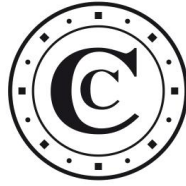


Cour des comptes



SUPPORTING THE DEVELOPMENT OF BIOGAS

Public thematic report
Public policy evaluation

March 2025

Executive Summary

Produced from the fermentation of organic matter through a process known as "methanisation", biogas is a renewable energy source that can be used to generate electricity or heat, "by cogeneration", or injected directly into gas networks after purification in the form of "biomethane". The organic matter used to produce biogas, the "inputs", is made up of matter and waste such as livestock effluents, crop residues or bio-waste collected by local authorities, which can be used to produce energy. As well as biogas, the methanisation process produces a substance known as "digestate", which can be used as an agricultural fertiliser, at least partially replacing mineral fertilisers.

Growing government support to develop biogas production that contributes to public policies on energy, climate, agriculture and the environment

Given the very nature of the process, biogas production can be used to meet a number of public policy objectives: decarbonising energy production, the agro-ecological transition and the resilience of farms, and waste management and treatment.

Support for the development of biogas production is therefore at the crossroads of these objectives, although the contribution of methanisation to achieving them has not been fully analysed. However, this sector is currently undergoing a major boom. It benefits from a proactive support policy, now mainly focused on the production of biomethane for injection into the gas network. By the end of 2023, there will be 1,911 methane plants in France, 652 of which will be injecting methane. Electricity generated from biogas amounted to 3 TWh in 2023, representing 0.7 % of French electricity consumption over the same period. The production of injected biomethane amounted to 9.1 TWh, 31% more than in 2022, and represented 2.4 % of French gas consumption. The new multiannual energy plan, which was put out for consultation at the end of 2024, now sets a biogas production target of 50 TWh by 2030.

This boom is backed up by the broad scientific consensus that biogas production has a positive carbon balance, justifying its development as a substitute for fossil natural gas and helping to decarbonise the energy mix to achieve carbon neutrality by 2050. This positive balance, however, only applies for the current biogas production methods. It is therefore important to constantly monitor compliance with certain conditions that must be met to preserve this positive character. These conditions relate in particular to limiting methane leakage, careful use of water resources for the production of agricultural crops for energy purposes, and more generally the way in which inputs are used.

The energy price crisis that erupted in 2021 has raised awareness of the benefits of locally-produced renewable gas, and strengthened the resolve to support its production.

For this reason, the Court wanted to carry out an assessment of the public policy of supporting the development of biogas. In this context, it sought to answer the following three evaluation questions, using an analysis period extending from 2011 to 2023:

- 1) Were the criteria on which the government based its biogas development objectives properly identified?
- 2) Have public support mechanisms enabled the sector to develop while keeping the cost to the public purse under control?
- 3) Has support for biogas helped to achieve objectives other than simply producing renewable energy?

Biogas production targets insufficiently supported in the face of uncertainties about the future place of gas in the energy mix and the availability of agricultural biomass

The objectives for biogas were mainly dictated by those for the development of renewable energies, and were only sparingly explained. In the short term, they have fluctuated according to budgetary considerations, in order to contain the cost of public support granted to a sector whose production costs have not fallen as predicted. The 2020 multi-annual energy plan lowered the target for the share of renewable energies in gas to 7 % by 2030, whereas the law of 17 August 2015 on the energy transition for green growth had set it at 10 %. In the longer term, the development of biogas is part of the national low-carbon strategy, which aims to decarbonise residual gas consumption by 2050, at which point the need for biogas production will depend on the share of gas in the energy mix. Its consumption could drop by more than 65 % compared to 2020. But at the same time, since only renewable gas will have to be used, residual gas consumption will also depend on biogas production capacity.

The energy production trajectories that will enable these targets to be met in 2050 remain highly uncertain. In particular, the balance between gas and electricity consumption is a sensitive issue, since a sharp and rapid fall in gas consumption could lead to an increase in peak electricity consumption. Dealing with these peaks would mean increasing electricity generation capacity and network sizing. Better coordination of forecasting work involving gas and electricity network operators is therefore needed to shed more light on the possible and desirable trajectory for the development of biogas, as part of a coherent and balanced energy system.

The development of biogas also requires gas networks to be extended or reinforced to accommodate the connection of methanisation plants, which is covered by a system known as the "right to injection". However, the work on the future of these networks does not sufficiently address the impact of the fall in consumption and the number of gas consumers on their financing, even though they bear the cost, and on their correct sizing. Additional economic and financial analyses are therefore needed to inform these debates and decisions.

Finally, irrespective of the role of biogas in the energy mix, the availability of the biomass needed for methanisation will be a key factor in its development in the medium and long term. At this stage, the General Secretariat for Ecological Planning estimates that the availability of biomass for methanisation could be insufficient as early as 2030, jeopardising 15 of the 50 TWh of biogas that could be included in the new multiannual energy plan. This gap is likely to give rise to conflicts over the use of biomass, between the development of biogas and food production, or between certain biofuels.

