Biogas injection into the Natural Gas Grid

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# Table of Contents

1.0 Introduction ........................................................................................................................................ 3  
1.1 Purpose of this paper .......................................................................................................................... 3  
1.2 Responding to this paper ...................................................................................................................... 3  
2.0 Background ........................................................................................................................................ 4  
  2.1 Legislative Background ....................................................................................................................... 5  
  2.2 Gaslink & Bord Gais Networks role in Biogas injection ........................................................................ 6  
3.0 Technical Issues .................................................................................................................................... 7  
  3.1.1 Injection into the Transmission System .......................................................................................... 7  
  3.1.2 Injection into the Distribution Systems ......................................................................................... 8  
  3.1.3 Centralised Injection Facilities ....................................................................................................... 9  
  3.2 Gas Quality and Safety ....................................................................................................................... 10  
    3.2.2 Odour .......................................................................................................................................... 12  
  3.2.3 Safety Procedures .......................................................................................................................... 12  
  3.3 Metering ............................................................................................................................................ 13  
4.0 Regulatory and Commercial Issues ..................................................................................................... 14  
  4.1 Licensing ........................................................................................................................................... 14  
    4.1.1 Authorisation to construct a distribution pipeline ....................................................................... 14  
    4.1.2 Distribution License .................................................................................................................... 14  
  4.2 Connection Costs ............................................................................................................................... 16  
  4.3 Biogas Connected System Charges .................................................................................................... 17  
  4.4 Connected Systems Agreement ......................................................................................................... 18  
5.0 Next steps and Summary ..................................................................................................................... 19  
Appendix A – Code of Operations Gas Quality Specifications ...................................................................... 20
1.0 Introduction

1.1 Purpose of this paper

The purpose of this paper is to seek the view of the public and the CER’s stakeholders in relation to the facilitation of the injection of biogas into the gas grid in Ireland. In order to make an informed and impartial decision on this topic, the CER wishes to obtain comments from producers and potential producers of biogas, the energy industry, customers and all interested parties.

1.2 Responding to this paper

Responses to this paper should be in the format of email, post or fax and marked for the attention of:

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2.0 Background

Anaerobic digestion is the process of converting organic waste or specially cultivated crops into biogas energy. Biogas is composed mainly of methane and carbon dioxide. Biogas is most commonly used as fuel for boilers and electric generators to produce power and heat but it can be upgraded to biomethane, which subject to certain gas quality standards, may then be injected into the gas grid for consumption directly by gas consumers.

EU Member States are required to undertake measures to assist the wider use of gas from renewable sources, which include granting non-discriminatory access to the natural gas network, provided that such access is compatible with relevant technical and safety rules on an on-going basis. The EU Third Energy Package requires that the cost of connection of biogas should be objective, transparent and non-discriminatory.

Prior to the connection of biogas facilities to the gas network, there are a number of legal, technical, commercial and regulatory issues that need to be addressed. In this consultation paper, the CER examines these issues and proposes possible solutions. The purpose of this consultation is to identify and address any potential barriers to biogas injection whether operational, commercial or regulatory in nature. Government supports or tariffs for renewables are a matter for the Department of Communications, Energy and Natural Resources and are not addressed in this consultation paper.

Biogas is a by-product of the decomposition of organic material. Depending on the feedstock and digestion method, biogas contains in the range of 60-70% methane which can be harnessed as an energy resource. The most common materials used for biogas production include animal slurries, municipal solid waste and energy crops such as miscanthus, straw or maize. Direct injection of biogas into the gas grid would provide increased security of supply with less reliance on imports and contribute to Ireland’s renewable energy targets.

