Biomethane Producer
Initial enquiry form

Version 4.0 January 2024

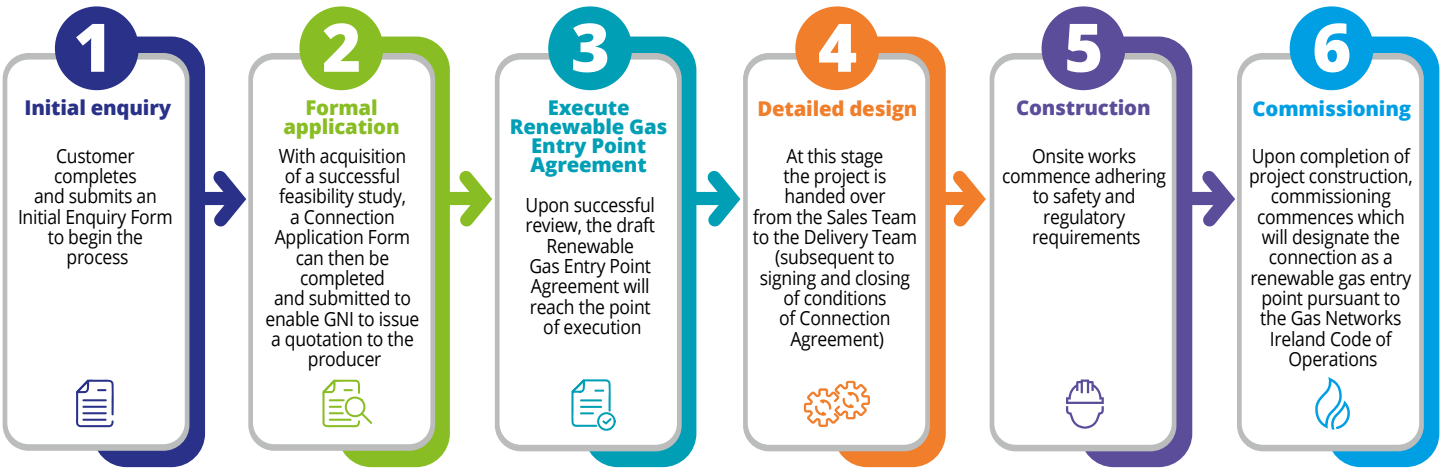
Gas Networks Ireland

Overview

The first stage of the biomethane producer connection process requires completion of the initial enquiry form. The purpose of this stage in the process will be to provide customers with a high-level indication of what their connection will consist of should they choose to progress their project with Gas Networks Ireland (GNI). This information will be used to inform part of the customer's initial project feasibility assessment. This assessment will aid customers in determining if they should progress their project to the next step, typically submission of a planning application. Other important aspects to consider as part of the initial feasibility assessment will be:

- Local feedstock availability and costing
- Preliminary site assessment feasibility
- Conceptual project design and costings
- Project sustainability assessment
- Digestate management feasibility assessment
- Funding and financing options
- Potential return on investment

Process



Waiver

Submission of this form to GNI does not constitute a request to connect. Rather, it is a request for more information on what a connection may involve. As such, GNI do not reserve any liability for commercial decisions made by the customer on the back of this report and do not reserve any connection points on the network based on receipt of this form. Any information within the feasibility report issued in response to this form is for information purposes only, valid at the time of issuance of the report and does not guarantee the long term validity of results as network conditions will vary overtime.

Data and Information

The information provided in this form will be used by GNI to form the basis for completion of the feasibility assessment. It is the responsibility of the customer to ensure all information is correct at the time of submission. In addition to this, GNI will use high level details within for the purposes of reporting typically on an anonymised and aggregate basis. Finally, GNI will retain contact information within this form and may use it to contact the customer in the future.

Submission

To request a high level connection feasibility assessment to be completed for your project, please submit a soft copy of this form to **RenewableGas@gasnetworks.ie**

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Block capitals only

Section 1: Basic contact information

Contact person:

Contact phone number:

Contact email:

Company name:

Company address:

If on behalf of a client, please specify client name:

If on behalf of a client, please specify client address:

Section 2: Technical Information

Site/enquiry name:

Connection point coordinates: Latitude Longitude

Please include with your submission a Geographical Map clearly identifying the proposed point of connection: YES ☐

Maximum Hourly Flow Rate Biomethane CH4: **(scm/hr)**

Estimated Annual Injection Quantity Biomethane: **(GWh/annum)**

Likely Connection Date / Year:

Please describe the project in as much detail as possible below:

Block capitals only

Section 3: General conditions

☐ I have read and accept the process overview, waiver and data usage requirements.

Applicant's name:
(block capitals):

Applicant's signature*:

** To be signed by applicant*

Date: / /

Section 4: Technical guidance notes

Site / Enquiry Name

The enquiry name should be representative of the site or immediate local area chosen and not the person submitting the enquiry.

Examples of good site names could be;

- **Rahan AD:** Where this is the name of a relatively local area to the anaerobic digestion (AD) location

Examples of bad site names are:

- **Kelly Consulting Engineers:** Where this donates the name of the entity submitting the enquiry but not the future limited company who will own the AD
- **Paddy Johnson:** Where this is the name of the designated contact person but not the legal entity / owner of the site.
- **Cork AD:** Where the name is too generic to distinguish the AD from others in the region.

