Institution of Gas Engineers & Managers

# Learning from France's biomethane strategy

**IGEM Country Brief**
November 2025

## About IGEM

The Institution of Gas Engineers & Managers (IGEM) is the UK's Professional Engineering Institution, supporting individuals and businesses working in the global gas industry. IGEM was founded in 1863 with the purpose of advancing the science and relevant knowledge of gas engineering for the benefit of the public.

As a not-for-profit, independent organisation IGEM acts as a trusted source of technical information, guidance and services for the gas sector. In today's net zero context, IGEM is focused on engineering a sustainable gas future, we do this by:

- Helping our members achieve and uphold the highest standards of professional competence to ensure the safety of the public
- Supporting our members in achieving their career goals by providing high quality products, services and personal and professional development opportunities
- Acting as the voice of the gas industry when working with stakeholders to develop and improve gas policy.

## Background

The urgent need to decarbonise our energy systems while maintaining security of supply has prompted countries across Europe to explore alternative, renewable gas sources. France has emerged as a leader in biomethane development, with a market that successfully combines clear strategic direction, supportive government policies and agricultural sector integration. This case study examines the French model and identifies transferable lessons for policymakers and industry stakeholders.

## What is France's current biomethane landscape?

France's energy system is characterised by a strong reliance on nuclear power, which accounts for approximately 70% of its electricity generation (2024). This heavy dependence on nuclear energy has enabled France to achieve a remarkably low-carbon electricity mix, with over 95% of its electricity generated from low-carbon sources in 2024.

While biogas currently represents a small fraction of France's energy mix, it is poised to play a much more significant role in the country's efforts to diversify its energy sources and strengthen energy security, while reducing greenhouse gas emissions.

Biomethane has been positioned as a valuable and vital part of France's renewable energy strategy, by offering a sustainable alternative to natural gas and integrating it across the energy system to support the decarbonisation of transport, heating (including district heating networks) and to a lesser extent, power generation.

By the end of 2024, France had connected 730 biomethane production sites to its gas networks, providing an installed capacity of approximately 14TWh/y (equivalent to the output of two nuclear reactors) and representing ~3.2% of France's gas consumption.

The industry comprises diverse stakeholders. As well as large utilities companies setting ambitious targets across France, other private sector firms and agricultural cooperatives have invested in biomethane projects, contributing to the sector's diversity and resilience.

What distinguishes the French model is its strong agricultural foundation. It's biomethane production strategy supports rural development by providing additional revenue streams for the agricultural sector and promoting waste management solutions. Approximately 90% of biomethane projects are linked to agriculture or agro-industrial feedstocks, with 83% of production capacity owned by farmers themselves. This approach has structured the entire market, influencing plant size, producer types and how system operators have adapted their organisations.

## How has the French biomethane market evolved?

The evolution of the French biomethane market has been distinct, with an initial focus on small, combined heat and power (CHP) projects led by farmers which later transitioned toward biomethane grid injection.

The first biomethane injection site into the gas grid was commissioned in 2011. By 2022 the number of active biomethane production units reached 514, rising to 730 by the end of 2024. This highlights the sector's rapid expansion, with new plants connecting at a rate of 2-3 per week.

The market has developed with clear projections on future growth. Current project pipelines suggest that 1,358 biomethane projects, representing 29.2 TWh/y capacity, could be in service by 2028.

In its Multiannual Energy Plan (Programmation Pluriannuelle de l'Énergie, PPE), France has set a specific target for biomethane integration, aiming for between 7-10% of the country's total gas consumption by 2030. This equates to 39 to 42 terawatt-hours (TWh) of biomethane injection, which is equivalent to the level of gas consumed by the whole of Scotland in 2024.

## What has driven France's thriving biomethane economy?

The French biomethane sector has flourished under supportive regulatory and policy frameworks. Its success can be attributed to a range of coordinated factors including:

**Clear and stable strategic direction**

The French government has provided clear, long-term targets for the share of green gas in the overall energy mix, through its Energy Transition for Green Growth Act and the Multiannual Energy Plan (PPE). France aligned its policies with the EU Renewable Energy Directive (RED II) and the REPowerEU Plan, integrating biomethane into national and European decarbonisation goals.

France's biomethane strategy is centrally coordinated, with clear responsibilities assigned to national and regional authorities. The government also actively promotes sectoral collaboration between energy companies, waste management firms, and farmers.

**Evolving support mechanisms**

France has implemented a staged approach to biomethane market support that has evolved with market maturity. Support mechanisms designed to encourage investment, rapidly grow the market and minimise risk by stabilising revenues for producers:

- Feed-in tariffs: Initially used to establish the sector, offering biomethane producers 15-year contracts with guaranteed fixed purchase prices.

- Direct subsidies and grants: Reducing the cost of setting up biomethane plants and connecting to the gas grid.

- The 'Right to Inject' Principle: This principle guaranteed biomethane producers access to gas networks (even outside gas-served zones), provided a financing framework for grid reinforcements and cost-sharing model for infrastructure developments. Moreover, it included a prescriptive infrastructure development plan based on feedstock potential within 'connecting zones'. However, rising concerns over public costs (estimated at €12 billion for current projects) have shifted support towards a market-based system.

