

BIOGAS PRODUCTION FROM PIG MANURE

EUROPEAN PIGMEAT REFLECTION GROUP

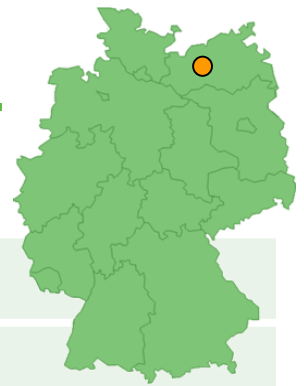


12 Sep 2022
Online



Federal Ministry
of Food
and Agriculture

Fachagentur Nachwachsende Rohstoffe e. V.



Facts

Foundation:	October 1993
Main office:	18276 Gülzow-Prüzen
Support:	Federal Ministry of Food and Agriculture (BMEL) and State of Mecklenburg- Western Pomerania
Employees:	133
Legal status:	Registered association with 82 members (7 voting members)
Tasks:	<ul style="list-style-type: none">• Promotion of research, development and demonstration (project management)• Information & advice• Public relations• International and EU activities
Target groups:	Industry, SME, public and private research institutes, universities, government agencies

BMEL-Climate protection measures in agriculture and forestry

1. Reduction of **nitrogen surpluses** incl. reduction of NH_3 and N_2O emissions, improvement of nitrogen efficiency (1.9 to 7.5 Mio. t CO_2 -equ. p.a.)
2. Improvement of **fermentation of manure** and agricultural residues (2.0 to 2.4 Mio. t CO_2 -equ. p.a.)
3. Expansion of **organic farming** (1.9 to 7.5 Mio. t CO_2 -equ. p.a.)
4. Reduce GHG emissions from animal husbandry (0.3 to 1.0 Mio. t CO_2 -equ. p.a.)
5. **Energy efficiency** in agriculture (0.9 to 1.5 Mio. t CO_2 -equ. p.a.)
6. **Building up and maintaining humus on arable land** (1.0 to 3.0 Mio. t CO_2 -equ. p.a.)
7. Maintain permanent **grassland** (no additional GHG reduction potential)
8. Protection of **peatland** and reduction of peat use (3.0 to 8.5 Mio. t CO_2 -equ. p.a.)
9. Maintenance and sustainable management of **forests** and wood use
10. **Sustainable diet** (3.0 to 7.9 Mio. t CO_2 -equ. p.a.)

Source: <https://www.bmel.de/DE/themen/landwirtschaft/klimaschutz/klimamassnahmen-klimaschutzprogramm2030.html>

accessed 12 May 2022

Biogas in Germany

Status quo

- 8,600 biogas plants in 2021, 6.5 GW installed electrical capacity
- Manure roughly 50 % of mass input of biogas plants, energy crops other half
- However only 30 % of total manure supply used in biogas plants so far
- Incentives for electricity generation from manure (next slide)
- Investment support programme by Federal Ministry of Agriculture

Biogas in Germany

Legal framework

- Legislation for renewable electricity since 1991
- Key legal act:
 - Erneuerbare-Energien-Gesetz (Renewable Energy Act, EEG) since 2000, but under constant revision (2004/2009/2012/2014/2017/2021/2023)
- Guaranteed electricity price (feed-in tariff) for 20 years
- Incentives and disincentives for various biomass feedstocks (energy crops in the past, manure and other wastes and residues at present), technologies, flexibility, plant size etc.
- Current EEG: highest fixed feed-in tariff for small scale manure based (>80 %) biogas plants (~ 22 ct/kWh)

