



# green gas guide

Helping biomethane  
producers get their  
gas into our grid





## About this guide

This guide is for biomethane producers in the North of England who are seeking to inject their locally sourced green gas into the distribution network.

It provides an overview of **how to connect to our network**; the **commercial opportunities** and sources of further help and advice.

Whether you are well advanced with your biomethane project, or simply want to learn more about the market, we hope you'll find this booklet useful.

Securing  
the UK's  
future  
energy  
supplies



The UK is committed to reducing its carbon emissions by 80% by 2050.

Biomethane is set to become an important element of the nation's future energy strategy, helping to meet environmental targets while reducing reliance on gas imports.

This clean, sustainable fuel can be transported to homes and businesses using the existing gas distribution network, avoiding the costs of widespread infrastructure upgrades. Existing household appliances, such as cookers and boilers, won't need replacing.

Retaining gas as part of our energy mix, rather than complete dependence on electricity, will also avoid the need for unsustainable upgrades to electricity distribution networks – which would see customers' bills soar.

**As the UK continues to seek out new forms of energy, exciting opportunities exist to make a profit and a difference to the environment by selling gas to the grid.**

**80%**  
reduction in UK carbon  
emissions by 2050



Introduction to biomethane



About Northern Gas Networks



The market opportunity



Connecting to our gas network



Our five stage process



Contact us

## A quick introduction to biomethane

Biomethane is a clean, sustainable gas produced from organic material such as green waste; food industry waste; agricultural waste and industrial waste.

In a biological process known as anaerobic digestion, microorganisms break down the material in the absence of oxygen. One of the end products is biogas.

This gas can be combusted to generate electricity and heat, or can be cleaned to remove impurities and upgraded to biomethane, to be injected into the gas distribution network.

**Injecting biomethane into the grid is far more energy efficient than using the gas to generate electricity.** That's because around 90% of energy is retained through grid injection, compared to just 65-70% when combusted to generate electricity.

Combustion also leads to the escape of methane into the air, which contributes to the build-up of harmful greenhouse gasses.

### The Biomethane Production Process





.....>  
**Sustainable  
Source**  
right here in the UK

.....>  
**90%**

of energy is retained  
through biomethane injection

.....>  
**Gas into cash**

We will help you  
get connected to our  
network

# Just starting out?

## Use our online tools

If you are considering biomethane production, we have a range of free to use tools on our website.

These include a '**gas to grid**' **calculator**, which allows you to work out capital and operating costs at all stages of the process. It even engineers a potential solution, based on the raw material you'll be using to produce the biomethane.

[biomethane.northerngasnetworks.co.uk](http://biomethane.northerngasnetworks.co.uk)



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About Northern Gas Networks



The market opportunity



Connecting to our gas network



Our five stage process



Contact us



# People, pipes, passion



# 4x

as much energy transported  
during peak times as the  
electricity networks

As the North of England's gas distributor, **Northern Gas Networks (NGN)** keeps 2.7 million homes and businesses in the **North East, Northern Cumbria and much of Yorkshire** cooking on gas.

Our patch contains a mix of large cities including Newcastle, Sunderland, Leeds, York, Hull and Bradford and more sparsely populated rural areas.

We don't generate the gas, we transport it, through a vast network of underground pipes – stretching 37,000 km. During peak periods of demand, we transport four times as much energy as the electricity networks.

**Safety, reliability, integrity and great customer service are at the heart of our business.** We have won many national awards for the quality of our customer service, and pride ourselves on being great people to work with.



# 37,000 km

network of underground pipes



# 2.7m

homes & businesses  
cooking on gas  
through our network

# 25,000 km<sup>2</sup>

is the area we serve



Working with biomethane producers

**If you are a biomethane producer, we can help you get your gas into our network, through a comprehensive design, consultation and connection service.**

We'll help you understand available capacity on our network; the most suitable connection point and the equipment, processes and costs involved. We'll also guide you through all the legislative and legal issues, to ensure your project complies with regulatory standards.

