BIOENERGY EUROPE

STATISTICAL REPORT 2019

REPORT BIOGAS

Bioenergy EUROPE

Supported by

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Contributor

CONTENTS

Index

List of Figures

List of Tables

STATISTICAL REPORT

TIMELINE

Every year since its debut release in 2007, Bioenergy Europe's Statistical Report has provided an in-depth overview of the bioenergy sector in the EU-28 Member States.

Bioenergy Europe's Statistical Report has been enriched each year with new figures and information, collecting unique data on the developments of the European bioenergy market from a growing number of international contributors.

Bioenergy Europe is therefore able to develop a detailed report that helps industry leaders, decision makers, investors and all bioenergy professionals to understand the situation of bioenergy in Europe.

With more than 150 graphs and figures, readers of Bioenergy Europe´s Statistical Report can get accurate and up-to-date information on the EU-28 energy system such as the final energy consumption of biomass for heat and electricity, the number of biogas plants in Europe, the consumption and trade of pellets, the production capacity of biofuels and other key information to help break down and clarify the complexity of a sector in constant evolution.

In 2017, the Report was rewarded by the European Association Awards for being the "best Provision of Industry Information and Intelligence", a recognition after a decade of collective work.

THE EUROPEAN ASSOCIATION AWARDS 2017

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300 PAGES

2019

ABOUT

OUR ACTIVITIES

Bioenergy Europe carries a wide range of activities aimed at supporting its members by informing them about latest EU and national policy developments, and by voicing their concerns to EU and other authorities. These include advocacy activities in key policy areas as well as the organisation of dedicated working groups acting as platforms where members can discuss common issues and exchange information on the state of play of bioenergy.

There are currently 7 active working groups:

- Agrobiomass & Energy Crops
- Biopower & CHP
- Competitiveness
- Domestic Heating
- Sustainability
- Pellets
- Wood Chips

In addition, Bioenergy Europe conceives and deploys targeted publications and communication campaigns to inform and educate about the potential of bioenergy for a decarbonised Europe.

Most notably, the association has several years of experience in data collection on the evolution of the bioenergy market and produce unique and tailored analyses along the year.

Thanks to the experience and authority acquired over the last 19 years, Bioenergy Europe successfully established two international certification schemes to guarantee high quality standard for fuels.

Bioenergy Europe is also the umbrella organisation of the European Pellet Council (EPC) and the International Biomass Torrefaction Council (IBTC). These networks have been created thanks to the dynamics of Bioenergy Europe members. Today, these networks bring together bioenergy experts and company representatives from all over Europe.

EUROPEAN PELLET COUNCIL
A NETWORK OF BIOENERGY EUROPE

The European Pellet Council (EPC) is an umbrella organisation of Bioenergy Europe founded in 2010, representing the interests of the European wood pellet sector. Its members are national pellet associations or related organisations from 18 countries.

The EPC is a platform for the pellet sector to discuss the issues related to the transition from a niche product to a major energy commodity. These issues include the standardisation and certification of pellet quality, safety, security of supply, education and training, and the quality of pellet-using devices.

EPC is managing the EN*plus*® quality certification.

www.pelletcouncil.eu
www.enplus-pellets.eu

INTERNATIONAL BIOMASS TORREFACTION COUNCIL
A NETWORK OF BIOENERGY EUROPE

The International Biomass Torrefaction Council (IBTC) is an umbrella organisation of Bioenergy Europe launched in 2012 and aims to building the first platform for companies having common interests in the development of torrefied Biomass markets. Currently, the IBTC initiative is supported by more than 23 companies active worldwide.

IBTC's objective is to promote the use of torrefied biomass as an energy carrier and to assist the development of the torrefaction industry. In this respect, IBTC's key activities are to undertake studies or projects, and to commonly voice its members' concerns to third parties to help to overcome barriers of market deployment.

www.ibtc.bioenergyeurope.org

ABOUT

BIOENERGY EUROPE

BIOENERGY EUROPE is the common voice of the bioenergy sector with the aim to develop a sustainable bioenergy market based on fair business conditions.

