



Biomethane

Connection Guide



This guide is intended to help you,
as owner or developer of a biomethane
production facility, to connect to
Phoenix Energy's gas distribution network

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About Phoenix Energy

Phoenix Energy (Phoenix) is the owner and operator of the largest gas distribution business in Northern Ireland (NI). Phoenix's licence (the 'Licence') to operate has a geographic coverage (the 'Licensed Area') that encapsulates c.45% of the population of NI, with the distribution network serving regions including Greater Belfast, Larne, East Down and Whitehead.

Phoenix holds a perpetual licence, which it was granted in 1996 as the initial greenfield developer of the natural gas distribution market in NI. Since that time Phoenix has built a modern, reliable, and cost-effective gas distribution network almost exclusively using polyethylene (PE) pipeline technology that best places it to transport alternative renewable gases including biomethane and hydrogen.

The gas network is a secure way of delivering energy to properties. At the end of 2022 Phoenix's gas distribution network comprised c.4,000km of intermediate, medium and low-pressure mains, making gas available to c.365,000 potential properties of which c.250,000 are already connected.

Phoenix is responsible for developing and maintaining its gas distribution network, for providing a 24/7 operational and transportation service platform, and for monitoring and managing the gas entering its network to ensure the gas is in compliance with the Gas Safety (Management) Regulations (Northern Ireland) ('GS(M)R NI').

As an integral part of the development of the gas industry within the Licence Area, Phoenix is also responsible for marketing to new end consumers and thereafter, supporting their connection to the network. However, once connected, consumers are serviced by third party Gas Suppliers for the gas that they use. Phoenix is responsible for providing Gas Suppliers with access to its gas distribution network and to charge them for doing so under the terms of its Distribution Network Code.

The NI Gas Network Operators (GNOs) – Mutual Energy, GNI(UK), evolve, firmus energy and Phoenix Energy – have developed a pathway to decarbonise the gas networks and are actively preparing for this transition.

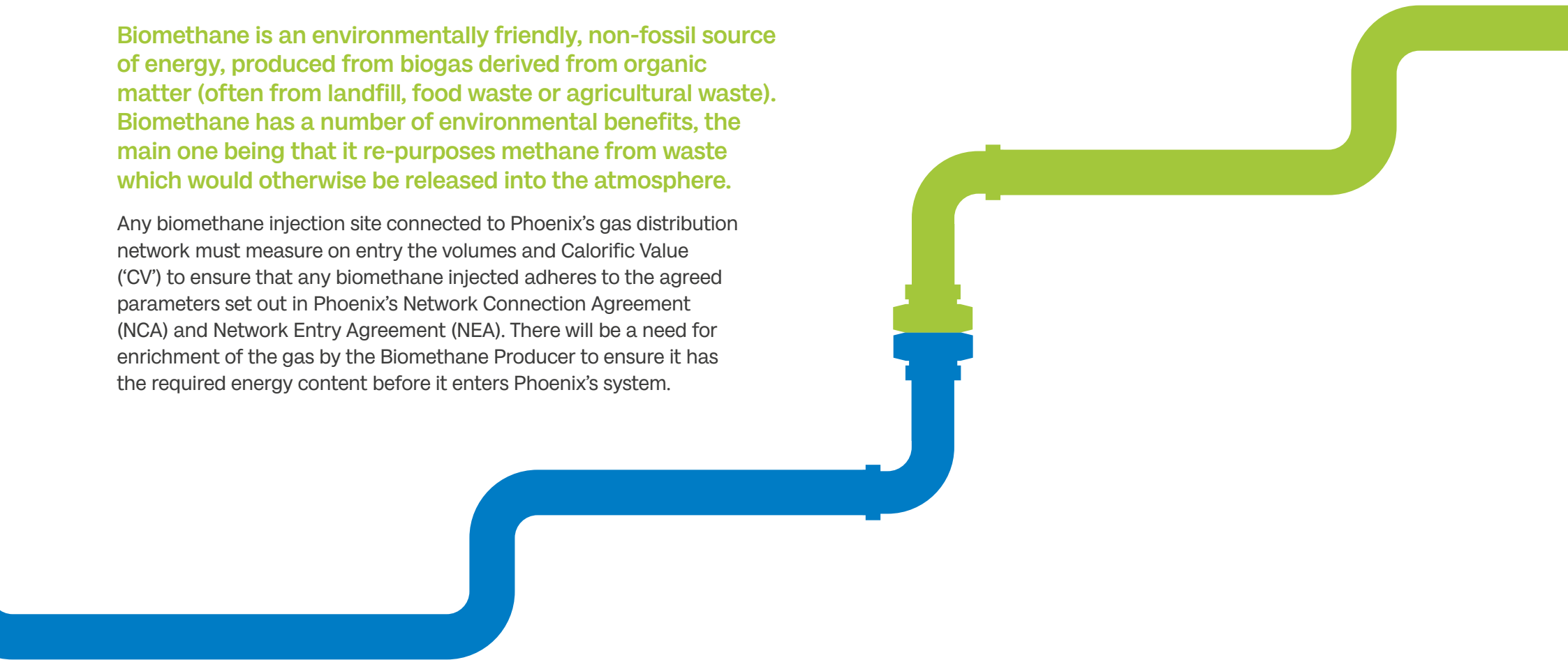
At the heart of our pathway is an affordable, least-disruptive, transition to Net-Zero where consumers can continue to enjoy all the convenience and benefits of a gas heating system safe in the knowledge that the gas they use will be 100% renewable by 2050.