You will have a dedicated key account manager working with you every step of the way. **We want your project to succeed!**



About Northern Gas Networks



The market opportunity



Connecting to our gas network



Our five stage process



Contact us

# 80,000

tonnes of waste saved from landfill

## Putting food waste to work in Yorkshire

Leeming Biogas is set to be the **largest food waste 'gas to grid' anaerobic digestion plant in North Yorkshire.**

This joint venture between developer JFS & Associates and Iona Capital is creating a multi-million pound plant at Leeming Bar which will convert waste from the food production industry into biomethane, for injection into NGN's pipe network.

The industrial sized plant will generate up to eight million cubic metres annually of biomethane and handle up to 80,000 tonnes of waste each year that would otherwise be taken to landfill or spread directly onto the land.



## Helping farmers to diversify

The biomethane industry is opening up valuable new revenue streams for local farmers, such as Ridge Road farm in East Garforth.

Here, the farm has teamed up with new power generation company, Clean Gen Ltd, to utilise the farm waste to create biomethane for grid injection.

The project is set to produce over 750 cubic metres of gas per hour. NGN has been working closely with Clean Gen Ltd to pave the way for the grid injection process and all the regulatory and engineering standards involved.

# 750m<sup>3</sup>

of biomethane produced per hour



## Gas to Cash

More than 100 delegates, including local authorities, farmers, waste distribution companies and industrial food waste businesses attended the region's first biomethane conference.

Organised by NGN in partnership with the Institution of Gas Engineers and Managers, the 'Gas to Cash' conference helped stakeholders appreciate the commercial advantages of biomethane production, and the steps organisations need to take to maximise return from their waste.

Our biomethane website [biomethane.northerngasnetworks.co.uk](http://biomethane.northerngasnetworks.co.uk) contains videos from the conference, featuring the thoughts of plant suppliers, specialist consultants and various funders.

## The market opportunity

As the UK looks for new ways to meet its low carbon energy targets and reduce reliance on fossil fuels, biomethane is set to become an increasingly prominent part of the nation's energy mix.

**Producers can gain an income stream by selling their biomethane to the grid, through a financial support programme called the Renewable Heat Incentive (RHI).**

## Renewable Heat Incentive

Funded by the UK Government and administered by the energy regulator Ofgem, RHI provides financial incentives for renewable heat producers, including biomethane producers.

For the non-domestic sector, RHI provides a guaranteed subsidy, payable for 20 years, to eligible producers.

Government support for biomethane projects, through RHI, is designed to promote confidence among producers, and stimulate the market in this exciting fuel for the future.



The market opportunity



Connecting to our gas network



Our five stage process



Contact us



# Connecting to our gas network

**Getting your biomethane facility connected to our gas distribution network is an involved process, but we can help you every step of the way.**

Here are some of the key technical and legislative issues to be aware of:

## **Available capacity**

To get your gas online, there needs to be adequate capacity in the local gas distribution network – or in simple terms, room in our pipes.

We can help you identify the best connection point, based on available capacity, and can even provide real-time flow data to give you even more insight.

## **Quality of gas**

Your biomethane must meet a certain regulatory standard, known as the Gas Quality 8 Standard, before it can be injected into our network.

We will assess your biomethane facility, and make recommendations, to ensure your product is ready for the grid.