BIOENERGY EUROPE is a non-profit Brussels-based international organisation founded in 1990 which brings together national associations and companies from all over Europe – thus representing more than 4000 indirect members, including mainly companies and research centers.

www.bioenergyeurope.org

ASSOCIATIONS

ACADEMIA

ABOUT

BIOENERGY EUROPE

Companies

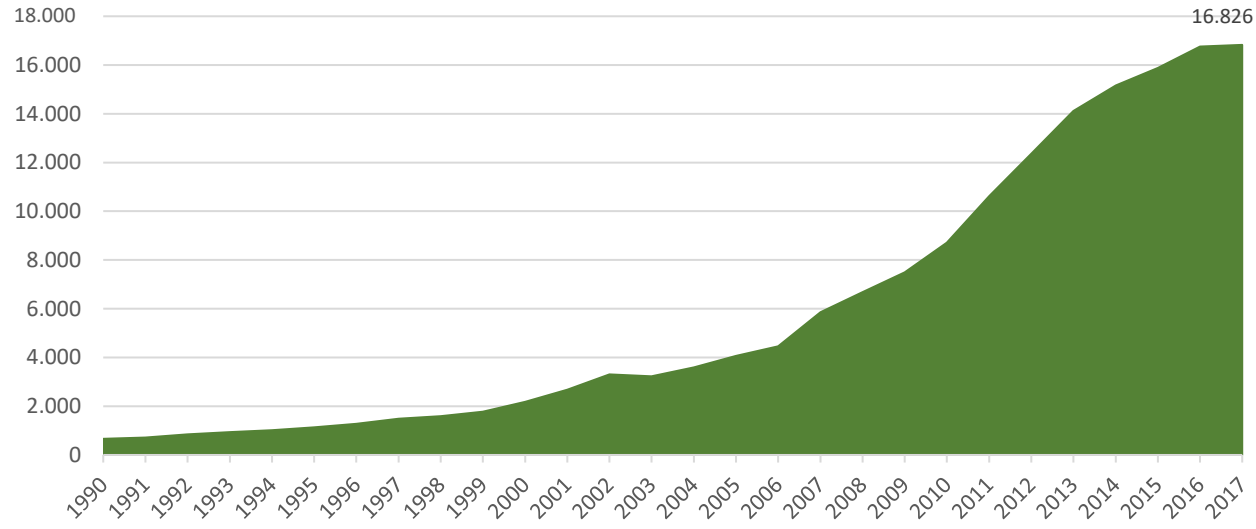
Members as of August 2019.

1. Biogas in Europe

The gross inland energy consumption of biogas has increased tremendously since 1990 and has been multiplied by a factor of 25. Over time this upward trend has demonstrated the strength and resilience that lies within the national biogas market. This increase was supported by the fast development of advanced technologies, resulting in higher plant efficiency, cheaper digesters as well as the cheaper upgrading units used for the conversion of raw biogas to biomethane of a natural gas grade.

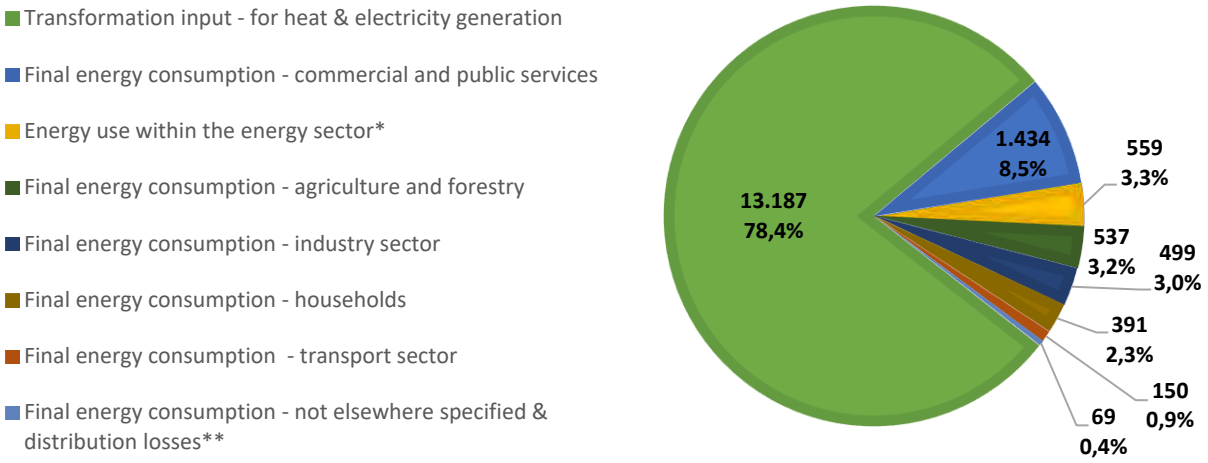
However, In 2017 figures showed that biogas represented only 1% of the total gross inland energy consumption within the EU28 Member States with 12% of the bioenergy used across the EU being that of biogas. These statistics highlight that the overall use of biogas equated to around 4% in comparison to that of natural gas consumption. In light of this, it is clear that there is still the possibility for a large increase of biogas usage and a real need to promote this bioenergy as one of the reliable solutions for a low-carbon energy transition.