Biogas in Germany

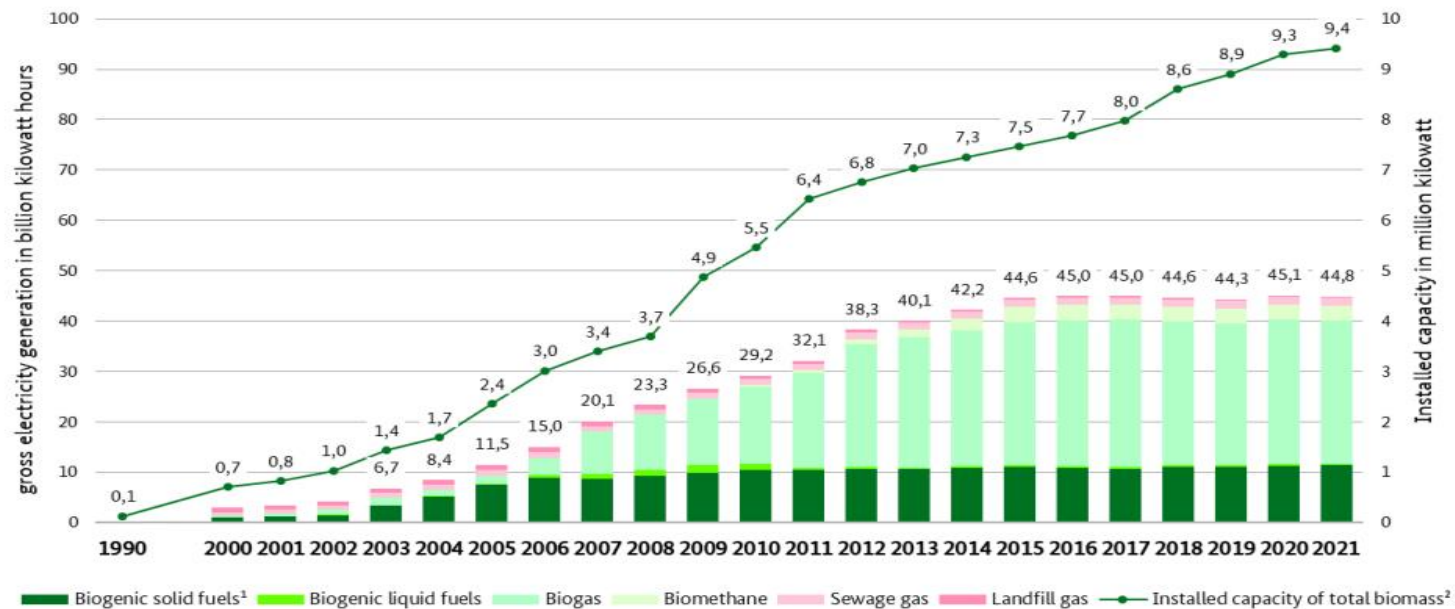
Gross electricity production from biomass



Federal Ministry
for Economic Affairs
and Climate Action



Development of gross electricity production and installed capacity of biomass plants in Germany



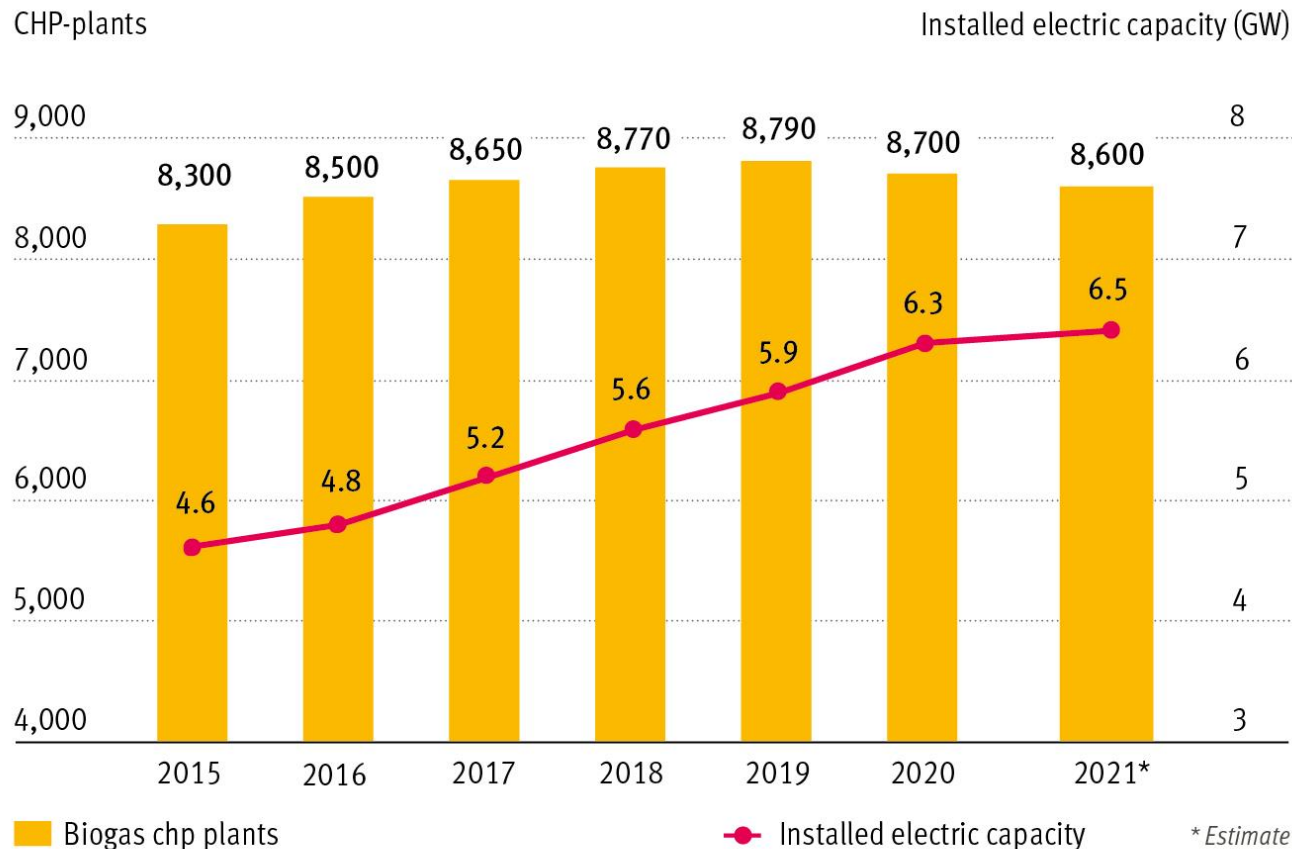
¹ incl. sewage sludge, without the biogenic fraction of waste in waste incineration plants;