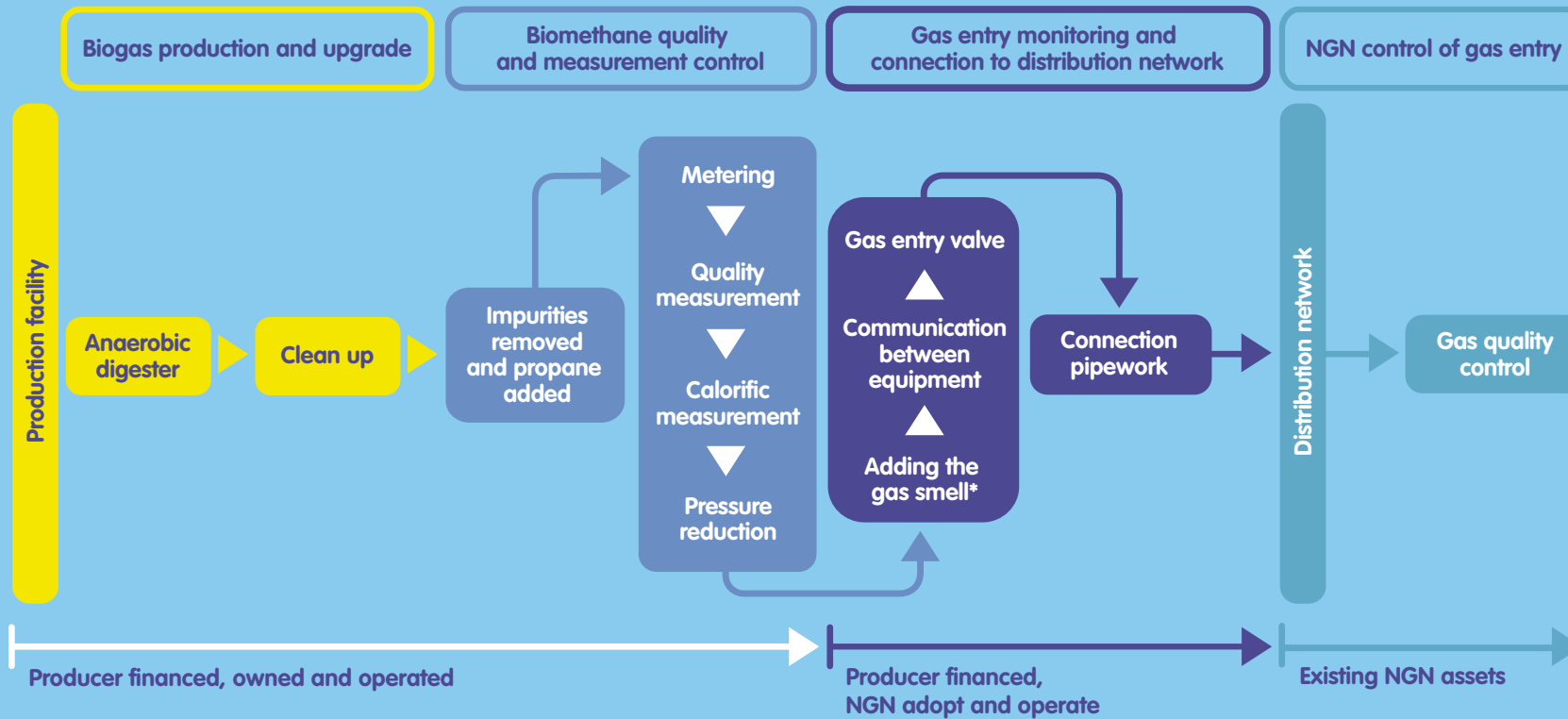
This might involve adding propane to your gas, to increase the calorific value or purifying your gas so that it meets the required standard.





# The right engineering solution

A connection project always involves a number of key elements. These are outlined in the diagram below, along with who is responsible for what.



\*Currently under review

## Types of connection

There is more than one way to connect to our gas distribution network. We will work with you to develop the best solution, based on the location of your production facility in relation to the preferred connection point on our network.

NGN's distribution network consists of different types of mains which vary in pressure, volume and flow.

