



## **A New Era for EU Biomethane:**

How can we build confidence in long-term biomethane valuation prospects to support investment decisions, facilitate financing, and enable informed BPA negotiations for all parties?

---

E-CUBE STRATEGY CONSULTANTS

September 2024

# 1 Executive Summary

**A strong market dynamic has been observed in the European biomethane market since 2022**, despite a trend of declining public subsidies and funding for the sector, as well as challenges faced by the industry in reducing production costs. This dynamic can be explained by a combination of favourable factors:

- The 2022-23 energy crisis demonstrated to consumers that natural gas prices at EUR 30/MWh and below are not a long-term guarantee, and it illustrated to European authorities that biomethane could be part of the solution to increase the energy sovereignty of the region. This resulted in the REPowerEU target to produce 35 bcm (approximately 340 TWh) of biomethane by 2030, compared to approximately 40 TWh today
- The enforcement of REDII, followed by REDIII regulations, has led to the implementation of new certificate markets to reduce emissions in the transport sectors (starting with road transport, now spreading to maritime and aviation), which in recent years have offered highly attractive price levels for biomethane.

**However, investors and consumers require long-term visibility on market prospects to ensure the continuity of this growth trend. As the years 2023 and 2024 demonstrated that market valuations are volatile** (drop by approximately 50-100% in the German, British, and Dutch markets between 2022 and 2024), **the need to build long-term convictions on future market equilibriums has been highlighted.**

Demand for biomethane is expected to be high by 2030, as it represents a relevant option for consumers in various sectors (transport, industry, buildings) experiencing increasing pressure to decarbonise. However, the level of willingness to pay and the ability of consumers to commit long-term is much more uncertain, depending on regulated market rules and external factors such as the availability and competitiveness of decarbonisation alternatives.

In this context, **project developers and their financing partners** require tools to address complex questions:

- **What end-markets** are or will be open for my production given its characteristics (country of production, C&I score<sup>1</sup>, public support schemes from which it has benefitted)?
- **Who are the most promising off-takers**, and what is their expected “willingness to pay” for biomethane? How can we negotiate with traders and intermediaries?
- **What price projections should I retain over the next 15 years** in a reference, low, and high case scenario to build my business plan? **How can I evaluate risks?**

**On consumers’ side** (industrial player facing Scope 1 decarbonization objectives, natural gas supplier in the tertiary and building sectors, and fuel supplier subject to transportation quota systems—such as THG Quoten, TIRRIEGEST, ERE, etc.), **the long-term availability and competitiveness of biomethane are also a key factors in supporting technological choices and valuing biomethane in long-term supply contracts.**

---

<sup>1</sup> Carbon Intensity Score. Usually displayed in kgCO<sub>2</sub>e/GJ. Example: Biomethane from manure (CI Score -100).

Answering these questions requires an in-depth analysis of the dynamics, drivers, and constraints of each European market sub-segment to establish the merit order of decarbonisation options available for each category of consumers across various geographies, position biomethane within this merit order, and determine long-term demand and supply balance prospects across different scenarios.

**E-CUBE Strategy Consultants has developed sophisticated consulting services and tools to support market participants in this exercise, enabling more robust investment decisions and supporting discussions between biomethane producers and consumers.**

**This perspective offers a Europe-wide analysis of the recent historical dynamics of biomethane and the future outlook for end-markets that could drive biomethane production by 2030.**

# Index

<b>1 Executive Summary</b>	<b>1</b>
<b>2 Introduction</b>	<b>4</b>
<b>3 Europe is experiencing a boom in biomethane dynamics, driven by the valuation levels observed in on the German transport quota market.</b>	<b>6</b>
3.1 Europe experiences a boom in the biomethane dynamics	6
3.2 The German THG Quoten market, with skyrocketing biomethane valuation levels in 2022, has been the main drivers of this boom	9
3.3 Since the beginning of 2023, prices have decreased in the German market; however, the interest of off-takers remains high, suggesting confidence in favourable market conditions in the future	11
<b>4 The long-term supply and demand balance at the European level is a complex equation upon which developers, investors, and financiers must build conviction to support robust business plans and continue to drive production growth</b>	<b>13</b>
4.1 Finally, although the new support schemes in Europe are primarily “market-based”, there should still be some opportunities to develop biomethane volumes supported by state-guaranteed tariffs until at least 2030, through these opportunities will be highly limited	13
4.2 The transport sector presents the most favourable prospects for biomethane valuation; however, high uncertainties remain.	15
4.3 Interest in biomethane from industrial companies is also increasing; however, few developments are expected before the 2030s, as the price barrier remains high.	17
4.4 In other sectors, the ETS II mechanism will be insufficient, and network gas consumption is expected to significantly decline. However, some volumes of biomethane should still be consumed in areas where states encourage its use through obligations within certificate markets.	19
4.5 Considering all end markets, the total demand for biomethane in Europe could easily reach the REPowerEU production target. However, the ability of consumers to establish profitable business models for producers remains uncertain.	20
<b>5 Conclusion: Long-Term Price Projections for Biomethane as a Complex Yet Valuable Decision-Making Tool for Investors</b>	<b>21</b>

## 2 Introduction

Since its development approximately 15 to 20 years ago, biomethane has remained a niche market, limited in volume and restricted to a few countries with high natural gas consumption, adequate infrastructure, and a significant agricultural sector. A rapid take-off is hindered by a still complex business case:

- Production costs remain significantly higher than the market prices of natural gas (approximately EUR 80 to EUR 120/MWh compared to historical gross market prices for natural gas below EUR 35/MWh), and the industry faces challenges in achieving the cost reductions promised to state over the past 10 years to justify large volumes of public subsidies.
- New challenges are emerging, including the difficulty of securing feedstock and an inflationary trend in agricultural and biowaste residues, as more restrictive definitions of “sustainable” biomethane exclude certain categories of feedstock. Additionally, residues that could previously be obtained “for free” by producers may now reach high price levels as alternative markets develop (such as biofuels, biomass energy, and inputs in the feed, food, and chemical industries, etc.).

The years approximately 2018 to 2024 have experienced a significant shift in the EU biomethane context, characterised by two successive reversals in market dynamics:

- At the end of the 2010s and the beginning of the 2020s, questions arose regarding the long-term viability of the biomethane market, as historically supportive countries like Germany and France ceased or limited their levels of public support in the form of guaranteed tariffs, without providing clear direction for the industry’s future.
- Since 2022, several factors have favoured the emergence of more optimistic perspectives for the industry:
  - The invasion of Ukraine by Russia and the resulting energy crisis have highlighted:
    - **For consumers**, natural gas prices at approximately EUR 30/MWh and below are not guaranteed in the long term, particularly as prices peaked at approximately EUR 240/MWh during 2022. This followed a significant increase in EU-ETS carbon prices as the “Fit for 55” package introduced structural reforms in the market, including the acceleration of quota reduction rates, a reduction in the allocation of free quotas, reinforcement of the Market Stability Reserve, the announcement of a new “ETS II” market for the buildings and transportation sectors, and updates on the CBAM<sup>22</sup>.
    - **To European authorities**, that biomethane could be part of the solution to increase the energy sovereignty of the region and reduce dependence on foreign energy resources, resulting in the REPowerEU’s target of

---

<sup>22</sup> Carbon Market Adjustment Mechanism

producing 35bcm (approximately 340TWh) of biomethane by 2030 (compared to approximately 44TWh in 2022<sup>3</sup>), which could represent around 10 to 15% of the estimated gas demand at that time. In the wake of this announcement, countries like Spain, Poland, and Ireland, which previously had no public ambition regarding biomethane, have begun to develop strategies and public targets.

