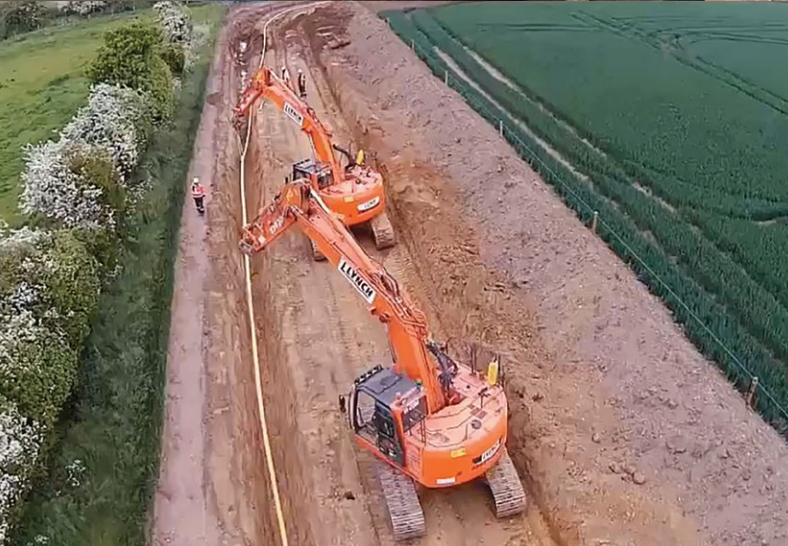


High Pressure Gas Transmission Connection and Pipeline Services



CNG SERVICES LTD



CNGServices Limited (CSL) provides consultancy, design and build services to the biomethane, power generation, Compressed Natural Gas (CNG), hydrogen and gas production industry, all focused on reducing Greenhouse Gas (GHG) emissions. This brochure is focussed on our high pressure gas transmission connection and pipeline services. Please visit our website at cngservices.co.uk for our full range of services.

CSL is an ISO 9001, 14001 and 45001 approved company and has also achieved Achilles certification for consultancy, design and construction services. CSL is GIRS accredited for design and project management for gas connections below 7bar and has been certified as a competent design organisation for high pressure UK onshore natural gas works by DNVGL for gas connection and pipeline design above 7 bar.



Lloyd's Register
Working together for a safer world

Lloyd's Register EMEA
Gas Industry Registration Scheme

This is to certify that
CNG Services Ltd.
has been awarded Full Accreditation against the above noted scheme. This accreditation enables the client to tender for the following work activities:

Design
Project Management

This scope of approval includes the assessment of the following systems and processes:
Human Resources and Training, Document, Contract and Change Control, Control of Work, Health, Safety and Environment, Procurement, Storage and Equipment.

This Approval is subject to:
The requirements set out in GIG 2 V5.1, IGEM/TD101
Any sub-contractor employed on such works must be accredited.

Approval Number: PRJ1100258323-1
Date of Issue: 01/04/2020
Date of Expiry: 31/03/2023

Paul Mason
Paul Mason
Senior Assessor - Utilities
Lloyd's Register EMEA
A subsidiary of Lloyd's Register Group Limited

GIRS
Gas Industry Register
Accredited

DNV-GL

COMPETENT DESIGN AUTHORITY

ORGANISATIONAL STRUCTURAL AUDIT

CERTIFIED BY DNV-GL

This is to certify that **CNG Services Limited** has undergone a Competent Design Authority Organisational Structural Audit on 17th July 2019 and successfully demonstrated it has appropriate processes and procedures in place to undertake UK onshore natural gas design works in the following disciplines:

- a. Mechanical Engineering
- b. Civil/Structural Engineering
- c. Electrical Engineering
- d. Instrumentation Engineering
- e. Safety Engineering
- f. Process Engineering
- g. Corrosion/Protection Engineering
- h. Software Engineering
- i. Human Factors Engineering

This Certificate is valid until **17-07-2024**
Issued by **DNV GL, Edinburgh, UK on 04-12-2019**

Paul Mason
Paul Mason
Senior Assessor - Utilities
Lloyd's Register EMEA
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DNV-GL
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ENGINEERING NET ZERO THROUGH RENEWABLE GASES

High Pressure Gas Transmission Connection and Pipeline Services

CSL has developed a strong team of specialists for high pressure gas transmission connection and pipeline services for pressures up to 85 bar.