Figure 1 Evolution of the Gross Inland Energy Consumption of Biogas in EU28 (in ktoe)



Source: Eurostat

Figure 2 Biogas Gross Inland Energy Consumption by End-use in 2017 in EU28 (in ktoe and %)



* Mainly the biogas consumed as energy for support operations in biogas gasification plants (535 ktoe)
** Distribution losses = 66 ktoe
Source: Eurostat

Depending on the process and feedstock considered, it is estimated that greenhouse gas (GHG) emission savings due to the use of biogas can reach more than 200% per unit of energy compared to fossil fuel. In fact, in 2017 the savings of GHG emissions due to biogas was estimated to 61 Mt CO2eq, which is roughly the equivalent of the annual emission of Bulgaria and representing 1,3% of the annual EU28 GHG emissions in 2017. These figures demonstrate the importance and potential of biogas as a contributor to achieve the EU GHG reduction targets.

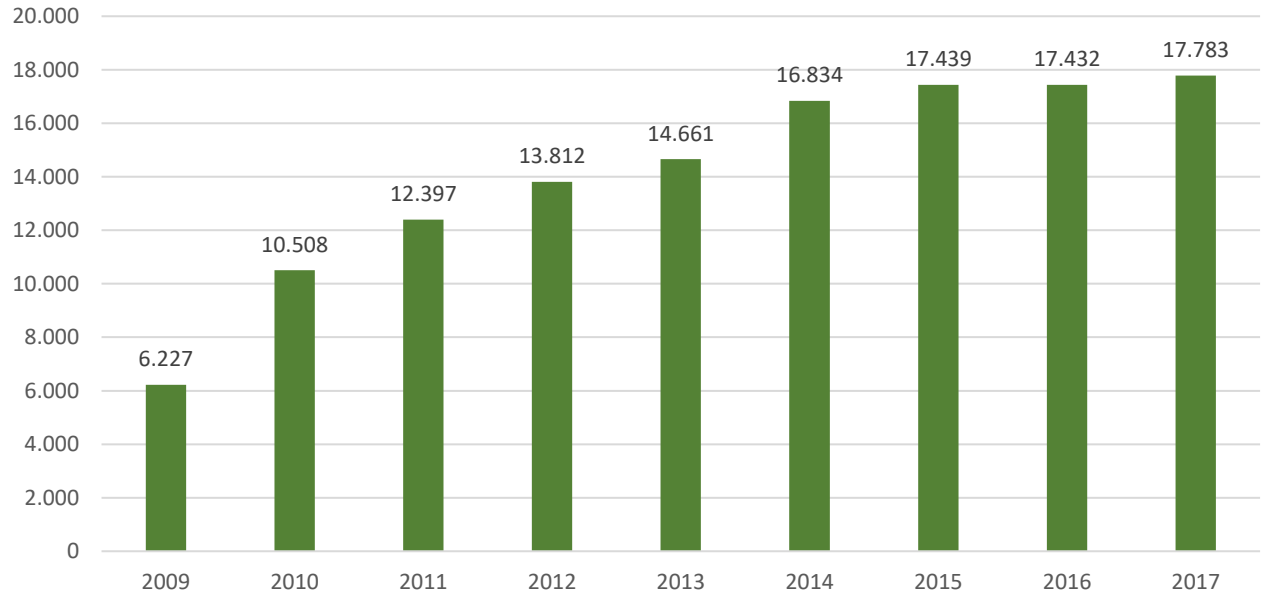
Almost one third of biogas consumption is directly used within different sectors (commercial and services, agricultural, industrial and residential). Germany, Italy, as well as the United Kingdom are the leaders in biogas production within Europe. These three countries consume respectively 50%, 10,7% and 10,4% of the gross final energy consumption of biogas within Europe.

Table 1 Gross Final Energy Consumption from Biogas by End-use in EU28 Member States in 2017 (in ktoe)

	Gross Final Energy Consumption	Gross Electricity Generation	Direct used - Final Consumption (industry, household, commercial etc.)	Gross Heat Generation	Transport
EU28	**9.199**	**5.452**	**2.864**	**734**	**150**
Growth rate (2016-2017)	2%	1%	3%	8%	14%
AT	107	54	49	4	0,3
BE	184	81	94	9	0
BG	30	19	8	3	0
CY	10	4	4	1	0
CZ	403	227	158	17	0
DE	4.632	2.913	1.466	215	38
DK	230	59	96	75	0,3
EE	12	4	8	1	0
EL	44	26	18	0	0
ES	134	81	53	0	0
FI	81	35	25	21	0,3
FR	513	180	271	62	0
HR	35	27	0	8	0
HU	49	29	18	2	0
IE	27	17	10	0	0
IT	981	714	41	226	0
LT	21	11	8	2	0
LU	13	6	5	2	0
LV	67	35	8	24	0
MT	2	1	1	0	0
NL	193	79	108	6	0
PL	198	94	83	21	0
PT	33	25	8	0	0
RO	16	6	5	5	0
SE	269	1	147	10	111
SI	18	11	1	5	0
SK	96	51	32	13	0
UK	954	664	290	0	0