Prior to injecting into the gas network, biogas has to be processed in order to remove various impurities. Carbon dioxide, hydrogen sulphide and other trace elements are removed, which is necessary to ensure the safe injection of biogas into the gas network. In addition, propane is added to increase the calorific value of the biogas so that it is compatible with the natural gas in the network. Gas which has been cleansed and treated in this way and is suitable for injection to the gas network is generally referred to as biomethane, but for simplicity will be referred to as biogas in this paper.
It should be noted that the CER has a responsibility to ensure that parties seeking a connection to the gas network are facilitated subject to certain safety, economic and financial conditions being met. This paper seeks to establish a practical, non-discriminatory and transparent connection regime for biogas producers. The aim is to prevent unnecessary barriers to connection and to tailor requirements to fit the situation. It is expected that biogas facilities and the quantities of injected gas (at least initially) will generally be small. This would suggest adaptation of the normal connection rules, the use of a standardised process, and regulated connection costs and tariffs. As more biogas comes onto the system, or as more experience is gained, it may be necessary to adapt these rules accordingly.

### 2.1 Legislative Background

The European Union is supportive of the production and injection of gas from renewable sources and provides through legislation that Member States facilitate direct injection into the gas grid. Specifically,

- Directive 2009/73/EC (Common Rules for the Internal Market in Natural Gas);
- Directive 2009/28/EC (Promotion of the use of energy from renewable sources);
- Regulation 994/2010 (Measures to safeguard security of gas supply);

provide for the injection of biogas into natural gas networks.

Recital 26 of the preamble of Directive 2009/73/EC, states that the rules established for natural gas shall also apply in a non-discriminatory way to biogas and gas from biomass or other types of gas in so far as such gases can technically and safely be injected into, and transported through, the natural gas network. Additionally, Directive 2009/73/EC states that Member States should facilitate access to the network for new production capacity, in particular removing barriers that could prevent access for new market entrants and gas from renewable sources (Art. 40).

Recital 62 of the preamble of Directive 2009/28/EC states that the cost of connecting new producers of renewable energy should be objective, transparent and non-discriminatory, and that due account should be taken of the benefit that embedded producers of electricity from renewable sources and local producers of gas from renewable sources bring to the electricity and gas systems.
Directive **2009/28/EC** also states that Member States shall ensure that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources (Article 16.7), and that where relevant Member States shall assess the need to extend existing gas network infrastructure to facilitate the integration of gas from renewable sources (Article 16.9).

Recital 16 of the preamble to Regulation **994/2010** states that due account should be taken of the need to facilitate the integration of gas from renewable sources into the gas network. Injection of gas from renewable sources into the gas network is also listed as a supply-side security of supply measure in Annex 2 of this Regulation.

### 2.2 Gaslink & Bord Gais Networks role in Biogas injection

Gaslink is Ireland’s Independent system operator. It operates all the network assets belonging to Bord Gais Eireann and is responsible for the operation, maintenance and development of the Irish gas network. Gaslink is responsible for network safety and administers the Code of Operations, the ‘rulebook’ for the transportation of natural gas in Ireland.

Gaslink interacts closely with CER on matters relating to the regulatory framework for the Irish gas market. Any potential producer of biogas intending to inject directly into the gas network should, in the first instance contact Gaslink. It should be noted that it may not be possible to inject biogas into the gas network point closest to the biogas plant and a suitable injection point may be some distance away (see section 3.2 below).

Under Gaslink’s direction, Bord Gais Networks (BGN) carries out the day-to-day operation of the transmission and distribution networks. They control access to the grid at entry and exit points to ensure that the quality and pressure of gas is kept at safe levels at all times. For safety and billing purposes BGN have gas chromatographs in several locations across the grid. This ensures that all gas in the natural gas grid meets the standards set out in the Code of Operation. It also provides the necessary information for calculating the energy content of the gas for supplier and customer billing purposes.

