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DECEMBRE 2020

EUROPEAN BIOMETHANE BENCHMARK

89 new units installed in 2019 and a sector facing major regulatory changes

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Executive Summary

Current situation

718 biomethane operating units have been registered in the main European producing countries at the end of 2019. These installations have a total biogas upgrading capacity of 682,000 Nm³/h, i.e. a maximum of **30 TWh of biomethane** per year. Most of these units inject into the national gas grids and are supplied with energy crops, organic or agricultural waste. The distribution of the units across countries is more and more uniform: large producers that have reached a certain level of development are receiving less subsidies and **the fastest growing countries, such as France, the Netherlands and Denmark**, are following their footsteps.

Trends

Despite a minor inflection between 2016 and 2018, **the sector registers a higher growth in 2019 with +12% of capacity over the year**. This increase is driven by countries promoting the use of local agricultural units to produce biomethane. The Italian market on the other develops its production installing large-capacity organic waste treatment plants. The COVID-19 crisis could slow down the sector's development in 2020, but the ongoing projects have not been cancelled and the governments have taken action to limit the impact of the crisis. **The first signs are encouraging, such as in France, where 62 new units have been commissioned in 2020.**

Outlook

Most mature countries are transitioning from feed-in tariffs to tendering systems that **encourage the industry to reduce its costs and be less dependent on support mechanisms.** Some countries are also ending investment subsidies to only stimulate demand for biomethane through quota systems or exemptions from consumption taxes. Meanwhile, an increasing number of **national registers tracking biomethane** production have been implemented, enabling **the development of Guarantees of Origin (G.O.) markets**. While several countries, including France, are revising their G.O. systems, **the REGATRACE project (June 2019 – May 2022) aims to implement a centralized European system to emit and share Guarantees of Origin.** It would allow the national registries to take other countries G.O. into account as of June 2020 and would be compliant with the guidelines of the RED II European directive.

Content

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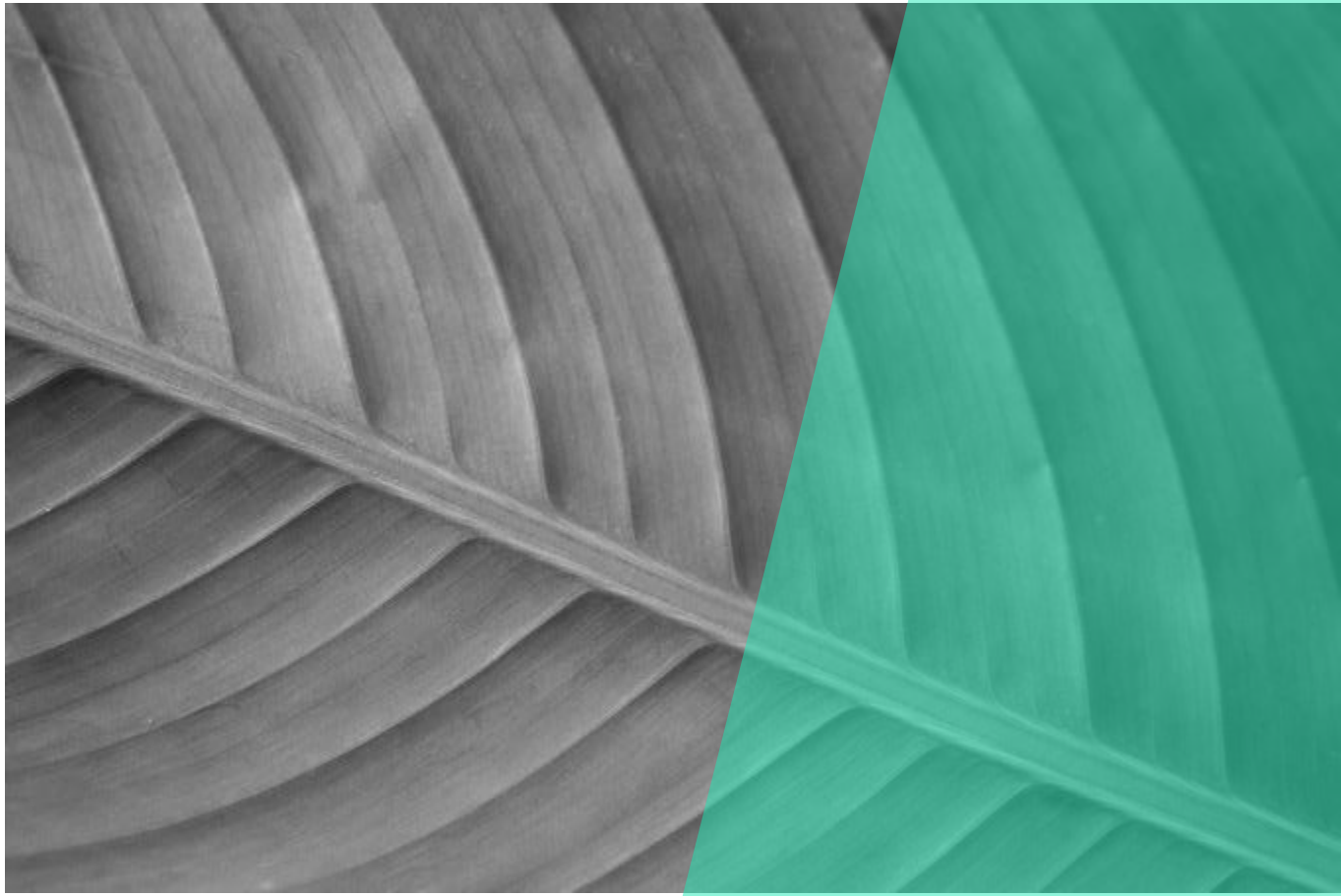
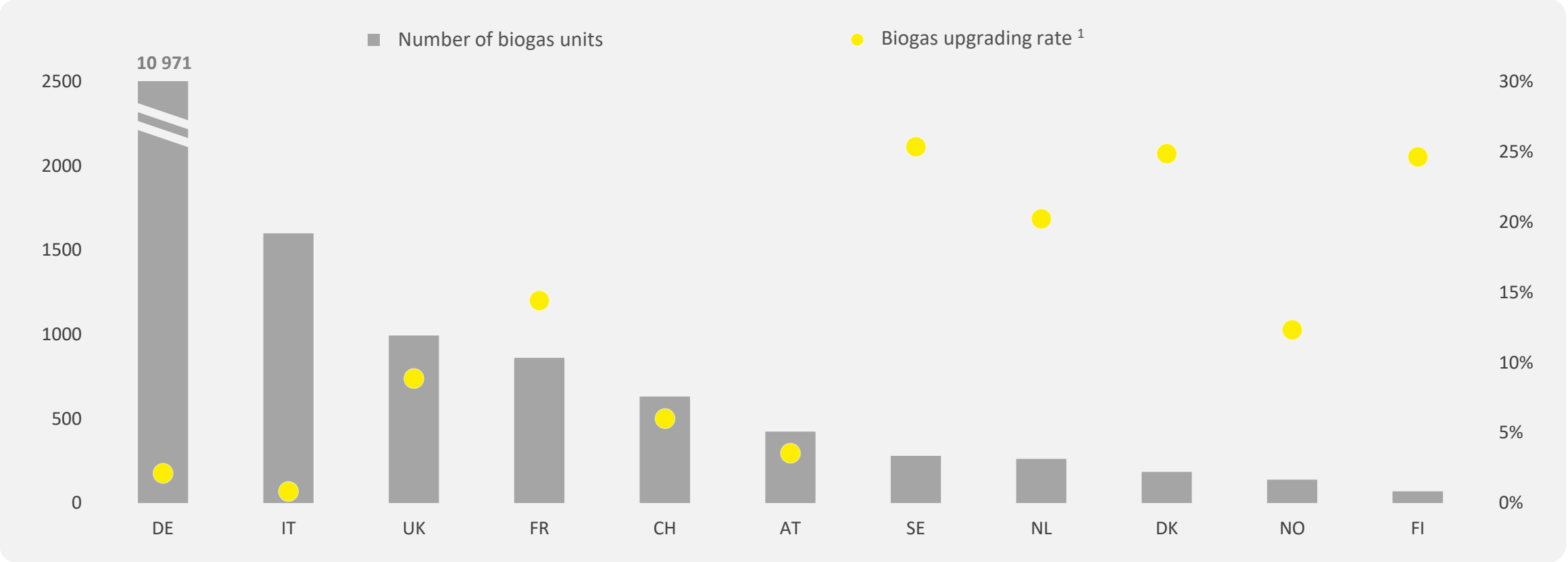
Cross analysis



Cross analysis

Number of biogas plants and biogas upgrading rate

[1] ratio between the number of units producing biomethane and the number of units producing biogas

