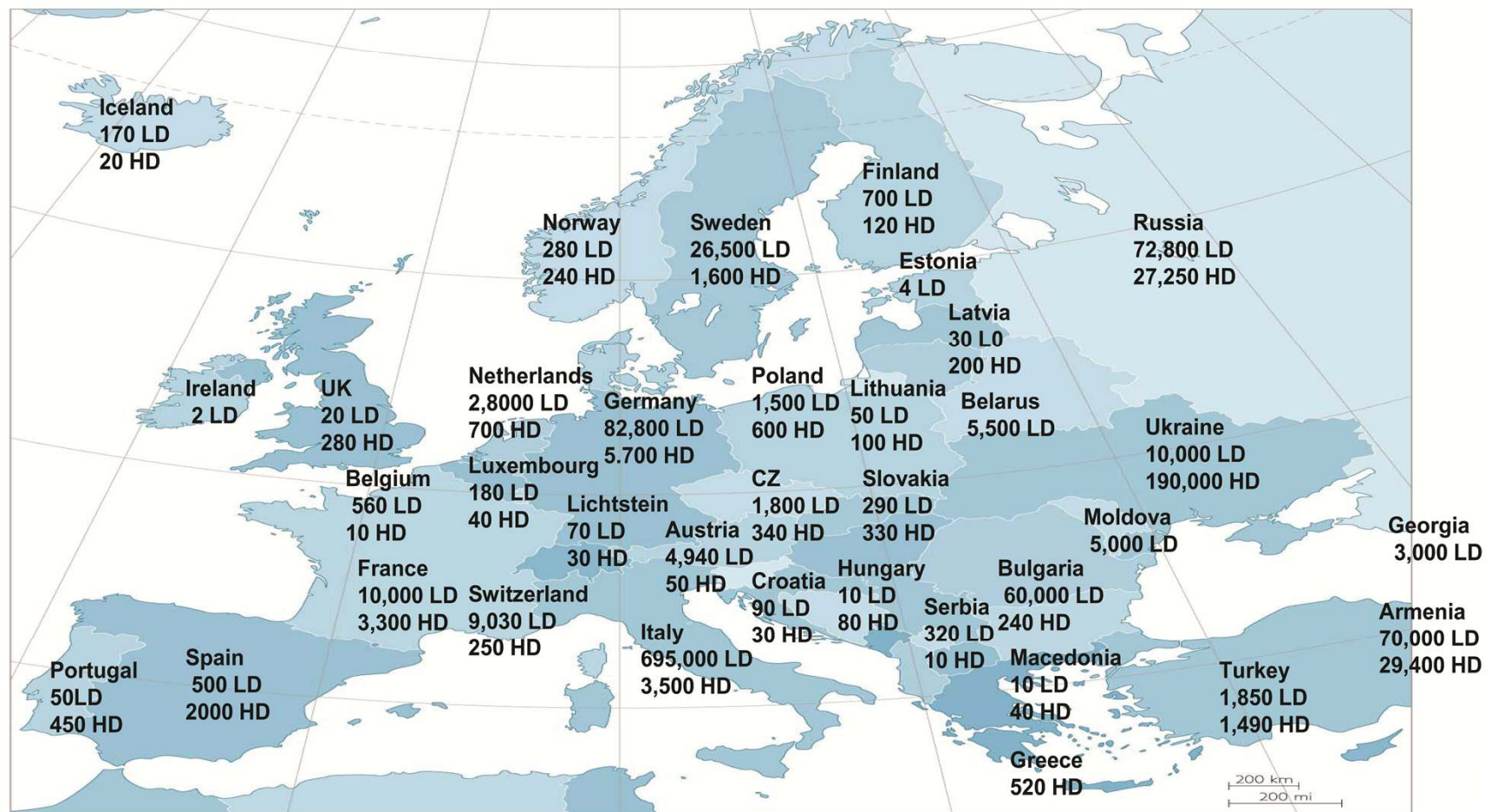
Reformed from Methane

ELECTRIC

Battery Technology

- Anaerobic digestion is a treatment that produces a biogas (Bio-Methane) that can be used to generate electricity and heat
- Solar power, wind power and water can all be used to generate electric power – but not vehicle fuels
- Fuel cells, electric vehicles, renewable energy from the food chain, hydrogen are all alternative options; however Bio-Methane is acknowledged as the best alternative vehicle fuel - available today
- Bio-Methane is sustainable because it is produced from virtually unlimited resources
- Anaerobic Digestion as a part of a sustainable waste management strategy provides transport with a renewable energy resource that will significantly lower emissions and help mitigate climate change

