BIOGAS & BIOMETHANE

Potential and Flexibility in the Czech Energy Transition

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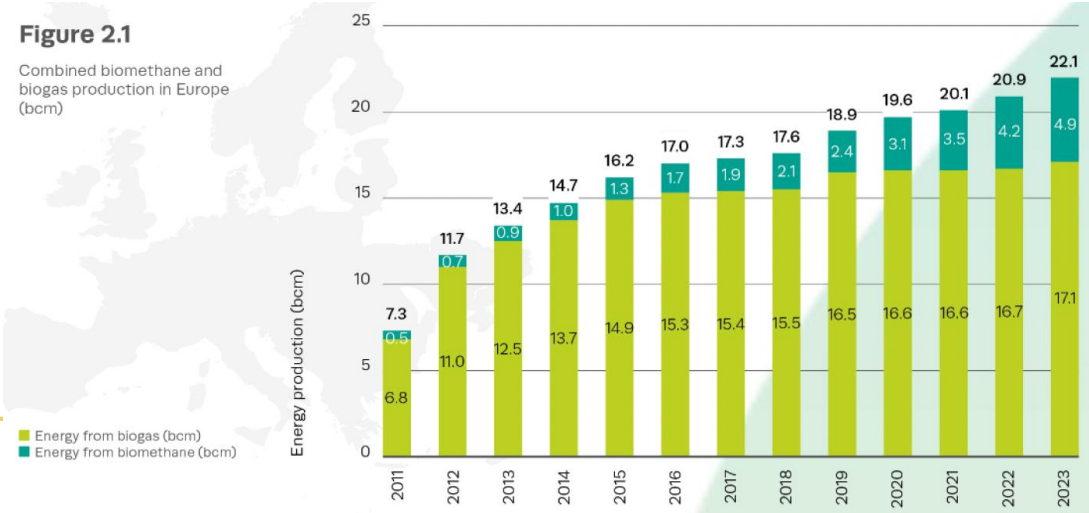
CZ BIOM
ČESKÉ SDRUŽENÍ PRO BIOMASU

Biogas in the EU – Key Figures

- 19,632 biogas plants in the EU (2024)
- 17.1 bcm biogas produced (~182 TWh)
- Feedstock: mainly agricultural residues & organic waste

- Digestate reduces mineral fertiliser use and returns nutrients to soil
- Flexibility & controllability – stable output, fast regulation
- Germany increases BPS capacity for peak operation

Source: EBA Statistical Report 2024



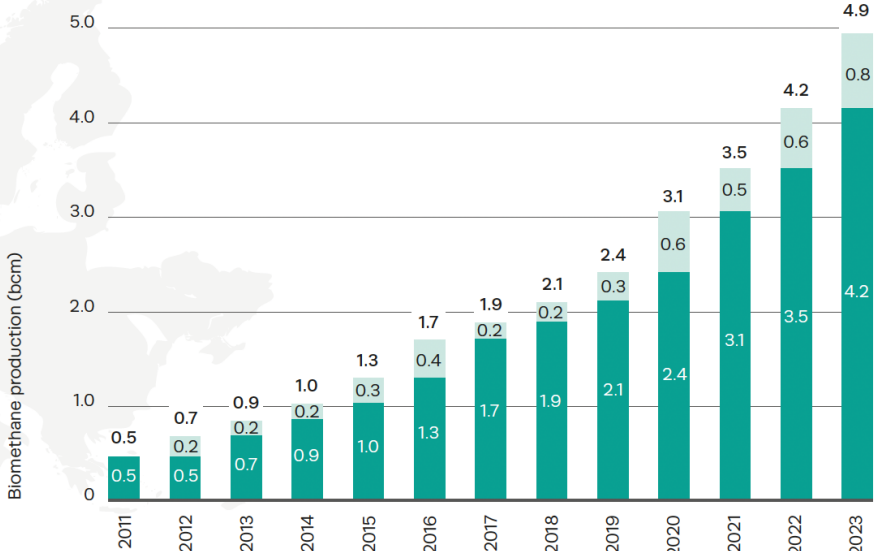
Biomethane in the EU – Rapid Growth and Outlook

- 1,510 biomethane plants in Europe (2024), +30% YoY
- 2023 production: 4.9 bcm (~52 TWh), +0.8 bcm from 2022
- Biomethane used in distribution grids, industry, and transport (bioCNG / bioLNG)
- Average plant output: ~44 GWh/year
- Policy targets:
- 35 bcm by 2030 (REPowerEU)
- Expanding role in EU ETS, national commitments, and GOs markets