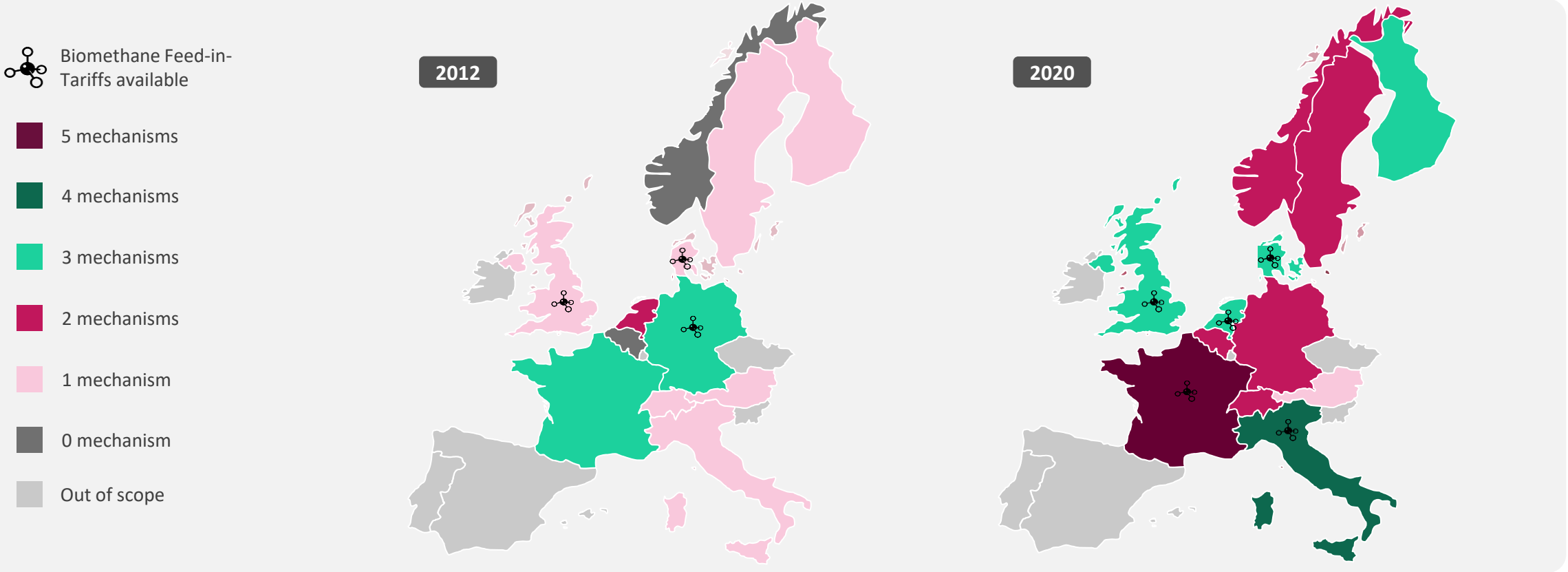


The development of biogas and its upgrading into biomethane varies greatly across Europe. At the end of 2019, three groups of countries stand out: Germany and Italy with highly developed biogas sectors, the other Western European countries, including France, Switzerland and the United Kingdom, which present dynamic sectors and promote the upgrading of biogas into biomethane, and the Nordic countries with few biogas production units.
In all countries, the biomethane sector is experiencing faster growth than other biogas valorization processes (heat and/or electricity).

Source : Sia Partners analysis based on IEA, GIE & EBA

Cross analysis

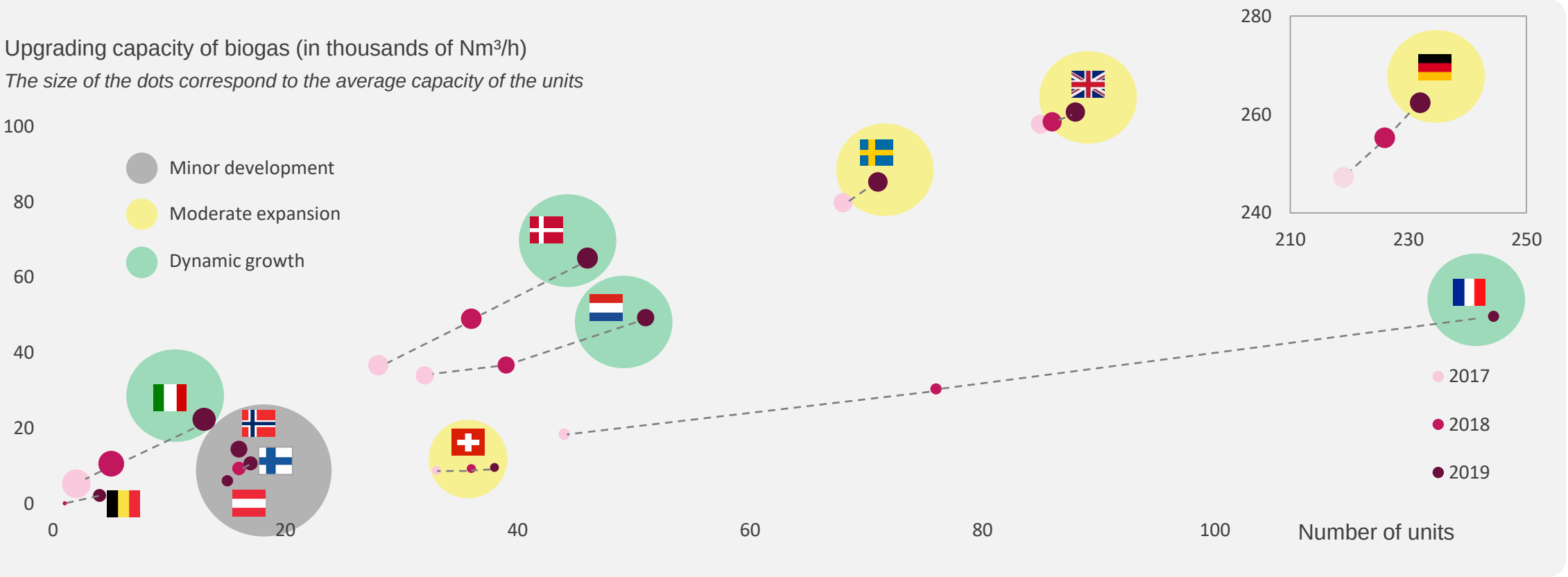
Regulatory environment evolution



Between 2012 and 2020, the number of support mechanisms for biomethane has increased in all producer countries, except for Germany, Europe's leader in the sector. The countries have implemented different strategies: some countries have favored support for production with the introduction of feed-in tariffs or investment subsidies, such as Denmark, which is recording steady growth. Other countries have opted for supporting the sector by boosting demand, in particular for biomethane fuel, such as Finland which is experiencing slower growth that is not as reliant on government incentives.

Cross analysis

Evolution of biomethane plants number and capacity over 3 years

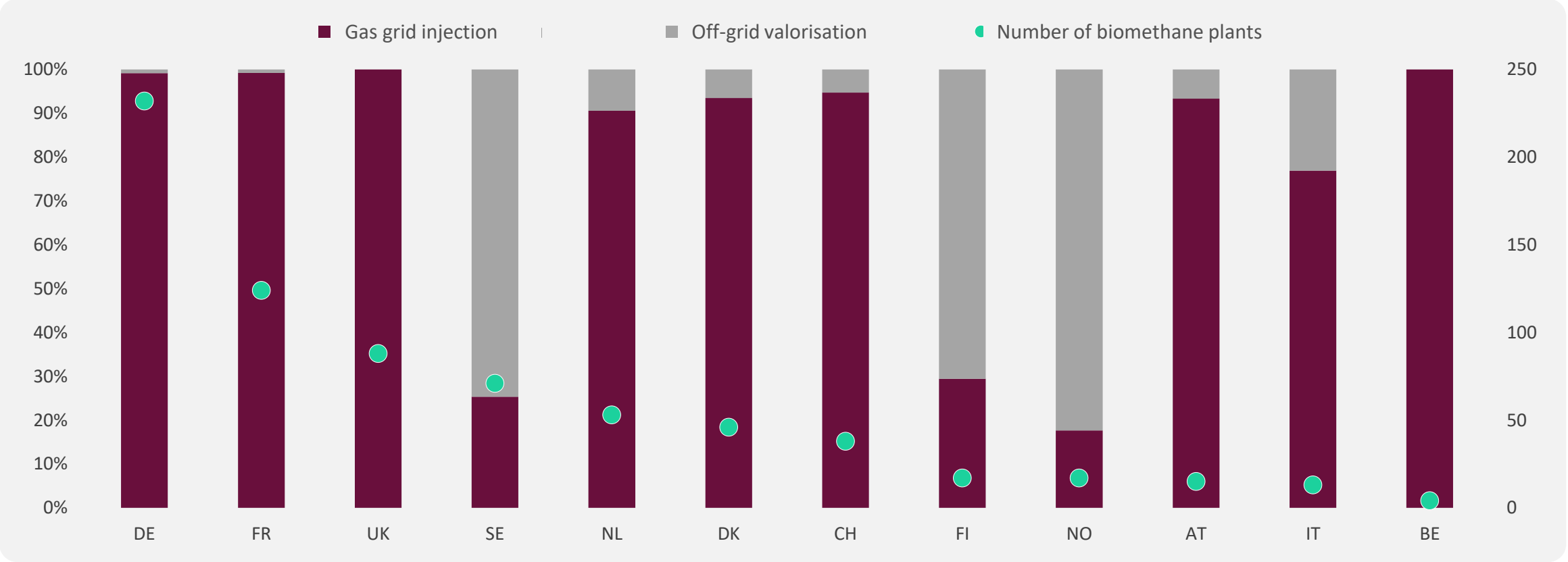


Three different stages of development have been identified in Europe: Germany, the United Kingdom and Sweden, with biogas upgrading capacities of more than 80,000 Nm³/h, but with moderate growth compared to 2018. Denmark, France and the Netherlands, the fastest growing countries, have treatment capacities of over 40,000 Nm³/hour. Finally, there are all the other countries whose capacities remain fairly low and which seem to have stagnated in recent years, the only exception being Italy, which may soon become one of the largest biomethane producers.

Source : Sia Partners analysis based on IEA, GIE & EBA

Cross analysis

Number of biomethane plants per country and injection rate in the gas grid



The biomethane sectors in Europe are fairly diverse, and despite the expansion in France and the United Kingdom, Germany still accounts for a third of all units in Europe. Apart from Sweden, the first country to have developed biomethane production in Europe, Finland and Norway, most of the major biomethane producers have opted for grid injection. The main reasons are the better accessibility to gas transmission and distribution grids in countries where there is greater coverage.