For safety reasons, BGN ensures that all gas in the network is odourised. Thus, leaks are quickly identified and responded to accordingly. Additionally, BGN directly and through their siteworks contractors, would be responsible for constructing the connection from the biogas producer to the network, monitoring the quality and metering the quantities of gas entering the network.
3.0 Technical Issues

There are a number of technical issues which need to be addressed before a biogas facility can connect and inject gas into the gas network. The objective of this section is to highlight these technical issues, and invite comment from stakeholders. Issues include where injection could take place (transmission or distribution level), appropriate gas quality specifications, control of injection systems and metering requirements.

3.1 Connection Options:

3.1.1 Injection into the Transmission System

The gas transmission system is the main artery of the gas grid, transporting large volumes of gas at high pressure around the country. The pressure in the system is created using high-powered compression plants. These compressors ensure that there is sufficient pressure in the gas system to deliver gas to all parts of the network to meet demand and maintain safe gas pressure levels in the whole network.

Biogas injected at transmission level therefore must be at a higher pressure than that injected at distribution level. Thus, gas compression costs would be higher for the producer injecting into the transmission system.

It may be possible to accept at transmission level, small volumes of biogas which do not meet the normal gas quality standards. The small quantity of biogas would be commingled with a much larger volume of gas which complies with the standards, resulting in dilution of the undesirable elements of the biogas. Thus, overall the natural gas in the system would meet the specifications set out in the Code of Operations. Similarly, odourisation may not be necessary if the quantities being injected are small relative to the volumes of gas in the transmission system which is odourised. This could provide some operational savings for the producer. However if large proportions of biogas are injected (from one or multiple sources) this could affect the overall gas quality standards. Thus, if a different standard was accepted for biogas plant initially this may need to change in the future as quantities of biogas in the system increases.

It is unlikely that any operational savings from a less onerous gas quality standard would outweigh the increased capital cost of the increased compression requirement. It is likely therefore, for economic reasons that most biogas plants would connect to the distribution system. It may however be desirable, for locational or other reasons, that a
biogas plant would have a preference to connect at transmission level. The CER expects that there will be very few instances of biogas injection at transmission level. Therefore, it is proposed that they should be dealt with individually. Project promoters would approach Gaslink directly who will assess the connection and use of system costs and the technical requirements on a case by case basis.

In the future, if there are numerous large-scale biogas plants injecting into the system it may be necessary to inject at transmission. This is because large-scale injection into the distribution network would lead to much higher concentrations of biogas in the downstream system and there are potential safety risks associated with this. As experience grows with biogas injection connection policy may have to be assessed.

| Should biogas plants have the option of connecting to the gas transmission network? |
| Should transmission-level connections be dealt with on a case by case basis? |

### 3.1.2 Injection into the Distribution System

The distribution system operates at a lower pressure and is designed to move smaller volumes of gas at lower pressures than the transmission system. It is expected, at least initially, that most biogas facilities will inject into the distribution system.

In this regard, it should be noted that not all distribution lines will be able to accommodate biogas injection due to the fact that these plants operate at a continuous load. Many gas distribution lines feed domestic and small business customers whose gas use is weather dependent and therefore have very low demand in summer months. If the quantities of biogas injected were to exceed the demand on the pipeline and the distribution system will not be physically able to take the gas away from the injection point, pressures would rise and this could pose a safety risk in the pipeline where the gas is being injected. The minimum demand levels (MDLs) on the distribution line therefore, limits the size of the biogas plant that can be accommodated at any particular point on the networks. If a biogas plant has its own gas storage facility on site then it may be permitted to connect to distribution pipelines where the MDL level is low. This will be a matter for Gaslink\BGN and will be assessed on a case by case basis. It is useful to note that it is practice in the UK that biogas plants are limited in size to the MDL of the downstream pipeline.
Areas where direct connection will be most cost-effective will have some or all of the following criteria:

- proximity to distribution network
- proximity to year-round gas consumption areas (i.e. industrial estates, hospitals, swimming pools)

Parts of the gas network that currently require reinforcement could especially benefit from the addition of local gas injection. Potential producers will need to contact Gaslink who will perform network analysis and determine if the proposed injection point can accommodate the additional gas load.