- Call for tenders: As the market has developed, competitive tenders for larger installations (>25 GWh/year) have been introduced, prioritising the most cost effective projects.

This progression demonstrates a thoughtful approach to market development, using higher levels of certainty and support in early stages, then gradually transitioning toward more market-based mechanisms as the sector matures.

**Diversity of end-uses**

France has actively supported diverse end-uses for biomethane rather than restricting its application to specific sectors. Current usage spans:

- Residential/commercial heating (28%)
- Industrial/processes heating (24%)
- Transport/mobility (20%)
- District heating (10%)
- Electricity production (3%)
- Other applications (15%)

This diversity creates multiple demand streams and strengthens overall market resilience. Particularly notable is the development of approximately 350 public refuelling stations for natural gas vehicles (NGV/bioNGV), creating a substantial transport market.

**Integration with agricultural policy**

By positioning biomethane development as complementary to agricultural objectives rather than competing with them, France has gained crucial support from farming communities, with farm-based anaerobic digestion (AD) plants playing a major role.

Farmers receive incentives to supply feedstock and participate in cooperative biomethane projects. Additionally, waste-to-energy policies ensure that organic waste is used for biomethane production, supporting circular economy initiatives. The French model is also sympathetic to agricultural issues such as food security, animal feed security, soil fertility and promoting intermediate cover crops to improve soil quality.

France's biomethane sector has increasingly focused on the importance of biogenic CO2 (carbon dioxide generated during anaerobic digestion) not only as a climate-neutral emission but also as a valuable industrial resource for use in food processing, greenhouses and carbonation, opening new revenue streams for operators. France currently captures 14% of the total captured volume of biogenic carbon in Europe, compared to Germany (15%) and the UK (22%). By 2027, France is expected to have the highest number of individual plants capturing biogenic CO2 in Europe. Although these plants are generally smaller than the average European size, the upcoming Biomethane Production Certificates scheme, favouring larger facilities over 25 GWh/year, could indirectly enhance economic returns by supporting scale efficiencies and encouraging CO2 valorisation at higher-capacity sites.

France is moving Bioenergy with Carbon Capture and Storage (BECCS) from concept to practice by adopting a national Low Carbon Strategy (Stratégie Nationale Bas-Carbone) that explicitly counts on BECCS to deliver up to ~10 Mt/yr of negative emissions annually by 2050, as well as progressing domestic storage options – most notably developing partnerships to inject biogenic CO2 into deep saline aquifers in the Paris Basin, building cross-border routes to proven North Sea storage, linkage to Norway's offshore reservoirs, and prioritising BECCS pathways tied to biogas upgrading so that CO2 from AD can be permanently stored rather than reused.

Digestate, the nutrient-rich by-product of biogas production, is widely recognised as a secure, sustainable fertiliser integral to the circular economy. French regulations promote the safe and agronomically beneficial application of digestate, closing nutrient loops and supporting long-term soil health. Quality controls and traceability are enforced by national standards with oversight by the French Environment and Energy Management Agency.

The rural economic benefits of biomethane in France are notable. For every €1 million invested in biomethane projects, it is estimated to create or sustain 10–15 local jobs, encompassing construction, operation, maintenance and logistics roles. These findings are supported by case studies highlighting additional income for farmers, broad diversification of local economies and rural revitalisation.

## What lessons can be learned?

As the fastest growing biomethane economy in Europe, the French experience offers valuable learning for other countries:

1. **Long-term strategic clarity is fundamental to market growth**

   The confidence provided by France's clear, long-term vision and legally binding targets has been fundamental to the market's success. In particular, the use of specific volumetric targets for biomethane production and introducing long-term support mechanisms that extend beyond short programme windows. This clarity has given investors, developers and network operators confidence to make long-term commitments.

2. **Phased policy support drives market development**

   The French transition from feed-in tariffs to more market-based mechanisms demonstrates the value of a phased approach support, where higher levels of certainty are provided in early phases of market development, moving to obligation-based systems that put less pressure on public finances once the market matures.

3. **Removing market barriers is key to growth**

   Mechanisms that remove the financial and technical barriers for biomethane producers and enable greater access to the market and the gas grid, have been transformative for France's biomethane economy. Several specific challenges have been addressed through targeted policies, including grid capacity limitations, financial viability and market uncertainty.

4. **Cross-sector integration and collaboration is essential**

   The strong agricultural connection in France has created a symbiotic relationship between farming and energy production. Biomethane has been positioned as complementary to agricultural objectives and frameworks have been developed that mutually benefit the agricultural sector and energy companies. This integration has helped overcome potential resistance from agricultural stakeholders and instead transformed them into key market participants.

5. **Market diversity builds resilience**

   France's approach to enabling multiple end-uses has strengthened overall market resilience. Biomethane has not been prematurely restricted to specific applications and supports decarbonisation across heating, industrial processes, transport and power generation. This diversity of energy supply also supports energy resilience and security.

   The French biomethane success story demonstrates how deliberate policy choices, regulatory frameworks and strategic planning can rapidly develop a sustainable gas market. By providing clear long-term direction, removing key barriers and evolving support mechanisms as the market matures, France has created a thriving sector that delivers multiple environmental and economic benefits.

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