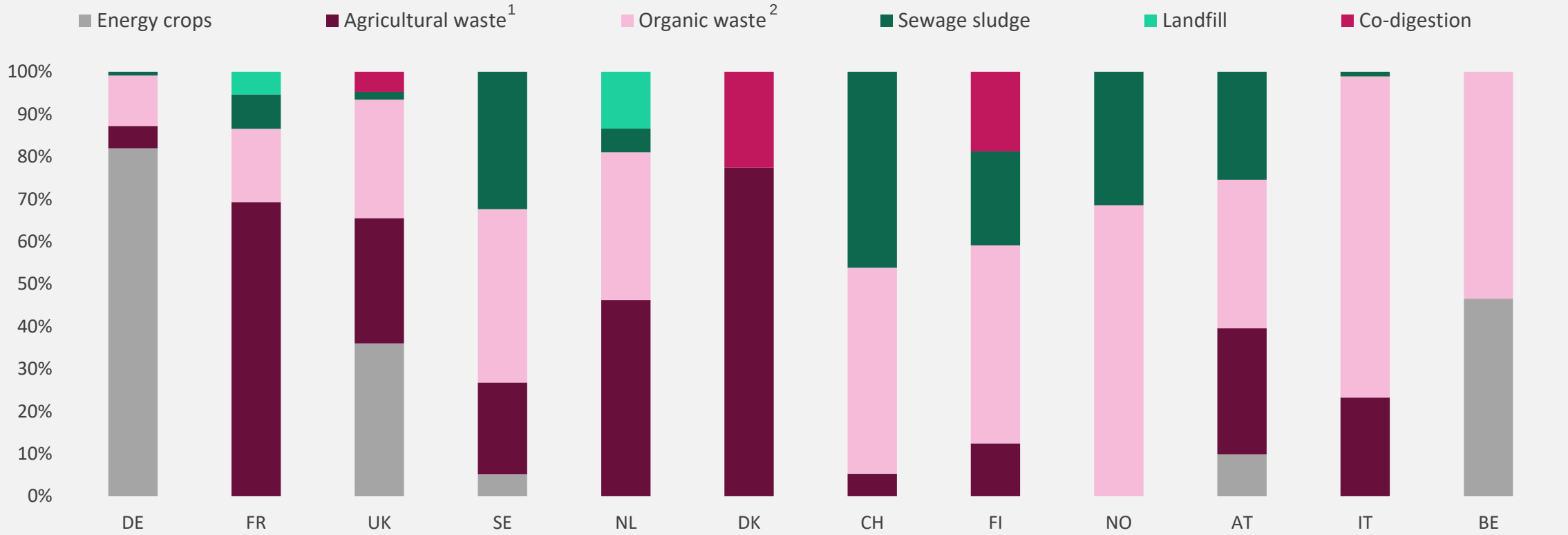
Source : Sia Partners analysis based on IEA, GIE & EBA

Cross analysis

Share of main feedstocks used by country

[1] *including intermediate crops*

[2] *including food industry waste, green waste and municipal waste*



Germany and the United Kingdom are still largely using energy crops to produce biomethane. France, the Netherlands and Denmark rely on the recovery of agricultural waste and intermediate crops, while most other countries favor organic waste (household or industrial). As for Sweden and Norway, they mainly produce biomethane out of wastewater treatment plants. Finally, the use of co-digestion, mostly found in Denmark and Finland, enables a combination of agricultural, household and industrial waste to be used to produce biomethane.

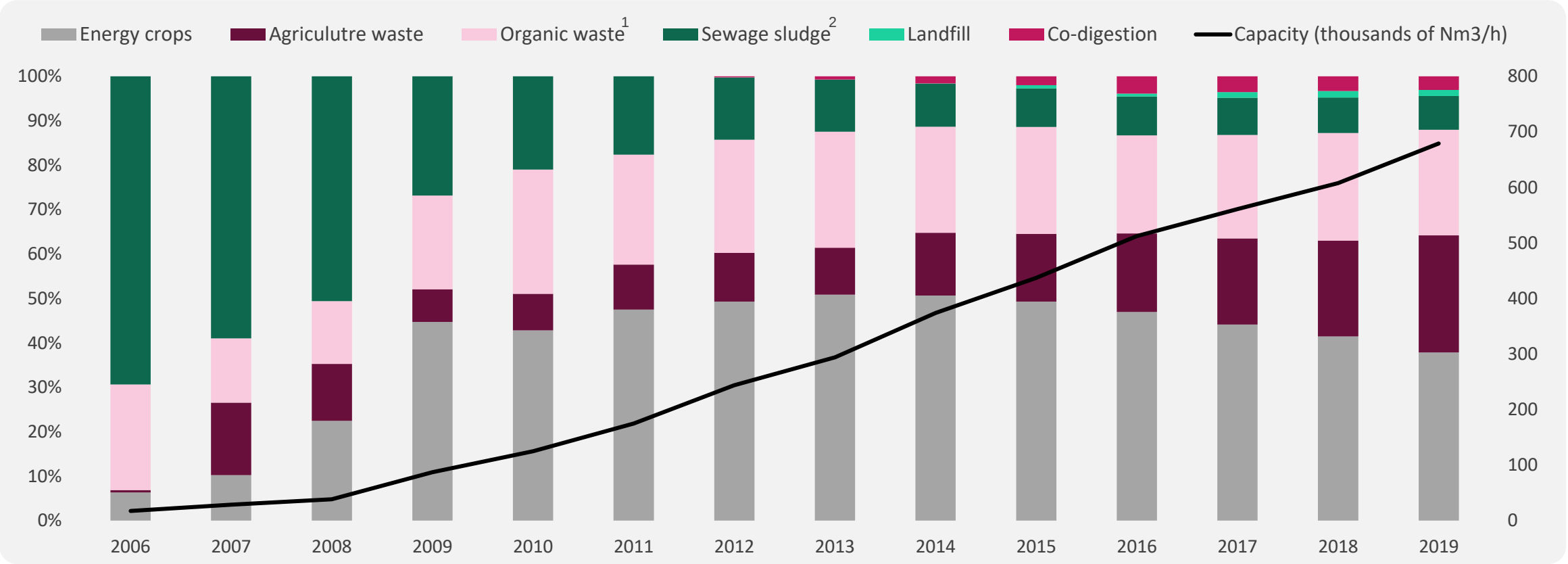
Source : Sia Partners analysis based on IEA, GIE & EBA

Cross analysis

Evolution of cumulative biogas upgrading capacity and feedstock mix

[1] *including intermediate crops*

[2] *including food industry waste, green waste and municipal waste*

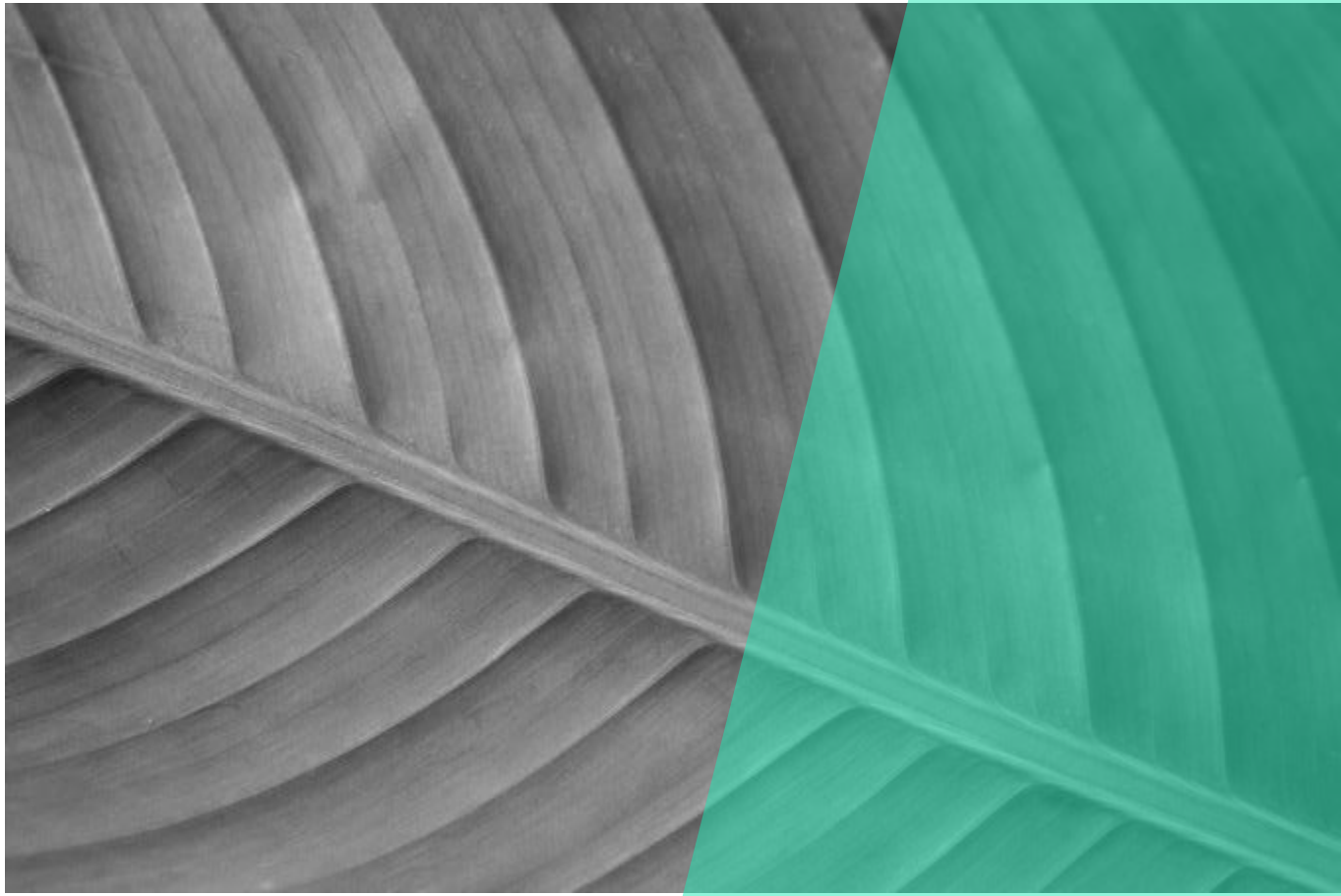


Dedicated energy crops, which are mainly located in Germany and the United Kingdom, account for 38% of the production capacity in Europe. The use of these controversial feedstocks is limited in countries that favor the use of land for food production over energy production only. The sewage treatment plants in Switzerland and Sweden have been replaced by agricultural and organic waste units in Denmark, the Netherlands and France. Despite a minor inflection between 2016 and 2018, the growth of the sector has been sustained in 2019.