For distribution connected biogas plants, Gaslink will design standard Connection Agreements and will publish the standard connection costs and Use of System (UoS) charges.

| Do you agree that standard contracts for connections are appropriate to the distribution system for biogas plants? |
| Are there any other factors that need to be considered when connecting a biogas plant to the network? |

### 3.1.3 Centralised Injection Facilities

The introduction of centralised facilities to produce and/or inject biogas into the grid is another alternative which could have particular advantages in Ireland. A centralised injection facility could provide a relatively easy and less costly alternative to installing a smaller dedicated biogas facility for many potential producers. It would facilitate biogas production particularly in places where direct connection to the network is not feasible. Overall capital and operating costs would be lower per unit of gas processed. In addition, network connection and operating costs would also be lower. It would be easier to monitor gas quality and enforce safety standards from a larger, centralised facility. All these factors could lead to more biogas production in Ireland if centralised facilities were available.
There are two potential models for such a centralised biogas injection facility. This first is centralised feed stock collection where small producers of biogas feedstock (manure, straw, husks etc.) deliver the raw product to a local central processing facility. Digestion, scrubbing and injection would be all carried out at this central location for multiple producers. Alternatively a centralised injection facility could be provided where producers would have their own digestion facilities and would deliver the biogas to the centralised facility for processing. At this facility all the biogas would be treated and scrubbed to convert it to biomethane and then it would be injected into the network. To efficiently transport the gas it would need to be compressed and would be collected from multiple sites by tanker.

This model of centralised injection could build on existing relations within the farming co-op or dairy sector. It is also possible that merchant plants could be established to provide the services on a competitive basis. Alternatively, Gaslink\BGN could build such a facility and provide services regulated by the CER.

Do you think a centralised model would be appropriate to Ireland?
Who could provide such a facility (Co-op, Gaslink or merchant project)?

3.2 Gas Quality and Safety

3.2.1 Gas Quality Specification

Ireland’s gas quality standards are set out in the Code of Operations. All gas being injected into Ireland’s gas network must comply with these standards for safety reasons and to avoid damage to the pipeline infrastructure, industrial boilers and burners, and peoples’ household appliances. As outlined in Section 3.1, a degree of flexibility on gas quality compliance could be envisaged for biogas plants connected to the transmission grid. However, as it is expected that the majority of biogas facilities would be connected to the distribution system, in these cases the Code of Operations standards will generally apply.
One of the most significant gas quality parameters is the Wobbe index. Essentially this is a measure of the energy value of the gas. Biogas injected will need to be within the Wobbe Index range as set out in the Code of Operations to ensure it is compatible with all industrial and household appliances attached to the gas network. It may not be safe to operate appliances with gas whose Wobbe index is outside of the specified range. For this reason the Wobbe index is closely monitored by Gaslink and a deviation from the standard could trigger the plant’s connection’s shut-off valve and for the plant to be ‘locked-in’.

As biogas contains between 30% and 65% methane it is necessary to inject propane into it to increase its calorific value and ensure that it is within the Wobbe index range specified in the Code of Operations. Other gas quality parameters are also important e.g. if there is too much oxygen in the biogas this can lead to corrosion and the formation of elemental sulphur in the gas network. In the Code of Operations it specifies that a gas must not contain more than 0.2% (molar) of oxygen at entry point. However, it may be possible to admit small quantities of biogas with a higher oxygen content into the gas network depending on the injection point. A review of biogas injection in the UK, by a working group under the auspices of the Joint Office of Gas Transporters, recommended that oxygen content be extended to 1% for biogas plants in Great Britain. This recommendation has been recently implemented in the UK.

It should be noted that the European Committee for Standardization (CEN) has been mandated by the European Commission to produce standards for biomethane for use in transport and injection in natural gas pipelines. It is expected that the Committee will report in early 2014. All EU countries will be obliged to comply with these standards. Until these come into effect, the standards as set out in the code of Operations are applicable unless the CER decides otherwise.

