



## Highlands CNG Project

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John Baldwin  
Managing Director  
CNG Services Ltd

[john.baldwin@cngservices.co.uk](mailto:john.baldwin@cngservices.co.uk)

[www.cngservices.co.uk](http://www.cngservices.co.uk)

07831 241217

# CNG Services Ltd

**Low Carbon Innovations**

**cng services Ltd**

Over the next 20 years, CSL's projects will contribute towards a CO<sub>2</sub> emissions saving of.....

**17,500,000 tonnes**

Celebrating over 16 years of innovation in gas

- CNG Services Limited (CSL) provides consultancy, design and build services to the biomethane industry, all focused on reducing Greenhouse Gas (GHG) emissions
- In the past 10 years our efforts have produced a material impact with an estimated 20 year project life reduction in CO<sub>2</sub> emissions of 17,500,000 tonnes through:
  - Biomethane injection into the gas grid
  - Running trucks on Bio-CNG
  - Acting as developer and design and build contractor for the Highlands CNG Project
- Working on a number of Biomethane, H<sub>2</sub> and CCUS innovation projects including:
  - Biomethane from manure with CCS
  - Green H<sub>2</sub> into the NTS
  - Reverse Compression to Create Capacity
  - Soluforce 50 bar H<sub>2</sub> pipelines
- CSL is an ISO 9001, 14001 and 45001 approved company and has also achieved Achilles certification. CSL is GIRS accredited for design and project management and has been certified as a competent design organisation for high pressure UK onshore natural gas works by DNVGL