Source: EBA Statistical Report 2024; EBA Market Outlook 2025

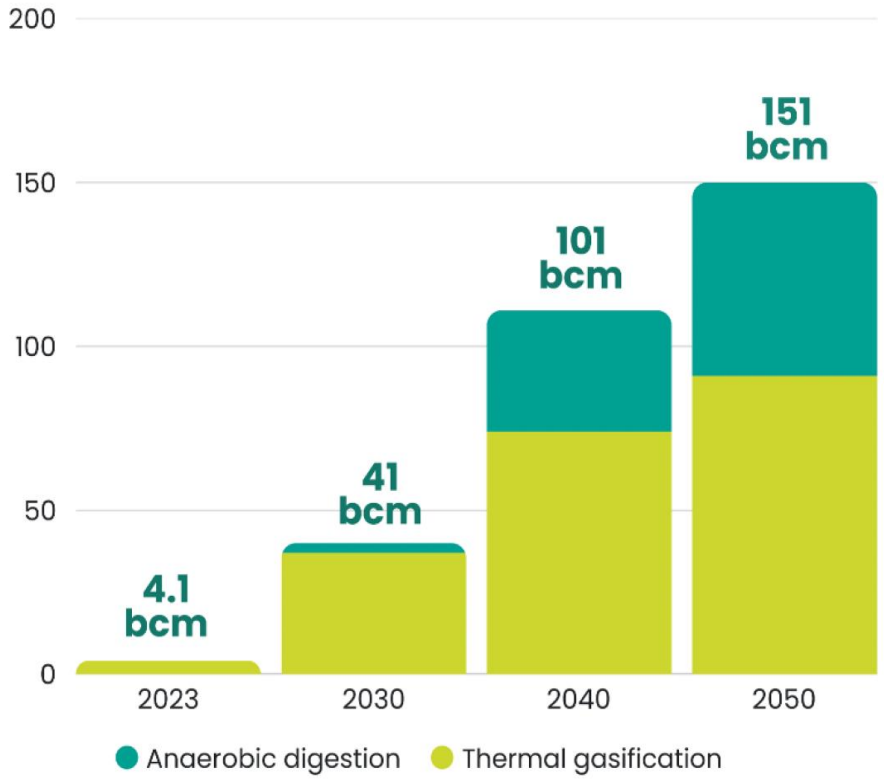
Figure 2.5

European biomethane production (bcm)



Biogas & Biomethane Outlook 2040 – EBA Roadmap

- Biogas & biomethane already cover ~7% of EU gas demand
- Combined potential (AD + gasification):
  - 41 bcm by 2030
  - 101 bcm by 2040
  - 151 bcm by 2050
- Private investments already exceed €27 billion by 2030
- Growth depends on infrastructure, unified GO markets, and permitting
- Strongest expansion expected in district heating, industry, and transport (bioLNG)



Source: EBA Biomethane 2040 Roadmap; REPowerEU

Role of Biogas and Biomethane in Czechia

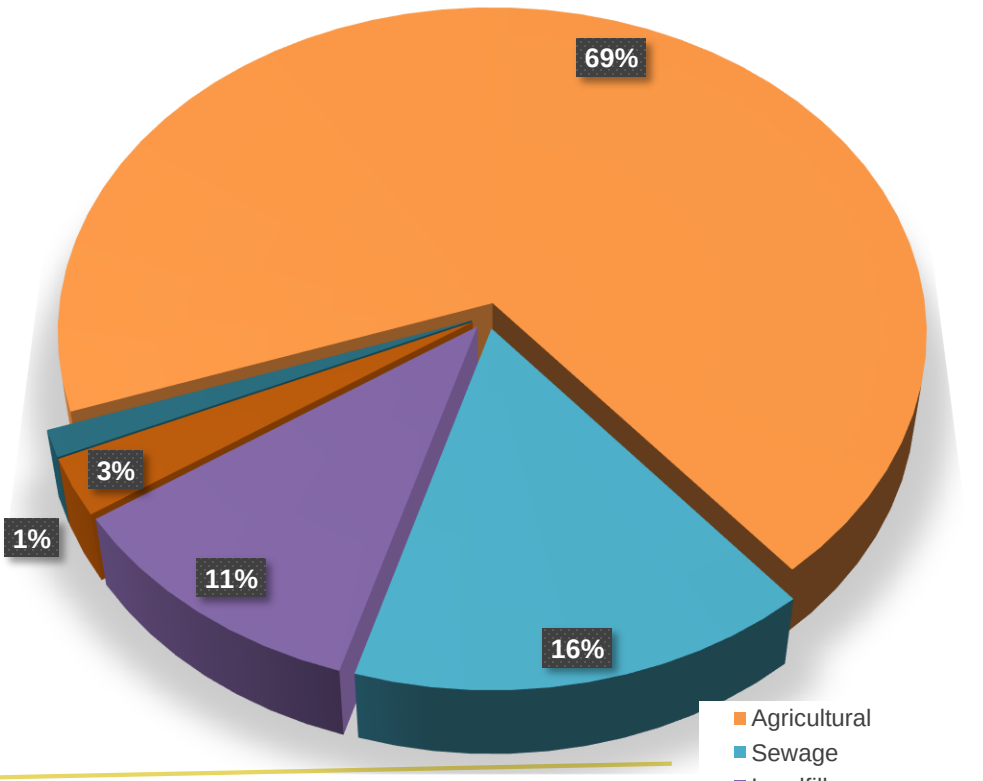
- Over 600 biogas plants with almost 400 MW installed capacity produce electricity, heat, and increasingly biomethane.
- Biogas is officially supported under Czech law.
- Biomethane is the long-term priority, but electricity and heat from biogas remain crucial.
- Used on-site in agriculture and as grid-flexible resources.
- Conversion to biomethane is often not feasible due to grid access or economics.