Biogas has the potential to produce micro-organisms, which is a potential safety hazard. This issue is the subject of investigation in countries where biogas injection into the grid is common. Depending on the findings of these studies it may be necessary in future to impose additional safety standards for the control of microorganisms on biogas producers.

Should biogas injected into the network fully comply with the gas quality specifications in the Code of Operations? Are there specific derogations that could be applied for biogas in the short term?

2 M/475 8th November 2010
3.2.2 Odour

As natural gas has little or no smell, all gas entering the system must be injected with odourant so that leakages can be detected and reported. At present, all gas is odourised at the entry points to the Irish gas network i.e. at transmission level. This practice is not expected to change in the near future. Biogas will need to be odourised prior to injection into the gas network.

Odourisation units can be installed by the biogas producer and it is understood that many turn-key biogas plants are designed with this facility. As Gaslink\BGN are responsible for safety of the Irish gas transportation system, they will need to be satisfied that the odourisation plant is fit for purpose. Any conditions in this regard shall be set out in Connected System Agreements (CSA).

Alternatively, Gaslink could own and operate odour facilities at entry to the gas network. This could be a more cost effective option if more than one facility were to inject at the same point. Additionally, it would be easier to monitor compliance with safety obligations.

Should the biogas producer be responsible for the injection of odourant?
Should Gaslink be responsible for the operation of all odourisation?

3.2.3 Safety Procedures

In order to protect the gas network and to comply with safety obligations biogas plants will need to have certain safety features, including a shut-off safety valve. Currently, Gaslink control all such valves at entry to the network and it is proposed that this should equally apply to biogas plants. Thus, if there is a safety issue pertaining to gas quality, odourisation or pressure, Gaslink can shut off the biogas plant remotely. The CER has approved procedures for curtailment of gas in the event of quality breaches and these should equally apply to biogas facilities.

In order to determine that biogas complies with the standards set out in the Code of Operations, chromatographs will need to be installed for continuous monitoring. It is proposed that these be installed and monitored by Gaslink. The biogas producer should have reasonable access to chromatograph data to allow action to be taken where necessary in a timely manner to redress any quality issues.
3.3 Metering

The quantities of biogas entering the system will need to be measured to ensure appropriate reimbursement for the biogas producer. This includes volumetric and calorific value measurements. Gaslink will need to be satisfied that the measurements are correct to allocate the gas to shippers and to pass the information to shippers in a timely manner. Gaslink has responsibility for metering the volumes of gas and calculating the energy value by application of the calorific value to the appropriate volumes for all gas on the system. This should equally apply to gas from biogas facilities. The biogas producer shall be provided with the metered quantities, associated calorific values and energy calculations in a timely manner.

Should Gaslink have responsibility for metering quantities of injected gas and will applying the calorific value to calculate the energy value of the injected gas post-blending.

What information should be provided to the biogas producer or shipper? And what timeframe would be appropriate for the information transfer?
4.0 Regulatory and Commercial Issues

4.1 Licensing

There is large body of legislation governing the production, distribution and supply of natural gas in Ireland. Biogas producers will have to adhere to all relevant legal requirements. The CER issues licenses for a range of activities relating to the transport, storage, distribution and sale of gas via the natural gas network.

4.1.1 Authorisation to Construct a Distribution pipeline

If a biogas plant is located at a long distance from the distribution pipeline, a pipeline would be required to deliver the gas to the network connection point. Any such pipeline will require consent prior to the construction of the pipeline. Provision of consents for pipelines is a CER responsibility under Section 39A of the 1976 Gas Act (as amended). The CER’s process for issuing pipeline consents is outlined in CER 02/116a, ‘Guidelines on the construction of gas pipelines in Ireland’. As outlined in this document, relevant environmental and safety assessments are required to be carried out prior to the CER issuing a consent. If constructing this pipeline themselves, the project promoter would need to contact the CER well in advance. Additional criteria for the granting of a pipeline consent are set out in SI 264/2002. Promoters will have the option of requesting Gaslink to construct and operate the pipeline.