Source: Eurostat

Figure 3 Evolution of the Number of Biogas Plants in Europe

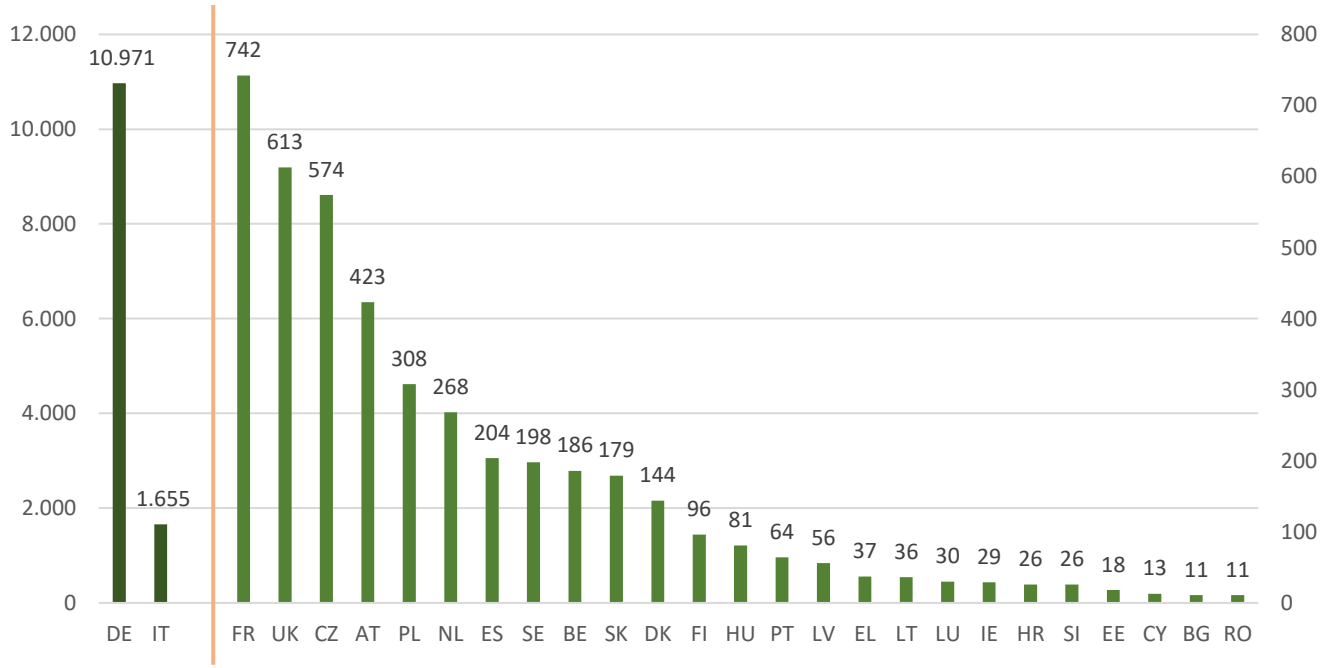


*EU28 + Switzerland + Norway + Serbia

Source: EBA

The biogas sector is expanding and has experienced many improvements in the last decade in terms of efficiency (physical and economic) due to research and innovation. Germany is the European leader in biogas even though there is a lull in recent years in this country (regarding the implementation of new biogas plants) mainly due to changes in the national support scheme (EEG). On their side, the United Kingdom and France have continued to increase the amount of new plants in operation.

Figure 4 Number of Biogas Plants in EU28 Countries in 2017 (n° of plants) (separated scale for Germany and Italy)



Source: EBA

Six countries have currently achieved their biogas target for 2020 under the 'National Renewable Energy Action Plans' (NREAPs) those countries being Austria, Germany, Italy, Portugal, Sweden as well as the United Kingdom. Landfill and sewage gas accounts for around 24% of total biogas production while most of the biogas is produced from anaerobic fermentation of agricultural feedstock.