However, there are still gaps in our knowledge of the volumes of biomass available and their capacity to be mobilised for various energy uses, despite the contributions made by the national observatory of biomass resources. Monitoring these resources and deciding between possible uses as part of the various planning processes is therefore a priority, which should be reflected in the updating and consistency of the various planning tools (national biomass mobilisation strategy, regional biomass plans in particular).

An abundance of public support, which has enabled the emergence of a production sector, at the cost of an imperfect calibration of aid

As with other renewable energies, the development of methanisation has been mainly supported by the introduction of feed-in tariffs for the energy produced, whether gas or electricity, financed by the State budget through offsetting with the energy public service charges assigned to the companies concerned. For the years 2011 to 2022, these costs will amount to €2.6bn. These guaranteed feed-in tariffs have been coupled with investment subsidies allocated by the French Agency for Ecological Transition (ADEME) and by the

regions, totalling €0.5 billion between 2019 and 2023. In comparison with the various support schemes for renewable energies, this cumulation is specific to biogas. In addition, a number of additional support measures have been introduced, including the assumption of network reinforcement costs by consumers and a reduction in the cost of connection to the gas network for biomethane projects (€147.5 million between 2019 and 2023), local tax exemptions targeted at so-called "agricultural" methanisation (carried out by farmers), and project financing facilities (€175 million in unsecured loans offered by Bpifrance from 2020).

The multiplicity of support arrangements, combined with the diversity of individual situations intrinsic to the industry, has made it difficult to assess the actual profitability of facilities and to properly calibrate the aid provided to a fledgling industry. However, the public authorities have not done enough to obtain the information needed to assess the profitability of these facilities, although the recent large-scale study by the Energy Regulation Commission (CRE) on biomethane injection is a noteworthy effort. This effort should be continued because excessive profitability has been observed for certain facilities that entered into contracts before 2020. The analysis carried out by CRE in 2024 on biomethane injection facilities, most of which benefit from pre-2020 contracts, shows that the median pre-tax internal rate of return for the corresponding projects would be 16.9% if investment subsidies were taken into account.

In practice, support schemes have tended to focus on small and medium-sized agricultural facilities, even though they have enabled the sector to develop across all types of facility, regardless of the methanogenic capacity of the inputs, i.e. their greater or lesser capacity to produce methane. The 2,000 or so methanisation facilities that have been set up produce biogas from non-hazardous waste storage facilities (ISDND), sewage treatment plant (STEP) sludge, and "industrial" or agricultural methanisation facilities (individual or collective). Agricultural methanisation units are by far the most numerous. As a result, biogas production has met the energy targets set for 2023 in the second multiannual energy plan.

The budgetary cost of the scheme is significant. The commitments made under the feed-in tariffs contracted at the end of 2022 (for contracts of 15 to 20 years) would still represent between €12.7 billion and €16.2 billion to be disbursed by the State between now and 2037 for injected biomethane and between €2.2 billion and €3.9 billion for electricity production in cogeneration between now and 2042. In addition to these costs, around €7 billion should be added for new biomethane injection contracts signed between now and 2028.

This financial outlook and the ambitions to develop and massify production if France is to meet its climate commitments have led the Government to propose a new support system, the biogas production certificates (CPB), which places the obligation to support facilities on gas suppliers and, *ultimately*, transfers the financing of this support from taxpayers to gas consumers. However, the conditions for the proper operation and monitoring of the future CPB market have not yet been defined. Little is known about the production capacity that could emerge under this scheme, and there are no robust assessments of the impact on consumer bills, which could usefully be made public. A more in-depth analysis should be carried out on this major development and its possible consequences.

An effective contribution to the agro-ecological transition and waste management, but the extent of this contribution is poorly appreciated

Biogas production helps to decarbonise the uses of fossil fuels and, unlike other non-renewable energies, can be controlled, helping to diversify the energy production mix. As well as producing renewable energy, it also offers significant co-benefits. It also contributes to the public policy of the agro-ecological transition and to waste treatment policy, although the scope of these contributions is not really measured or appreciated.

So, by favouring the development of a large number of agricultural facilities, the support schemes for methanisation have aimed to strengthen the resilience of farms. According to the Court's estimates, on average each year, farms involved in methanisation increased their gross

operating surplus (EBITDA) by €40,000 over one year and €55,000 over five years between 2016 and 2019, an increase of around 20 % compared with similar farms not involved in methanisation. The effect is significant for farms that have their own methaniser; it is much more uncertain for those that simply supply a methaniser or recover digestate from it.

Support for the production of biomethane was also designed to help farms make the agro-ecological transition, in particular by limiting the use of mineral fertilisers thanks to digestate and by contributing to the treatment of livestock effluent. However, research into the impact of methanisation on farming practices does not reveal any systematic effects, for example on livestock management, crop rotation practices, crop fertilisation levels or phytosanitary treatment levels. On the other hand, they agree on the importance of monitoring the possible impact of the development of intermediate crops for energy purposes (CIVE), which represent the main source of biomass for methanisation in the long term. Depending on how they are developed, they could have an impact on both food crops and the environmental balance of the farms concerned. The impact of methanisation on farming practices should therefore be monitored.