4.1.2 Distribution License

To transmit or distribute natural gas through the network in Ireland a distribution licence from the CER is required. It would be an offense to transmit or distribute gas without such a license. Under the existing framework, if a biogas gas producer had a direct connection to the gas transmission or distribution network there would be no need for a distribution license. However, if the biogas facility was located some distance from the injection point and the connection was by way of a gas pipeline, a distribution licence would be required. There are stringent obligations associated with these licences including safety and legal requirements, and providing access to pipeline infrastructure to third parties. Gaslink holds Transmission and Distribution licences and therefore could operate the pipeline under their existing licences. Gaslink is the only holder of these network licences and the CER would carry out a rigorous assessment before issuing any such license.
In general, CER believes that requiring biogas facilities to possess a distribution license for a single, likely low-volume, pipeline would be an unnecessary administrative burden on all parties. Having Gaslink own and operate such longer connecting pipelines is therefore likely to be the preferred option of the biogas producers. The costs involved in operating the pipeline on behalf of the biogas facility would have to be recovered by Gaslink via the System Access charges – see Section 4.4.

**Should biogas producers have the option of building and operating the pipeline connecting to the Gaslink system?**

**Should Gaslink be the sole operator of the connecting pipelines from the biogas facility to the connecting point on the gas network?**

### 4.1.3 Shipper and Supply Licenses

The two forms of license most relevant to the sale of gas are shipper licences and supplier licences. A Shipper's Licence relates to moving gas across the system and is required in order to enter (inject) gas into the Irish gas network and to off-take it at an exit (supply) point. Any gas from a biogas from a biogas facility will need to be injected or off-taken by a licenced shipper.

Producers of biogas could apply for a shippers licence and this may be a good option if they wished to use the gas at a remote site on their own behalf. However, shippers have to comply with the Code of Operations. This could be onerous for a small producer. Alternatively, an exemption from the requirement to have a shipping licence could be put in place for producers of biogas if they intend to off-take at an off-site facility owned by the same entity. This is in line with new guidelines for the industry recently agreed in the UK, and existing practice in a number of EU Member States.

If they do not have an exemption for whatever reason, they would either have to get a shippers license from the CER, or sell their gas to an existing shipper. This would most likely be an existing shipper who would purchase the gas at the distribution entry (injection) point. This shipper would sell the gas to end users. And for this purpose, they would need a supplier’s license.
If the quantities of biogas injected into the system were small, Gaslink may be able to absorb the gas into the system. Gaslink provides some shipper services for which they are paid, including for shrinkage gas (gas which is used in the process of delivery). Shippers would be indifferent as to where the shrinkage gas came from if it was priced in the same way as normal shrinkage gas. Thus, Gaslink could replace normal shrinkage with some biogas and pay the producer accordingly. This could help producers in the early years of biogas production in Ireland as it would remove a barrier to market entry. If the volumes of gas produced by biogas increased significantly (exceeded the requirement for shrinkage gas), this mechanism would no longer be viable but at this stage the market would have developed and producers should be able to source shippers to whom they can sell their gas.

Should a biogas facility who injects gas solely for use at an off-site facility be exempt from having a shippers license?

Should Gaslink purchase biogas for use as shrinkage gas?

4.2 Connection Costs

Gaslink has responsibility for managing all connections to the network. Any connection assets installed by the project promoter would need to meet Gaslink’s technical and safety criteria before it could be operated. The CER envisages that there would be a connection methodology for turn-key facilities and purpose built facilities which require different connection assets. Under the existing connection policy, there are two models for recovering the costs of connecting to the grid.