Source : Sia Partners analysis based on IEA, GIE & EBA

2

Countries sheets



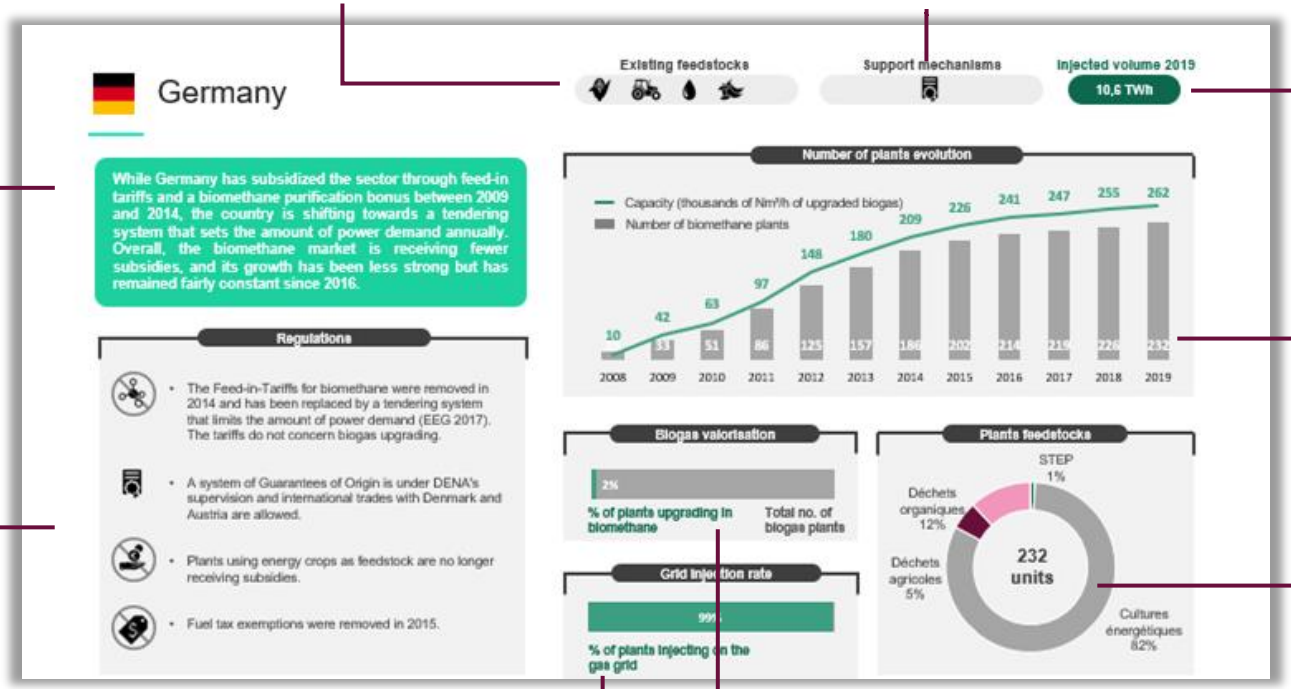
How to read the countries sheets ?

Energy crops | Agricultural waste | Sewage sludge | Organic waste | Landfill

Existing feedstocks

Priority access to gas grid | Feed-in tariffs of biomethane | Certificates or quotas | Grants | Exemptions

Support mechanisms



Synthesis on the current situation of biomethane sector in the country

Description of the regulatory system and support mechanisms helping specifically biomethane production and demand

Biomethane volume injected in the gas grid

Number of plants and capacity evolution over the past 10 years *(upgrading biogas capacity in thousands of Nm3/h)*

Production capacity's breakdown *(in Nm3/h of upgrading biogas capacity)* of biomethane units based on the type of feedstock

Grid injection rate
(Number of plants injecting in the gas grid / Total number of biomethane plants)

Biogas upgrading rate
(Number of biomethane plants / Number of biogas plants)

Some discrepancies with previous editions may be due to the requalification of some feedstocks (in particular landfill and co-digestion) by the sources used or to the amendment of the years of commissioning for some units.

Germany

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

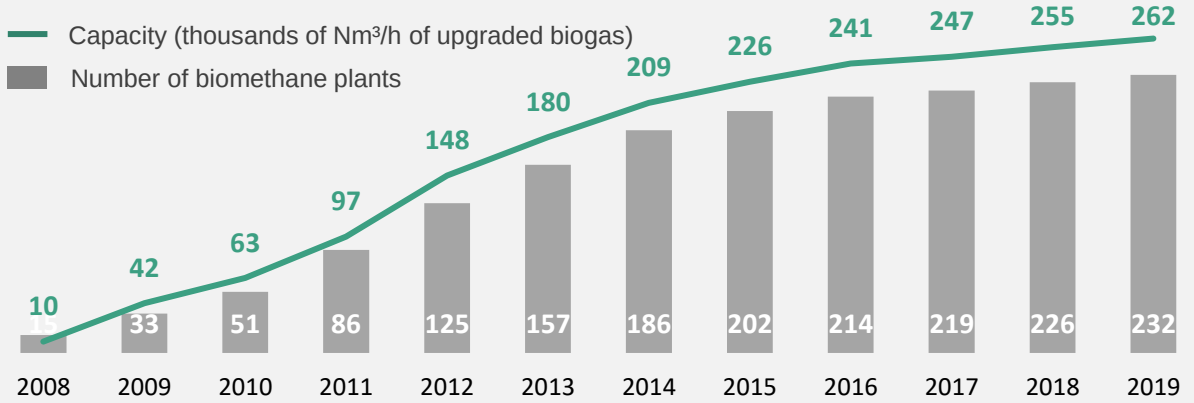
10,6 TWh

While Germany has subsidized the sector through feed-in tariffs and a biomethane upgrading bonus between 2009 and 2014, the country is shifting towards a tendering system that sets the amount of power demand annually. Overall, the biomethane market is receiving fewer subsidies, and its growth has been less strong but has remained fairly constant since 2016.

Regulations

- The Feed-in-Tariffs for biomethane were removed in 2014 and has been replaced by a tendering system that limits the amount of power demand (EEG 2017). The tariffs do not concern biogas upgrading.
- A system of Guarantees of Origin is under DENA's supervision and international trades with Denmark and Austria are allowed.
- Plants using energy crops as feedstock are no longer receiving subsidies.
- Fuel tax exemptions were removed in 2015.

Number of plants evolution



Biogas valorisation

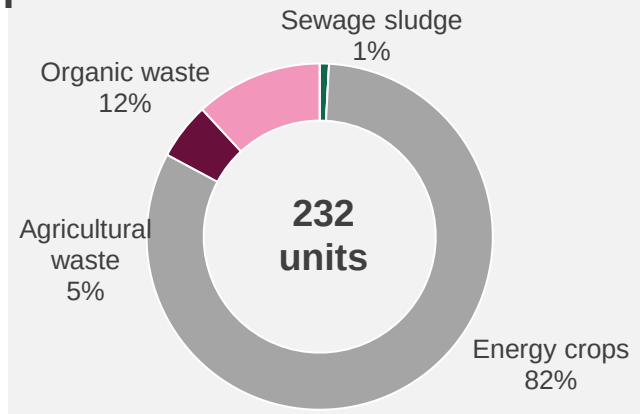
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Biogaspartner, IEA, GIE & EBA

Austria

Existing feedstocks

Support mechanisms

Injected volume 2019

0,2 TWh

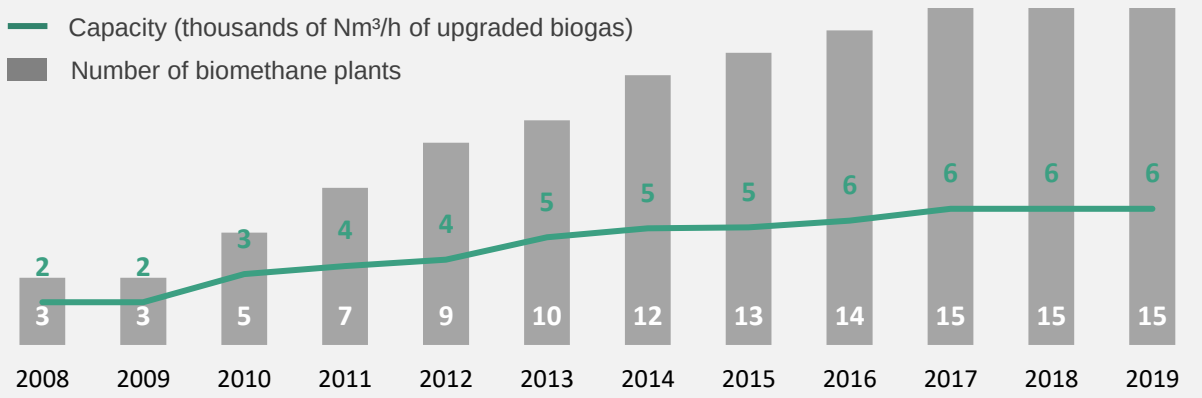
The Austrian sector is slowly developing, mainly due to the lack of a feed-in tariff for the injection of biomethane, despite requests from the sector. At the same time, the legislation encourages producers to develop more efficient installations to improve their profitability and attract investors with no need to provide substantial support for production.