² since 2013 including additional capacity for increased flexibility of electricity production

BMWK based on Working Group on Renewable Energy-Statistics (AGEE-Stat); as of February 2022

Biogas in Germany

Development of biogas CHP plants in Germany



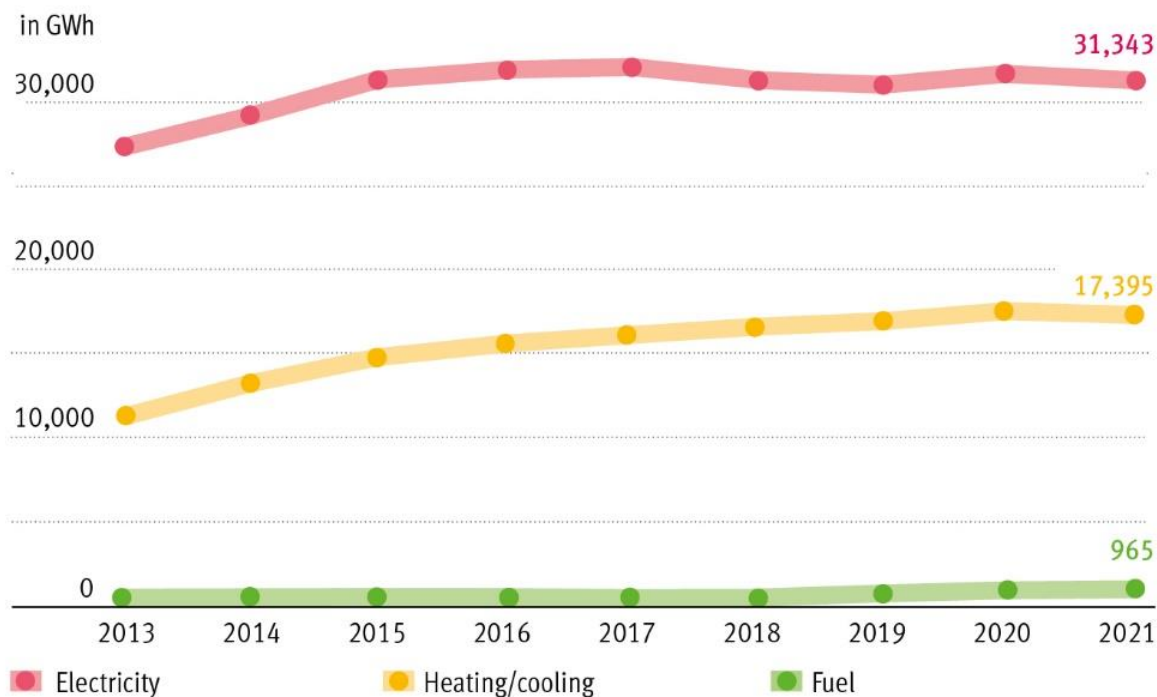
Source: FNR based on AGEE-Stat, DBFZ (2021)
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Biogas in Germany