- New models of biomethane support mechanisms have begun to replace feed-in tariff systems<sup>4</sup>, primarily based on consumption incentives:
  - Germany was at the forefront of implementing the most significant mechanism for biomethane development in the coming years: a national low-carbon transportation quota market based on obligations for fuel suppliers to incorporate low-carbon fuels and to reduce the GHG emission factor of their portfolios, as a national response to the RED II and RED III transport decarbonisation targets. Similarly, countries such as the Netherlands, Italy, the UK<sup>5</sup>, Ireland, Spain, and Poland have developed RED II transport mechanisms that include biomethane, while other countries, including France, Belgium, and Denmark, have recently included it or are expected to do so shortly. These markets are progressively encompassing the maritime sector, which has also been included in the EU-ETS mechanism since early 2024 and is subject to increasing decarbonisation targets set forth by the International Maritime Organization and the European Regulation FuelEU Maritime.
  - In the building sector, in addition to the EU-ETS II mechanism, France has begun to establish a new mechanism imposing obligations on natural gas suppliers to incorporate a specified share of biomethane into their portfolios, fulfilled through a market of “Biomethane Production Certificates.” A similar mechanism is being implemented in the Netherlands, which was voted on at the end of 2023 for implementation from 2025, and to a lesser extent in Ireland<sup>6</sup>.

### **Are these trends truly building a new era in biomethane? How can investors and producers gain confidence in the long-term viability of this market?**

---

<sup>3</sup> 2023 EBA Report on European biomethane and biogas production

<sup>4</sup> N.B. Such systems offering support directly to producers in the form of guaranteed tariffs or contracts for difference do not fully disappear, but they tend to be reserved for smaller and less competitive installations. Among EU countries, Italy is an exception as the only country that switched from a mechanism based on transport certificates (CICs) to a Contract-for-Difference mechanism open for new production units from 2023.

<sup>5</sup> Although not in the European Union, the UK can valorise EU biomethane respecting RED II sustainability criteria and must therefore be included to consider the global European biomethane market balance.

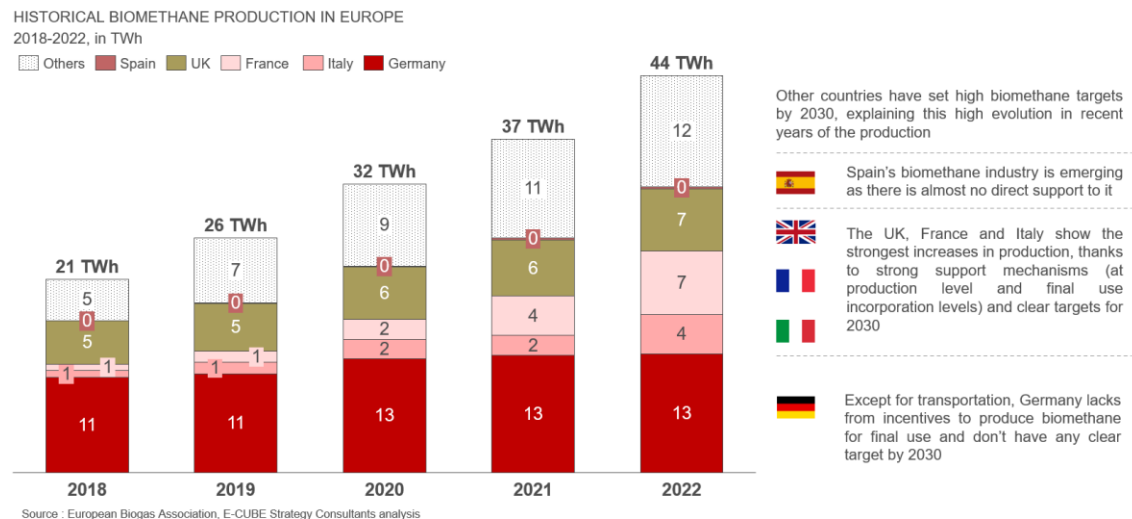
<sup>6</sup> The Irish mechanism is supposed to be implemented from 2026 and should oblige heat suppliers to incorporate ~10% of renewable heat and should be opened to renewable heat importations contrary to the French and Dutch mechanisms. Some features of the mechanism are not yet known or validated.

### 3 Europe is experiencing a boom in biomethane dynamics, driven by the valuation levels observed in on the German transport quota market.

#### 3.1 Europe experiences a boom in the biomethane dynamics

Europe experienced a significant growth in biomethane volumes, doubling between 2018 and 2022, with a strong ramp-up since 2021 linked to several drivers:

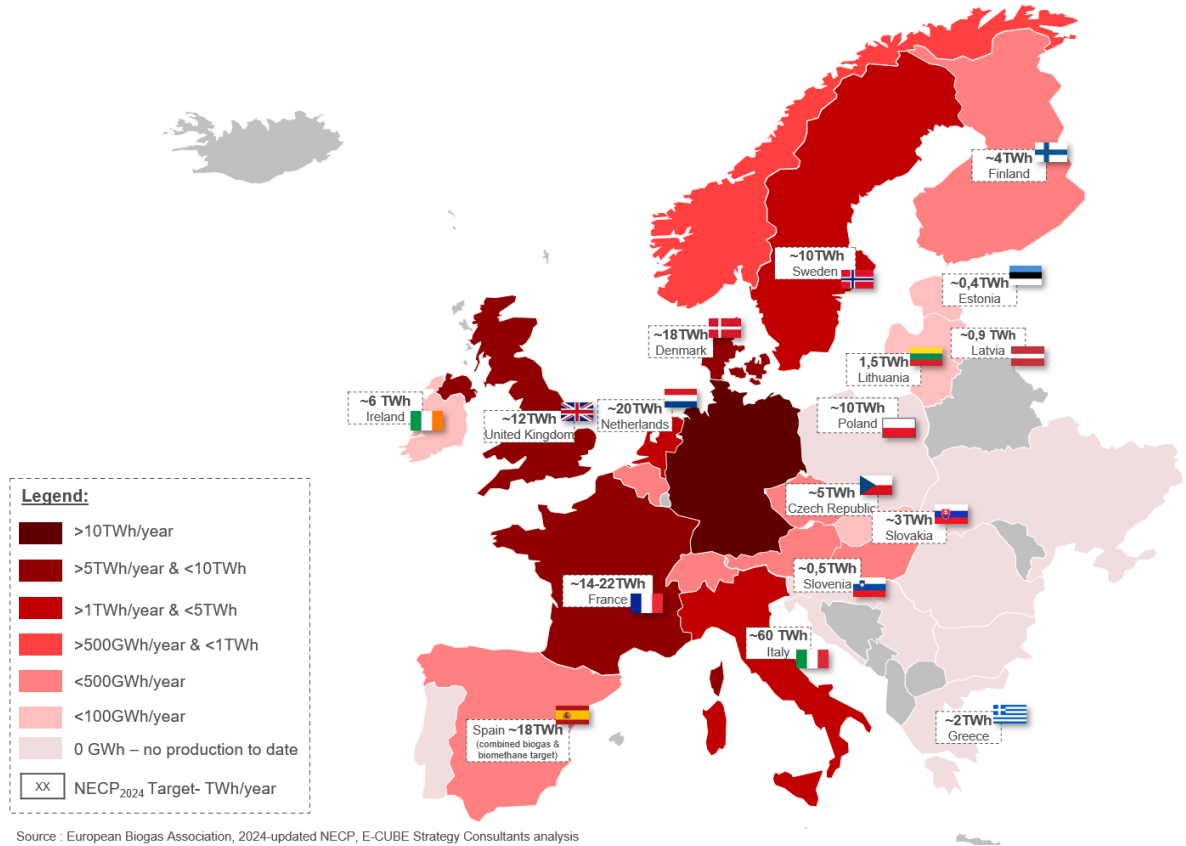
Figure 1 – Historical European biomethane production between 2018 and 2022