Over 1.3 million NGVs in Europe by mid 2010
(500,000 at the end of 2003)



1,065,800 cars, 144,200 buses, 123,600 trucks and 3,400 other NGVs 3200 filling stations

8.7 billion Nm³ (7.5 Mtoe)

Available Vehicles

 Fiat Panda Panda 1.2 8V Natural Power	 Fiat Grande Punto 1.4 8V Natural Power	 Fiat Doblo 1.6 16V Natural Power	 Ford Focus 2.0 CNG Linnaeus 3/5-Türer	 Ford C-MAX 2.0 CNG	 Mercedes-Benz B 180 NGT BlueEfficiency Sports Tourer
 Opel Combo 1.6 CNG ecoFLEX	 Opel Zafira 1.6 CNG ecoFLEX	 Opel Zafira 1.6 CNG TURBO ecoFLEX	 Škoda Octavia Combi II CNG *	 VW Caddy Life EcoFuel	 VW Caddy Life Maxi EcoFuel
 VW Passat TSI EcoFuel Linnaeus	 VW Passat TSI EcoFuel Variant	 VW Touran TSI EcoFuel	 VW CrossTouran TSI EcoFuel	 Fiat Doblo Cargo Natural Power	 Fiat Doblo Cargo Maxi Natural Power
 Mercedes-Benz Sprinter NGT monovalent und bivalent	 Opel Combo Kastenwagen 1.4 CNG ecoFLEX	 VW Caddy EcoFuel Kombi und Kastenwagen	 VW Caddy Maxi EcoFuel Kombi und Kastenwagen	 VW T5 2.0 BiFuel * verschiedene Varianten	 Ford Transit CNG verschiedene Varianten
 Iveco Daily CNG verschiedene Varianten	 Fiat Ducato Natural Power verschiedene Varianten	 Fiat Fiorino Combi Natural Power	 Fiat Punto Evo Natural Power		



Dual Fuel is a combustion technology that simultaneously burns two fuels.

Designed for use with natural gas and diesel, Hardstaff patented OIGI® Dual Fuel technology meets the highest emission standards, whilst maintaining maximum fuel economy and cost savings.

Even greater CO₂ savings using Bio-Methane



Dual Fuel is also perfectly compatible with Bio-Methane - a renewable, sustainable energy source which, when used as a vehicle fuel, can double the CO₂ savings – **giving 32-40% lower CO₂ emissions.**

“Very clean fuel in, very clean emissions out”





16-20% lower CO₂
double when using Bio-Methane

Reduced fuel costs
3-10 euros per 100km

Significant reductions
in all regulated tailpipe pollutants

Lower noise emissions

Retains vehicle performance

100% diesel operation fall-back

Enhanced corporate image

Dual Fuel

- Supports Government policy on sustainable procurement and actively encourages low cost entry into fuel diversification and growth in low carbon vehicles.
- Utilises existing technologies and is an ideal solution that allows transport operating companies to comply with the principles of corporate social responsibility.
- Confirms that there are alternatives to crude oil available on the market today and will act as a catalyst to future OEM product



“Long term sustainability of technology through its wide range of application”



7.5 tonne



18 tonne



44 tonne



Buses & Coaches



Refuse Vehicles



Airside Vehicles

Snow Groomers, Passenger Cars, Vans, Taxis, Trains, Marine.....

Market Interest

- BAKERIES
- FOOD DELIVERY / SUPERMARKETS
- WASTE MANAGEMENT
- COUNTY COUNCILS
- BUS & COACH
- HOME DELIVERY
- CONSTRUCTION INDUSTRY
- ROAD TRANSPORT



GREEN WHEELS IN MOTION

Award Winning Dual Fuel technology developed by Hardstaff in the East Midlands has worldwide potential

Recognised by:

