

# Will biogas sector face the risk of production overcapacity against shortage of feedstock?

Turning various types of local waste into energy has been made possible thanks to biogas technology. In spite of its numerous advantages including an increase of energy self-sufficiency of regions and countries, the industry faces important issues. Will the governments of the EU countries manage to implement sufficient supporting policies to help the biogas sector reach profitability and independence? And, on top of everything, will there be enough waste to cover the demand for biogas feedstock?

## Biogas: what is it?

Biogas is a source of renewable energy produced out of the fermentation of organic waste. It is a renewable substitute for natural gas and can be used for electricity and heat production as well as fueling vehicles.

The feedstock used for biogas production contains predominantly agricultural or industrial residues, waste from local communities, sewage or food waste. After an anaerobic digestion process (conducted without oxygen), gas is extracted from the biomass. This gas contains mainly methane (CH<sub>4</sub>, around 60%), carbon dioxide (CO<sub>2</sub>, around 40%) and hydrogen sulphide (H<sub>2</sub>S in small quantities).

As the energetic power of biogas comes only from its methane content, in order to inject it in the national gas distribution grids or use it as a fuel, it has to undergo an additional stage of purification. The final product is biomethane.

## What are the advantages?

The biogas sector contributes to the development of sustainable energies in the EU. **Using biomethane reduces the Green House Gas (GHG) emissions by more than 95%** in comparison to fossil fuels.

The possibility to reuse various types of local waste as an energy source is the key advantage of biogas. Some of the biogas plants operate in closed circuits by using their own waste as feedstock.

The transition of biogas to biomethane and the possibility to inject it into national gas distribution grids allow the separation of the production place and utilization place thus

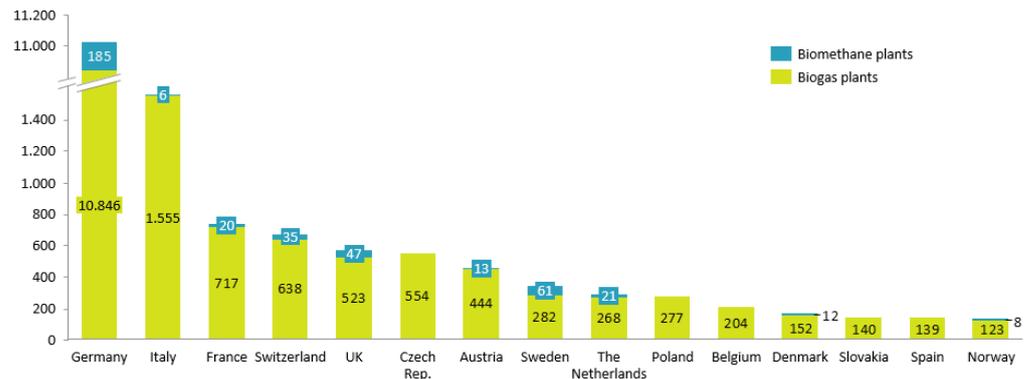


Exhibit 1: Number of biogas and biomethane units per country in Europe

opening the door to new markets. In this case, economies of scale also allow for sourcing of various feedstock types from further locations. The input of external resources such as glycerin, fat wastes, biodiesel distillation residues or cereals by-products connects the biogas industry to other sectors creating a circular economy.

## Who are the key players?

There are more than 16,000 biogas units in Europe. However, **EU is by far the biggest producer of biogas as 90% of all the plants are located here.** Most of these projects were established thanks to the support policies initiated in the 1990s. Currently, the biogas units also take advantage of various incentives such as subsidies, quotas, guaranteed prices over a determined period, etc., depending on the country.

**Biogas production units are still far more popular than biomethane plants.** Less than 2% of biogas units in Germany (around 190 units) are biomethane production plants, in France it is less than 3% (around 20 units) while in other EU countries this rate varies between 4% and 12%. Only in Sweden 21% of biogas plants produce biomethane (61 units).

**Around two thirds of European biogas plants and nearly half of biomethane units are located in Germany.** In 2015, they supplied power equivalent to the energy consumption of around 9.1 million households (of which 1.5 million households supplied directly by biomethane). The average size of the biogas unit there is around 500 Kw which is considered a large-scale production especially when compared to such plants in France, for example. The biogas sector in Germany is considered to be quite mature already and thus the Federal Government decided to stop its incentive policy.

In addition to the production itself, Germany developed a significant know-how related to the whole biogas value chain from conception to production (technical consultants, technology providers...). The industry employs 44.000 people with a total estimated turnover of 9,2 billion euros in 2015. Thus, German companies can export also their technology and their knowledge to develop biogas projects all over the world.

In Europe, **the second biggest biogas producing country is Italy** with 1555 units generating around 1.000 MWe. The market there relies on the farming business and benefits from significant outlets in the transport sector. In fact, Italy is the first

European market for methane-fueled vehicles.