This is an exciting time for the NI Gas Networks and we are enthusiastically looking forward to working with renewable gas producers, consumers and energy stakeholders to play a full role in NI's journey to Net-Zero.

Greening the Gas

Biomethane is an environmentally friendly, non-fossil source of energy, produced from biogas derived from organic matter (often from landfill, food waste or agricultural waste). Biomethane has a number of environmental benefits, the main one being that it re-purposes methane from waste which would otherwise be released into the atmosphere.

Any biomethane injection site connected to Phoenix's gas distribution network must measure on entry the volumes and Calorific Value ('CV') to ensure that any biomethane injected adheres to the agreed parameters set out in Phoenix's Network Connection Agreement (NCA) and Network Entry Agreement (NEA). There will be a need for enrichment of the gas by the Biomethane Producer to ensure it has the required energy content before it enters Phoenix's system.



Who is Involved in the Biomethane Injection Process?

The process of connecting to the Phoenix gas distribution network involves a number of parties, where contractual and commercial arrangements are required to be in place. The diagram below illustrates the parties involved.

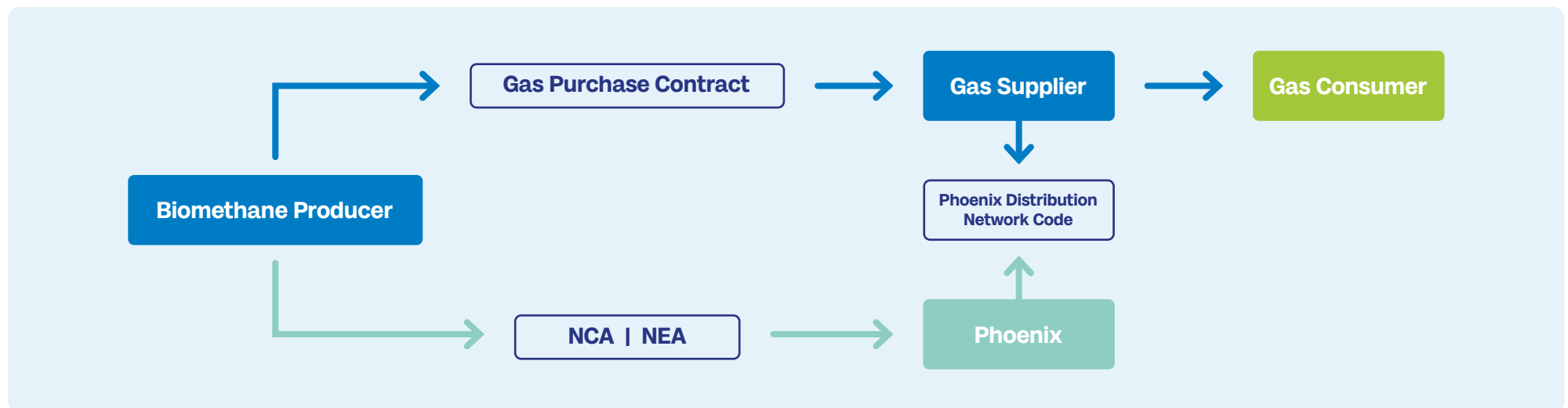
Biomethane Producer

The Biomethane Producer is responsible for producing the gas and ensuring that it meets the appropriate gas quality requirements set out in the NCA and NEA. Contracts for the

sale of gas must be secured with a Gas Supplier before it can be injected into the Phoenix gas distribution network.

Gas Supplier

A Gas Supplier must have both a Licence to supply gas within Phoenix's Licensed Area and must have acceded to the Phoenix Distribution Network Code. The Gas Supplier will be responsible for managing the shipping arrangements for any biomethane injected into the Phoenix gas distribution network.