The first option is that the connection cost would be paid for in full at the time of connection. This may be a desirable option in the case of a turn-key facility located adjacent to the connection point.

In line with existing Connection Policy, a portion of the connection cost could be paid upfront and the rest recovered over a period of time. It is proposed that this time period be ten years as this is the expected lifespan of an anaerobic digestor. This may be more appropriate for purpose built connections which require different connection assets to the standard connection, require quotation from Gaslink and may have a higher capital cost.
Where the facility is remote from the injection point requiring downstream pipeline work, an economic test may be required. This could provide for a shortened payback period for the recovery of the connection costs. A negative test result could indicate that the biogas facility may be unable to pay its connection costs over the lifetime of the plant. Payment would then be required up front if the producer wants to proceed with the connection project.

The methodology for the economic test which would apply to biogas facilities will be submitted to CER by Gaslink for approval.

**Should the existing Connections Policy cost-recovery framework (upfront in full; upfront sum + recovery over the lifetime of the connection) be used for biogas plants?**

**What lifetime is appropriate in the case of a biogas facility?**

**Is it appropriate to use an economic test for biogas connections?**

### 4.3 Biogas Access Charges

Gaslink will incur on-going operation costs associated with biogas injection. These Access charges will vary depending on the connection method and will have to be borne by the biogas producer. Depending on the agreed connection process, these costs could include the cost of gas quality monitoring, odourisation, compression, metering and general administration. All Gaslink cost structures will have to be submitted to the CER on an annual basis and a special tariff will be submitted to the CER for approval, and published.

The CER proposes that for small, turn-key biogas facilities these charges could be on a fixed per annum based on the rated-output of the facility. For larger, turn-key projects, it may be more appropriate to charge based on a metered per kWh (unit) basis. It is likely that in the latter case, a fixed element would also be necessary.

**CER will approve a methodology for access charges to be applied to biogas producers, submitted by Gaslink, which will be based on objective and transparent criteria. What costs should be included in the access charge?**

**What tariff structures are appropriate for biogas producers?**
4.4 Connected Systems Agreement

Any potential producer connecting to the gas network will require a Connected Systems Agreement (CSA) with Gaslink prior to their connection to the grid. This CSA would outline the requirements on the producer in relation to gas quality, pressure and asset ownership arrangements. Gaslink will produce a standard form of CSA to facilitate connection of biogas injection facilities to the natural gas network. A draft form of this agreement will be prepared by Gaslink following this consultation process and this will be submitted to the CER for approval.

Under the Natural Gas Safety Regulatory Framework, Gaslink have a responsibility under its license to manage the safety of connections of third-party systems to the network. This requires them to assess and approve third-party designs; ensure that all construction, testing and commissioning is undertaken in accordance with design specifications; and manage the interface (pressures, flows and gas quality) between the connected system and the Operator’s network. As Gaslink is also responsible for managing any emergencies on connected systems, agreement on procedures for managing such emergencies would be required between the biogas producer and Gaslink in advance of the commissioning of the facility. The CER would expect this agreement on managing emergencies to form part of the CSA.

The CSA will formally set out the technical and commercial terms for connection to the network. The CSA will specify at least:

- **The point of entry**
- **The asset ownership arrangements for monitoring and injection equipment**
- **Responsibilities of its maintenance and operational control of equipment**
- **Gas quality specification**
- **Measurement and shut-off valve arrangements**
- **On-going charges (based on the CS charges agreed by CER for biogas plants**
- **Local Operating Procedures**
- **Procedures for amendment of the CSA**

The CSA system will set out the formal terms of the relationship between Gaslink and biogas producer. Are there any other issues that should be included in the CSA?
5.0 Next steps and Summary

The CER seeks the views of interested parties regarding the steps outlined for facilitation of biogas injection to the gas grid in Ireland as put forward in this paper. It is intended that what is provided in this paper will give a framework or guideline to prospective biogas producers who wish to inject gas directly into the natural gas network to provide their input on the safest and most economical ways of connecting to the gas grid.