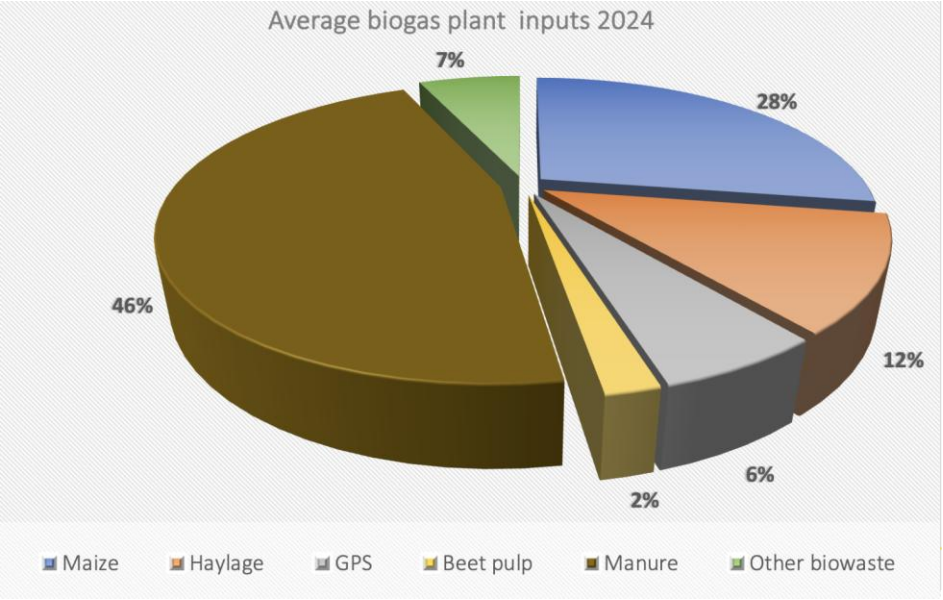
Biogas in Czechia

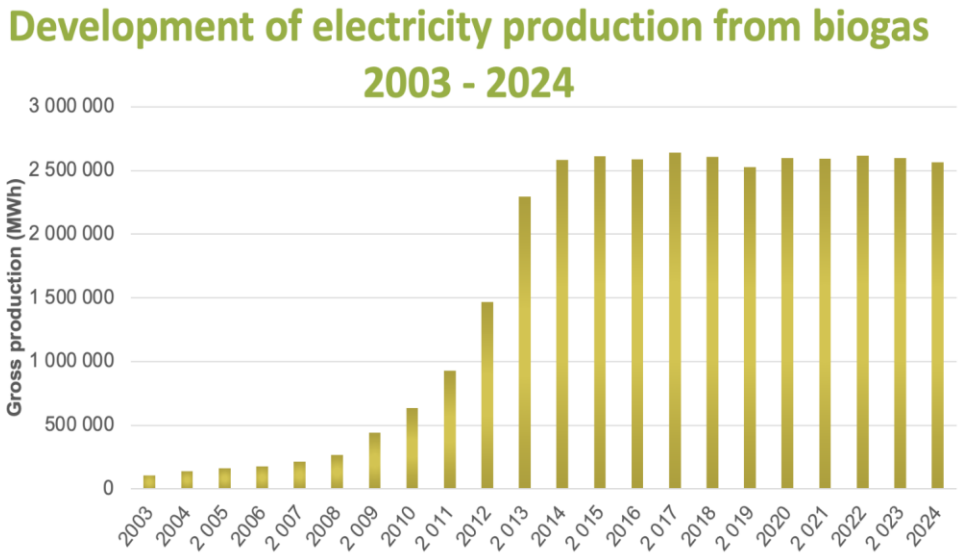
- **603** biogas plants
- **370 MW** of installed electric capacity
- **420 MW** of installed thermal capacity.