Regulations

- The Green Electricity Act of 2016 encourages plants of more than 150 kW to upgrade biogas up to the quality of natural gas, to reach an energy consumption efficiency of at least 67.5% and to be placed no further than 5 km from the grid.

- Certificates of origin are accepted by the AGCS (Austrian Gas Clearing & Settlement). There are some international agreements for the trading of Guarantees of Origin with Denmark and Germany.

Number of plants evolution



Biogas valorisation

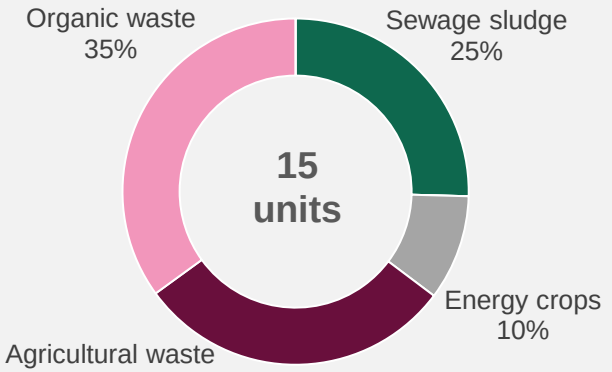
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on IEA, GIE & EBA

Belgium

Existing feedstocks

Support mechanisms

Injected volume 2019

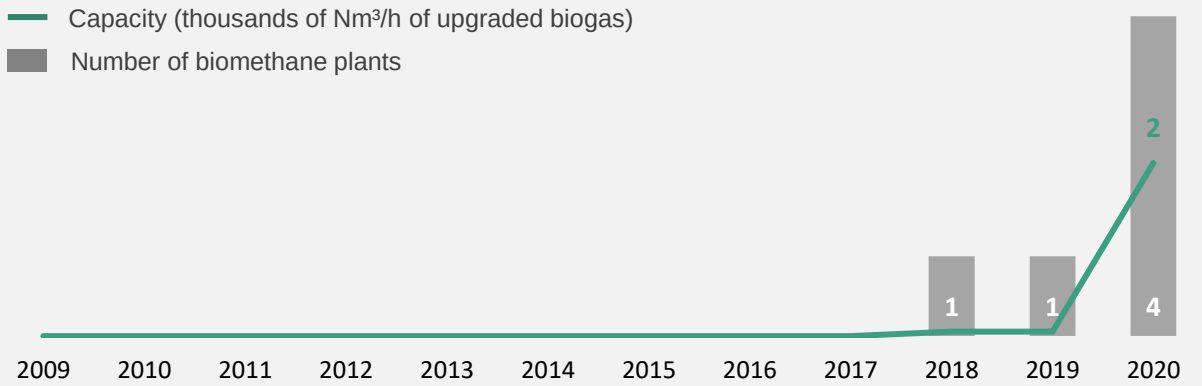
5,5 GWh

The biomethane sector is still in its early stages of development in Belgium. The development of the biomethane sector is highly dependent on support mechanisms that are still poorly developed. The recent implementation of the Guarantees of Origin systems in Wallonia and Flanders could boost the sector in both areas, whereas in Brussels, the legislation regarding the sector has not yet been defined.

Regulations

- System of Guarantees of Origin (G.O) has been introduced by the Flemish (VREG) and Walloon (CWaPE) gas regulators based on the G.O model for electricity. The G.O are purchased by producers of fossil fuel cogeneration plants.
- Investment incentives: in Wallonia, a plant can receive support for investment in sustainable energy use up to a 27.5% limit. In Flanders, investment support is limited to 65% and capped at €1 million. For both zones, the amount of subsidy decreases with the size of the unit.

Number of plants evolution



Biogas valorisation

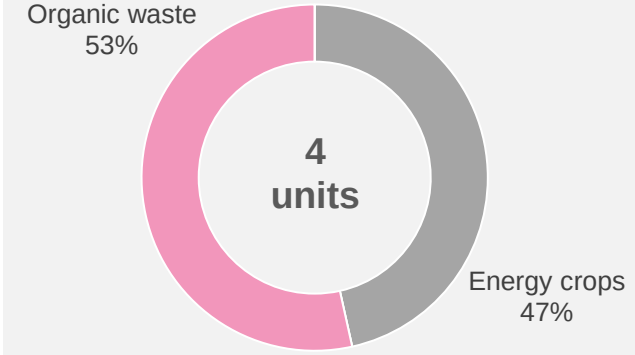
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Gas.be, IEA, GIE & EBA

Denmark

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

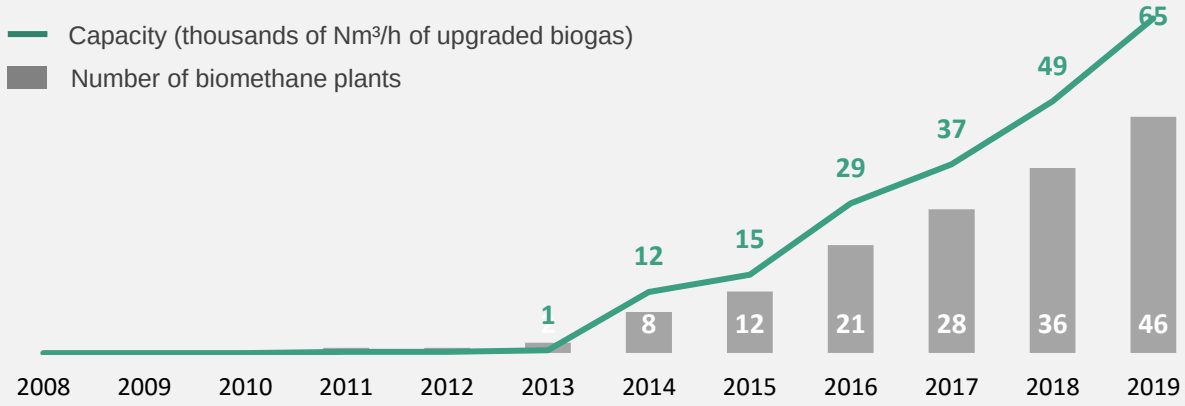
2,0 TWh

The biomethane sector has experienced fast growth in Denmark after the introduction of feed-in tariffs in 2012. The country is now reducing its support by implementing a tendering system aimed at limiting both the feed-in tariffs and the investment subsidies.

Regulations

- Grid operators are obliged to connect biomethane installations upon request.
- The feed-in tariff system will end in December 2020. However, plants will continue to receive the feed-in tariffs guaranteed in their contracts. After 2020, a tendering system will limit the installed capacity up to a maximum of around €32 million per year. The 20-years feed-in tariffs will be awarded through tender offer with a ceiling price.
- Minimum quotas of 5.75% biofuel in fuel sold are imposed for transport by land (RED II). Guarantees of Origin ensure that biofuel quotas are met.
- Plants recorded in Energinet's register can sell their Guarantees of Origin in Germany and Austria.

Number of plants evolution



Biogas valorisation

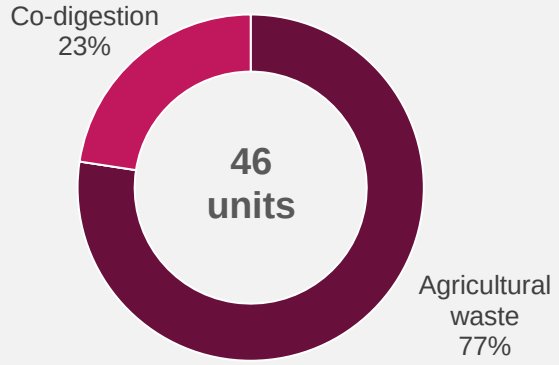
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Energinet, Nature Energy, Danish Gas Association, GIE & EBA

Finland

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

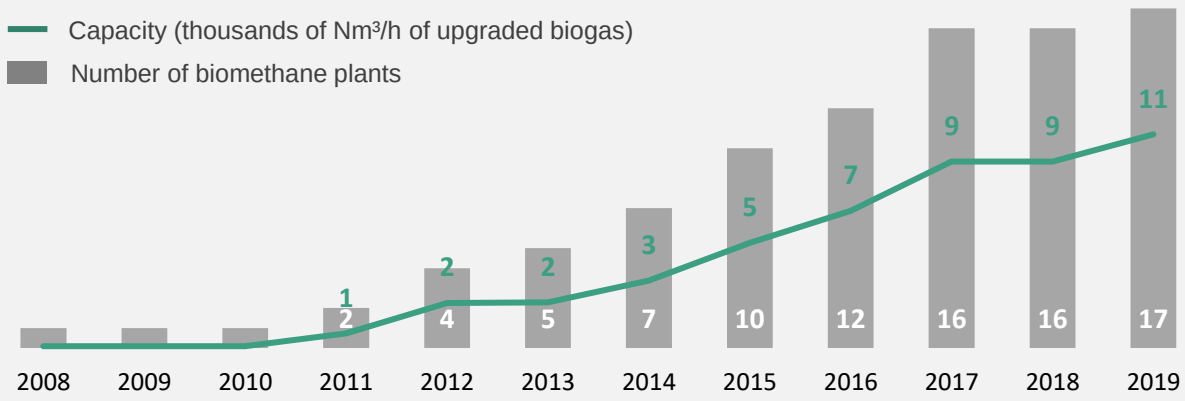
0,2 TWh

The lack of visibility on the future support system for the sector is currently hampering the development of biomethane in Finland. The sector is still in the development phase. Meanwhile, a common gas market between Estonia, Latvia and Finland has been launched in January 2020.