- The post-energy crisis REPowerEU plan, aimed at enhancing energy sovereignty in Europe, has set a target of 340 TWh of biomethane production by 2030. This initiative has influenced biomethane strategies across EU countries, even in those with low or non-existent support schemes. In the 2024-updated NECP<sup>7</sup> of the 27-EU countries, 15 out of the 27 EU countries (over 50%) have established specific biomethane production targets for 2030.

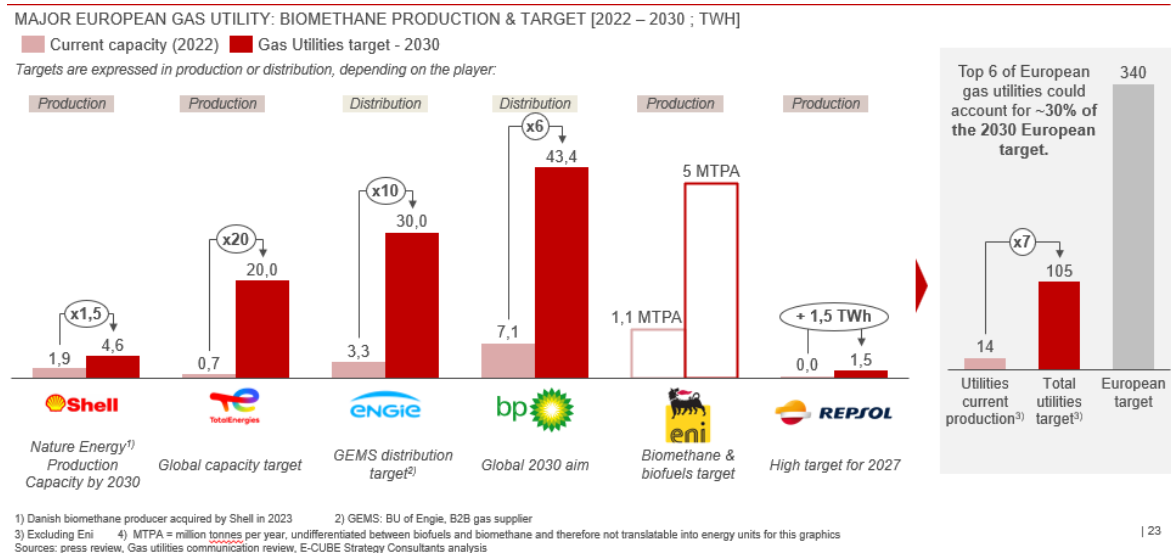
<sup>7</sup> NECP: National Energy and Climate Plan

Figure 2 – European biomethane targets by 2030



- The competitive landscape has significantly influenced the development of biomethane:
  - The European energy majors (Engie, BP, TotalEnergies) have set ambitious biomethane’s targets by 2030 and are investing in independent developers.

Figure 3 – Energy majors’ ambitions on biomethane





- o Independent developers are being financed by large infrastructure investment funds, which are creating multi-player platforms to scale-up biomethane production and establish European leaders.

**Figure 4 – Example of investments in biomethane in Europe**

EXAMPLES OF INVESTMENTS IN BIOMETHANE PROJECTS IN EUROPE

Investment fund	Partner	Amount	Project
		€ 1 B	Investment in Greenfield & Brownfield biomethane plants In Europe.
		n.d	Strengthening of CVE's positioning on upstream activities
		€ >100 M	Joint venture to build & operate >10 projects in Italy
		€ 35 M	Joint venture to build & operate >10 projects in Italy, already 2 plants built. Valuation or fertilizer as well.
		n.d.	Develops, constructs and operates biomethane projects
		n.d.	Joint venture with Atlas Renewable Energy and Energex Partners
		n.d.	Pan European biomethane production platform
		€ >100 M	Financing of biomethane's production pipeline of projects in Spain and Italy

Sources: Press Review, E-CUBE Strategy Consultants Analysis

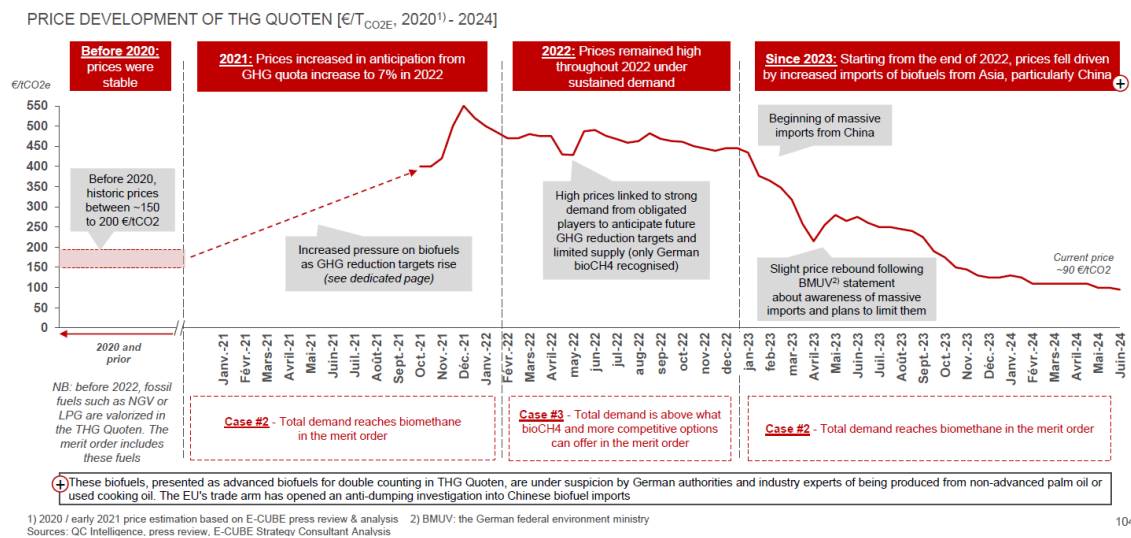
13

- The recent development of unsubsidised biomethane has also driven the growth of biomethane's production, with few operational contracts from gas suppliers (Shell, Althernoil, Rolande, Liqvis) or large natural gas consumers (BASF, Arkema, AstraZeneca) able to pay a green premium.

## 3.2 The German THG Quoten market, with skyrocketing biomethane valuation levels in 2022, has been the main drivers of this boom

In 2022, biomethane in Germany, recognised as an advanced biofuel that allows obligated suppliers to fulfil their emission reduction targets, reached valuation levels exceeding EUR 400/MWh, creating significant opportunities for producers and traders.