Connection Point Coordinates

Please express coordinates in the enquiry form as *Universal Transverse Mercator (UTM) Co-ordinates*. For Ireland these coordinates should be somewhere between 51.4 – 55.7 degrees latitude and between -5.8 to -10.2 degrees longitude.

An example of the coordinate system is as follows:

Latitude 53.446205, Longitude -7.897915 which should correlate roughly to Athlone.

If the client is using a different coordinate system reference to UTM, a converter tool can be found at the link below to convert to the required format for this enquiry form.

https://gnss.osi.ie/new-converter/

Section 4: Technical guidance notes *(continued)*

Maximum Hourly Flow Rate Biomethane CH4 (scm/hr)

This figure forms the basis of assessing feasibility of a connection into local distribution networks where flows may be limited.

The volume should be expressed as flow of biomethane to be injected (CH4) into the gas grid.

1. **Guidance on converting from biogas yields to biomethane injected per hour**

   Worked Example

   Plant produces 800 scm/hr of biogas. The biogas is ~60% pure CH4 plus 40% CO2. 15% of methane produced is required for onsite heating and electrical needs.

   In this example the injected methane CH4 volume will be 800 x 0.6 x (1 – 0.15) = **408 scm/hr**

2. **Converting from normal cubic meters to standard cubic meters**

   Gas volumes will expand and contract depending on temperature and pressure. Due to this it is important to pick a standard reference temperature and pressure when expressing gas volumes of flows. To this extent there are typically two reference conditions;

   - Normal cubic meter (NCM) - Temperature: 0 °C, Pressure: 1.01325 barA
   - Standard cubic meter (SCM) - Temperature: 15 °C, Pressure: 1.01325 barA

   The Irish gas network typical refers to volumes in standard cubic meters and therefore this is the value you should submit in your enquiry form.

   If your biogas yield is measured in NCM to convert this to SCM you can apply a multiplication factor of 1.0549.

   Worked Example

   Biomethane injection rate calculated by client is 408 NCM/hr. In this example the injected methane in SCM/hr would be 408 x 1.0549 = **430.9 SCM/hr**

3. **Calculating Max Hourly Quantity based on an assumed annual energy value**

   Some developers may be at very early stages of project feasibility assessment and do not have enough design work completed to have an informed maximum hourly quantity. In this scenario the customer may have a rough indication of the annual production volume they hope to achieve. To calculate an assumed gas volume per hour the following must be done:

   Worked Example

   Proposed annual gas injection volume of 40 GWh / annum. There are 8760 hours per annum. Assume a plant uptime of 92% due to maintenance requirements. Assume a 10% uplift on the maximum hourly flow as a plants injection rates may vary +/- 10% throughout year.

   ➞ 1 GWh = 1000 MWh

   ➞ 1 MWh = 1000 kWh

   ➞ 1 SCM of biomethane is ~37 MJ ~10.27 kWh

   To calculate max hourly flow rate in standard cubic meters the following calculation can be used:

   ➞ 40 x 1000 x 1.1 / (8760 x 0.92) = 5.459 MWh / hour of gas required to be injected.

   ➞ 5.459 x 1000 / 10.27 = **531.6 SCM/hr** of biomethane to be injected

   Please note this calculation is dependent on the calorific value (CV) of the gas being injected. Natural gas typically has a CV between 38-40 MJ/m3. However, biomethane tends to be lower than this typically in the region of 37 MJ/m3.

Section 4: Technical guidance notes *(continued)*

Estimate Annual Injection Quantity (GWh / annum)

To calculate an estimated Annual Injection Quantity based on a Max Hourly Flow rate the customer should apply the reversal of the worked example shown in number 3 above.

Worked Example

Proposed maximum injection rate of 500 SCM/hr with a 10% variance (i.e. average injection rate of 450 SCM/hr across the operational hours of the year). The site has a downtime of 8% (92% uptime) for maintenance etc. Same conversion factors as above apply.

To calculate estimate annual quantity the following calculation can be used:

➞ 500 x 0.9 x 0.92 x 8760 = 3,626,640 scm / annum

➞ 3,626,640 x 10.27 / (1000 x 1000) = 37.24 GWh / annum

Likely feedstock volumes required to achieve a 20 GWh / annum energy input

Most likely an AD plant will be running on a mixture of multiple feedstocks, each of which will have slightly differing capabilities to produce gas yield. In some cases, developers may only have an estimate of feedstock available to them but are unsure as to what this means in terms of gas production. The below worked examples may help to simplify the conversion from feedstock volumes to gas yield in these cases.

The below is a rough estimate of how much quantity of an individual feedstock would likely be required to achieve a total energy output of 20 GWh if the AD plant was running on this feedstock alone.

Grass Silage - 24,000 tonnes / annum required to produced 20 GWh injection

Assumptions:

➞ 175 SCM biogas per tonne raw material

➞ 53% methane content

➞ 15% parasitic load required

Cow Manure - 154,000 tonnes / annum required to produced 20 GWh injection

Assumptions:

➞ 27 SCM biogas per tonne raw material

➞ 55% methane content

➞ 15% parasitic load required

Food Waste - 38,000 tonnes / annum required to produced 20 GWh injection

Assumptions:

➞ 100 SCM biogas per tonne raw material

➞ 60% methane content

➞ 15% parasitic load required

Estimated gas yields in raw biogas terms of many other common crops can be found at the link below for reference:

http://www.biogas-info.co.uk/about/feedstocks/