Lord Stafford Awards

Low Carbon Vehicle Partnership Technology Challenge

East Midlands Family Business Awards

Midlands Excellence Awards

- And others





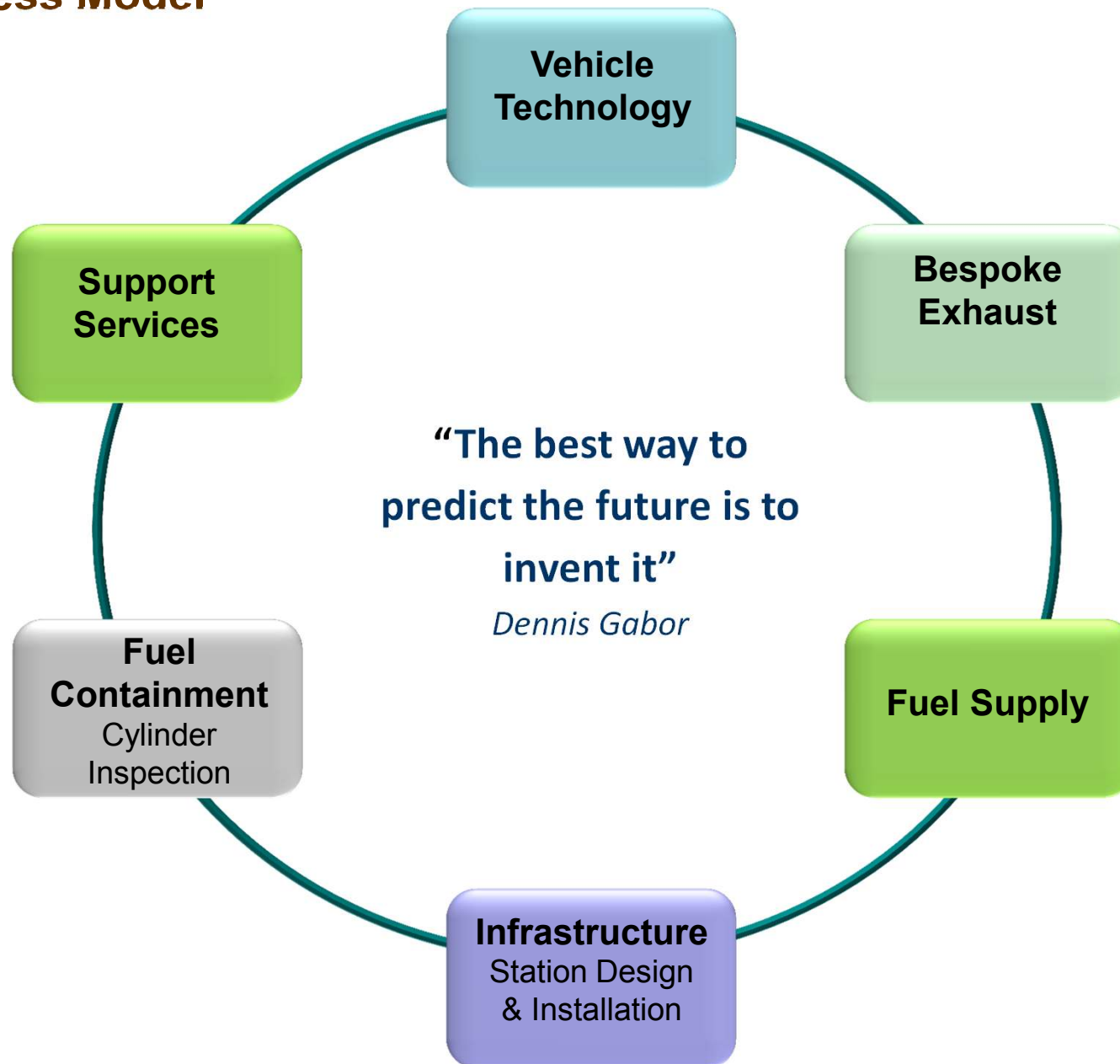
“The final piece of the Jigsaw”

Station size and type depends on a number of factors including location, limitations and the specific needs of the customer.



- PGS facilitate the design and installation of a range of refuelling facilities that enable the operator to move between different supply levels as their business and fleet numbers grow.
- By sizing the refuelling system to the exact customer's requirement the fuel remains simple, convenient and operating at optimum performance