- **Electricity production:** 2.5 TWh
- **Heat production and utilisation:** 4.0 PJ

- **Total emissions saved (electricity):**
  1,690 ths. tons of CO_2eq/year
- **Total emissions saved (heat):**
  500 ths. tons of CO_2eq/year







The biogas sector has reached maturity and is now evolving toward hybrid operation and biomethane conversion

Flexibility Potential of Biogas in Czechia

- Fast start capability: CHP warm start ≤ 2 min, cold ≤ 5 min
- Methane storage = seasonal energy shifting
- Able to operate outside PV generation profile
- Flexible capacity potential:
  - Stand-by CHP at converted biomethane plants: 150–200 MW
  - Modernised BGP (peak mode): ~300 MW
  - New small-scale flexible BGP: ~100 MW
  - Power-to-heat shift: ~150 MW
  - Post-2030 H_2 biomethanation: ~50 MW
- Aggregated potential exceeds 700 MW of dispatchable RES flexibility
- Message: Biogas enables flexibility at GW-scale when aggregated.

Why Fuel-Based RES Matter for System Stability

- Dispatchable renewable capacity complements volatile solar & wind
- Enables load shifting and reduces curtailment
- Supports balancing markets and grid stability
- No loss of RES generation – production is shifted, not curtailed
- Cost-competitive with battery storage (EY 2025 analysis)
- Strengthens energy security through decentralised operation

Proposed Targeted CfD Bonus – Under Discussion

- Support only granted during 2 daily peak demand periods.
- Aims to reduce support costs and align production with electricity market needs.
- Promotes flexibility and integration with intermittent RES (solar, wind).

  2×6 hours per day:
  - → Morning peak: ~4–10 AM
  - → Evening peak: ~4–10 PM
- Seasonally adjusted windows (e.g., 2×5h in winter, 2×7h in summer).
- Defined by quarter-hour intervals, adjustable by the regulator (ERÚ).

- Time-banded CfD scheme proposed – not yet adopted (Lex OZE III 2025).

Operation Mode	LCOE [€/MWh]	Market Price [€/MWh]	Support [€/MWh]	Support [ths. €/year]
2×5h/day	211.7	108.6	102.7	338.8
2×6h/day	200.9	104.7	95.9	379.8
2×7h/day	193.2	100.2	93.0	426.9
24h	177.8	85.0	92.7	695.6

Policy Alignment & NAP RF Inputs (CZ Biom)

CZ Biom's key proposals for the National Action Plan for Flexibility:

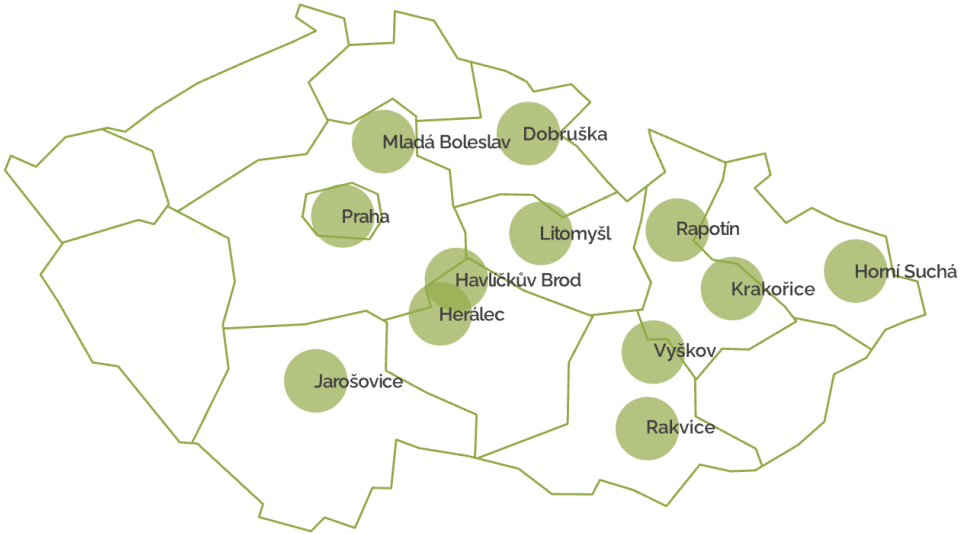
- Recognise fuel-based RES (biogas, biomass, biomethane) as flexibility providers
- Adapt CfD / premium payment schemes to support generation during peak demand
- Dynamic network tariffs to reward energy use in surplus periods
- Aggregation and balancing market access for flexible RES
- Include flexible RES in non-fossil flexibility schemes (Article 19h, EU Reg. 2024/1747)
- Ensure budget neutrality – flexibility without higher state costs