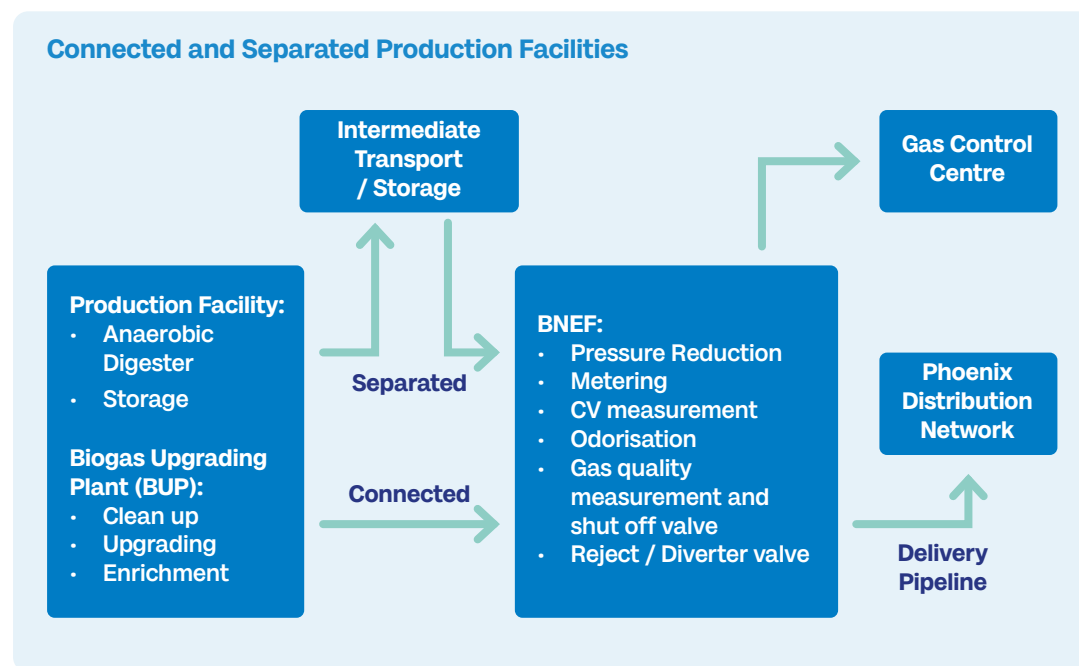
The Supply Chain

The equipment configuration used to produce and supply biomethane into the Phoenix gas distribution network broadly falls into 'Connected' and 'Separated' Production Facilities.

Connected: where the Production Facility is physically connected to a Biomethane Network Entry Facility (BNEF).

Separated: where the Production Facility and the BNEF are physically separated and rely on storage and tankers to transport biomethane to the BNEF.

For both of the above, a BNEF remains a requirement for any connection to the Phoenix gas distribution network.



Production Facility

A facility that includes biogas production (i.e. the anaerobic digester (AD) and storage, plus a Biogas Upgrading Plant (BUP) to process and clean the gas to bring it to an acceptable specification for injection into Phoenix's gas distribution network.



The Supply Chain

Biomethane Network Entry Facility

The BNEF will meter, measure the quality of, and odourise the biomethane prior to it being injected into Phoenix's gas distribution network. Additionally, a Gas Control Centre (GCC) via a Supervisory Control and Data Acquisition (SCADA) system will monitor the connection to ensure compliance with the NEA is achieved, e.g. gas quality requirements. The GCC will control a shut off system (Remote Operated Valve (ROV)) to prevent non-compliant gas from entering Phoenix's gas distribution network.

The Delivery Pipeline

The Delivery Pipeline transports the biomethane from the BNEF to Phoenix's gas distribution network. The size of this pipe will depend on the flow capacity, distance to, and pressure of the receiving gas distribution network main.

Phoenix will construct and commission the Delivery Pipeline and Biomethane Producers will be advised of the length, size, route and cost as part of the Detailed Capacity Study provided during the planning stages. The Delivery Pipeline will generally be laid in the public highway, however routing through private land may be necessary, or more practical / cost effective. In such situations the Biomethane Producer will be responsible for securing any land owner permissions for easements and providing these to Phoenix.

Injecting Biomethane into the Phoenix Gas Distribution Network

A BNEF can potentially inject biomethane into any of the three Phoenix gas distribution network pressure tiers:

Tier	Maximum Operating Pressure (MOP)
Intermediate Pressure	7 bar (g)
Medium Pressure	4 bar (g)
Low Pressure	75mbar (g)

Capability for injection is dependent on capacity on Phoenix's gas distribution network which will vary with hourly / daily / seasonal demand profiles, however it is more likely to have a secure flow of injection into the medium and intermediate pressure tiers.