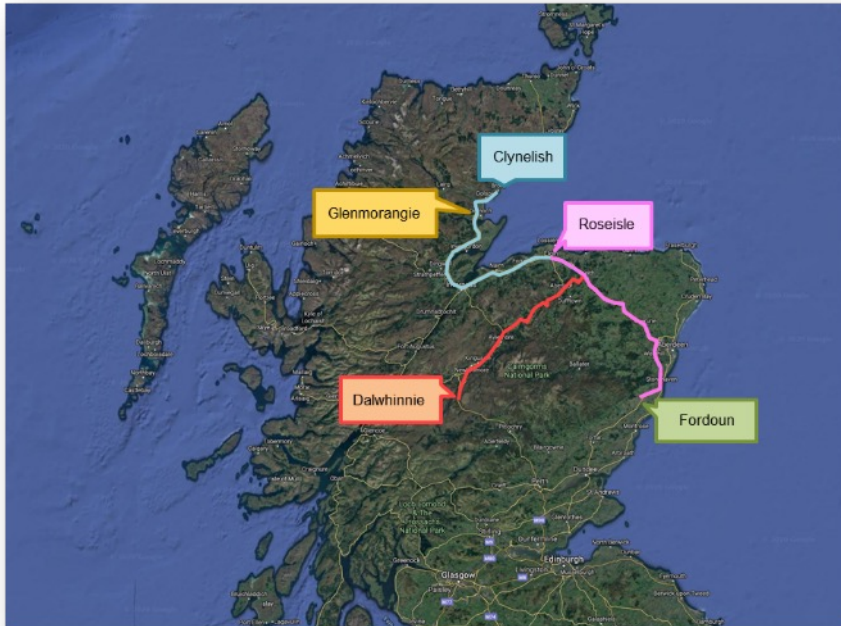


# Delivery of CNG Supply to four off-grid distilleries

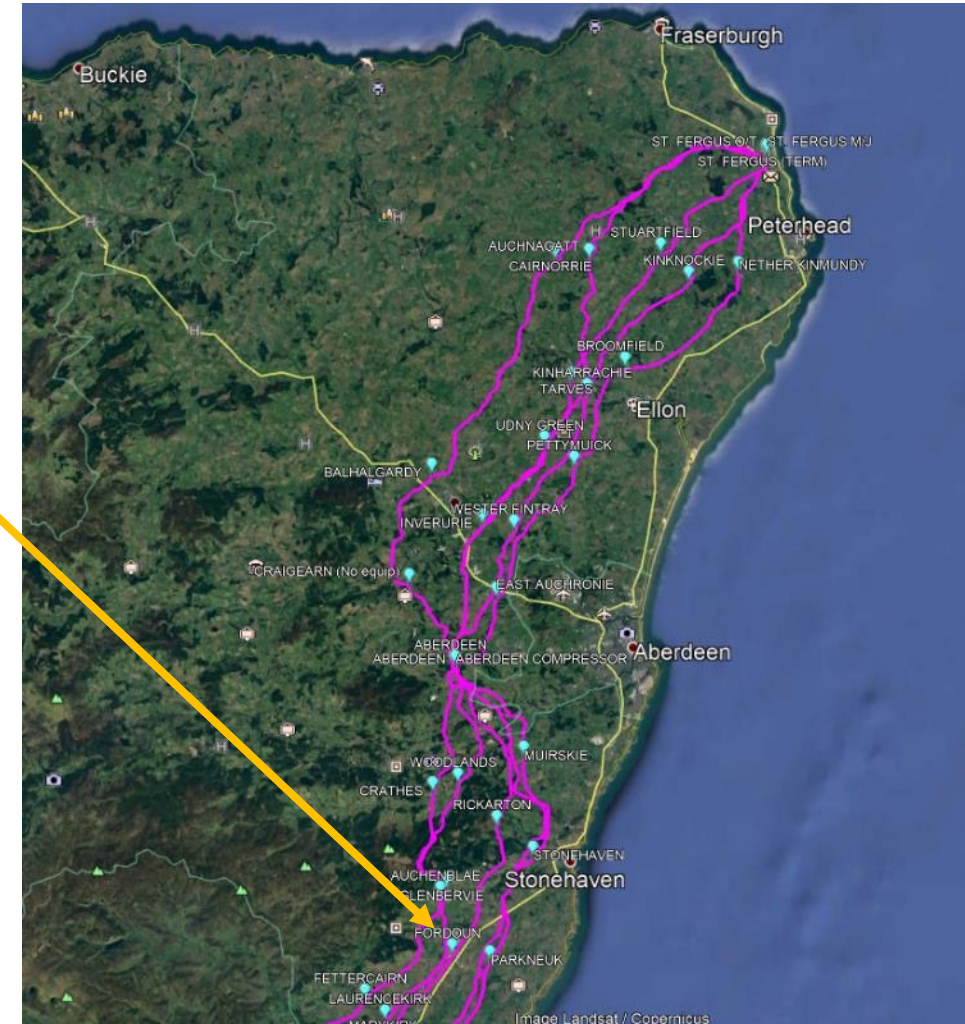
- **Aim:** Supply off-grid whisky distilleries with natural gas to fuel their boilers, producing steam for their production process

- **Basis:**

- **Funding:** Air Liquide fund and operate a CNG filling station at Fordoun with a network of CNG decanting stations across Scotland.
- **Distilleries:** Four distilleries signed up, Glenmorangie (LVMH), Clynelish, Dalwhinnie and Roseisle (Diageo).
- **Compression:** Gas is taken from the grid and compressed to 250barg into CNG Trailers before being transported to one of the decanting stations
- **Transportation:** Gas is transported via road using X-Store CNG trailers. At 250barg these hold ~10 tonnes of gas (~13,000 Sm<sup>3</sup>)
- **Decanting:** Gas is decompressed at the decanting station down to 2barg and is piped to the distillery boiler-house. The gas is then further reduced in pressure (down to hundreds of mbar) before entry into the boiler.
- **Connection/Pipeline:** Fordoun is located near the NGT NTS grid. A connection was made in an existing NGT AGI and a customer ROV was installed just outside the AGI. A 3" carbon steel pipeline was installed, running from the ROV outlet to the meter inlet onsite.
- **Design Gas Load:**
  - **Fordoun :** Max 11,500 Sm<sup>3</sup>/hr (pipeline), Max 5,500 Sm<sup>3</sup>/hr (each compressor)