Regulations

- Ambitious biofuel targets set at 20% in 2020 and 30% in 2030 could boost demand for biomethane fuel. The government is also targeting a goal of 50,000 private vehicles running on NGVs by 2030.
- The Ministry of Employment and the Economy provides investment subsidies to biogas production plants up to a maximum of 30% of the overall project costs and up to 40% for projects using new technologies.
- A separate subsidy system for agricultural sites has been set up: the investment subsidy amounts to 30% and is available until 2020.
- Biomethane installations are exempt from energy and CO2 taxes.

Number of plants evolution



Biogas valorisation

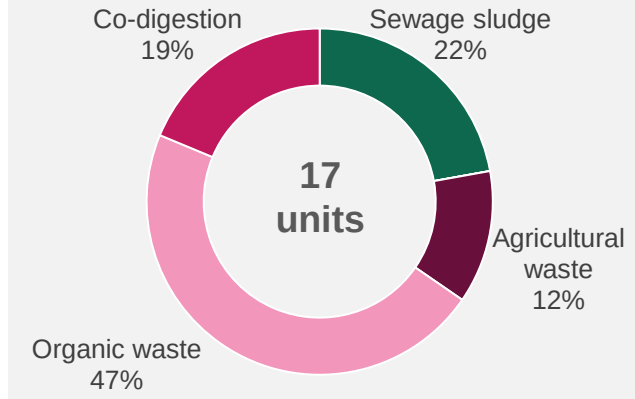
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Metener, Gasum, Envor, Finnish Biocycle and Biogas Association, GIE & EBA

France

Existing feedstocks

Support mechanisms

Injected volume 2019

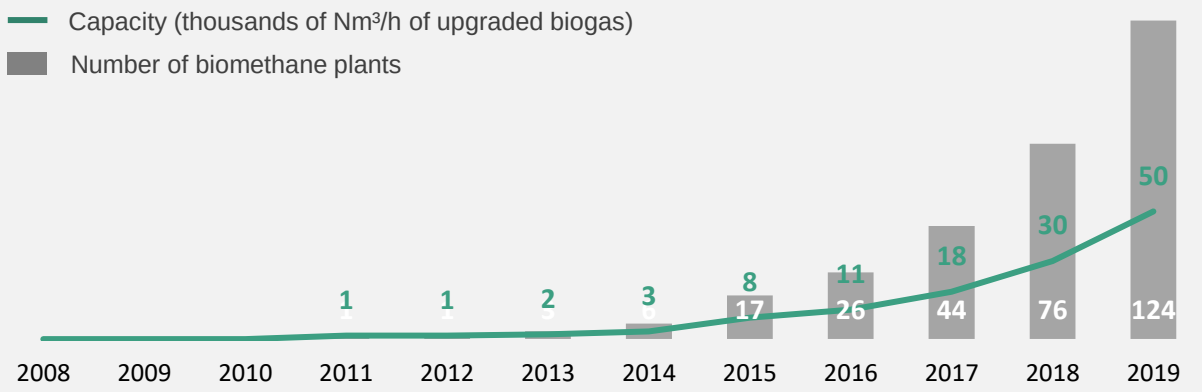
1,2 TWh

The upward trend in the biomethane sector continues in 2019, positioning France as the European leader in terms of the number of new units. The regulatory framework is undergoing major changes: PPE is restructuring the current feed-in tariff in favor of a mixed system with tender offer, reform of the Guarantees of Origin system, TICGN taxation...

Regulations

- DSOs and TSOs contribute to 40% of the connection costs to the distribution and transmission grid.
- Feed-in tariffs will evolve towards a tendering system with a target purchase price of 75 €/MWh in 2023 and 60 €/MWh in 2028.
- From 9 November 2020, the Guarantees of Origin attached to the purchase contracts between the producer and the supplier will be auctioned by the State, putting an end to the over-the-counter system.
- Subsidies and local aid are available to help financing biogas upgrading projects.
- The exemption from the domestic consumption tax on natural gas (TICGN) for biomethane installations has been extended for 2020.

Number of plants evolution



Biogas valorisation

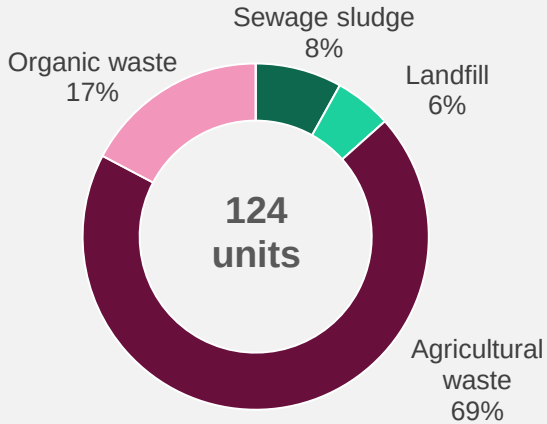
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Open Data Réseaux Energies

Italy

Existing feedstocks

Support mechanisms

Injected volume 2019

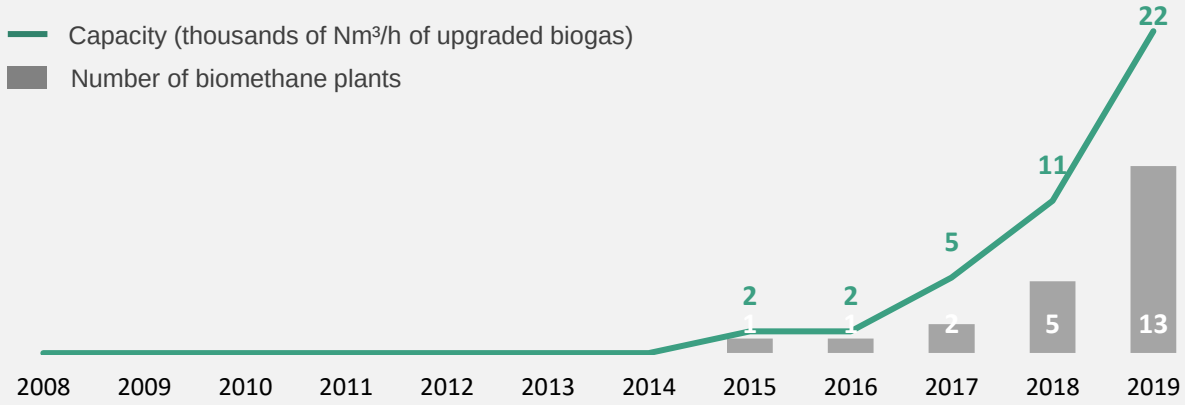
0,6 TWh

In March 2018, the government passed a ministerial decree to support the production of biomethane fuel. This law has boosted the Italian biomethane sector, reflected in the growth of municipal organic waste installation projects. However, citizen protests are rising against the increase in poorly regulated construction in certain areas.

Regulations

- 20% reduction in connection costs is granted for biomethane facilities.
- A bonus is granted for "advanced" biomethane (feedstock from household waste, manure or agricultural by-products) of around 61 €/MWh.
- A system of biofuel quotas sets a biomethane integration rate for suppliers of 8% in 2020. The purchase of CICs (production certificates) ensures that these targets are met.
- Biomethane producers issue Guarantees of Origin that can be sold to meet the emission quotas.
- Installations receive CICs depending on their production. A 20% bonus to the CICs is granted for the construction of biomethane compression or liquefaction infrastructure.

Number of plants evolution



Biogas valorisation

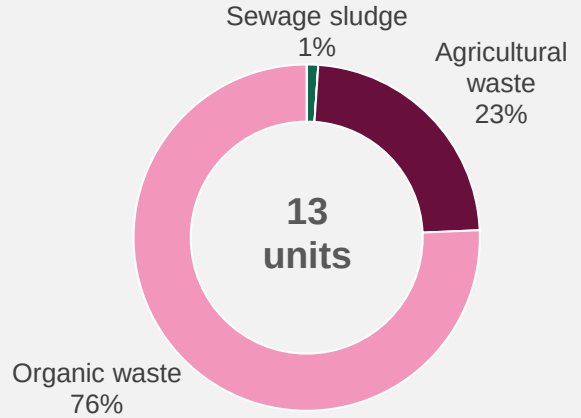
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Consorzio Biogas, Legambiente, Asja Energy, GIE & EBA

Norway

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

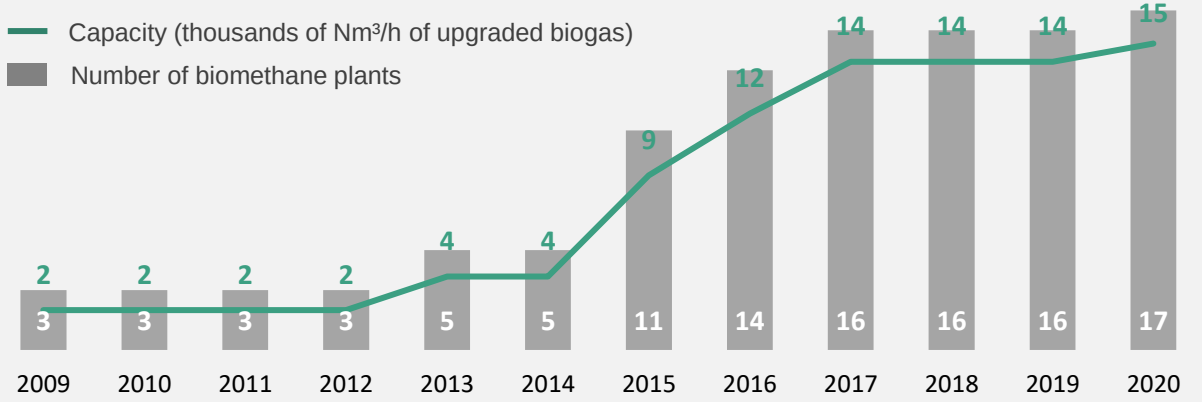
0,1 TWh

The Norwegian biomethane sector is poorly developed despite the investment subsidies provided. The country needs a clear national guideline on biomethane as well as a system that stimulates the demand for biomethane fuel as it has been implemented in the other Nordic countries.