Figure 5 – THG Quoten historical prices



Such levels can be attributed to a combination of factors:

- Although the market had been operating for several years, Germany announced in 2022 a high level of ambition for 2030, creating tension in the market and a rush to secure volumes from suppliers.
- This sudden rush could hardly be met by the supply, which was structurally limited in volume. In particular, the private fleet of electric cars eligible for highly valued certificates was not organised to collect certificates and participate in the market. On the biomethane side, Germany had strict regulations prohibiting the generation of certificates from biomethane produced and injected into the natural gas network outside Germany, thereby strongly limiting the available volumes<sup>8</sup>.
- Structurally, the market favours biomethane, along with other advanced biofuels, by double counting their decarbonisation effects, thereby allowing higher valuation levels compared to first-generation biofuels. The high emission reduction potential of certain categories of biomethane (produced from manure feedstock) further enhances this effect.

<sup>8</sup> This rule was then attacked in Court and suppressed, allowing all biomethane produced in any country and injected in the European natural gas grid to be valorised in the German market, opening opportunities for foreign producers to valorise their production in the still high German THG Quoten market.

- Finally, the energy crisis, with gas prices reaching over EUR150/MWh, increased the attractiveness of biomethane, making it suddenly more competitive than the same molecule from fossil origins.

## HOW CAN BIOMETHANE BE VALUED AT EUR 400 TO 800 per MWh WITHIN THE GERMAN MECHANISM?

Biomethane valuation prices are determined by summing the natural gas prices and the valuation of clean fuel quotas (in EUR per MWh).

Theoretically, quotas prices (in  $\text{€t}_{\text{CO}_2}$ ) and, therefore, biomethane prices are determined according to a **“clean fuel merit order” logic**, that is, **by the emission reduction cost of the most expensive clean fuel required to meet the emission reduction target**. The positioning of biomethane within this merit order determines its valuation potential in both volume and value.

**In case of market shortage**, that is, when the available volume of clean fuels is insufficient to reach the emission reduction target (due to either production shortages or significant increases in targets), **quotas prices will rise to exceptionally high values, surpassing the most expensive clean fuel in the market (estimated at approximately EUR 180-200/ $t_{\text{CO}_2}$ ), with no theoretical maximum.**

**The volatility of clean fuel quota prices can impact final biomethane prices (in EUR/MWh), as they depend on the biogas C&I Score and local multiplying factor (i.e. on the accounted emission reduction<sup>9</sup> of its consumption in  $t_{\text{CO}_2}$ /MWh).**

*For instance, in Germany, with a quota price of  $\text{€}250/t_{\text{CO}_2}$  (due to market shortage), biomethane emission reduction are accounted for using a multiplying factor of 2 in the THG Quoten Scheme. This allows biomethane to be valued at approximately  $\text{€}400/\text{MWh}$  (for biomethane derived from manure, C&I Score -100) and at least  $\text{€}200/\text{MWh}$  (for a high C&I score of approximately 10).*

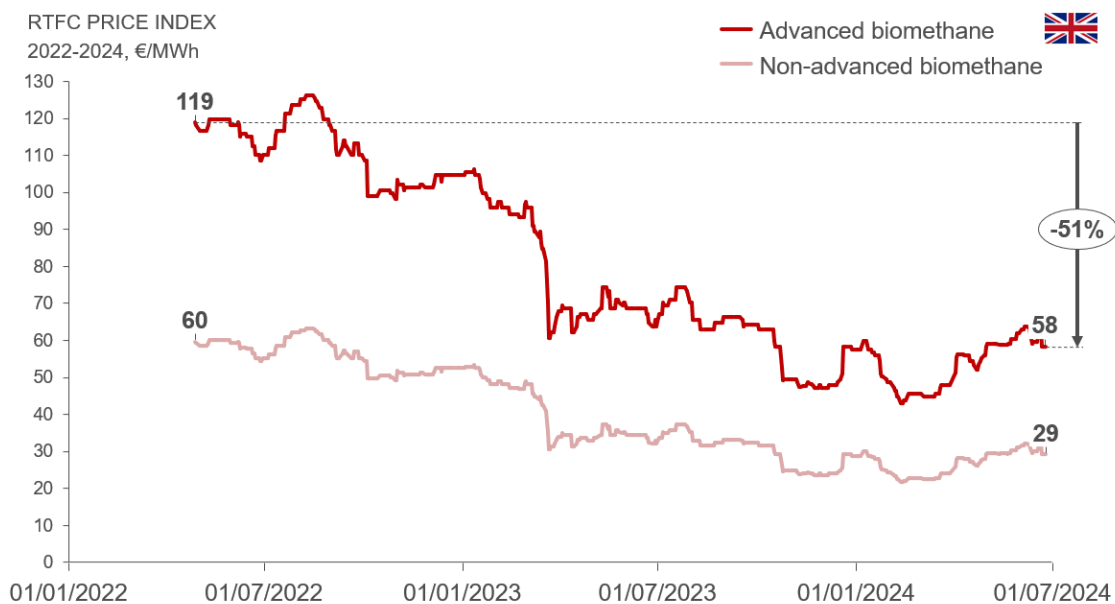
---

<sup>9</sup> Emissions reduction related to biomethane consumption (depending on its C&I Score) compared to a European fossil value reference set at 94.1  $\text{kgCO}_2/\text{GJ}$ . The physical value can be multiplied depending on the considered scheme (hence the “accounted emission reduction”).

### 3.3 Since the beginning of 2023, prices have decreased in the German market; however, the interest of off-takers remains high, suggesting confidence in favourable market conditions in the future

Price have significantly dropped on the German THG Quoten market, as well as other similar markets in Europe, such as the Netherlands' HBE mechanism and the UK's RTFO.

*Figure 6 – Price evolution of advanced and non-advanced biomethane certificates under the RTFC mechanism between 2022 and 2024*



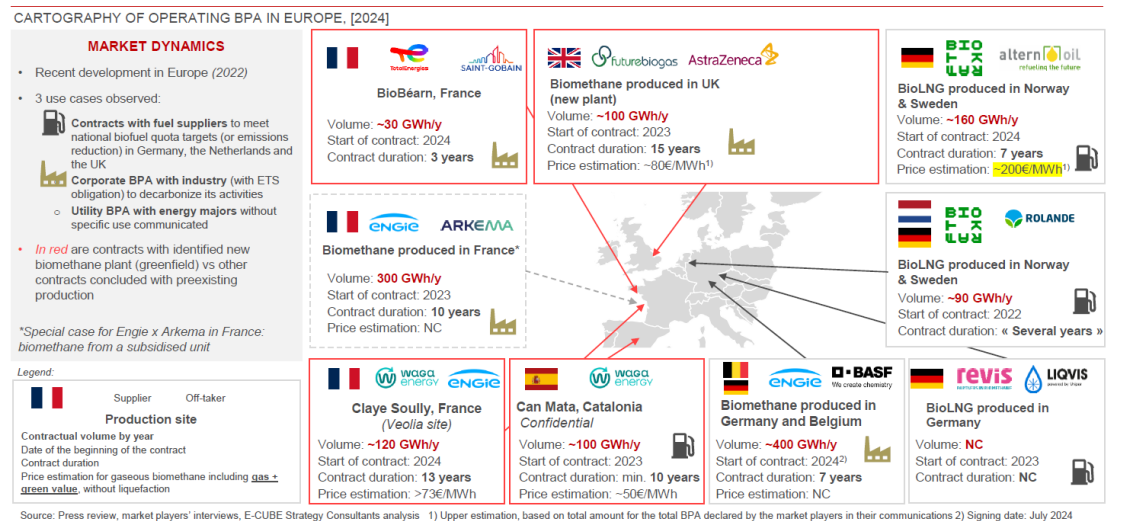
This price drop can be attributed by several factors, including a sharp increase in biofuel imports from Asia and China, which were sold on the market as “advanced HVO” but later denounced as fraudulent<sup>10</sup>. Additionally, market players and public authorities organised the aggregators’ market, allowing private electric car owners to claim and valorise certificates on the market, thereby increasing the supply of certificates and reducing market tensions.