# Fordoun CNG Mother Station on the National Transmission System (85 bar)



# NTS Block Valve Site and CSL ROV Compound



- Remotely Operable Valve (ROV) is located approximately 50m downstream of the connection to the NTS block-valve site
- Downstream of the ROV is a ~900m 3" carbon steel pipeline which feeds into the CNG Mother Station
- The ROV is operated locally via a dedicated button at the CNG site and from the ESD buttons locally and at the CNG Mother Station

## Fordoun – Finished Site



**Meter, Odorant Unit, CV Measurement and Dispensers**

- Downstream of the pipeline the gas is metered (yellow pipework) and analysed (green kiosk behind the yellow pipework)
- The gas is then odourised using an odourant unit
- Following compression, gas is dispensed onto trailers (four dispensers installed)



**Compression Compound**

- Two compressors (duty/standby) were installed, designed to flow a maximum of 5,500 – 7,000 Sm<sup>3</sup>/hr of gas
- The compressors and the gas are cooled by water-based systems, with one large air cooler installed per compressor.
- Gas is further cooled on compressor outlet by chillers

# CNG Trailer Details and Important Features

## 1. Pneumatically operated isolation valves

Air provided from site-based plant during filling/offloading. Removal of air leads to closure of valves and effective isolation of trailer gas from the site

## 2. Pneumatic anti-drive-away system

Switch on trailer manifold cover activates skeletal air brakes if the swing cover is open; if the manifold cover is open and hoses are connected, driving away (and possibly bursting the hoses) is prevented

## 3. Two loading and two off-loading lines

Separate lines for loading and offloading with manual valves and non-return valves for ease of operation and prevention of reverse flow



## 4. Port for cylinder process monitoring

Pressure/Temperature signals from transmitters installed in the trailer cylinders can be received by connecting into the port. These signals can then be read by the site PLC's and used for safety and control purposes

## 5. Oasis high-flow nozzles/couplings

These high-flow nozzles reduce flow restrictions when loading and offloading at lower pressures. The Oasis nozzles also allow for fast and simple coupling of CNG flexible hoses and isolate the high pressure gas if no hoses are connected. Loading couplings on the trailer are female whilst offloading are male; this prevents mistakes during the connection process

