

Step-by-step guide: ***Biomethane***



***How to start
producing
and injecting
biomethane?***



kiwa

Step-by-step guide:

Biomethane

How to start producing and injecting biomethane?

Producing biomethane offers opportunities to convert waste materials into renewable energy and supply it to the natural gas network. This is not only beneficial from a sustainability perspective, it also comes with economic advantages, such as subsidies and additional revenue streams.

But where do you start? And what do you need to consider?

Discover in 5 steps:

1. What biomethane actually is
2. The requirements you need to meet
3. The available quality inspections
4. What a gas analysis entails
5. Why gas camera measurements are useful



1.

What exactly is *biomethane*?

Biomethane is a renewable energy source that is increasingly gaining traction as a sustainable alternative to natural gas. It is produced from biogas and upgraded to the same quality as natural gas, allowing for seamless injection into the existing gas network. But who can benefit from this? And why is it interesting?

From organic waste to biomethane

In simple terms, businesses that generate organic waste can explore opportunities to produce biomethane. Examples include:

- Livestock farmers and manure digesters converting manure into biomethane
- Waste processors turning organic household waste into energy
- Water boards digesting sewage sludge for biogas production

Biogas is extracted from organic waste and then refined to meet natural gas quality standards, a process known as ‘upgrading’.

After undergoing rigorous quality controls, the biomethane can be injected into the existing natural gas network, a process known as ‘grid injection’.

The benefits of producing and injecting biomethane

Converting waste streams into biomethane offers several advantages, such as:

- CO₂ reduction
- Lower methane and nitrogen emissions from manure digestion
- Additional revenue from gas sales
- Contribution to sustainability with renewable energy
- Reduction of waste

Moreover, since the raw materials are often already available in the form of organic waste, there are no additional costs for sourcing materials.

Subsidy opportunities

Governments support this transition through subsidies, such as the SDE scheme (Dutch: Stimulerend Duurzame Energieproductie en Klimaattransitie, Stimulation of Sustainable Energy Production and Climate Transition), which includes a dedicated subsidy program for biomethane.

An increasingly attractive option

In short, producing and injecting biomethane is becoming increasingly attractive for various industries. It promotes a circular economy, offers financial benefits and reduces environmental impact.



2.

What requirements do I need to consider?

Injecting biomethane comes with strict quality requirements. This is understandable, as it is added to the existing natural gas network. To ensure safe and compliant injection, you must meet various legal and regulatory requirements, such as the Dutch Ministerial Regulation on Gas Quality (MR Gaskwaliteit) and additional quality standards set by Dutch grid operator Netbeheer Nederland.

Ministerial Regulation on Gas Quality (MR Gaskwaliteit)

The MR Gaskwaliteit specifies that the physical properties of biomethane must meet certain standards, including the Wobbe Index. This is the key combustion characteristic of a gas and is expressed in MJ/m³. Every gas appliance is designed for a specific Wobbe Index range, which is why strict limits are imposed.

Additionally, biomethane must comply with maximum allowable concentrations of unwanted substances, such as hydrogen sulfide and silicon-based compounds.

There are also emission regulations in place to limit methane emissions and the gas must be properly odorized. Just like natural gas, odorization is legally required for safety reasons: an odorant (THT) is added to ensure leaks are easily detectable.

Netbeheer Nederland

The Dutch regional grid operators, represented by Netbeheer Nederland, oversee gas quality and impose additional requirements on gas injectors. To ensure safe injection of biomethane, the grid operator makes specific agreements with the producer. These agreements stem from the MR Gaskwaliteit and include a comprehensive inspection process with mandatory testing at various stages.

Some of these mandatory tests are covered by Netbeheer Nederland, while others are at your own expense. It's important to be aware of this in advance. We will cover this topic in more detail on the next page.

Risk-free integration

Proper management of this process ensures that biomethane maintains a quality comparable to natural gas and can be safely integrated into the network without risks.



3.

How do I get started as an injector?