Energy Security & Resilience

- Decentralised assets protect against cyber/physical risks
- Support rural grid stability & critical infrastructure
- On-site heat & power supply = higher community resilience
- Fits ENTSO-E guidance on resilience planning

Biomethane in Czechia – Current Status

Plant	Installed capacity (m^3/year)	Licence
Rapotín	1 600 000	2020
Horní Suchá	2 890 000	2023
Litomyšl	1 716 960	2022
Mladá Boleslav	1 275 000	2023
Herálec	1 200 000	2023
Havlíčkův Brod	756 500	2023
ÚČOV Praha	1 220 000	2023
Rakvice	1 000 000	2024
Jarošovice	3 500 000	2023
Vyškov	3 500 000	2024
Dobruška	3 882 000	2024
Krakořice	2 600 000	2025



- **12 biomethane plants** operational by November 2025
- Installed capacity: 29.3 Mm^3/year

Biomethane Development

- Production : 2024 – 6.956 Mm³
  2025 – approx. 17 Mm³
- Focus: Upgrading biogas for transport, heating, and industry.
- Main barriers: delayed RED III transposition, guarantees of origin system, off-grid injection.

Potential:

- Czech Republic targets 490 Mm³ biomethane by 2030 (NECP).
- Feedstock potential: 47% agricultural waste, 40% sequence crops, 13% sewage/biowaste.

Biomethane Development

Grid Integration:

- Biomethane uses existing gas grids, with plants strategically located for connection.

Policy Shift:

- Move to advance feedstocks e.g., waste, though waste yields less biogas, requiring more volume.

Biomethane Focus:

- Advanced biomethane (waste-based) prioritized for transport; other biomethane for heating/industry

New GHG Savings Obligations under RED III

- A crucial pillar of sustainability – emissions assessed over the full life cycle
- **Thresholds identical to those for sustainability schemes under RED II/III:**
  - ≥2 MW for gaseous fuels (biogas, biomethane)
  - ≥20 MW/7.5 MW for solid biomass (heat/electricity)
- **RED III (Art. 29) introduces explicit minimum GHG savings:**
  - ≥80 % for new installations
  - Existing installations (before 2021) → must reach 80 % within 15 years of operation (2026 – 2029)
- **Older plants may receive temporary derogations if:**
  - Support was granted before 20 Nov 2023 under sustainability rules valid as of Sept 2020, or
  - Long-term support was based on fixed remuneration with a correction mechanism preventing overcompensation.
- Full compliance becomes mandatory for continued eligibility for operating aid.

Czech Implementation – Legal Framework

- **Renewables Support Act (§ 4(4) POZE)** – since 2021 requires GHG savings as a condition for operating support.
- Transitional provision postponed this requirement for pre-2021 plants until 2030.
- **Energy Act Amendment (87/2025) adopted this year:**
  - Introduces a general GHG savings obligation (not only for supported units).
  - Extends the requirement to solid biomass plants > 7.5 MW, with a delay until 2031.
- **Decree 110/2022 defines verification procedures** – draft update under discussion.
  - Current version: GHG savings must be demonstrated from 2027 (via sustainability audit).
  - Sector associations (CZ Biom, KOZE, Industry Chamber) requested postponement to 2030 – 2031.

Practical implications timeline (2025 – 2030)

2025	2026	2027	2028	2029	2030
	Announcement of biomethane auctions (Q2), implementation period: 36 months	GHG savings obligation: covering of digestate storages, higher heat utilisation, and adjustment of feedstock composition (e.g. increased share of manure and by-products, reduced use of energy crops).		Biomethane deployment phase	
	Compliance costs for meeting GHG savings targets may lead to partially stranded assets and lock-in of the current technological configuration. Increased administrative burden during the preparation and permitting of biomethane projects.				

Thank you for your attention

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