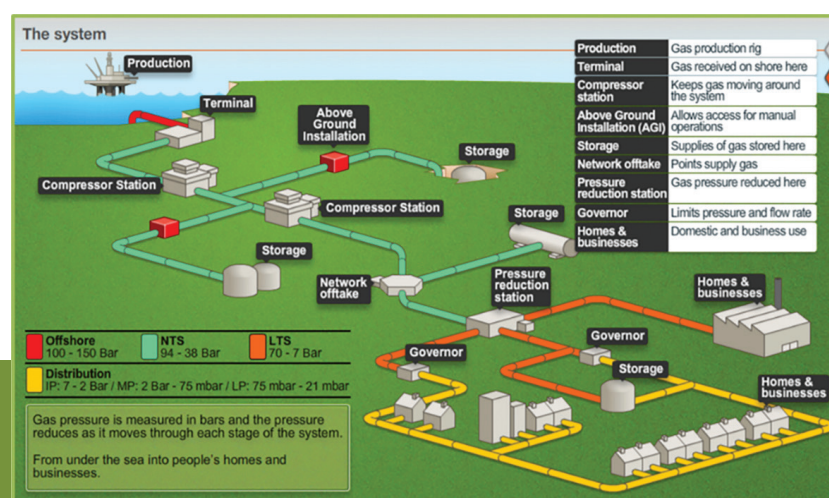
We deliver projects that involve the design, construction, testing, commissioning and maintenance of assets for gas networks and third party operators.

Projects are managed through to full completion and involve all stages of the pipeline lifecycle, including but not limited to:

- Feasibility Studies
- Conceptual Design
- Construction
- Commissioning
- Maintenance & operation
- Environmental Statements
- Detailed Design
- Testing
- Asset handover
- Legislative & technical compliance

We can also deliver pipeline duty holder operator, emergency and maintenance responsibilities to ensure private pipelines are in full compliance with HSE, GS(M)R, PSR and PSSR requirements.

Since 2014 we have designed and constructed over 30 high pressure above 7 bar projects adopted by Gas Network Operators (GNOs) and private pipeline operators, including connecting to the high pressure Local Transmission (LTS) and National Transmission Systems (NTS).



High-pressure connections provide the benefit of better entry network capacity and also reduced compression costs where higher pressures are required for CNG usage.

Our preferred approach is to offer the connection and pipeline works under a self lay process where CSL manages the design and construction of the assets for the network operator to adopt. This provides the customer with a more competitive quote, improved timelines and greater transparency. At the same time we can also provide design and construction services for the client's interconnecting high pressure pipework enabling better efficiency by using joint design and construction resources.



Innovation is a critical part of the design process, case studies include:

- **Holkham Biomethane Injection** – CSL designed and constructed the first LTS (19 bar) “Self Lay” Biomethane connection including design and construction of the LTS under pressure connection and entry facilities including an ROV, RTU and secure compound which were then adopted by the Network operator Cadent.
- **Leyland Bio-CNG filling station** – CSL designed and constructed the first UK LTS (32 bar) Bio-CNG Filling Station connection
- **Raynham Farms Biomethane Injection** – CSL designed and constructed the first UK LTS (19 bar) Reinforced Thermoplastic (RTP) pipeline for high pressure gas transmission with a 1.5 km pipeline constructed saving 2 months in construction time and cost compared to a steel pipeline.



LTS CASE STUDIES



Project: Raynham Biomethane (19 bar)

Client: Cadent (formerly National Grid)

Connection Type: LTS Entry

Concept: Innovation project to demonstrate the safe use of Reinforced Thermoplastic Pipe (RTP) for 19 bar biomethane injection into an LTS network.

Completion: 2015

Project Outcomes:

- CSL successfully designed and installed a 1.4km HexelOne RTP pipeline for biomethane injection into the LTS network. Previously the only accepted material for high pressure pipelines was steel.
- Using RTP enabled significant reductions in costs, including fabrication and installation time as well as avoiding corrosion issues from steel.
- The equivalent steel pipeline would have taken 2 months to fabricate and lay compared to 1 week for the RTP welding and pipelaying element.
- IGEM standard TD/19 was developed following the trial to allow the use of RTP for gas transmission pipelines up to 100 bar in the UK.



Project: Leyland CNG Station (32 bar)

Client: CNG Fuels & Cadent / National Grid

Connection Type: LTS Exit

Concept: To carry out a "Self lay" connection onto the LTS and connect an unregulated meter installation and compressors for a new CNG HGV filling station.

Completion: 2016

Project Outcomes:

- CSL designed and constructed a Minimum Offtake Connection (MOC) to a 24" LTS pipeline under the "Self Lay" process) for Cadent adoption, as well as customer HP meter inlet and outlet pipework.
- CSL identified significant compression cost savings by taking gas from the LTS network and supplying unregulated. CSL presented the case to the HSE to gain exemption - causing industry rules to change.
- A detailed analysis and risk assessment was performed to eliminate the requirement of an ROV.



LTS CASE STUDIES



Project: Bonby Biomethane Project (37 bar)
Client: UK biomethane developer and operator
Connection Type: LTS Entry
Concept: Design and construction of a pipeline connection between the AD plant and the nearest LTS pipeline which was 7 Km away by the most cost effective option.
Completion: 2018

Project Outcomes:

- CSL successfully designed and constructed a Minimum Entry Connection (MEC) at the LTS 7 Km away from the AD plant including an ROV, RTU and Cadent compound for adoption under the “Self Lay” process.
- CSL also designed and constructed a remote customer compressor compound and 7km 125mm PE 7 bar gas pipeline between the AD Plant and remote compound, including HV supply and fibre optic communications.