The process begins with the installation of a digestion plant. Once the plant is operational, organic waste streams can be converted into biogas. This biogas is then upgraded to natural gas quality, ensuring compliance with the required standards.

Mandatory quality controls

To guarantee gas quality, several mandatory quality checks must be performed at specific stages. The following gas analyses are part of this process:

24-hour initial test

- One-time mandatory test
- The first quality check to determine if the gas meets the required standards
- The injector is responsible for the cost of this test

Four-week monitoring

- One-time mandatory test
- Continuous monitoring of the gas composition and THT content for four weeks
- Costs covered by Netbeheer Nederland

Biannual quality control

- Recurring mandatory test
- Conducted by an accredited independent organization such as Kiwa
- The injector is responsible for the cost of this test

Monthly odor control

- Recurring mandatory test to check detectability and THT levels
- Ensures the gas has a recognizable odor for household safety
- Costs covered by Netbeheer Nederland

Ensuring compliance

By following this process carefully, you ensure that your biomethane meets all requirements and can be safely injected into the natural gas network.

4.

What is a *gas analysis*?

A gas analysis is a crucial part of the quality control process for injecting biomethane. By taking samples and conducting laboratory analysis, it is determined whether the gas meets legal requirements and can be safely injected. The analysis examines the methane content, CO₂ levels, sulfur and other components that may affect gas quality. Additionally, the physical properties of the biomethane, such as the Wobbe index, are assessed.

Sampling process

Sampling is conducted at the injection site following a strict protocol to ensure reliable results. The samples are then analyzed by a certified laboratory, such as Kiwa's chemical analytical laboratory, where the exact composition of the gas is determined. Any deviations are reported, allowing you to make timely adjustments to stay compliant with regulations.

Mandatory periodic gas analyses

To ensure consistent biomethane quality, periodic analyses are mandatory. The network operator specifies when and how often these analyses must be conducted. Refer to the previous page for an overview of the different periodic gas analyses.

Additional inspections

It may also be beneficial to conduct additional checks to prevent unforeseen issues. By doing so, you can avoid unexpected problems and continuously guarantee quality, contributing to a safe and sustainable gas supply.







5. Why is *measuring emissions with a gas camera* useful?

During the production and injection of biomethane, methane emissions can occur. Since methane is a potent greenhouse gas, it is crucial to minimize emissions. A gas camera allows for quick and accurate detection of leaks, reducing gas loss, environmental impact, and safety risks. This inspection can be performed alongside gas sampling for analysis, helping to save costs.

Benefits of this voluntary measurement

Although not mandatory, this measurement is highly recommended. Modern gas cameras can detect even tiny emissions, helping to identify potential problem areas at an early stage.

Using a gas camera offers multiple benefits:

- Prevents financial losses due to gas leakage, improving profitability.
- Reduces methane emissions, ensuring compliance with strict environmental regulations set by the government.
- Enhances safety by lowering the risk of fire and explosions in your installation.

How does a gas camera work?

A gas camera inspection uses infrared technology to visualize invisible gas emissions. With an Optical Gas Imaging (OGI) infrared camera, leaks can be detected quickly and accurately, even before they become a problem. By conducting regular inspections and addressing leaks immediately, you ensure that your installation continues to perform optimally and meets emission standards.

Getting started!

Ready to get started producing and injecting biomethane?

Request a free consultation now



Biomethane & Kiwa

Kiwa makes the energy transition tangible. We do this with tailored advice, testing, certification and training. Together, we harness our innovative strength and future vision to create concrete, achievable products and services.

- One-stop-shop: expertise in all sustainable energy solutions under one roof
- Proven quality in testing, certification and training
- Independent advice and assessment
- Concrete innovation steps with a tailored approach
- Fast progress with our clear vision on the energy transition

www.kiwa.com/energy-transition/

kiwa

Kiwa Technology

Kiwa Expert B.V.
Wilmersdorf 50
7300 AC Apeldoorn
The Netherlands

Telefoon (0)88 - 998 35 21
E-mail Technology@kiwa.com

kiwa.com