Today, certificates are still traded at levels that allow for high values (up to approximately EUR 120-150/MWh) for the most sustainable categories of advanced biomethane, such as those incorporating large shares of manure and generating negative carbon emissions – see *Figure 5 above*.

<sup>10</sup> A European Commission investigation was opened in December 2023 into unfair imports of Chinese biodiesel: the results of the investigation should be known by the end of 2024 and effective measures should be taken by February 2025

However, although newly signed BPA contracts of more than 10 years, with prices above EUR approximately EUR 100/MWh, indicate that market players still anticipate high values in the long term, they remain more cautious when it comes to investing in greenfield merchant biomethane units.

Figure 7 – Operating BPA in Europe in 2024



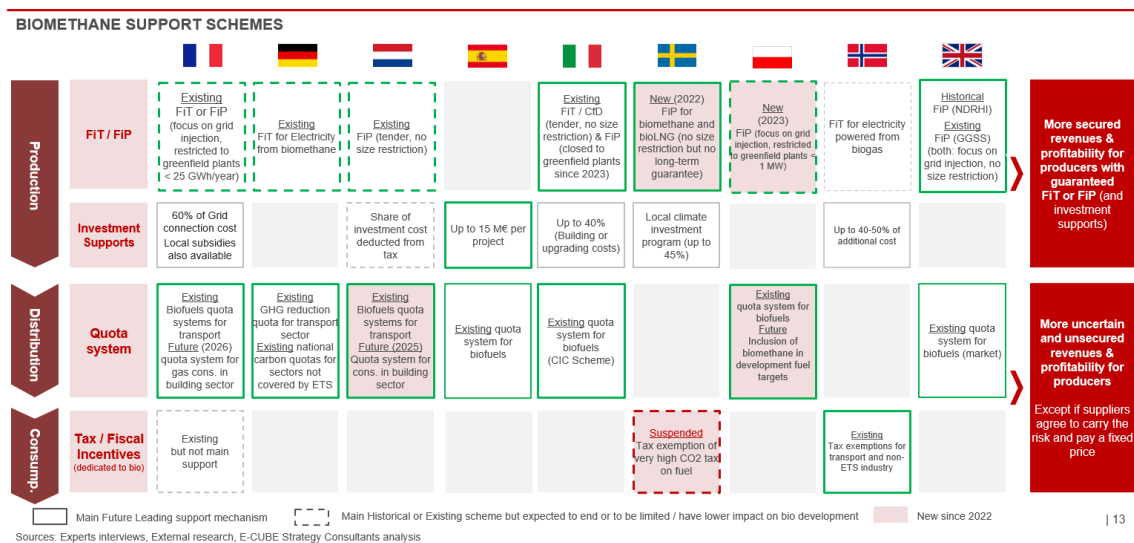
The pertinent question, therefore, is: what are the prospects for long-term equilibrium between biomethane supply and demand, and the resulting value of the end-product (gas molecule plus “green value”)?

## 4 The long-term supply and demand balance at the European level is a complex equation upon which developers, investors, and financiers must build conviction to support robust business plans and continue to drive production growth

4.1 Finally, although the new support schemes in Europe are primarily “market-based”, there should still be some opportunities to develop biomethane volumes supported by state-guaranteed tariffs until at least 2030, through these opportunities will be highly limited

The new support schemes in European countries are evolving towards “market-based” mechanisms. However, several countries (France, Germany, Italy, Poland, Netherlands, Norway) have retained their historical mechanisms to support biomethane production, though the guaranteed volumes are often limited (e.g. production unit below 25 GWh in France or less than 1 MW in Poland) or directed towards specific markets, such as electricity generation in Germany or Norway.

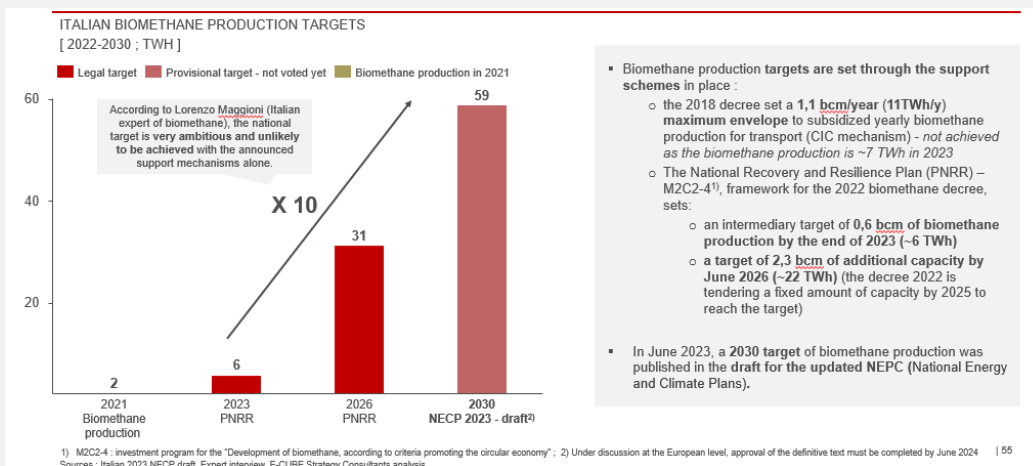
Figure 8 – European biomethane mechanisms



### ITALIAN BIOMETHANE: AN EXCEPTIONAL CASE

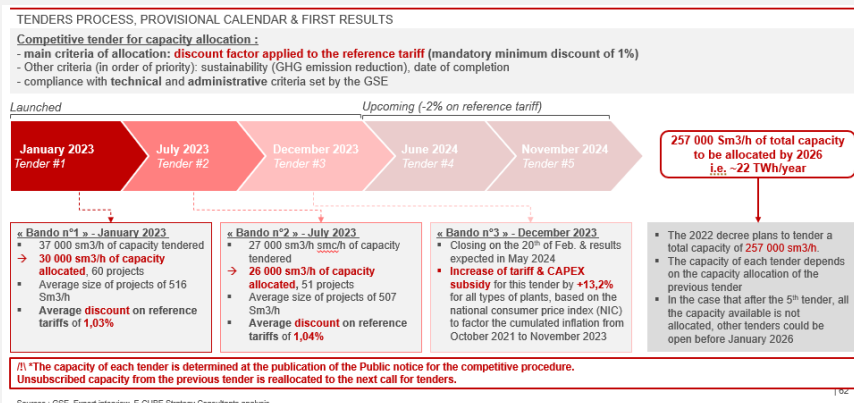
The Italian biomethane market is experiencing dynamic growth, driven by strong government support for the conversion of existing biogas plants and the development of greenfield projects.