Project: Erdington CNG Station (19 bar)
Client: CNG Fuels
Connection Type: LTS Exit
Concept: To connect a new CNG station to the existing LTS network by the most cost effective method.
Completion: 2020

Project Outcomes:

- CSL successfully designed and constructed a 19 bar steel MOC under the “Self Lay” process utilising an existing redundant 3” connection to a 24” LTS pipeline connecting to a customer unregulated meter skid.
- CSL also designed and constructed the customer HP connection pipework including 120m of 90mm HexelOne RTP meter outlet and steel HP twin compressor inlet pipework.



LTS CASE STUDIES



Project: Barnes Farm Biomethane (70 bar)

Client: UK biomethane developer and operator

Connection Type: LTS Entry

Concept: Design and construction of a pipeline connection between the AD plant and the LTS by the most cost effective means.

Completion: 2019

Project Outcomes:

- CSL successfully designed and constructed a 600m 70 bar 4" steel biomethane injection LTS pipeline under the "Self Lay" process with underpressure connection to an existing 24" steel LTS pipeline.
- CSL also designed and constructed the customer facilities which include twin reciprocating compressors, the customer HP steel outlet, GEU, ROV and RTU.



Project: Euston Biomethane

Client: UK biomethane developer and operator

Connection Type: LTS Exit

Concept: Design and construction of a pipeline connection between the AD plant and the nearest LTS pipeline which was 6 Km away by the most cost effective option.

Installation: 2015

Project Outcomes:

- CSL successfully designed and constructed an MEC at the LTS 6 Km away from the AD plant by modifying pipework at an existing AGI including a new ROV and modification of an existing RTU for adoption under a "Self Lay" process.
- CSL also designed and constructed a remote customer compressor compound and 6km 125mm PE 7 bar gas pipeline between the AD Plant and remote compound, including HV supply and fibre optic communications.



NTS CASE STUDIES



Project: Fordoun CNG Mother Station (84 bar)

Client: UK CNG developer and operator

Concept: Connect a CNG “Mother station” to the NTS including trialling the first “self-lay” NTS connection. CSL developed the concept of a “Virtual pipeline” to deliver greener energy to remote Scottish Distilleries.

Completion: 2015

Project Outcomes:

- CSL designed and constructed an MOC 900m away from the CNG daughter station by modification of an existing NTS block valve under a “Self Lay” process. This was the first “Self-lay” connection to the NTS.
- A detailed analysis and risk assessment was performed to eliminate the requirement of an ROV providing significant whole life cost benefits and UK policy change.
- CSL designed and constructed a 900m 3” steel customer private pipeline incl ROV and is the pipeline operator under a Safety Case Exemption developed by CSL.
- CSL designed and constructed the 300 bar compression “Mother station” and 4 decanting “Daughter stations” at the Distilleries including specifying the 300 bar storage trailers.



Project: Somerset Farm Biomethane (75 bar)

Client: UK biomethane developer and operator

Concept: Design and construction of a pipeline connection between the AD plant and the NTS. This was the first NTS Biomethane connection

Completion: August 2020

Project Outcomes:

- Design and construction of a 3” steel 1km private gas pipeline & fibre optic communications from the AD plant boundary to a new NTS MEC at an existing block valve site. CSL is the private pipeline operator under a Safety Case developed by CSL.
- CSL design and construction of HP customer compressor outlets from twin reciprocating compressors and 150m of 6” 75 bar Soluforce RTP meter outlet pipework to a boundary ROV compound. This was the first UK use of Soluforce RTP pipe at 75bar.



NTS CASE STUDIES



Project: Theddlethorpe NTS Injection Pipeline (70 bar)

Client: UK onshore gas operator

Concept: Divert an existing onshore gas pipeline and connect to the NTS to allow for gas injection.

Completion: 2021

Project Outcomes:

- Design and construction of a 700m private injection pipeline, including 4" RTP Soluforce and 250NB/100NB steel with modification of an existing 10" onshore gas pipeline and connection to a new NTS MEC at an existing block valve.
- RTP pipeline installed by Horizontal Directional Drilling (HDD) up to 6m deep under multiple drainage culverts.
- This was the first UK NTS rated RTP private Gas Network transmission pipeline.



POWER GENERATION



Project: Power generation project (37 bar)

Client: UK power generator

Connection Type: LTS Exit

Concept: To provide a temporary pressure reduction station pending further site development

Completion: 2019

Project Outcomes:

- CSL successfully designed and installed a modular pressure reduction system to a metered LTS supply
- A range of assessments were required to determine the suitability of the system for the UK gas industry.
- The system is separated into a filtration/pre-heating module and a metering/pressure reduction module.
- The units have been in operational for 3 years in their current position and continue to be relied upon with a full maintenance programme in place.





cngservices

ENGINEERING NET ZERO THROUGH RENEWABLE GASES

Achilles

UVDB

SILVER PLUS

IGEM
Institution of
Gas Engineers & Managers



ENGINEERING NET ZERO THROUGH RENEWABLE GASES



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