Potential Biomethane producers will be provided with a full overview of the 24/7 injection potential of their chosen site via the Detailed Capacity Study (see page 14).

The Phoenix Connection Model

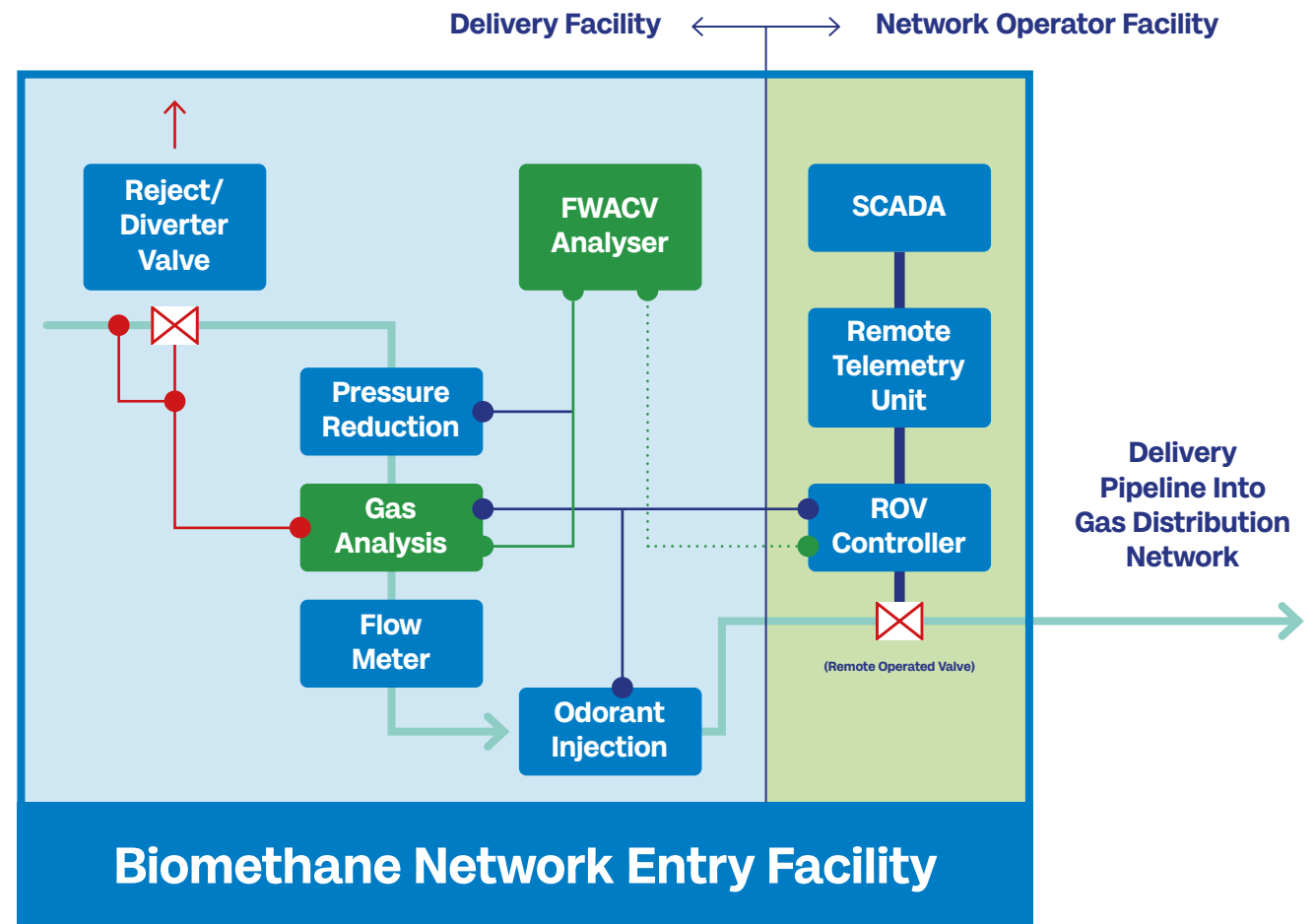
Biomethane Network Entry Facility

Phoenix operates a connection asset ownership model where Phoenix will adopt the ROV, its associated controller, telemetry systems and some support equipment (the Network Operator Facility) within the BNEF. Together, these elements perform the function of ensuring that any biomethane injected into Phoenix's gas distribution network meets the requirements of the NEA.

The BNEF ownership is therefore split into two once installation and commissioning has been completed (as shown in the figure opposite).

The Delivery Facility (DF) will be owned and maintained by the Biomethane Producer (who is referred to as the Delivery Facility Operator in the NEA).

The Network Operator Facility (NOF) will be adopted and maintained by Phoenix.