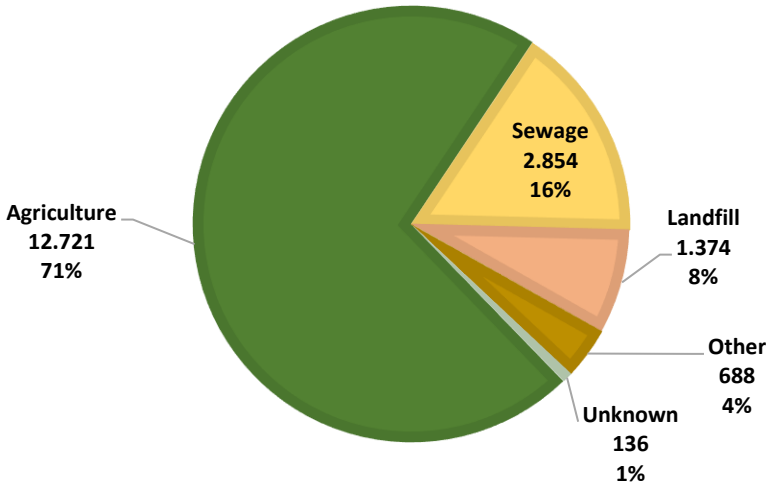
Table 2 Primary Energy Production of Biogas by Type in EU28 Member States in 2017 and 2020 NREAPs Targets (in ktoe)

	Total Biogas	Landfill gas	Sewage sludge gas	Other biogas from anaerobic fermentation	Biogas from thermal processes	NREAPs targets
EU28	**16.826**	**2.596**	**1.387**	**12.629**	**214**	**20.820**
Growth Rate (2016-2017)	0%	-3%	1%	1%	34%	/
AT	246	2	15	229	n.a.	162
BE	224	20	25	174	5	418
BG	47	n.a.	3	44	n.a.	111
CY	12	n.a.	1	11	n.a.	35
CZ	608	23	43	541	n.a.	902
DE	7.845	132	460	7.252	n.a.	7.748
DK	389	5	26	235	123	807
EE	13	9	3	n.a.	n.a.	0
EL	107	69	16	22	n.a.	220
ES	261	150	65	23	24	761
FI	125	21	16	31	56	137
FR	899	311	27	561	n.a.	1.562
HR	64	5	3	55	n.a.	0
HU	92	15	29	48	n.a.	222
IE	55	38	9	7	n.a.	117
IT	1.898	350	54	1.488	6	1.796
LT	32	5	7	20	n.a.	160
LU	20	0	2	19	n.a.	51
LV	93	8	2	83	n.a.	201
MT	2	n.a.	n.a.	2	n.a.	0
NL	321	17	58	246	n.a.	1.485
PL	281	48	115	118	n.a.	1.520
PT	85	73	3	9	n.a.	50
RO	18	n.a.	n.a.	18	n.a.	233
SE	178	5	79	95	n.a.	26
SI	26	2	2	22	n.a.	90
SK	152	10	12	130	n.a.	282
UK	2.733	1.277	312	1.144	n.a.	1.724

Source: Eurostat

Thermal processes represent gasification or pyrolysis of biomass as wood residues to produce biogas and in 2017 accounted for around 1,3% of the biogas production.

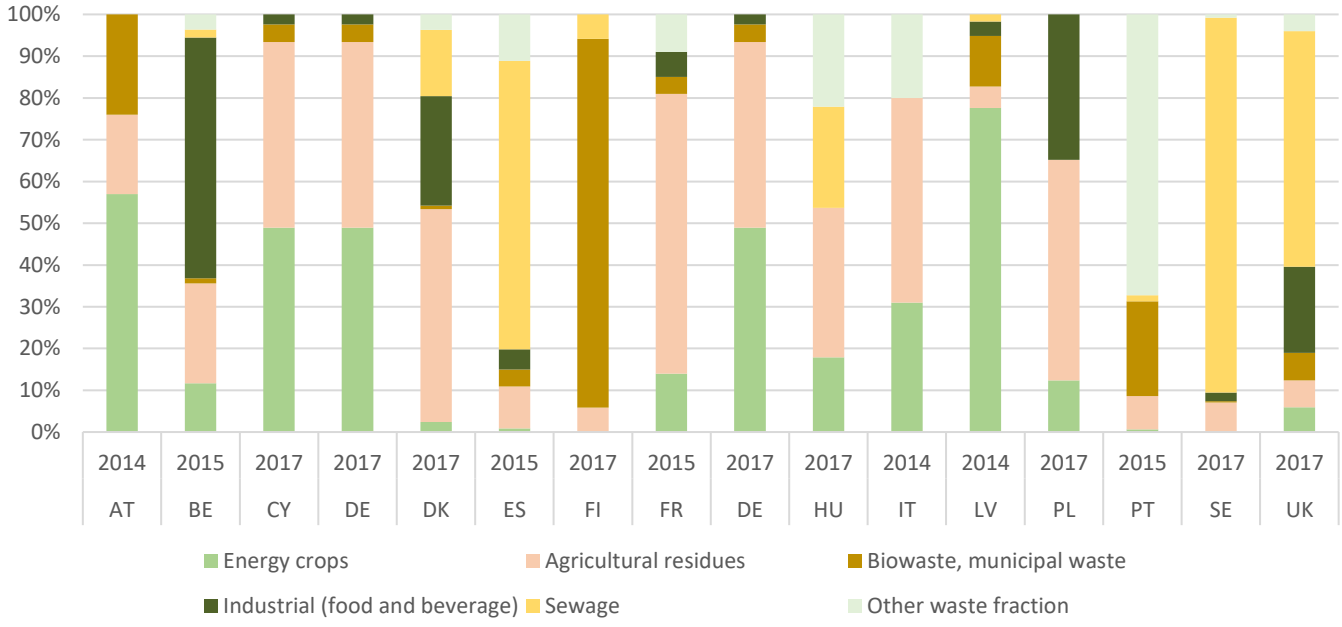
Figure 5 Distribution of Biogas Plants by feedstock in Europe* in 2017 (number of plants)