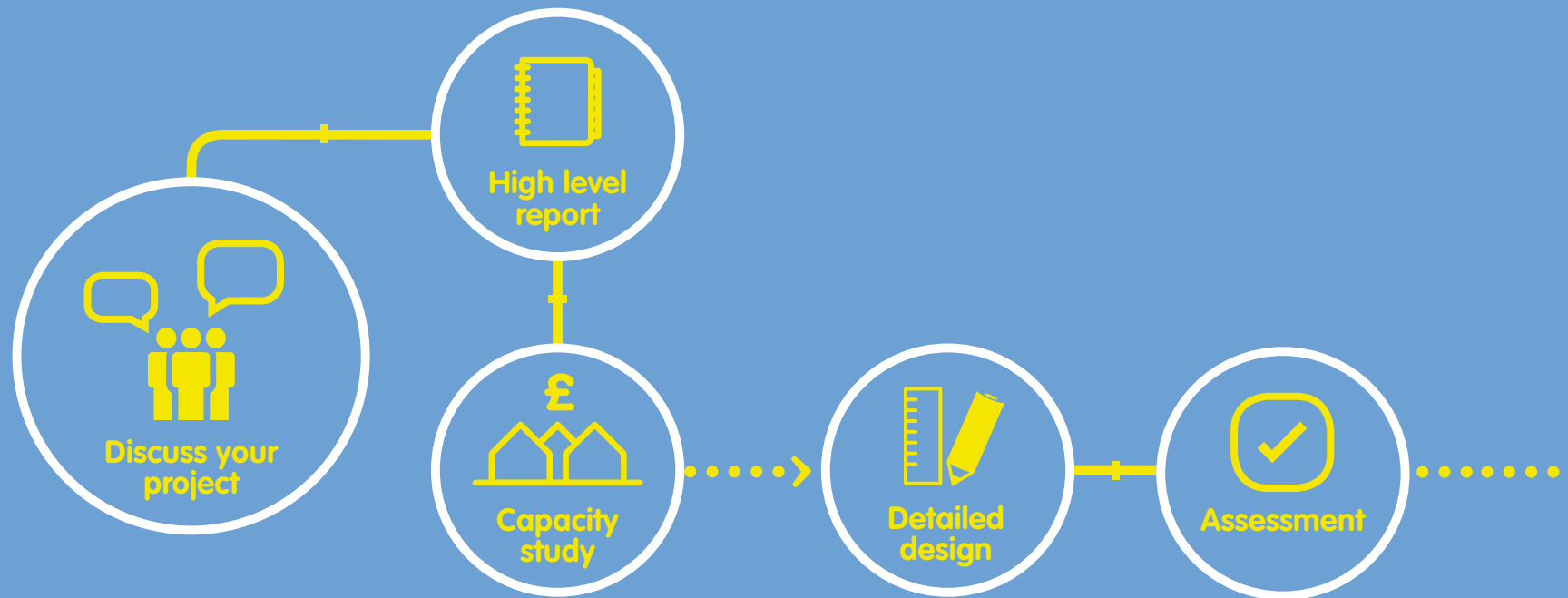
These mains are categorised as high, intermediate, medium and low pressure mains. Connections into these mains can vary considerably in cost, complexity and construction. We support providers to make sure the right main is selected.



Connecting to our gas network

Our five stage process

Contact us



## Working with you: a five stage process

We will work with you every step of the way to get your biomethane facility connected to our network, so you can start turning your gas into cash.

### Stage 1: Network capacity

We'll meet to discuss your project, its scope and objectives. Armed with this knowledge, we'll produce a free, high level report for you, identifying available network capacity and the feasibility of your project.

If the initial assessment is encouraging, we'll move on to a more detailed 'capacity study'. This sets out your connection options; the available capacity of the local network under different conditions (e.g. cold days and warm days); proposed pipeline route; plant and equipment and indicative costs for the project.

### Stage 2: Designing your connection

Our engineers will work up a detailed design for the connection. If you'll be connecting to a medium or intermediate pressure main you may wish to commission your own design for these elements, which we would then validate.