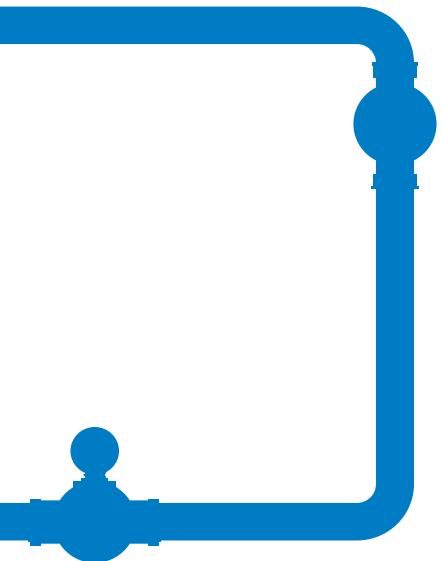
BNEF Ownership Model and Delivery Pipeline

The Phoenix Connection Model

The Phoenix connection model allows Biomethane Producers to independently design and procure the BNEF, however in order to permit safe, efficient and fit-for purpose grid injection of biomethane, the Biomethane Producer must follow **Phoenix/BIO/2: Specification for BNEF, ROV & Controls.**

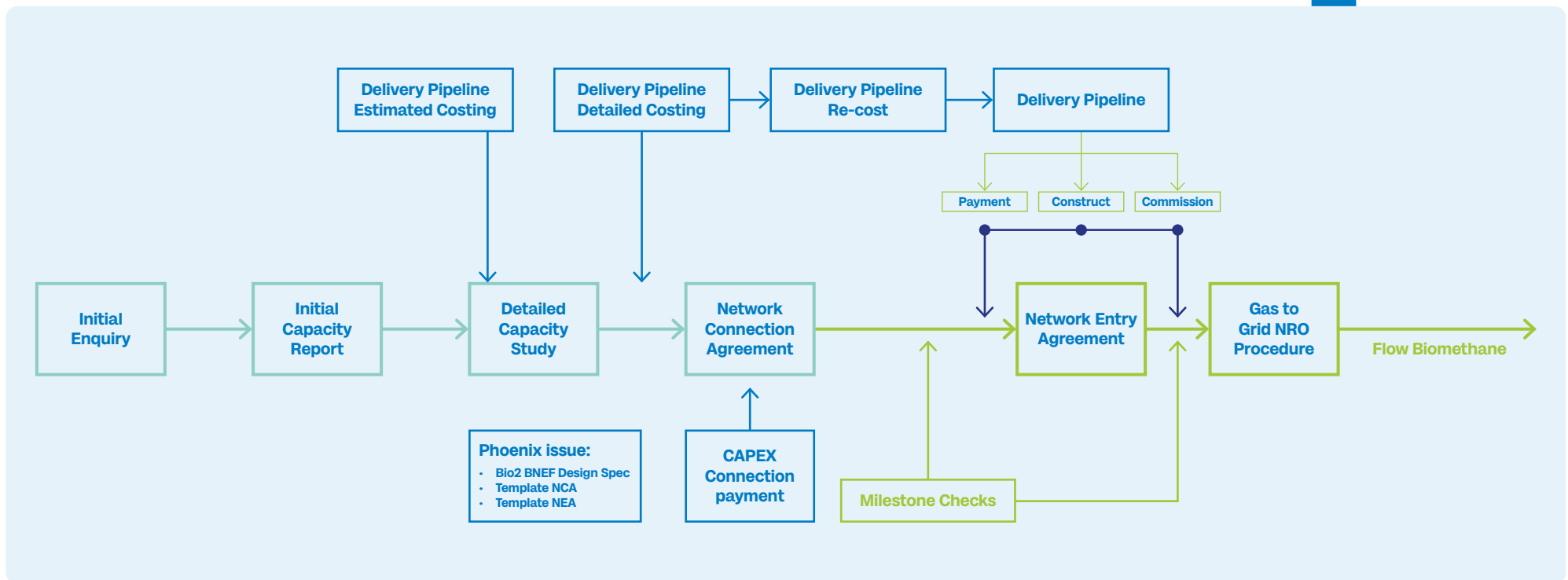
This specification will be provided to Biomethane Producers alongside their Detailed Capacity Study, and sets out the minimum process and functional requirements that must be met. These include:

- Production and clean-up plant and mitigation processes for out of specification gas;
- Pressure regulation and control systems;
- Plant start up and shutdown, and associated operating procedures;
- Gas specification (quality and energy content), sampling and analysis / BNEF supervisory controls;
- Diverter valve(s);
- ROV, associated controller and shutdown controls;
- Metering;
- Odorant injection;
- Management of the CV