Italy has set an ambitious target for the development of biomethane, aiming to increase national production by tenfold to reach approximately 60 TWh of biomethane production by 2030 (NECP, pending approval). Interim targets are established through regulatory schemes, with a target of approximately **22 TWh of supported production by 2026** (the maximum capacity to be supported by the new Feed-in-Tariff (FiT) scheme, after which 22 TWh/year should be supported).



- Biomethane production targets are set through the support schemes in place :
  - the 2018 decree set a 1,1 bcm/year (11TWhly) maximum envelope to subsidized yearly biomethane production for transport (CIC mechanism) - not achieved as the biomethane production is ~7 TWh in 2023
  - The National Recovery and Resilience Plan (PNRR) – M2C2-4<sup>1)</sup>, framework for the 2022 biomethane decree, sets:
    - an intermediary target of 0,6 bcm of biomethane production by the end of 2023 (~6 TWh)
    - a target of 2,3 bcm of additional capacity by June 2026 (~22 TWh) (the decree 2022 is tendering a fixed amount of capacity by 2025 to reach the target)
- In June 2023, a 2030 target of biomethane production was published in the draft for the updated NECP (National Energy and Climate Plans).

- Historically, the Italian government supported biogas production for electricity generation, leading to an important development of the biogas market in Italy (24 TWh in 2021). Since 2018, public support has shifted from biogas towards biomethane production for the transport sector, leading to a significant increase in production (6 TWh in 2023). The Consumption Release Certificate (CIC) scheme allocates certificates for the production of biomethane and bio-LNG, which are only used by fuel suppliers to meet their obligations to incorporate biofuels.
- Through a new decree published in 2022, the Italian government implemented a **new support mechanism for biomethane producers, providing CAPEX support** of up to 40% of the costs, as well as **production incentives through a FiT or Premium**. This new scheme also extends the end-use sectors supported, including transport (including maritime), industry, residential, sectors. The guaranteed tariffs range between EUR 60 to 130 per MWh, depending on the plant (upgrade or greenfield) and the feedstock (agricultural or OFMSW<sup>11)</sup>). The FiTs are allocated through public tenders to biomethane plants that inject into the Italian gas grid.



<sup>11</sup> OFMSW: Organic Fraction of Municipal Solid Waste

## 4.2 The transport sector presents the most favourable prospects for biomethane valuation; however, high uncertainties remain.

Transport quota mechanisms are spreading among European countries: most countries are using renewable incorporation targets in 2024. However, several countries, such as France and the Netherlands, which initially implemented mechanisms based on renewables incorporation targets, are now moving towards GHG reduction targets. This shift follows RED III new target of 14.5% carbon intensity reduction and the successful example of the German THG Quotas reform.

Figure 9 – RED II Implementation Mechanisms

RED II IMPLEMENTATION MECHANISMS								
TYPE OF PUBLIC SUPPORT								
RED II implementation mechanisms	Law on Blending Obligations	HBE <sup>2)</sup> (Hermieuwbare brandstofeenheden)	THG Quoten (Treibhausgasminderungsquoten)	TIRUERT <sup>3)</sup>	CIC mechanism	Green Certificates	NCW (Narodowy Cel Wskaznikowy)	OiV (Omsetningskrav i veitrafikk)
Target type	RE <sup>1)</sup> incorporation obligation	CO2 intensity reduction + RE <sup>1)</sup> incorp. obligation	Emission intensity reduction	RE <sup>1)</sup> incorporation obligation		RE <sup>1)</sup> incorporation obligation + CO2 intensity reduction	RE <sup>1)</sup> incorporation obligation	RE <sup>1)</sup> incorporation obligation
Type of mechanism	Blending obligations for diesel and gasoline fuel suppliers	CO2 reduction/ biofuels incorporation obligations through quota mechanisms based on a tradable quota market mechanism between diesel and gasoline suppliers (and benefiting alternative fuel producers)			Blending obligations for diesel, gasoline and methane suppliers	Blending obligations for diesel and gasoline suppliers	Blending obligations no quota market	Blending obligations for fuel suppliers
BioNGV recognition	BioNGV is included since 2022 and be double counted (depending on feedstocks) ✓			BioNGV is going to be included by 2026 in the new CO2 mechanism <sup>3)</sup> ⚠		BioNGV is included and can be double counted ✓		BioNGV cannot be used to fulfill ✗

1) RE: Renewable Energy 2) The mechanism should change to become the ERE with only a CO2 intensity reduction mechanism for each transport sub-segment 3) A new CO2-based intensity reduction mechanism is going to be developed in France for all CO2 emission of transport  
Source: European Commission, E-CUBE Strategy Consultants Analysis

However, the role of biomethane is structurally limited by the size of the NGV<sup>12</sup> fleet, and high uncertainties remain regarding its growth prospects. Considering the current level of the NGV fleet in Europe (<2% in 2023), biomethane could account for a maximum demand of approximately 25 TWh by 2030; particularly in light of the EU target of a 14.5% reduction in GHG emissions in the transportation sector by that year (RED III target).

- As demonstrated in the years 2022-2024 on the German THG Quoten market, fleet electrification- which tends to be favoured by quota mechanisms through multiple counting systems, sometimes at higher levels than those for advanced biofuels<sup>13</sup>- along with the international imports of biofuels, can significantly influence the market supply and demand equilibrium.

Demand in the maritime sector also offers promising prospects as LNG fleets are increasingly deployed, creating future captive markets for bio-LNG. However, apart from LNG vessels, the development of methanol or ammonia fleets face challenges. For example, Maersk, which was

<sup>12</sup> NGV: Natural Gas Vehicle

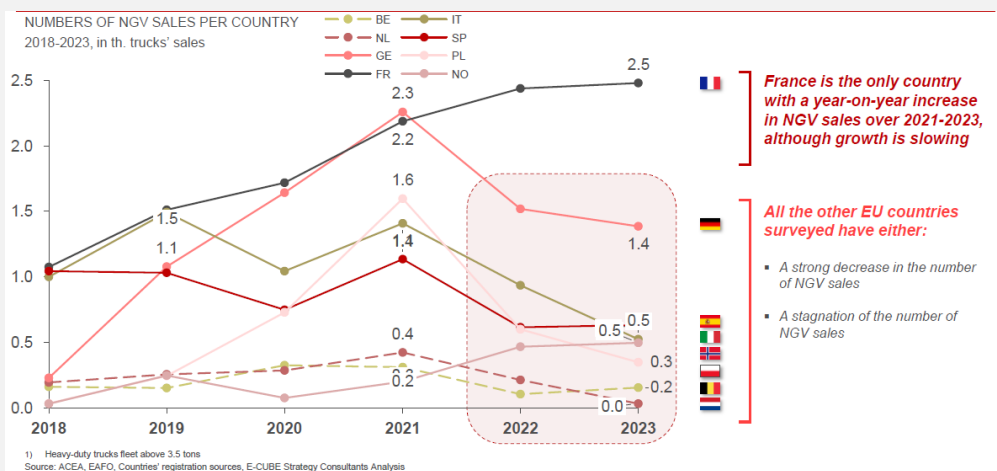
<sup>13</sup> E.g. triple counting for electricity vs. double counting for advanced biofuels in the Germany THG Quoten system.



the main promoter of methanol solution, invested in LNG vessels in August 2024, while Orsted cancelled its e-methanol production plant around the same period<sup>14</sup>. Given the intensity reduction targets set by the European regulation FuelEU Maritime—6% by 2030 and -35% by 2040 along with the IMO strategy of achieving a 20% reduction of total GHG emission reduction by 2030, fossil LNG will likely be insufficient to meet these targets in the medium term.