With nearly 50 running plants, **the UK has become the second largest biomethane producer after Germany.** Nearly all the plants have been created in the last three years due to extensive support policies. As a matter of fact, the country injected around 2TWh of biomethane in the gas network in 2015.

**A rapid development of biomethane production could also be observed in Sweden.** The country was one of the first in the EU to turn towards biomethane units within a strategic investment plan to supply public transport. Since 2010, the biomethane can be directly injected into the public buses without going through the energy grids. Besides, the Government fosters actively the market with subsidies and tax credits.

### Challenges to face

The **world biogas production capacity is estimated to reach 9.600 MWe1 by 2025** compared to 7.000 MWe1 nowadays. Most of the investments will be made in Europe, especially in France where the law on Energetic transition from 2015 provides solid incentives and should increase the biogas production by 440 MWe1.

Even though **the estimated growth in the next 8 years should reach nearly 40%**, we can see a significant slowdown in the industry development. Between 2010 and 2015, we have seen the biogas output increase by 3.000 MWe1 which represented a nearly 100% increase. This change in the growth rate reflects challenges of the industry such as replacement of an outdated technology and its dependence on public support policies. This, however, varies significantly from country to country and depends on the national targets for renewable energies in their energy mix and the maturity of the sector.

Some of the countries set unrealistic targets. For instance, in France, the biomethane share of the total gas consumption is set at 1% in 2020 and at 10% in 2030 while the total injected volume represents less than 0.02% today. The fact that French biogas facilities are mainly small units with limited

output makes it even more difficult to achieve the targets.

Another issue, not only in France, is the **difficulty to obtain financing for biogas plants** as banks are averse to take any risks. They are uncertain about the guaranteed feed-in tariff and the long-term support policies.

Last but not least, the feedstock supply is a significant challenge for the biogas sector. Shortage of waste-based material in the EU causes fierce sourcing competition between players across different industries. So, the **producers of biogas or biomethane risk not having enough feedstock to run their production.** Therefore, the key is to have an excellent feedstock sourcing strategy that will allow mitigating the risk of having to lower or pause the production due to lack of waste-based feedstock available.

Moreover, **in the case of biogas, the price of feedstock is crucial for securing producers' margins** thus sourcing is strictly dependent on the waste supply in the given region. Price fluctuations can make or break the profits of a biogas or biomethane unit. As a result, diversification of feedstock types as well as building a wide base of suppliers can help to ensure that the feedstock supply is continuous and at a reasonable price.

In order to secure the stability of the development of the sector, **promotion of biomethane units over pure biogas plants seems to be a viable option.** This can help to meet the countries' targets by increasing the number of possible outlets. It is because only biomethane can be turned into Liquefied Natural Gas (LNG) or Compressed Natural Gas (CNG) and supply the transport sector or be injected in the national grids to be distributed to a larger number of people. These two outlets appear to be crucial for the biogas sector to have a consistent share in the renewable energy-mix.

### Future outlook

The **frequent changes in regulatory and support mechanisms make it difficult for the biogas industry to grow at a stable pace.** As a result, the sector is still struggling to reach an autonomy and relative independence from other industries and from local feedstock suppliers.

The level of development of the biogas sector in the EU varies significantly from country to country. Therefore, it is necessary to implement supportive policies on the Member State level rather than general EU regulations and targets. However, **it is crucial to introduce more stability into the biogas sector through long-term planning and consistent subsidy schemes.**

In order to increase efficiency of the biogas industry, technology improvements are necessary to introduce. This could help to optimize the production yield and improve producers' profitability.

Transition from biogas to biomethane units can be an answer to some of the struggles of the industry. It allows for the output increase and thus optimization of the production margins making the producers less dependent on the local feedstock supply. Biomethane can be injected directly to the national grid or sold as fuel which helps to diversify client portfolio. In turn, bigger client base secures sales and insures better prices.

At the same time, biomethane units are less dependent on the local waste-based feedstock supply. More stable margins allow for sourcing the waste from more distant suppliers if necessary. Bigger sourcing volumes ensure also higher bargaining power in case of prices which is a definitive advantage in the extremely competitive waste-based market.

We believe that the biogas sector will continue to develop in a professional way in order to meet the requirements of the industry. The production of biogas is not simply an installation of methanisation units, there is a sourcing strategy of the raw materials to be set up, preparation of the raw material mix to create a homogeneous and regular input, as well as the creation of a production strategy to ensure optimum revenues during periods of energy peak demand. Producers also have to work on the evolution towards the biomethane production and optimization of their portfolio of clients from regular energy utilities to industrials. **The biogas producers will have to work together in order to develop this business not only commercially but also technically** so as to optimize and increase their production yield.

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