# Filling CNG Trailers

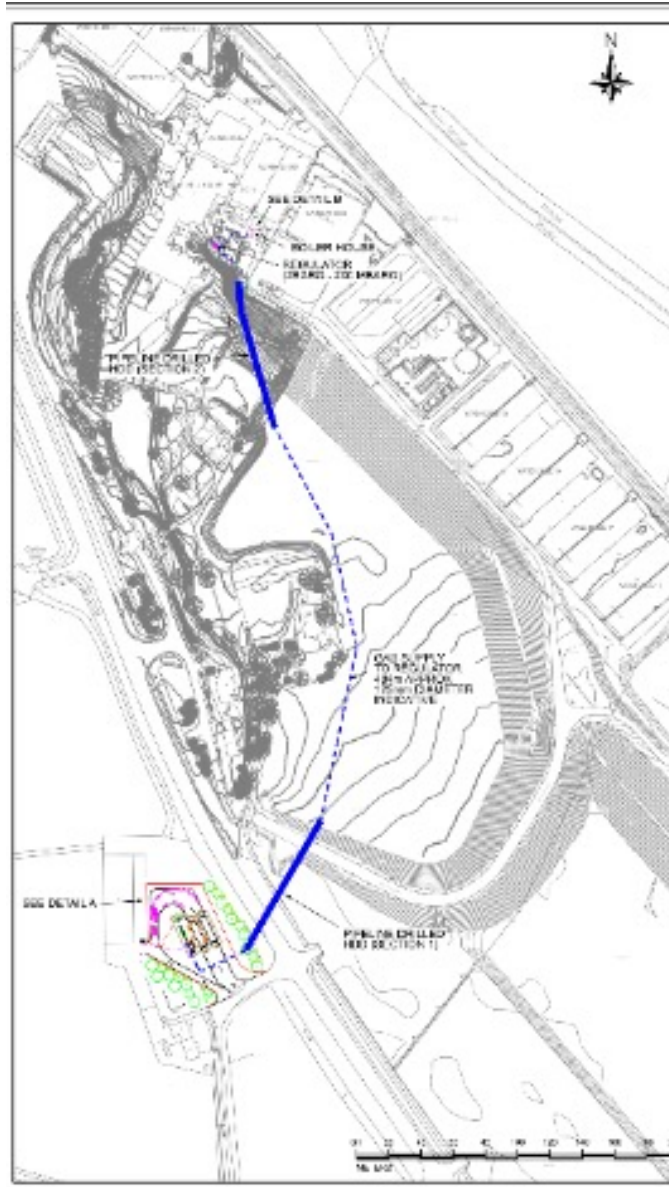




# The first customer – Glenmorangie Distillery



# Glenmorangie Decanting Station - 500m from the distillery



## Other Distilleries

## Dalwhinnie Distillery



## Clynelish Distillery

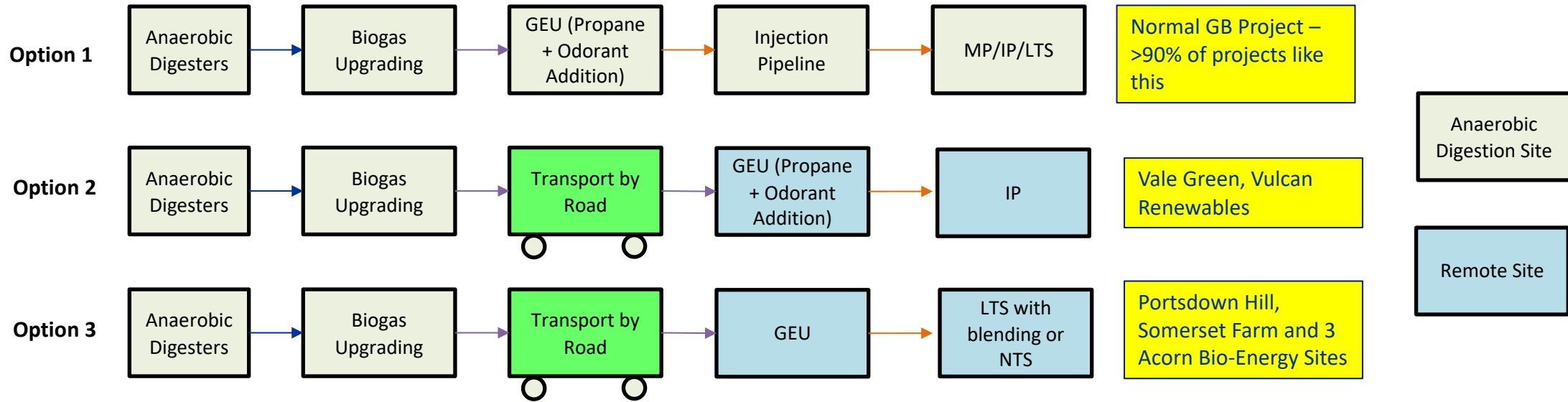


# Roseisle Distillery



## Moving Biomethane by Road

# GB Biogas/Biomethane to Grid Options



There are now over 100 biomethane projects in GB. As the gas grid gets saturated with biomethane on summer low demand periods there is insufficient capacity to inject biomethane

Moving compressed upgraded biomethane by road is now taking place