Development of energy supply from biogas/biomethane

Development of energy supply from biogas/biomethane

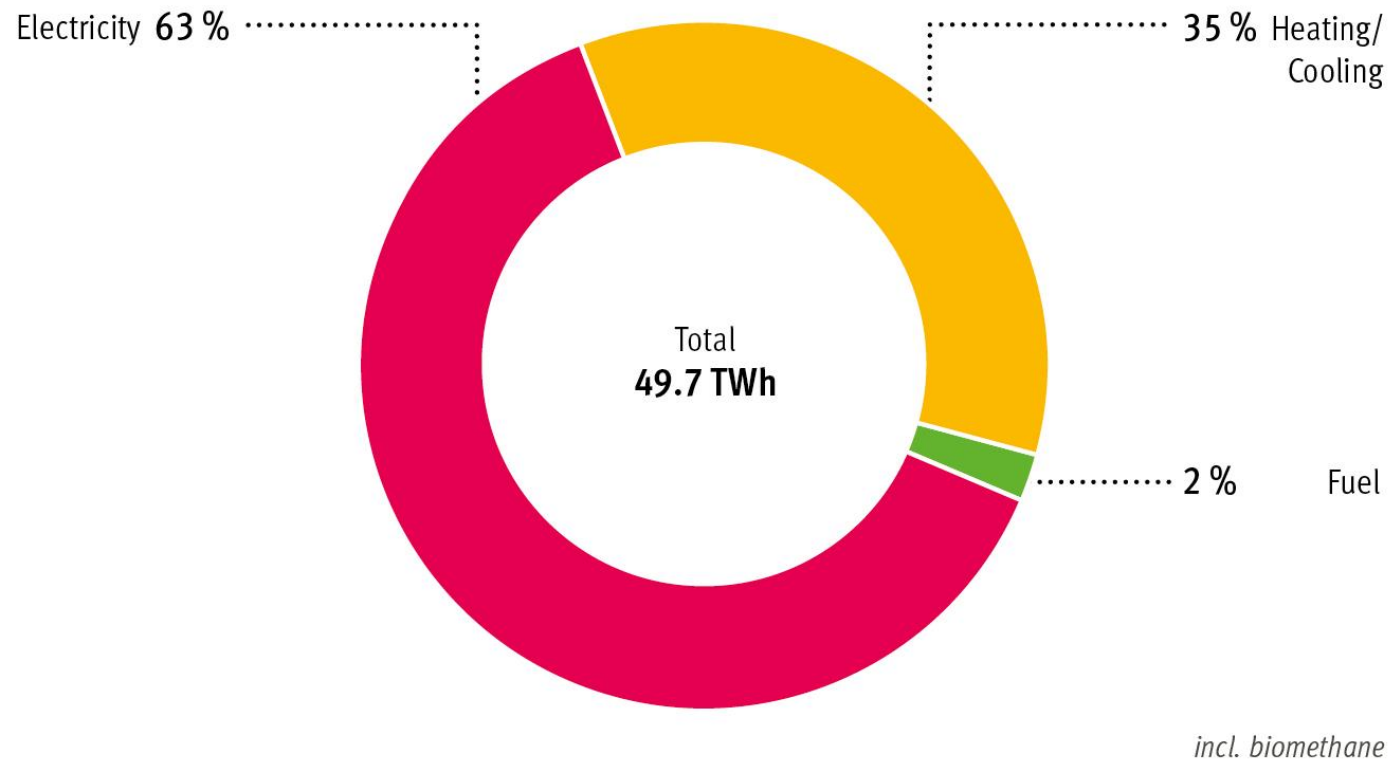


Source: BMWK, AGEE-Stat (February 2022)
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Biogas in Germany