*EU28 + Switzerland + Norway + Serbia
Source: EBA

In Europe, up to 70% of the feedstocks used for biogas production come from the agricultural sector such as energy crops, manure, as well as agricultural residues. The utilisation of agricultural residues such as manure is particularly important in countries such as Denmark, France and Italy. This underlying growth in synergies between animal farming and biogas provide a profitable manure management solution. Energy crops such as Maize, Silphium or Sorghum are largely used in Germany and Austria. The organic waste (municipal – included in figure 5 in "other", or industrial – from food and beverage industry) still has the potential to be developed for use in biogas production as it is currently underrepresented.

Figure 6 Feedstock Use for Biogas Production in European Countries (excluding landfill - expressed as a mass percentage)



Source: EBA

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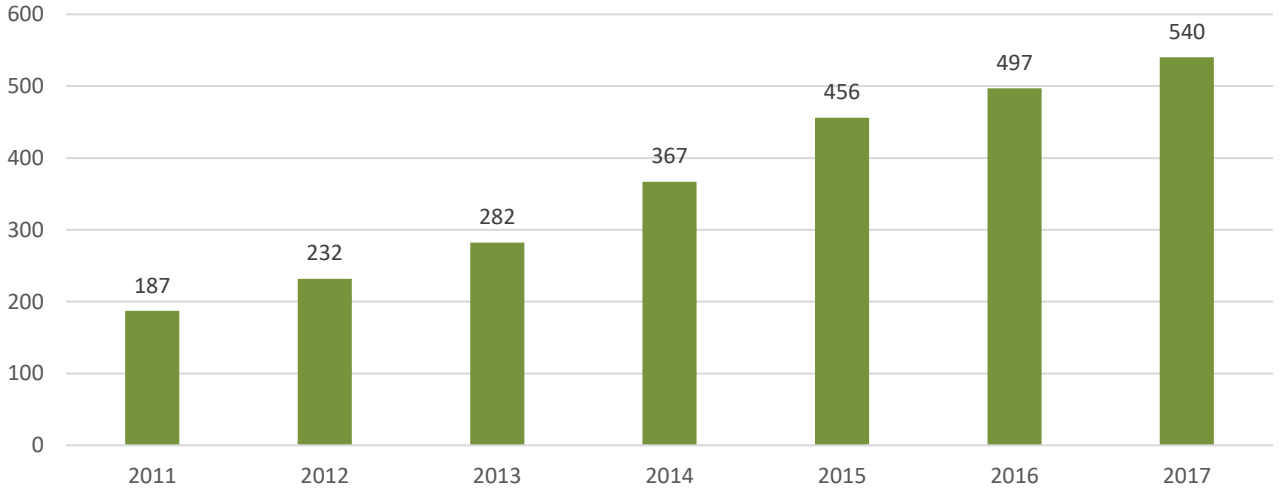
2. Biomethane in Europe

Biomethane is defined as methane produced from biomass, with properties close to natural gas. The initial product is raw biogas which is purified (upgraded) to reach a high methane content (usually >96%) which can then be used in the gas grid or as a fuel for transport.

The number of biomethane plants has nearly tripled from 2011 to 2017 showing the fast development of this sector.