Regulations

- Investment subsidies of around 30% are provided, with a limit set by the EEA (The European Economic Area Agreement). These grants can reach up to 50% for pilot or research projects.
- Biogas upgraded into biomethane for fuel use is exempted from tax.

Number of plants evolution



Biogas valorisation

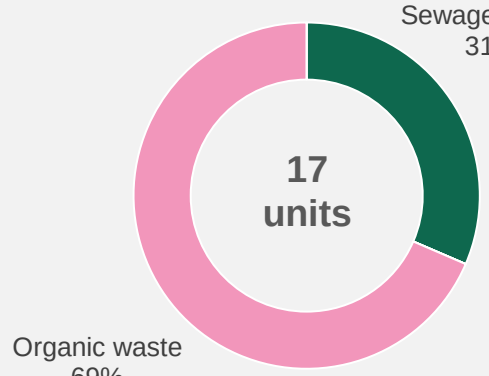
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on IEA, GIE & EBA

The Netherlands

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

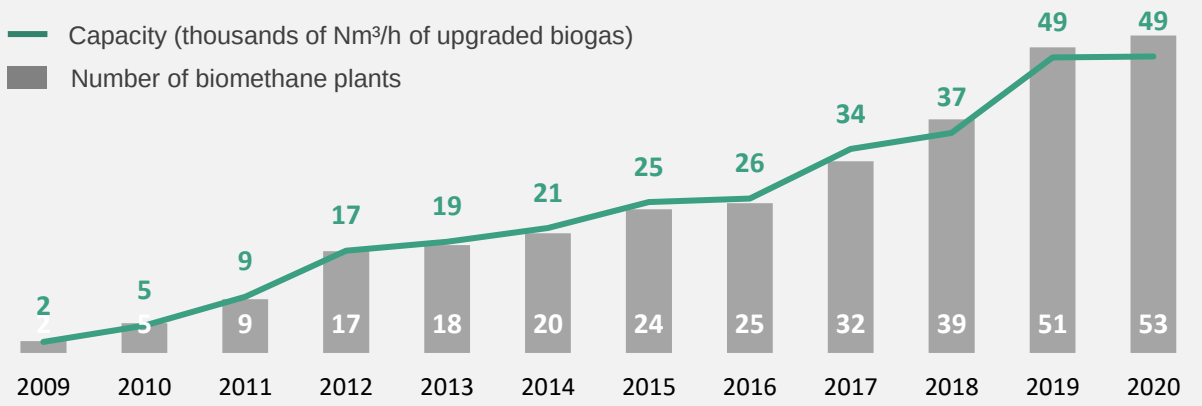
1,5 TWh

The sector is experiencing steady growth and is made up of large-capacity plants. The balance struck within the support mechanisms should ensure the increase in the production of biomethane. The growing biomethane demand for transportation uses is met by resorting to imports.

Regulations

- Feed-in-Tariff is granted for the production of electricity, gas and renewable heat (biogas and biomethane).
- Guarantees of Origin for biomethane can be valued on the market as an income supplement
- A 10% biofuel quota is set for the transport sector and a minimum of sales is required from suppliers in the country.
- Blending obligations are imposed on companies that use or sell fuel and diesel. The blending can be achieved with bio-CNG or bio-LNG.
- An €150 million support fund is allocated to small-capacity units.

Number of plants evolution



Biogas valorisation

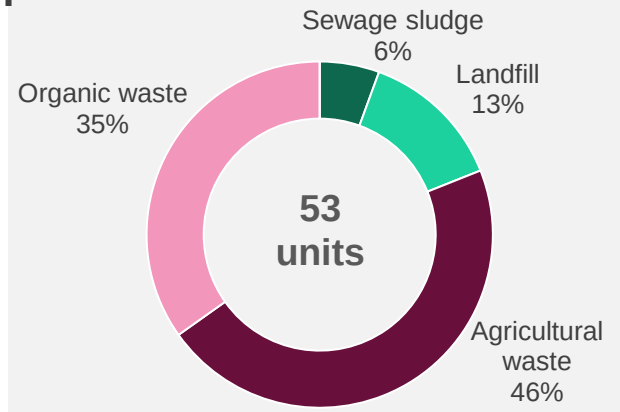
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on IEA, GIE & EBA

The United Kingdom

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

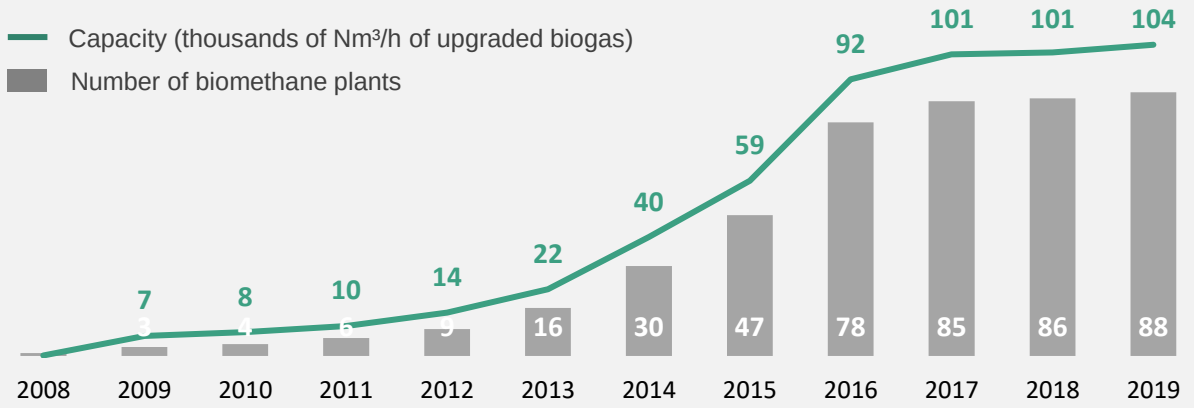
4,2 TWh

With one of the highest growth rates in Europe in its early stage, the British biomethane sector appears to be stabilizing. The new guidelines of the energy policy introduced in 2019 will limit the support for biogas production and will instead favor biomethane and its injection into the gas grid.

Regulations

- The Green Gas Support Scheme (GGSS) will replace the actual Renewable Heat Incentive (non-domestic scheme) for 4 years as of March 2021. The GGSS will only support biomethane produced by anaerobic digestion of biomass feedstocks and injected into the gas grid.
- Valuable Certificates of Origin certify the origin of the injected biomethane.
- Renewable Transport Fuel Obligation: requirements for fuel suppliers to incorporate a share of renewable fuel (including biomethane).
- The Climate Change Levy (CCL) tax exemption for renewable energy is no longer applicable.

Number of plants evolution



Biogas valorisation

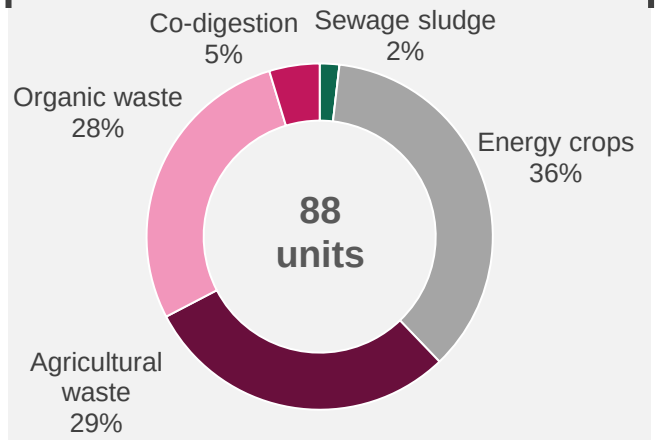
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on IEA, NNFCC, GIE & EBA

Sweden

Existing feedstocks

Support mechanisms

Estimated injected volume 2019

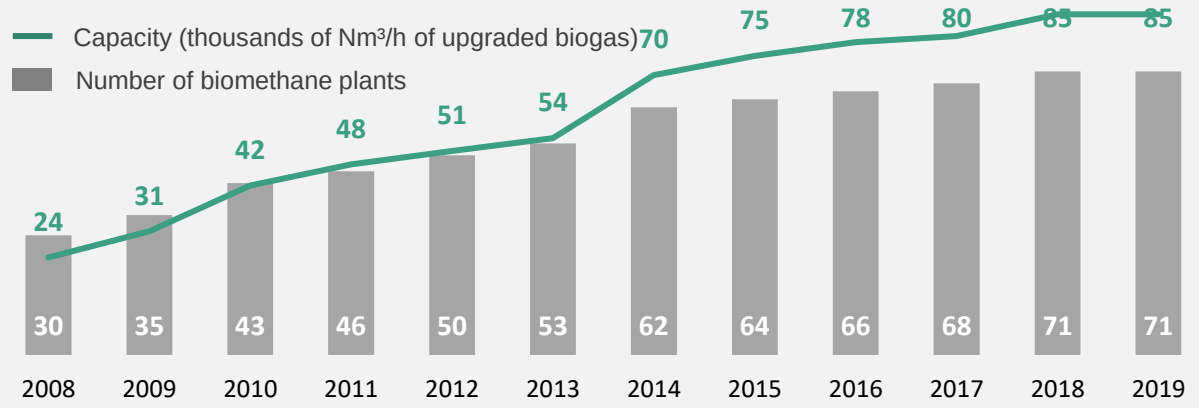
0,5 TWh

As one of the pioneers of biomethane in Europe, Sweden is now growing at a fairly slow pace. The support mechanisms are mainly focused on stimulating demand for biomethane fuel and most of them will end in 2019/2020. Meanwhile, the industrialists are advocating for ambitious targets such as 100% biomethane in the grids by 2050.