Energy from biogas in 2021

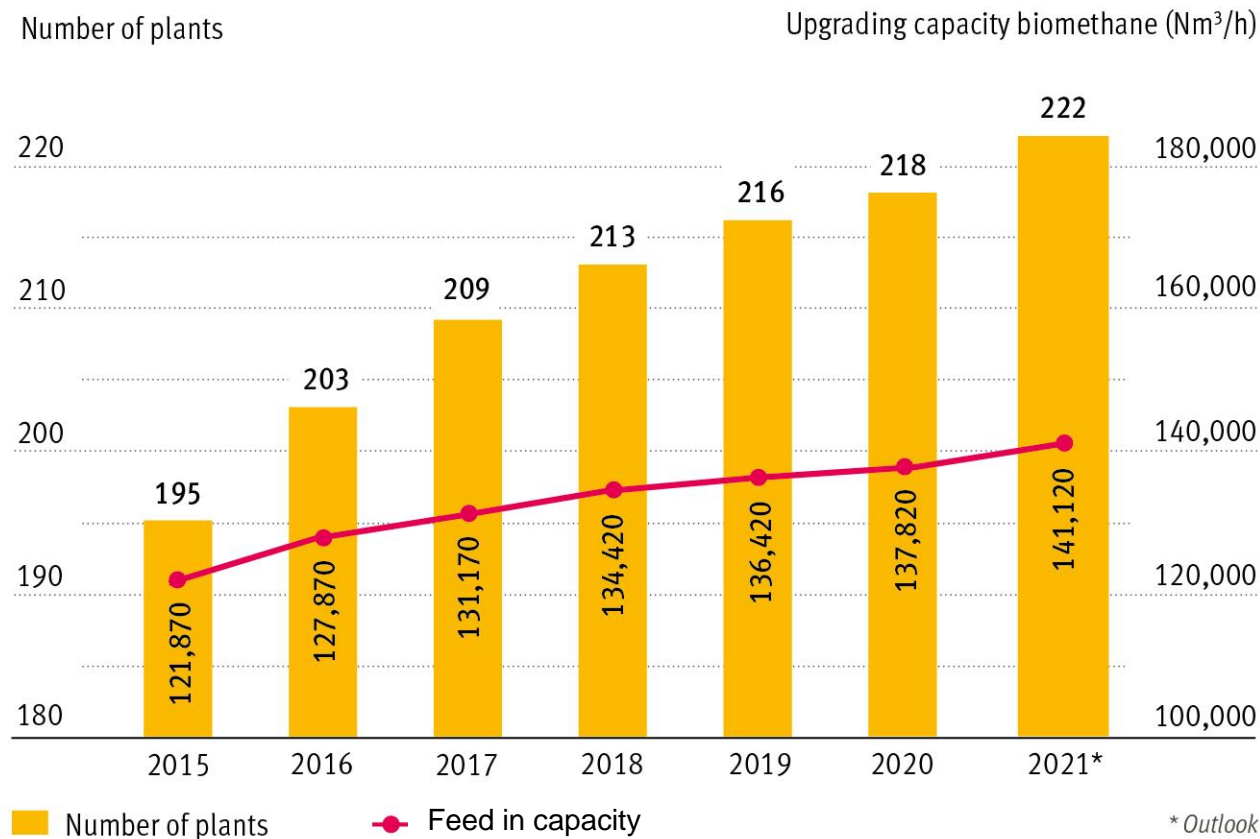


Source: BMWK, AGEE-Stats. (February 2022)
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Biogas in Germany