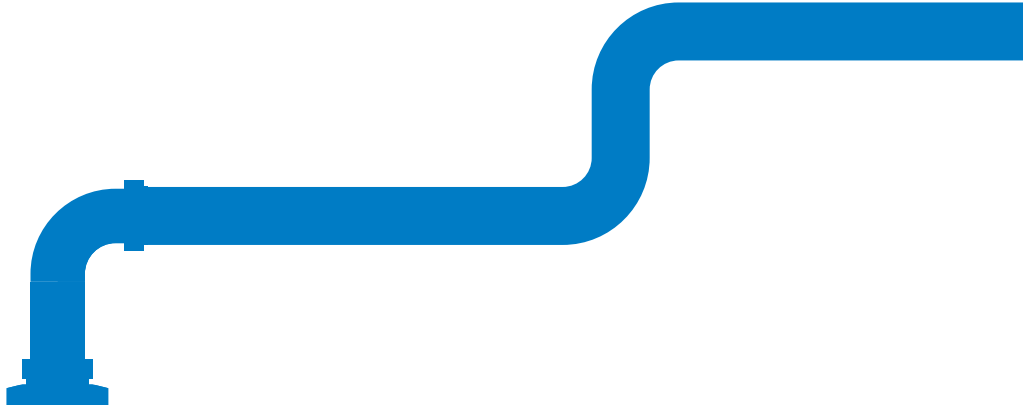
How to Get Connected

To get connected to the Phoenix gas distribution network the connection pathway is as follows;



For more detail please see steps 1 to 9

Key Steps in the Connection Pathway

- Step 1** Submit an Initial Enquiry Form
 - Step 2** Request an Initial Capacity Report
 - Step 3** Request a Detailed Capacity Study
 - Step 4** Work with Phoenix on the Delivery Pipeline design route
 - Step 5** Work with Phoenix on a more detailed assessment of the Delivery Pipeline route and revalidating costs
 - Step 6** Sign the Network Connection Agreement and pay the connection fee
 - Step 7** Procure and construct the BNEF while completing milestone checks along the way
 - Step 8** Sign the Network Entry Agreement and pay operational charges
 - Step 9** Complete the Non-Routine Operation procedure and flow gas into the Phoenix gas distribution network
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STEP	What is it? What happens?	Biomethane Producer Requirements / Phoenix Actions	Phoenix Standards of Service	Validity Period	Cost
1 Initial Enquiry Form (IEF)	<p>To begin the process and potential for biomethane injection into the Phoenix gas distribution network, the Biomethane Producer (or nominated agent) should register their interest with Phoenix and provide some preliminary information relating to the proposed biomethane injection site.</p>	<p>Biomethane Producer will complete and submit the Producer Initial Enquiry Form which can be found here: https://www.phoenixenergy.com/safety-environment/energy-transition/biomethane-for-producers</p> <p>Enquires will only be accepted from either the landowner/leaseholder or clearly authorised representatives.</p> <p>Information Required:</p> <ul style="list-style-type: none"> • Applicant Details Name/Address/Organisation/Contact Details/Requestor Role • Site Details Name/Address/Organisation/Contact Details/Facility Co-Ordinates (TM65 Irish Grid Co-Ordinates preferred) • Source of Gas Feedstock • Gas Volumes Gas Injection volumes (m³/hr) Gas extraction volumes – if applicable • Gas On Date (estimated date) • Any additional Information (e.g. owner authorisation) 	<p>5 working days</p> <p>Phoenix written acknowledgment of receipt</p>	<p>N/A</p>	<p>Please refer to Schedule of Rates</p>
2 Initial Capacity Report (ICR)	<p>Once an IEF has been submitted to Phoenix by a Biomethane Producer, using the facility co-ordinates and proposed gas injection volumes, Phoenix will on request undertake a high-level review of the proposed biomethane injection site and provide an indication whether it is suitable for a connection to the Phoenix gas distribution network. This is known as the Initial Capacity Report (ICR) from which an informed decision can be made by the Biomethane Producer whether to progress to a Detailed Capacity Study.</p>	<p>Biomethane Producer or approved representative will make payment for the ICR production.</p> <p>Phoenix will produce the ICR based on the specific information provided on the IEF.</p> <p>At this stage Phoenix will also be in contact with the Biomethane Producer to discuss their project.</p>	<p>20 working days (From payment)</p>	<p>N/A</p>	<p>Please refer to Schedule of Rates</p>