Regulations

- A national biogas register/ Guarantee of Origin system operated by the Swedish Energy Agency will probably be implemented in 2021.
- The Local climate investment program (2015-2023) provides investment support (up to around 45 %) for all types of GHG reduction measures, including support to biomethane plants.
- Exemption from CO2 and energy tax for biogas or biomethane used as Heat or CHP Plant and for transport use.
- Introduction of a "Reward-Penalty" taxation system for light vehicles from July 2018. Gas vehicles are entitled to a bonus of around 950€.

Number of plants evolution



Biogas valorisation

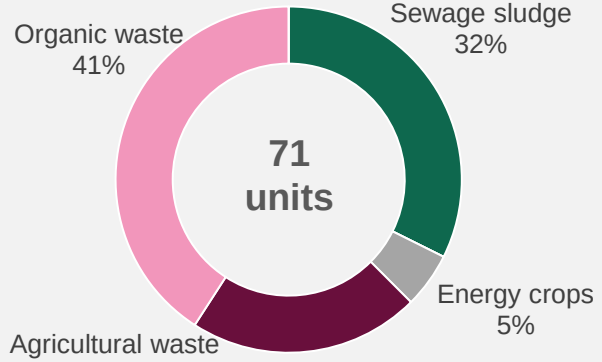
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on IEA, GIE & EBA

Switzerland

Existing feedstocks

Support mechanisms

Injected volume 2019

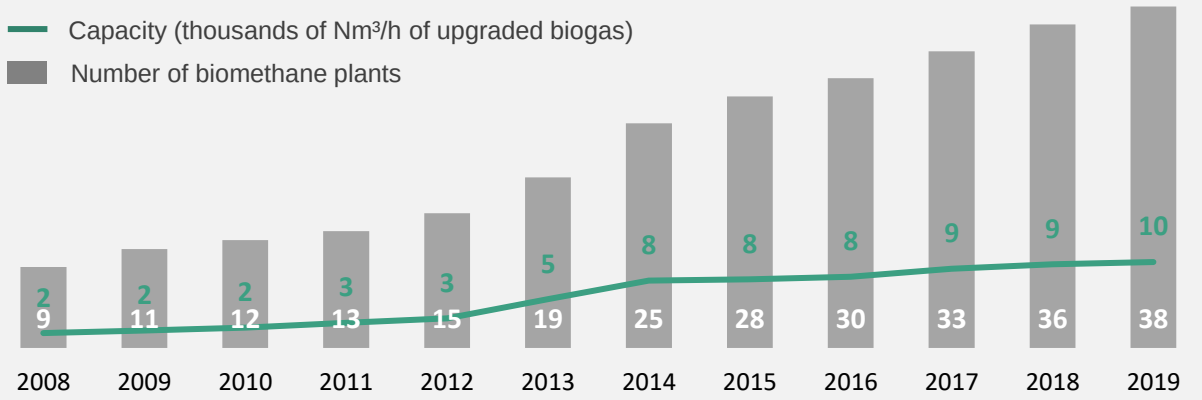
0,3 TWh

Development of the Swiss biomethane sector continues at a moderate but steady pace. No specific targets are set in the current legislation, but the Swiss Association of Gas Industry (VSG) aims to achieve a 30% share of biomethane in the gas consumed in the country (excluding industry) by 2030.

Regulations

- VSG has created a fund to support new or expanded biomethane plants through an investment grant depending on the capacity, injection and grid operator support for the first 36 months
- Exemption from CO2 tax for the consumption of biomethane, for combustible uses and also as a vehicle fuel.

Number of plants evolution



Biogas valorisation

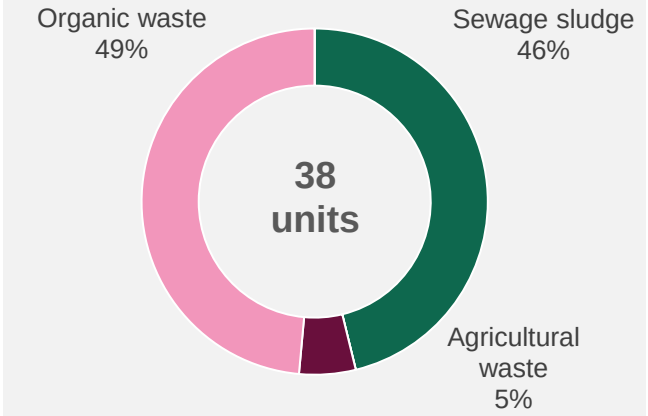
% of plants upgrading in biomethane

Total no. of biogas plants

Grid injection rate

% of plants injecting on the gas grid

Plants feedstocks



Source : Sia Partners analysis based on Kompost à Biogas, IEA, GIE & EBA

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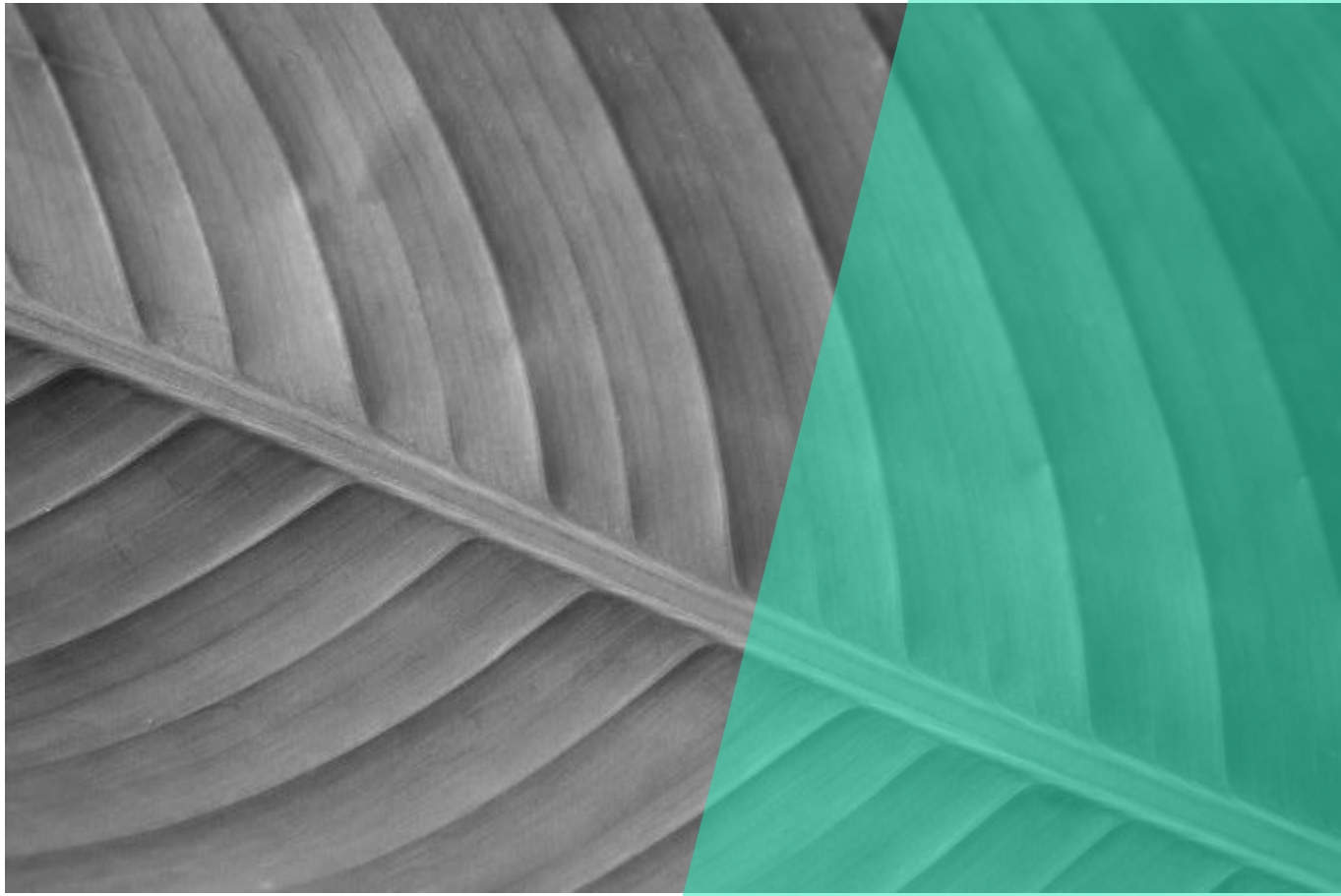
Contacts



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