Finally, the development of methanisation contributes to the policy of waste treatment, even if waste only represents a minor part of the inputs used. An analysis of waste-related regulations highlights the constraints on methanisation, which are imposed for fully justified health or environmental reasons. However, these rarely constitute a limit to the development of biogas production. While the ban on mixing waste sludge from wastewater treatment plants (STEPs) with other waste is in principle a limit, the characteristics of French wastewater treatment plants mean that there is no de facto potential for significant production. Similarly, while the separate collection of bio-waste, which has been compulsory since 1 January 2024, opens up a new source that can be mobilised for methanisation, it has to be said that the current level of collection is very low. Lastly, the recovery of digestate from methanisation partly determines the expected benefits of biogas production, as set out in the French Ministry of Agriculture's Energy, Methanisation and Nitrogen Autonomy Plan (EMAA). It envisaged the transfer of nitrogen surpluses produced by certain territories to others with deficits. However, the complex regulatory framework for this type of recovery and the practicalities involved (transfer of liquid effluent, etc.) restrict its implementation.

A balance between energy, climate, agricultural and environmental policies needs to be maintained in the face of the expected increase in biogas production targets.

Support for biogas, centred on the growth of its production, has developed in a relative balance between the objectives of the various public policies to which it contributes. The result is a French biogas production landscape that is unique compared with comparable European countries, based more on small and medium-sized agricultural facilities. Current scientific knowledge attests to the multiple benefits (energy, climate, agro-ecological practices, etc.) of biogas production. It also highlights the risks associated with the conditions in which it is produced, which need to be guarded against.

The inevitable divergences that emerge between the various public policy objectives mean that they need to be ranked in order of importance, and the associated methods of support need to be clarified. Support for the production of electricity from biogas, which is not justified solely for the production of electricity or heat, has been maintained for the decarbonisation of the agricultural sector. However, the expected impact of this support is not explained. What's more, decarbonisation can be achieved at lower cost through new regulations on effluent management. This support should be reduced to a level supported by an assessment of the expected benefits. The role of investment grants also needs to be clarified. These should be kept to a minimum, given that feed-in tariffs should already guarantee "normal" profitability for projects.

Above all, at a time when France's energy and climate ambitions mean a significant increase in biogas production targets from 2030, maintaining France's unique characteristics is a challenge. The deployment of biogas production certificates from 2026, which is the industry's main request for support for its development, requires particular attention. Over and above the short-term issues involved in its implementation (organisation and monitoring of the market, liquidity, effects on consumer prices, etc.), in the medium to long term it could lead to changes in the biogas production sector, stimulating the development of larger units, which are expected to reduce production costs. It therefore requires monitoring of the distribution of value between farmers and operators of large-scale methanisation units, as well as the methods used to supply these units with agricultural inputs in order to maintain the positive carbon balance of biomethane injection. The prospect of increasing biogas production targets and the adjustments to both the support arrangements and the regulatory framework mean that we need to take greater account of the agricultural and environmental issues that underpin this growth. Otherwise, the balance that has governed the development of biogas to date could be upset, at the risk of reducing the proven benefits of this public policy, in terms of the various objectives it serves.

Recommendations

1. Based on the forecasting work of the gas transport managers and RTE's electricity mix scenarios, draw up updated scenarios for the complete energy mix up to 2050 (*Ministry of the Economy, Finance and Industrial and Digital Sovereignty, 2026*).
2. Based on the various scenarios for growth in gas consumption, analyse the economic and financial impact of the necessary changes to the gas network (*Energy Regulation Commission, 2025*).
3. Update the national biomass mobilisation strategy, speed up the adoption of regional biomass plans and ensure their consistency with the next energy planning exercise (*General Secretariat for Ecological Planning, Ministry of the Economy, Finance and Industrial and Digital Sovereignty, Ministry of Agriculture and Food Sovereignty, 2025*).
4. Organise periodic monitoring of the costs and profitability of biogas production facilities receiving public support (*Ministry of the Economy, Finance and Industrial and Digital Sovereignty, Energy Regulation Commission, 2025*).
5. Define biogas production certificate targets for 2035, based on an independent assessment of achievable targets and the cost passed on to consumers (*Ministry of the Economy, Finance and Industrial and Digital Sovereignty, Energy Regulation Commission, 2025*).
6. Entrust the "Bioeconomy" cross-sector thematic committee with monitoring the impact of methanisation on farming practices, based on a list of key indicators (*Ministry of Agriculture and Food Sovereignty, FranceAgriMer, 2025*).
7. Digitalise methanisation input registers and organise the collection and use of biomass sustainability declarations submitted under the "RED" directives (*Ministry of the Economy, Finance and Industrial and Digital Sovereignty, Ministry of Agriculture and Food Sovereignty, 2025*).
8. Review support for the development of new cogeneration facilities, based on an updated assessment of the associated benefits (*Ministry of the Economy, Finance and Industrial and Digital Sovereignty, Ministry of Agriculture and Food Sovereignty, 2025*).