Figure 7 Evolution of the Number of Biomethane Plants in Europe*



*EU28 + Switzerland + Norway

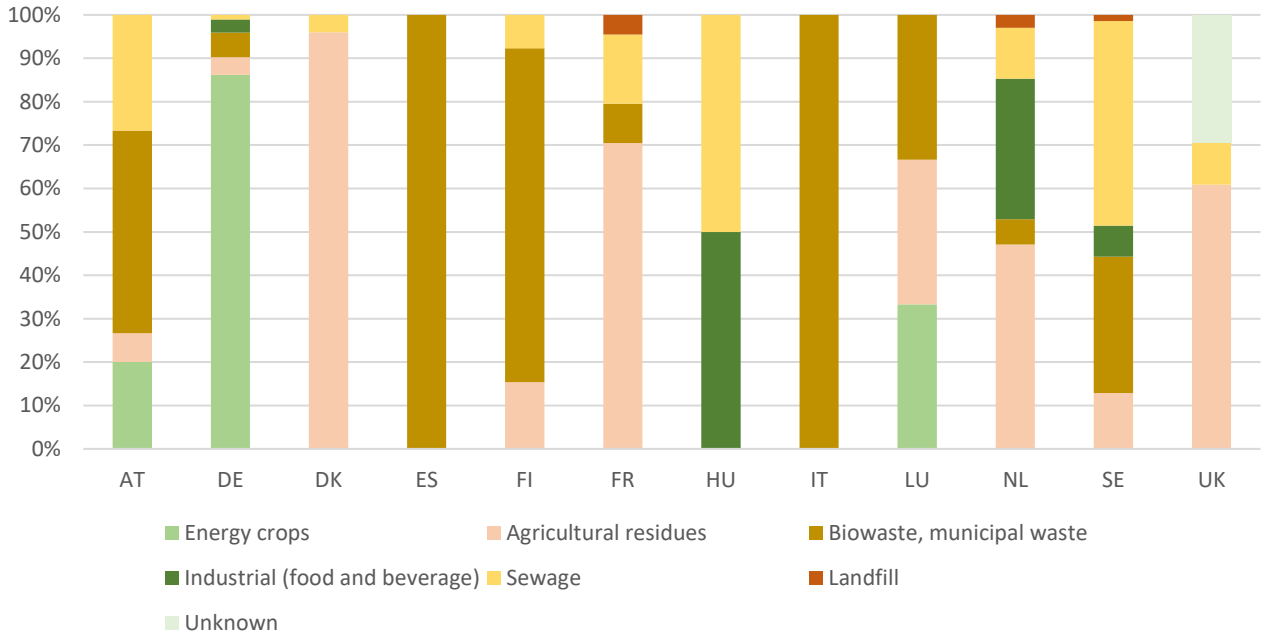
Source: EBA

In 2017, 18 new biomethane plants were constructed in France and before the end of 2018, 23 additional plants were installed, reaching a total of 67 biomethane plants. France has the highest growth rate for biomethane plants due to favourable policy conditions for biomethane production. The country is attempting to reach 1.000 biomethane plants injecting its gas into the national gas grid by 2020. To achieve this target, an incentive scheme has been put in place to support biomethane production.

In Belgium the biomethane sector is starting to gain traction with the first plant coming into fruition in 2018.

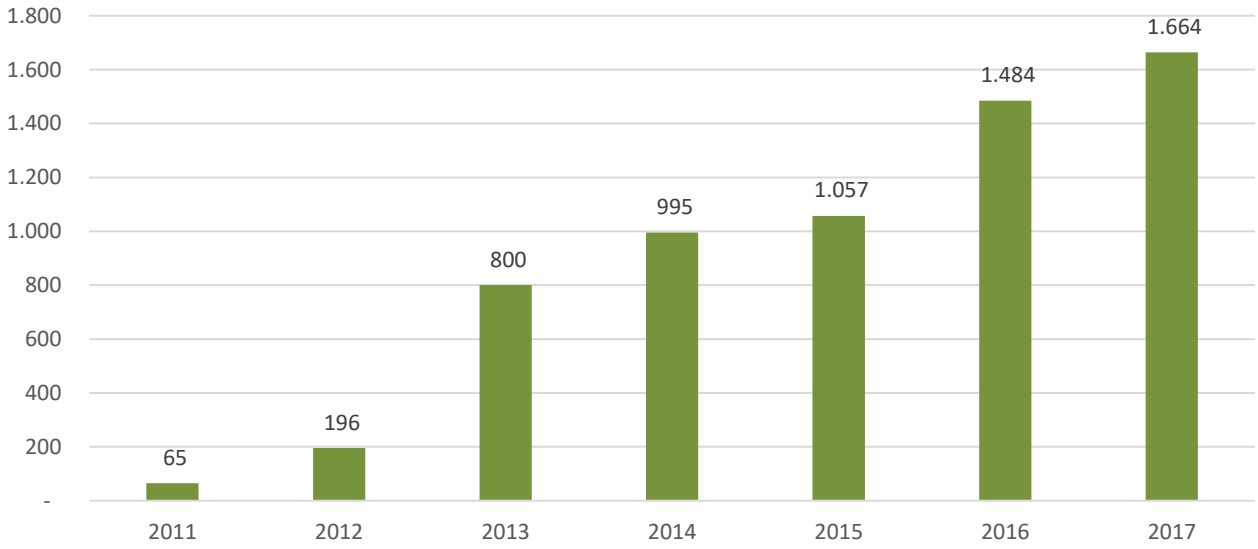
With the right incentives, biomethane is a commercially viable fuel: it can rely on existing natural gas infrastructure and it contributes to reaching European climate targets by reduced CO_2 emissions and improved air quality.