Plants for biomethane production

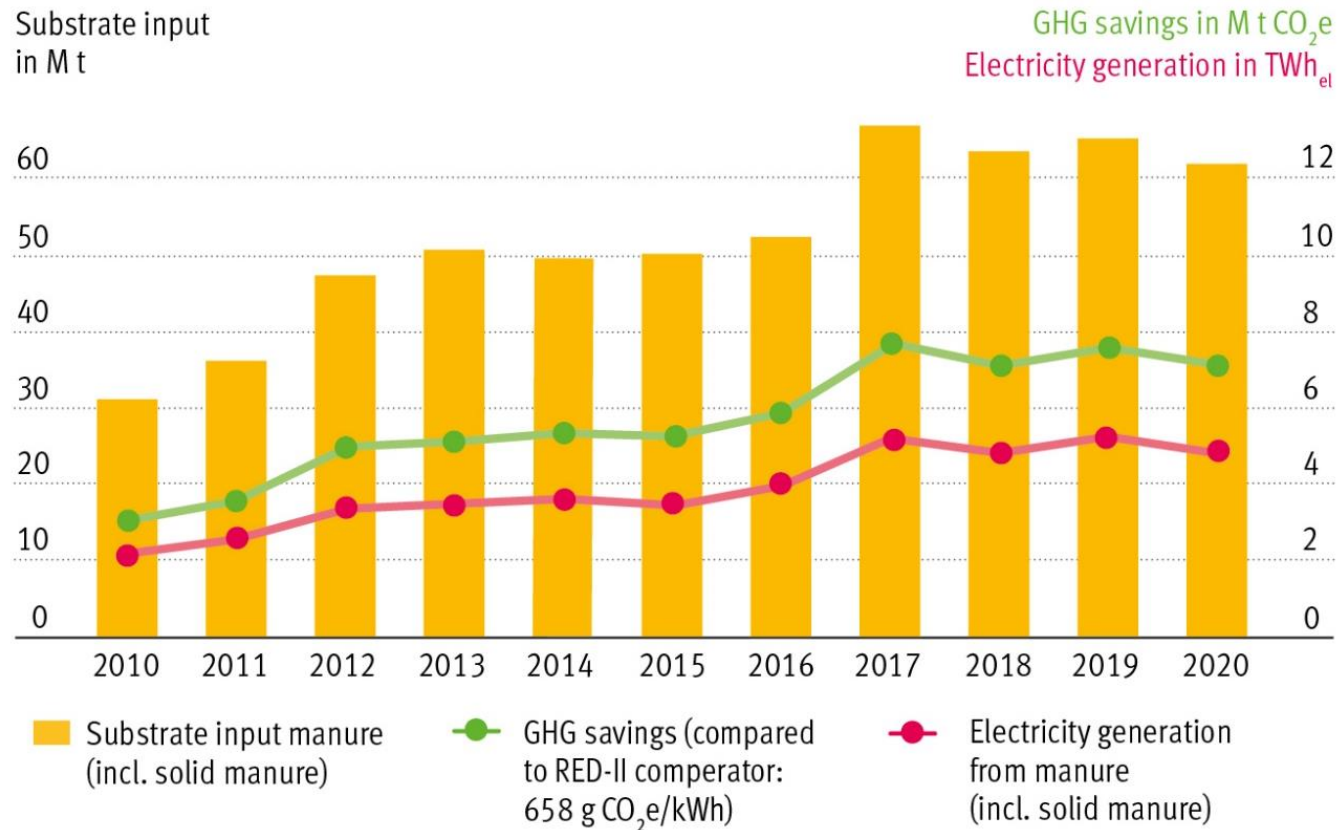


Source: FNR based on dena (2021)
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Biogas in Germany

Development of GHG avoidance and electricity generation through manure fermentation