STEP	What is it? What happens?	Biomethane Producer Requirements / Phoenix Actions	Phoenix Standards of Service	Validity Period	Cost
3 Detailed Capacity Study (DCS)	<p>Following review of the ICR by the Biomethane Producer the next stage in the process is the production by Phoenix of a more detailed study on capacity on the Phoenix gas distribution network surrounding the proposed biomethane injection site. The Detailed Capacity Study (DCS) provides the Biomethane Producer with an in-depth network analysis specific to the proposed connection and any injection constraints that may apply.</p> <p>The DCS will cover</p> <ul style="list-style-type: none"> · Potential entry point for the Delivery Pipeline. · Daily gas demand profiles for the Phoenix gas distribution network surrounding the proposed biomethane injection site. · Sensitivity analysis to identify tolerances within the Phoenix gas distribution network and how that will impact the projects viability. · Gas quality requirements for injection into the Phoenix gas distribution network. · Indicative capital costs for the connection of the BNEF and the construction of the Delivery Pipeline. · Other operating costs associated with managing and monitoring the biomethane injection site. 	<p>Biomethane Producer or approved representative will make payment for the DCS production</p> <p>Phoenix will complete the DCS based on the information provided on the IEF. Any information that has subsequently changed from that provided in the IEF should be made known to Phoenix prior to the commencement of this stage.</p> <p>At this stage Phoenix will also be in contact with the Biomethane Producer to discuss the Delivery Pipeline in more detail (see Step 4).</p> <p>Phoenix will issue the link to key literature associated to the connection process along with the DCS:</p> <ul style="list-style-type: none"> · Phoenix/BIO/2 BNEF, ROV and Controls design specification · NCA Template · NEA Template 	30 working days (From payment)	180 days Post 180 days an updated DCS can be requested however may be chargeable	Please refer to Schedule of Rates
4 Delivery Pipeline Design (DPD)	<p>As part of the DCS development, Phoenix will complete the design of the Delivery Pipeline and will provide the Biomethane Producer with indicative costs.</p> <p>These will be reassessed in more detail before any commitment is made at the point of signing the NCA.</p>	<p>To assist with the design the Biomethane Producer must provide:</p> <ul style="list-style-type: none"> · An estimated / proposed location of the BNEF · Any information to assist with the Delivery Pipeline design and outline any route where there is potential to lay through private land. Any known difficult crossing obstacles for the Delivery Pipeline such as water, drains, bridges etc. should be highlighted. <p>Note: Any notifications and legal fees associated with easements will be the responsibility of the Biomethane Producer.</p>	N/A	N/A	Please refer to Schedule of Rates

STEP	What is it? What happens?	Biomethane Producer Requirements / Phoenix Actions	Phoenix Standards of Service	Validity Period	Cost
<p>5 The Delivery Pipeline</p>	<p>If the indicative costs in the DCS are deemed reasonable to the Biomethane Producer, Phoenix will undertake a more detailed survey and cost review of the Delivery Pipeline prior to the Biomethane Producer signing the NCA and their commitment to connect. This will include sourcing actual 3rd party quotes and potentially carrying out trial holes along the Delivery Pipeline route.</p> <p>Whilst Phoenix will make every effort to provide robust, accurate estimates for the Delivery Pipeline, a delay in associated works commencing or a change to 3rd party costs may require a further review of Delivery Pipeline costs prior to construction. Notification of any such change to costs would be provided prior to works commencing, with a full breakdown of relevant changes.</p> <p>The Delivery Pipeline is one of the milestone checks and must be fully constructed, tested and commissioned before the Gas to Grid Non-Routine Operation (NRO) procedure is carried out (see Step 9).</p>	<p>Phoenix will work along with the Biomethane Producer to map out a construction schedule of the Delivery Pipeline to fit within the overall biomethane injection facility project. At this stage Phoenix will need:</p> <ul style="list-style-type: none"> • The final site location of the BNEF • Agreement on the final route of the Delivery Pipeline • To complete a joint walking survey of the Delivery Pipeline if the route is on private land • Disclosure of any easements requirements associated with laying the Delivery Pipeline in private land • Information on any special engineering difficulties such as water, culvert, bridge or rail crossings; or impacts on main arterial traffic routes etc. <p>To ensure the Delivery Pipeline construction is completed in a timely manner, it is recommended that the following be considered/completed early in the process:</p> <ul style="list-style-type: none"> • Time-scales around pipeline construction and commissioning • Public access and noticing of works • Ordering of materials and lead times (estimated to be up to 36 weeks) • Delivery Pipeline construction and commissioning • Any special engineering difficulties • Environmental considerations such as hedge removal and associated nesting periods. <p>The Biomethane Producer will also be required to pay full costs upfront (subject to signing the NCA), prior to any material orders being placed.</p>	Site specific	28 days	Please refer to Schedule of Rates