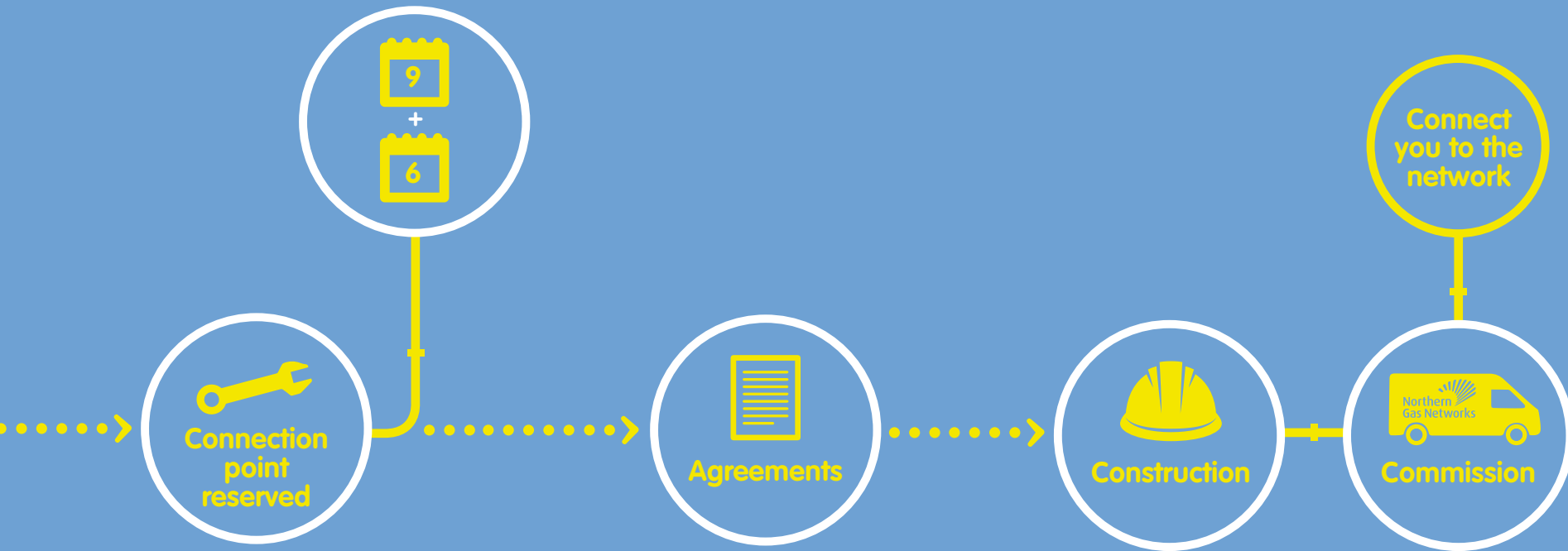
At this stage in the process, we also carry out an assessment of the quality of your biomethane, and any upgrade work (e.g. additional purification) needed to meet the regulatory standards for our network.





Our five stage process

Contact us



### Stage 3: Reserving your connection

Once your capacity study has been completed (see Stage 1) and you have commissioned a detailed design (see Stage 2) you will be able to reserve your connection point on our network.

Your connection point will be reserved for 9 months, with the option to extend the reservation for a further 6 months if you end up needing more time to commit to a construction agreement.

### Stage 4: Paperwork

There are several crucial agreements that need to be signed before the project can progress to injecting gas into the gas distribution network.

These include the Network Entry Agreement, the Adoption Agreement and the Construction Agreement. All of these documents can be downloaded from our biomethane website – [biomethane.northerngasnetworks.co.uk](http://biomethane.northerngasnetworks.co.uk)

### Stage 5: Construction and completion

It's time to make your plans a reality. Depending on the agreed design solution, the construction work may need to be carried out by an NGN appointed contractor (e.g. if you are connecting to a high pressure main) or an approved provider of your choosing.

Once you are ready to connect, we will carry out a site examination, to ensure everything has been completed according to our network adoption criteria.

**If your project meets all the requirements, we'll get you connected, so that your biomethane, and revenue, can start flowing!**



## Turning sludge into power

**Northumbrian Water's award-winning anaerobic digestion plant at Howdon on Tyneside** produces biogas from sludge – the by-product of the sewage treatment process.

The gas is currently used to generate electricity, but Northumbrian Water is now working to upgrade and purify the biogas into biomethane, so it can be injected directly into the grid.

The company hopes to inject around 1,200 cubic metres of gas per hour into the grid.

We are working closely with the water company on this exciting project.





**We'd love to talk to you about  
your biomethane project.**

Please contact us on  
**0113 397 5301**

Or visit our website  
**[biomethane.northerngasnetworks.co.uk](https://biomethane.northerngasnetworks.co.uk)**

where you will find:

- Free to use tools, including a 'gas to grid' calculator and lots more
- A document library, containing all the key agreements and regulations that underpin the connection process
- More detail about our 5 stage connection process





[northerngasnetworks.co.uk](http://northerngasnetworks.co.uk)

 [@NGNgas](https://twitter.com/NGNgas)

[biomethane.northerngasnetworks.co.uk](http://biomethane.northerngasnetworks.co.uk)

Smell gas? The National Gas Emergency Service is available 24 hours a day.  
FREEPHONE 0800 111 999\*

\*All calls are recorded and may be monitored.