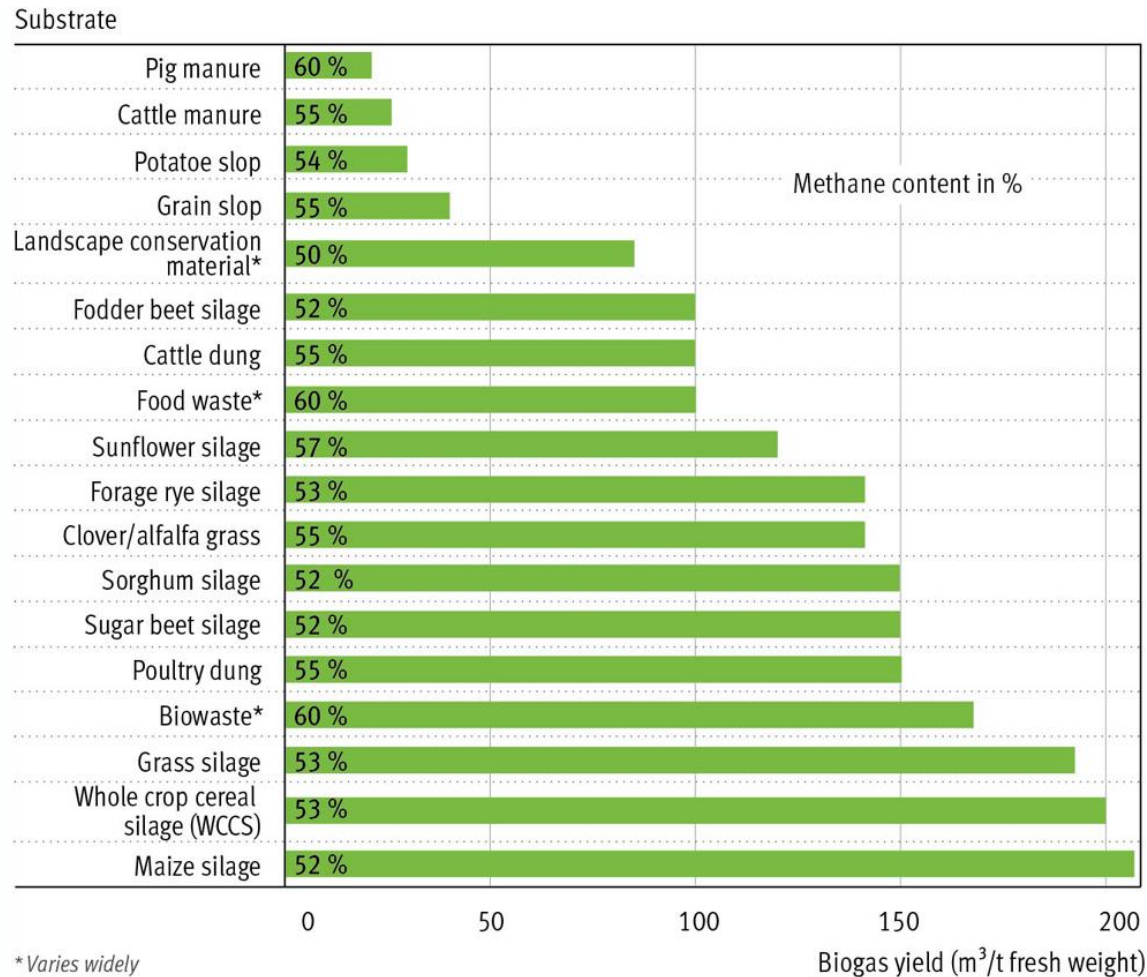


Source: FNR based on UBA, DBFZ (2022)
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Biogas in Germany