## WHY IS THE FUTURE DEVELOPMENT OF NGV HEAVY-DUTY FLEETS HIGHLY UNCERTAIN IN EUROPE?

After 5 years of rapid growth between 2017 and 2021, the recent gas crisis (2021-2023) has had a major impact on the NGV market in Europe.



Road carriers that invested in gas trucks have suffered economic difficulties due to soaring prices, with some having to lease diesel trucks at very short notice. **The crisis has slowed sales of NGV trucks, and the future development of the market remains uncertain, depending on several factors:**

- The European regulation for car manufacturers (VECTO 2019/1242) does not fully recognize the environmental value of biomethane, as the emission reduction targets are based on vehicle tailpipe emissions and not LCA<sup>15</sup>, which penalizes manufacturers that offer NGV vehicles. **The review clause scheduled for 2025 could prove decisive for the industry.**
- **The ramp-up in manufacturers' electric and H2 offerings could benefit NGV if it proceeds slower than anticipated.** However, only a third of European OEMs currently offer NGV trucks, and there unlikely to be more OEMs in the future than there are in 2023 within the NGV mobility sector.
- **The price of gas and bio-NGV certificates could render the bio-NGV solution competitive** with other low-carbon alternatives as well as diesel
- In the current context, liquid biofuels such as HVO are easier to implement and relatively competitive; however, their **future availability-** due to new usages such as aviation or maritime fuel - could make them less competitive in the medium term.

<sup>14</sup> <https://www.lloydlist.com/LL1149842/Maersk-hedges-on-LNG-amid-methanols-bumpy-road> ; <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/081524-orsted-scraps-swedish-flagship-e-methanol-project-under-development>

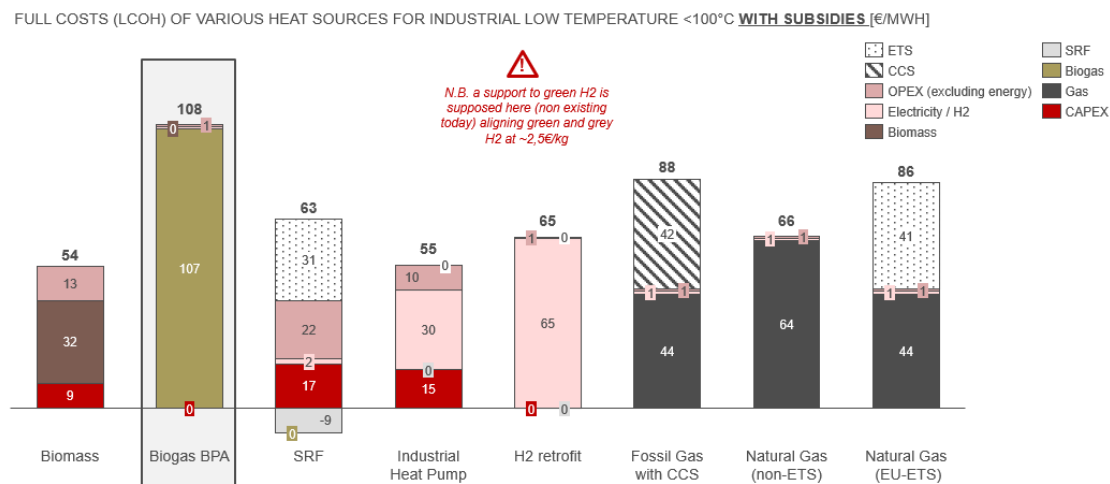
<sup>15</sup> LCA: Life-Cycle Analysis

### 4.3 Interest in biomethane from industrial companies is also increasing; however, few developments are expected before the 2030s, as the price barrier remains high.

As decarbonisation pressure increases, industrial interest in biomethane is rising. However, the economic equation remains complicated, despite the opportunity to capitalise on biomethane within the EU-ETS scheme. The additional cost of biomethane compared to natural gas remains prohibitive, and this situation is unlikely to change before 2030.

Additionally, many industrial sectors have more competitive alternatives to biomethane, such as Biomass or SRF:

*Figure 10 – Economic competitiveness of different low-carbon solutions for industry*



Source: E-CUBE Strategy Consultants analysis

| 107

- However, opportunities could still emerge in the most promising sectors- those with few technical alternatives, high decarbonisation pressures, and the ability to translate extra-costs into a “green value” reflected in the final product price. These sectors include chemical and pharmaceutical industries (e.g. Arkema, BASF, Astra Zeneca, L’Oréal) as well as the food & beverage industry (e.g. Heineken, with local models valorising inhouse feedstocks).
- Additionally, industrial players face greater challenges in committing long-term contracts beyond a few years (e.g., TTE / Saint-Gobain: 3 years, ENGIE / BASF: 7 years, which is already considered long). Depending on the solidity of the counterparty, financing might be complicated.
- Even though industrial willingness to pay may not be sufficient to fully support a business case, it can still bring confidence to investors in a long-term “stable” valuation for

biomethane at approximately EUR 70/MWh. When combined with higher, but shorter-term, valuations in transport quota systems, this could enable projects to proceed.

This conclusion may also change if the GHG Protocol and SBTi reach a definitive decision regarding the recognition of biomethane in Scope 1 declarations under a “market-based” approach.

## THE UNCERTAIN STATUS OF BIOMETHANE UNDER THE GHG PROTOCOL AND SBTI ENGAGEMENTS

**Currently, the GHG Protocol does explicitly prohibit the use of biomethane certificates to reduce the emissions, but does not clearly endorse it either:**

- Between 2015 and 2020, the “Scope 2 Guidance” in Appendix A **allowed the use of biomethane to decarbonize gas purchases. However, the sentence was since removed**, because the information referred to Scope 1 rather than Scope 2. However, the GHG Protocol states: *“In the absence of guidance, companies purchasing certificates may wish to consult with their auditors and consider rules provided by relevant target-setting programs or applicable regulatory schemes in their jurisdiction(s) on how to report these purchases in their reports, while ensuring full transparency and following all GHG accounting and reporting principles.”*

For the future, **there remains uncertainty regarding the value of these certificates:**

- In September 2022, a draft version of the GHG Protocol's *Land Sector and Removals Guidance* Annex B initially stated that *“included guidance that companies sourcing gas from a common carrier pipeline should report combustion emissions based on the grid-average mix of fossil and biogenic natural gas from the common carrier pipeline, and that purchases or trades of certificates or credits should not be used to adjust the associated scope 1 emissions.”* **However, this version was deleted in the final publication.**
- The possibility of adopting a 'market-based' approach, which would allow companies to account for emissions reductions from their gas supply through specific contractual instruments, such as Guarantees of Origin (GoO) or biomethane purchase agreements, is currently under examination.
- **A global consultation process concerning the use of market-based approaches for Scope 1, 2, and 3 was initiated in 2023** and remains ongoing. The GHG Protocol received many answers and suggestions through March 2023, with a final decision expected in 2024.

On the other hand, SBTi has not taken a position yet. At the end of 2023, SBTi has a “call for evidence on the effectiveness of the use of environmental attribute certificates in corporate climate targets” to further investigate this matter<sup>16</sup>.