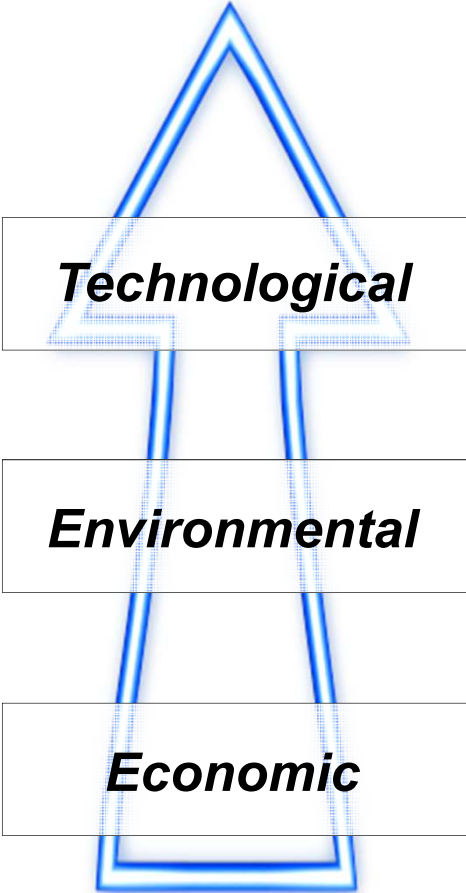
Business Model



Total Solution Providers

Hardstaff is a total solution provider and through its group activities is perfectly positioned to provide all disciplines required for successful integration of product, including:

- ◆ **Dual fuel technology**
- ◆ **Vehicle**
- ◆ **Refuelling station, bespoke design and build options**
- ◆ **Fuel - Natural Gas in CNG or LNG form and Bio-Methane in LBG or CBG form**
- ◆ **Support services**
- ◆ **Warranty**



Technological

Environmental

Economic

Worldwide Recognition



Hardstaff Dual Fuel is currently shipped worldwide

Product in:

UK
Brazil
Sweden
Germany
Norway
USA
Austria
Spain

Interest in:

China
Australia
France
Italy
Holland
Croatia
Belgium
Denmark

A pair of hands, one above and one below, gently cradles a small, realistic Earth. The Earth shows continents and clouds. The background is a deep blue space filled with numerous small white stars. The text 'The world needs dual fuel' is written in a bold, white, italicized font across the center of the image, partially overlapping the hands and the Earth.

The world needs dual fuel



DYNEVOR ARMS

Renewable Energy “Centre of Excellence”

“THE VISION”

“Dynevor Arms”



- Previously a “Gas Peak Shaving Plant” owned by National Grid
- Acquired by the Hardstaff Group late 2009.
- Main assets include:
 - ▶ 93 acre secure site
 - ▶ Cryogenic storage tank (21,000 tonne capacity) for Liquefied Natural Gas (LNG) or Bio-Methane.
 - ▶ Liquefaction plant
 - ▶ Offices and Workshop facilities

Project – Anaerobic Digestion

Anaerobic Digestion for the production of Bio-Methane

The site has room for one or more Anaerobic Digestion plants.

Requires small liquefaction plant

Four smaller plants would enable partnerships with Universities to develop models

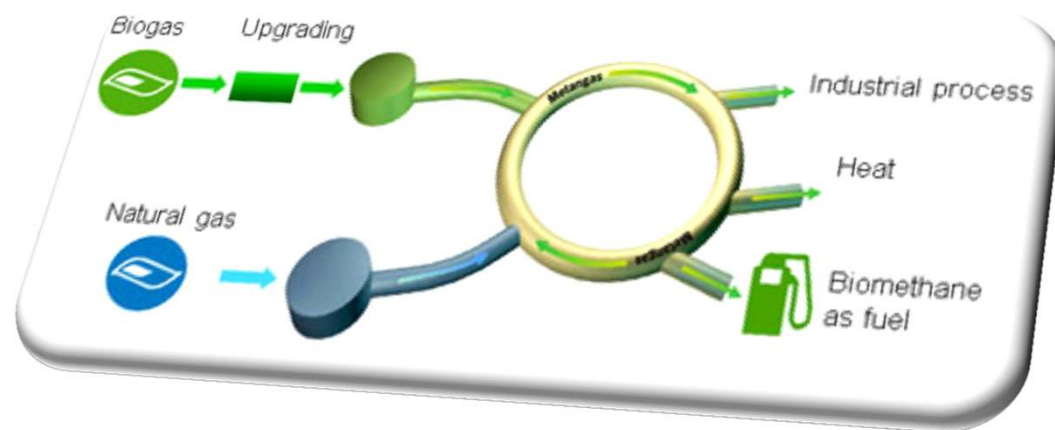
Can be operated by Hardstaff or in partnership with waste handling organisations

Bio-Methane dispensed as alternative road fuel with public access filling station at site entrance, or to CHP and generation plants in region.

BENEFITS	TIMESCALES
Bio-Methane production centre for region. Collaboration with University. Storage facility and outlet for Bio-Methane. Reduced gate tipping fees for local contractors. By-product digestate compost for sale in region. Further Job creation.	Partnership with Glamorgan University agreed in principle; University staff will use site buildings and laboratories for AD development.