Biogas yields and methane content of various substrates

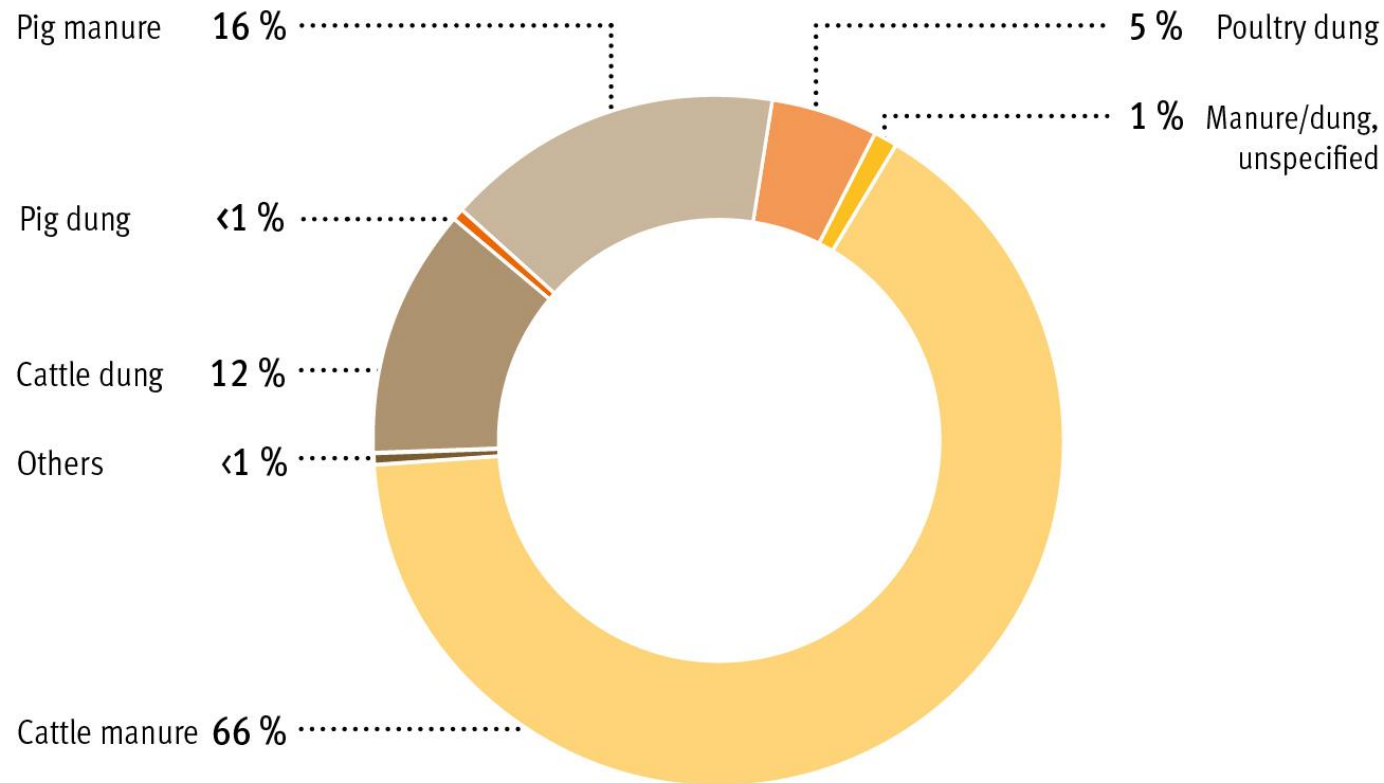


Source: KTBL (2015)

© FNR 2015

Biogas in Germany

Manure as a substrate in biogas plants 2019



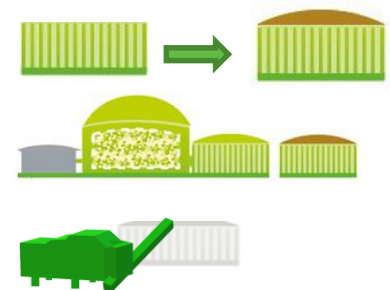
Mass-related substrate use

Source: DBFZ Betreiberbefragung Biogas (2020)
© FNR 2021



Biogas from manure – funding activities of BMEL

- Funding from general programme renewable resources for many years
- Since 2021 from Climate and Transition Fund (KTF); budget 2022 58 Mio. €
- 1. Research and development
 - 16 ongoing projects
 - Focus: Fermentation process technologies, emission reduction, small scale plants, efficiency increase
- 2. Pilot and demo plants
 - Call ongoing
 - Focus: Prototypes, pooling, small scale plants, low emission storage, mobilisation of potentials
- 3. Investments
 - Focus:
 - Closed gastight digestate storage systems
 - Adaption of plants for increased manure share
 - Joint plants, manure specific parts for new plants



Biogas from pig manure- examples of current funding activities of BMEL

- Biogas from pig faeces

Acronym: BioSeK, 2220NR028X (2020-2021)

- Feasibility study from barn to biogas plant
- Technical requirements, potential, logistics, economics
- Initial point are new barn systems with separation of faeces and urine

- Standardised micro biogas plants

Acronym: MABR-Inno, 2220NR062 (2020-2021)

- For pig farms < 15,000 m³ manure p.a.
- Development of a modular technology for the treatment of farm manure with methane enrichment, digestate and wastewater treatment as well as nitrogen recovery

Biogas from pig manure- examples of current funding activities of BMEL (2)

- Economic and technical optimisation of the anaerobic digestion of pig manure

Acronym MOVE_WD, 2220WD012 (2022-2024)

- Development of practically applicable measures and concepts that lead to the development of the biogas potential of pig manure

Biogas and pigmeat production

Q1: To which extent can biogas add value to the pigmeat sector?

- Depends on market and legal framework as well as alternative uses of manure
- Guaranteed electricity price (feed-in tariff) of major importance
- 22 ct/kWh (in EEG) not sufficient in many cases due to limited economies of scale
- If there is enough manure and other useable co-substrates biogas can provide extra income, reduce emissions (see show cases in FNR [publication](#) small scale manure based biogas plants)

Biogas and pigmeat production

Q2: To which extent can biogas address environment and climate challenges?

- Current saving 7-8 Mio t GHG equivalents p.a.
- Only 30 % of manure used so far – lion share of GHG saving potential of agriculture
- Future of livestock housing and husbandry uncertain (economics, environmental and societal demands etc.)

Biogas and pigmeat production

Q3: Are there pitfalls with biogas that should be avoided?

- Farming structure vs. economies of scale for biogas plants, new and changing husbandry systems (f.e. more straw)
- Future of pig farming in Germany/in Europe
- Will next generation of farmers continue with pig farming? Shortage of workers
- Price fluctuations energy and fertilizers, building materials etc.
- High investments and payback time for biogas plants

Biogas and pigmeat production

Q3: Are there pitfalls with biogas that should be avoided? - continued

- Keep investment and operation costs under control
- Secure substrate supply and energy sale
- Acquire knowledge to operate a biogas plant
- Don't underestimate (daily) time necessary to run the plant
- Consult experts and stay informed

Thank you for your attention!

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