<sup>16</sup> <https://sciencebasedtargets.org/resources/files/call-for-evidence-environmental-attribute-certificates.pdf>

#### 4.4 In other sectors, the ETS II mechanism will be insufficient, and network gas consumption is expected to significantly decline. However, some volumes of biomethane should still be consumed in areas where states encourage its use through obligations within certificate markets.

The development of the ETS II mechanism is insufficient, as the CO<sub>2</sub> price is capped at EUR 45/tCO<sub>2</sub> before 2030, as currently announced. This would result in an increase in natural gas prices of approximately EUR 10-12 /MWh and EUR 15-20/MWh for heating oil, which does not offset the additional cost of biomethane compared with fossil fuels.

Several countries are developing certificate markets or obligation systems for natural gas suppliers to integrate a share of biomethane into their portfolios, thereby driving demand. Currently, these systems are under experimentation in France, the Netherlands, and Ireland, and biomethane valuation levels in these markets remain uncertain. In France, for instance, the penalty level announced is EUR 100/CPB or EUR 80-110 / MWh of natural gas, which represent modest volumes of approximately 4% of the total sold. Nonetheless, these systems provide an additional consumption stream, ensuring producers a certain level of demand.

##### **FOCUS ON THE FRENCH BIOMETHANE PRODUCTION CERTIFICATE MECHANISM**

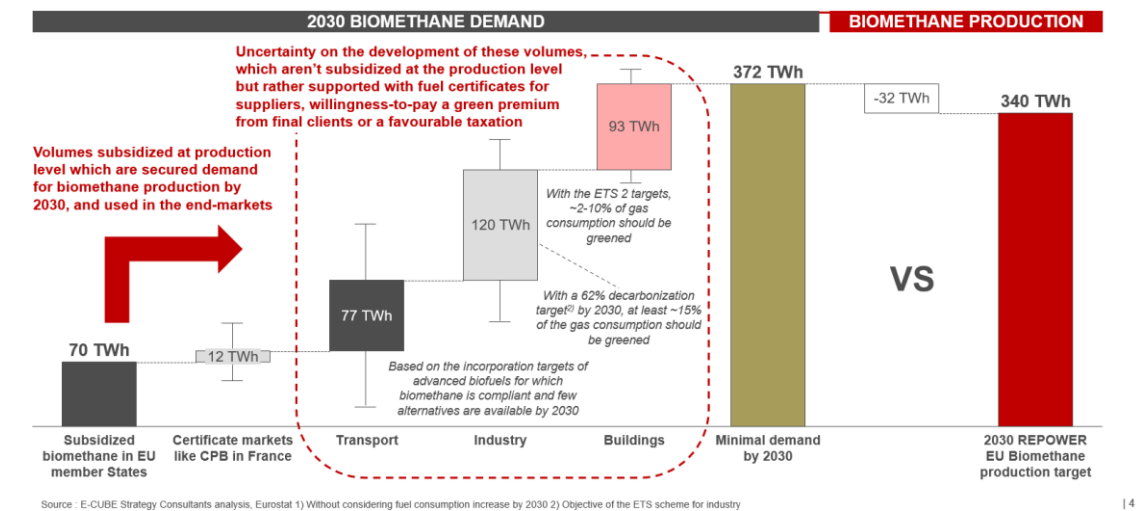
- 2018-2020: Public authorities exhibited a reluctance to invest further in the sector, which including a regression regarding the TICGN mechanism and the ETS for industry. They also announced a transition from a Feed-In Tariff system to a tendering mechanism, along with the development of “Biomethane Production Certificates,” without giving any details. In the short term, market players have rushed to secure tariffs for ongoing projects under the previous regime, anticipating a significant slowdown in the industry.
- 2023-24: After the energy crisis, there has been a renewed interest from the end customers in biomethane, although only a few players are fully committing. The first major BPAs have been signed, with French utilities such as Total Energies and ENGIE leading the way. Additionally, the French government has clarified the forthcoming support mechanism for CPBs. At last, the French transport quota mechanism will switch to the new TIRRIEGEST, which will include the potential utilisation of biomethane.

*N.B. Uncertainty remain regarding the eligibility status of non-domestic production in such systems. Currently, the French Biomethane Production Certificate market is reserved for domestic production. However, as a court decision compelled Germany to amend this rule in their transport market, this situation may not be in the long term.*

### 4.5 Considering all end markets, the total demand for biomethane in Europe could easily reach the REPowerEU production target. However, the ability of consumers to establish profitable business models for producers remains uncertain.

At the European level, the demand for biomethane is divided between volumes subsidised at the production level and those stimulated by support mechanisms in end markets. The first case allows producers to establish a profitable business model, especially on small production facilities; however, it is gradually being supplemented by other market mechanisms to enhance demand for biomethane. The volumes that are not subsidised at the production level are significantly more uncertain. These volumes, stimulated by regulatory obligation mechanisms (such as EU ETS, fuel certificates, and tax exemption for bio-NGV), are put in competition with various low-carbon alternatives. Therefore, these volumes will only develop if the price and financial benefits offered align with the ability for stakeholders to pay. For example, although industrial players subject to the EU ETS will increasingly face higher carbon quota obligations, they are unlikely to pay more than EUR 60-70/MWh for biomethane, due to the greater competitiveness of other alternatives such as biomass, SRF, and heat pumps (see Figure 10 above).

Figure 11 – Biomethane demand vs production by 2030



## 5 Conclusion: Long-Term Price Projections for Biomethane as a Complex Yet Valuable Decision-Making Tool for Investors

A large demand for biomethane by 2030 and beyond appears to be assured when considering the dynamics of demand, including the decarbonization pressure faced by market players and the availability and competitiveness of alternative solutions that ensure at least a share for biomethane:

- However, this demand is driven by markets that are regulated to a certain extent, yet still experience high price volatility due to changes in regulatory rules and external market conditions, which do not provide the same level of security for project developers and financiers.
- Developing merchant biomethane projects requires a certain level of certainty for equity investors, for banks. The BPA model is the preferred option; however, it remains challenging to secure satisfactory pricing levels, long-time horizon, and reliable counterparties for banks.

In this context, project developers and their financing partners require tools to address complex questions:

- As a producer in one country, which end-markets are open to me across Europe?
- Who are the most promising off-takers, and what is their expected level of “willingness to pay” for biomethane? How can we negotiate with traders and intermediaries who possess a sufficiently good understanding of the end-valuation potential?
- How can I build a long-term business plan without guaranteed fixed prices? What price projections should I consider over the next 15 years in reference, low, and high case scenarios? How can I evaluate the associated risks?
- What impact would variations in the feedstock mix have on the valuation potential of my production volumes?

From the consumers’ perspective—be they industrial players faced with Scope 1 decarbonisation objectives, natural gas suppliers in the tertiary and building sectors, or fuel suppliers subject to transportation quota systems such as THG Quoten, TIRRIEGEST, and ERE—the long-term availability and competitiveness of biomethane are crucial factors in supporting technological choices among various decarbonisation options and in valuing biomethane within long-term supply contracts.

Answering these questions requires an in-depth analysis of the dynamics, drivers, and constraints of each European market sub-segment. This analysis aims to establish the merit order of decarbonisation options available to each category of consumer across various geographies, position biomethane within this merit order, and assess the long-term prospects for supply and demand balance across different scenarios.

E-CUBE Strategy Consultants has developed sophisticated consulting services and tools to support market players in this exercise, facilitating more robust investment decisions and enhancing discussions between biomethane producers and consumers.