The CER has proposed that Gaslink develop a number of standard procedures to facilitate biogas connections, including the creation of a connection procedure documents for distribution connections; a methodology for calculating connection costs in line with the principles of the existing Connections Policy; and a proposal for calculating access charges for biogas producers. The CER has also proposed that biogas must meet existing gas quality standards and that Gaslink should monitor gas injected from biogas facilities. Proposals were also made in relation to licensing arrangements for biogas plants.

To allow industry to consider develop a robust response to the issues raised in this paper this consultation will remain open for six weeks, after which the CER will issue a decision paper as soon as is feasible. The deadline for responses is Wednesday, October 23rd 2013.
# Appendix A – Code of Operations Gas Quality Specifications

## QUALITY SPECIFICATION OF NATURAL GAS AT ENTRY POINTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sulphur</td>
<td>( \leq 50 \text{mg/m}^3 ) (including ( \text{H}_2\text{S} ))</td>
</tr>
<tr>
<td>Oxygen</td>
<td>( \leq 0.2 \text{ mol%} )</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>( \leq 2.5 \text{ mol%} )</td>
</tr>
<tr>
<td>Hydrogen Sulphide</td>
<td>( \leq 5 \text{mg/m}^3 )</td>
</tr>
<tr>
<td>Water Content</td>
<td>( \leq 50 \text{mg/m}^3 )</td>
</tr>
<tr>
<td>Gross Calorific Value (Real Gross Dry)</td>
<td>36.9 - 42.3 MJ/m(^3)</td>
</tr>
<tr>
<td>Wobbe Index (Real Gross Dry)</td>
<td>47.2 – 51.41 MJ/m(^3)</td>
</tr>
</tbody>
</table>

### Contaminants\(^4\) & Odour\(^5\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incomplete Combustion Factor</td>
<td>( &lt; 0.48 )</td>
</tr>
<tr>
<td>Delivery Temperature</td>
<td>( 1^\circ \text{C to } 38^\circ \text{C} )</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>( &lt; 0.1 \text{ mol%} )</td>
</tr>
<tr>
<td>Soot Index</td>
<td>( &lt; 0.60 )</td>
</tr>
<tr>
<td>Organo Halides</td>
<td>( &lt; 1.5 \text{ mg/m}^3 )</td>
</tr>
<tr>
<td>Radioactivity</td>
<td>( &lt; 5 \text{ Becquerels/g} )</td>
</tr>
<tr>
<td>Ethane</td>
<td>( &lt; 12 \text{ mol %} )</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>( \leq 5 \text{ mol %} )</td>
</tr>
<tr>
<td>Hydrocarbon Dewpoint</td>
<td>( \leq -2^\circ \text{C up to } 85 \text{ barg} )</td>
</tr>
</tbody>
</table>

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\(^3\) The CO2 limit of 2.5% will not be considered breached if the total inerts (including CO2) in the gas is less than 8% where: “inerts” in natural gas means carbon dioxide(CO2), nitrogen(N2), helium(He), argon(Ar), and oxygen(O2).

\(^4\) Natural Gas shall not contain solid liquid or gaseous material which may interfere with the integrity or operation of pipes or any Natural Gas appliance which a consumer or transporter could reasonably be expected to operate. With respect to mist, dust, liquid, gas delivered shall be technically free in accordance with BS3156 11.0 [1998].

\(^5\) Natural Gas shall have no odour that might contravene the obligation of the Transporter to transmit gas which possesses a distinctive and characteristic odour. Where the Transporter requires gas to be odourised, the gas shall be odourised in accordance with the following specification:

- Odour intensity of 2 olfactory degrees on the SALES Scale (Ref: IGE/SR/16/1989), or
- such other specification determined by the Transporter acting as an RPO.