Bio-Methane as a Vehicle Fuel

Bio-Methane is almost pure methane gas produced from upgraded landfill gas or raw biogas.



Source: NGVA Europe



BIOMETHANE

A RENEWABLE NATURAL GAS



VERY CLEAN FUEL IN - VERY CLEAN EMISSIONS OUT

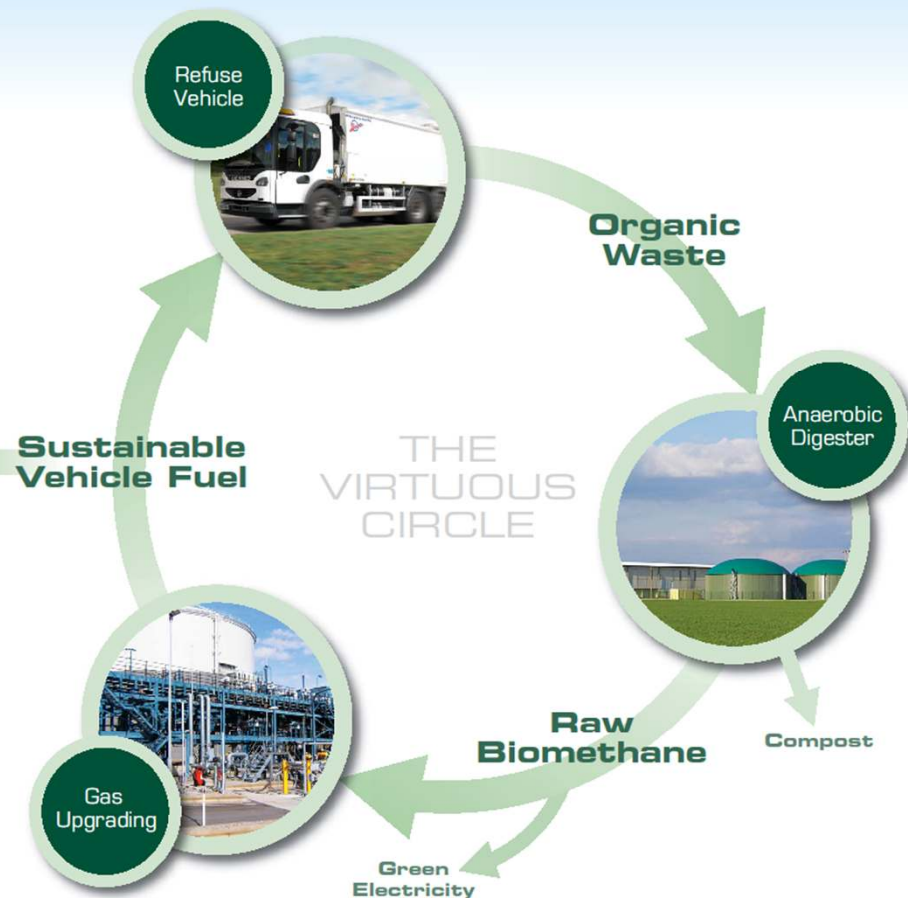
Biomethane offers significant environmental benefits including 32-40% lower CO₂ and very low emissions in all tailpipe pollutants when compared with standard diesel and petrol engines.



- The Hardstaff Group DIGI® Dual Fuel technology is designed to run on fossil and renewable compressed natural gas or liquid natural gas, using diesel as the primary ignition source.



- Dynevor Arms Renewable Energy Centre in South Wales will produce biomethane from household waste via anaerobic digestion.



Community **'waste-to-fuel'** partnership

Project – Training & Dissemination

Visitor and Training Centre

Initially based in existing offices, expanding to self contained new build.

Three main functions:

1. Information centre for alternative fuel technology, open to the public and schools/universities
2. Training facility, for up-skilling employees, customers and contractors in the use of natural gas possibly in partnership with FE College.
3. A step towards a 'Low Carbon Technology Park'

BENEFITS

Information and education - global
Formal training
Benefits the community and environment

TIMESCALES

Could be short term dependent on initial partnership development.

Welsh Initiatives

- University of Glamorgan Anaerobic Digestion Development
- CymruH2Wales
- Local Councils' Waste Food Recycling Schemes
- One Wales : One Planet
- Heads of the Valleys Low Carbon Programme
- 'Turning Heads'
- Green Jobs Strategy for Wales
- Welsh Automotive Forum – Low Carbon Cluster
- M4 Low Carbon Corridor

Plus extra UK support for use of Bio-Methane in vehicles (announced in budget)





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