Figure 8 Distribution of Biomethane Plants by Feedstock Type in 2017 for some European Countries



Source: EBA

Figure 9 Evolution of the Production of Biomethane in Europe* (in ktoe)

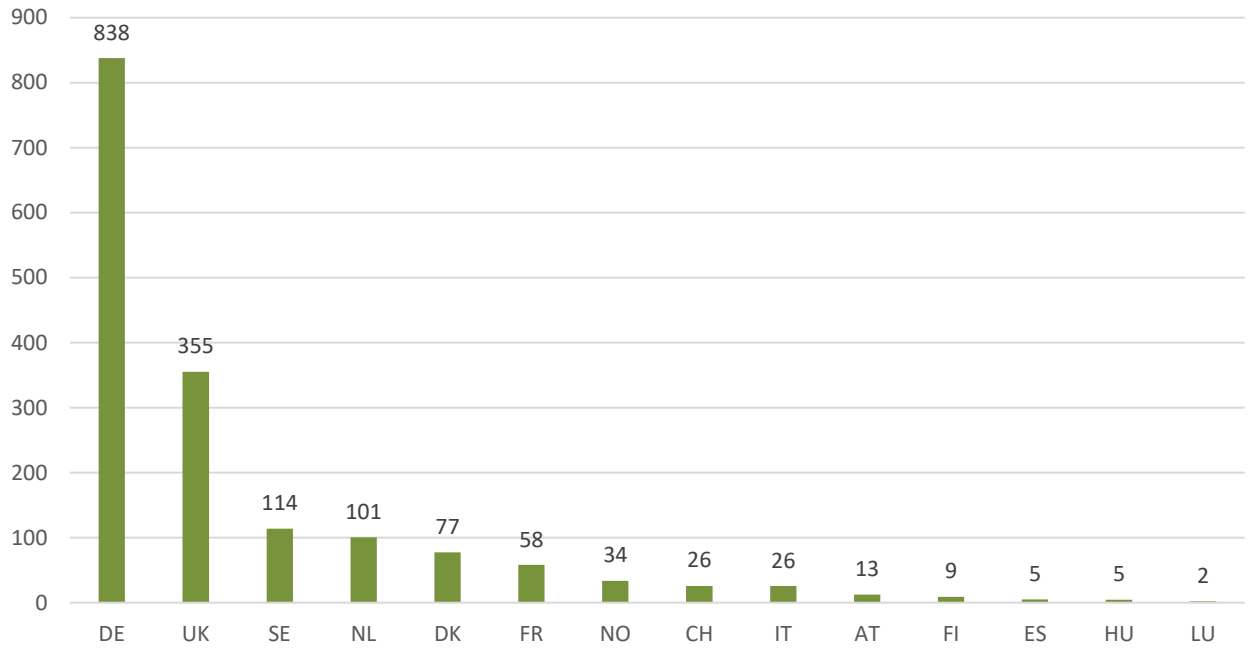


*EU28 + Switzerland + Norway

Source: EBA

In 2017, the biomethane produced (1.664 ktoe) was equivalent to 0,42% of the natural gas consumed in Europe.

Figure 10 Production of Biomethane in European Countries in 2017 (in ktoe)



Source: EBA

Additionally, Belgium, Estonia as well as Ireland reported their first biomethane production plants in 2018.

3. Annexes

Table 3 Country Codes

EU28	European Union (28 members)
AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovak Republic
UK	United Kingdom

Table 4 Symbols and Abbreviations

Symbol	Meaning
,	Decimal separator
.	Thousand
n.a.	Data not available

Table 5 Decimal Prefixes

10^{1}	**Deca (da)**	10^{-1}	**Deci (d)**
10^{2}	**Hecto (h)**	10^{-2}	**Centi (c)**
10^{3}	**Kilo (k)**	10^{-3}	**Milli (m)**
10^{6}	**Mega (M)**	10^{-6}	**Micro (μ)**
10^{9}	**Giga (G)**	10^{-9}	**Nano (n)**
10^{12}	**Tera (T)**	10^{-12}	**Pico (p)**
10^{15}	**Peta (P)**	10^{-15}	**Femto (f)**
10^{18}	**Exa (E)**	10^{-18}	**Atto (a)**

Table 6 General Conversion Factor for Energy

to from	1 MJ	1kWh	1 kg oe	Mcal
1 MJ	1	0,278	0,024	0,239
1 kWh	3,6	1	0,086	0,86
1 kg oe	41,868	11,63	1	10
1 Mcal	4,187	1,163	0,1	1

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