STEP	What is it? What happens?	Biomethane Producer Requirements / Phoenix Actions	Phoenix Standards of Service	Validity Period	Cost
6 Network Connection Agreement (NCA)	<p>Phoenix will issue a contractual connection offer via a NCA to provide assurance that a Biomethane Producer will design, install, and validate the BNEF in line with Phoenix/ BIO/2 Specification to achieve successful commissioning.</p> <p>The NCA sets out both the obligations for the Biomethane Producer and Phoenix for the installation, validation, and commissioning of the BNEF before biomethane can be injected into Phoenix's gas distribution network.</p> <p>Key sections of the NCA are:</p> <ul style="list-style-type: none"> • Agreement parameters • Biomethane Producer obligations • Phoenix obligations • Design, Development and Validation arrangements • Commissioning and Adoption arrangements • Completion arrangements • Emergency response requirements • Charging arrangements • Liabilities 	<p>The Biomethane Producer will be required to sign the NCA, followed by Phoenix, which will then initiate the formal start date of capacity reservation, and allow the Biomethane Producer to progress to the physical construction stage.</p> <p>The Biomethane Producer will also need to provide a Planning Application Reference Number to secure the capacity reservation.</p> <p>Note: Phoenix (and their supporting representatives) will continuously work with the Biomethane Producer through the connection process by attending regular project development meetings and workshops.</p>	20 working days (From receiving NCA signed by Biomethane Producer)	24 months Note: Phoenix recognise other external factors may impact timelines, and extensions can be provided where reasonable progress has been demonstrated	
7 Milestone Checks	<p>Following the signing of the NCA and confirmation of a successful capacity reservation, the Biomethane Producer is required to undertake / demonstrate progress with key activities along the way to connection in order to maintain their capacity reservation.</p> <p>Insufficient progress may lead to the termination of the NCA if milestones continue not to be met, however Phoenix will engage regularly with the Biomethane Producer and provide flexibility where reasonable.</p>	<p>The Biomethane Producer will need to meet several Milestone Checks during the project build. These include:</p> <p>General Site</p> <ul style="list-style-type: none"> • Evidence of site development • 3rd party access rights / Delivery Pipeline easements • Planning permission approval • Environmental consents • Any other duty-bound approvals • Gas Supplier agreement • Delivery Pipeline constructed and commissioned <p>BNEF Specific</p> <ul style="list-style-type: none"> • BNEF Design submission (within 6 months of NCA acceptance) • BNEF order placed • GQ8 Gas Quality & HAZOP Workshops • Factory and Site Acceptance Tests (FAT/SAT) • Standard gas reference test complete • Odorant sample test point & pass • Plant Certification • Validation / End to End Test NRO • Completion of Local Operating Procedures <p>And any other relevant information that Phoenix may reasonably require.</p>	Its recognised these milestone checks can be at various points along the connection process, however Phoenix will be monitoring progress and confirming completion before allowing gas into the network.	Within 24 months (as per NCA) or any approved extension	Please refer to Schedule of Rates

STEP	What is it? What happens?	Biomethane Producer Requirements / Phoenix Actions	Phoenix Standards of Service	Validity Period	Cost
8 Network Entry Agreement (NEA)	<p>The signing of the NEA between the Biomethane Producer and Phoenix is a prerequisite before any biomethane is allowed to be injected into Phoenix's gas distribution network.</p> <p>The NEA details the conditions, limitations and rules regarding biomethane injection and is a contractual document once the biomethane injection site is operational.</p>	<p>At least 30 days prior to biomethane being injected into the Phoenix gas distribution network, the NEA must be signed by the Biomethane Producer and submitted to Phoenix.</p> <p>Phoenix will counter sign the NEA.</p> <p>Biomethane cannot be injected without the NEA being signed by both the Biomethane Producer and Phoenix.</p>	20 working days (Upon receiving NEA signed by the Biomethane Producer)	Ongoing	Please refer to Schedule of Rates
9 Gas to Grid NRO	<p>With all Milestone Checks confirmed and the NEA completed, to inject biomethane into Phoenix's gas distribution network a Non-Routine Operation (NRO) procedure in accordance with Phoenix Safe Control of Operations Procedures is required. This is a written procedure that sets out the individual steps required to ensure safe and controlled injection into the Phoenix gas distribution network.</p>	<p>The Biomethane Producer will need to prepare and submit for approval, a commissioning NRO.</p> <p>Once approved, the commissioning NRO can take place with Phoenix also onsite to undertake any associated operational activities on the day of commissioning.</p>	10 working days	28 days	Please refer to Schedule of Rates

Please contact Phoenix Energy at
biomethane@phoenixenergyni.com
for more information on how to connect
to the gas distribution network
