The Implementation of Regulation (EU) 2024/1787 in Italy

on the reduction of methane emissions in the energy sector

Amici della Terra

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Introduction

This report provides an analysis of the implementation in Italy of Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector, with particular reference to the obligations and deadlines relevant for 2025.

The Regulation addresses an issue that, until a few years ago, had been largely underestimated: the climate impact of methane emissions. These emissions have a significant impact in the medium term and, over a 100-year horizon, have a global warming potential almost 30 times higher than that of carbon dioxide (CO_2). At the same time, reducing methane emissions in fossil fuel energy supply chains, such as natural gas and oil, is generally associated with relatively low costs. This makes mitigation actions particularly effective and, in many cases, allows for the recovery and valorisation of energy resources that would otherwise be lost. In a phase of energy transition in which, at a global level, the use of fossil fuels will remain significant, reducing methane emissions therefore represents one of the most impactful contributions to climate change mitigation.

The report first provides an overview of the main relevant baseline data, derived both from energy statistics (**Chapter 1**) and environmental statistics (**Chapter 2**), with reference to the activities covered by the Regulation in Italy. Within the energy statistics, national data are analysed across the entire natural gas value chain, the oil upstream sector, and gas and oil imports. As for environmental statistics, the analysis focuses in particular on methane emissions from the energy sector in Italy, using data produced by ISPRA within the national greenhouse gas inventory.

To place the Italian case within an international context, the report presents (**Chapter 3**) one of the main global initiatives for reducing methane emissions in the energy sector, promoted by UNEP: the Oil and Gas Methane Partnership 2.0 (OGMP 2.0). This is a voluntary initiative that requires the adoption of rigorous monitoring and reporting standards by oil and gas operators and now covers a significant share of global oil and natural gas production. OGMP 2.0 standards are recognised by the European Regulation, and several Italian operators have joined the initiative.

One of the most ambitious objectives of the Regulation is to influence the environmental performance of fossil fuel imports, on which the European Union, and Italy in particular, still heavily depend. To this end, the report (**Chapter 4**) analyses methane emissions associated with gas and oil production in Italy's main supplier countries, proposes an estimate of emissions linked to national imports, and assesses the level of adherence to OGMP 2.0 standards by upstream operators in those countries.

Chapter 5 represents the core of the report and provides a detailed analysis of the first phase of implementation of the Regulation in Italy, with reference both to the role of institutions and to the obligations of operators across the energy value chains. The active role of the Ministry of the Environment and Energy Security (MASE), together with the overall positive response of operators, has made available highly relevant data and documentation. This has enabled an in-depth analysis, both quantitative and qualitative, particularly of the methane emission quantification reports submitted under Article 12 of the Regulation.

To better understand the context in which this initial phase of implementation has developed (**Chapter** Errore. L'origine riferimento non è stata trovata.), the report describes the process of dialogue and cooperation initiated in 2020 among operators, institutions, associations and environmental organisations on methane emission reduction. This process has been centred on a working group promoted by Amici della Terra, which has facilitated dialogue among stakeholders both during the approval phase of the Regulation and throughout its implementation.

Finally, to frame this phase and the main critical issues that have emerged, the report analyses the European context (**Chapter 7**), both with regard to the role of the European Commission in implementing the Regulation and the state of progress across Member States. The analysis is based on publicly available documentation and, for the cross-country comparison, draws on information from the Methane Regulation Tracker developed within the framework of the European Civil Society Observatory on Methane (CSO-M).

The report concludes with a set of final considerations on the main lessons learned, highlighting both challenges and strengths of the implementation process in Italy, and putting forward recommendations and operational proposals to support the achievement of the Regulation's objectives.

1. Energy consumption and the natural gas value chain in Italy

1.1. Gross inland energy consumption

Italy's gross inland energy consumption (GIEC) has undergone a significant evolution since 1990, as shown in **Figure 1**. GIC (which takes into account domestic production, imports, exports and stock changes), amounting to about 150 Mtoe in 1990, increased moderately until reaching the highest value in the available historical series in the mid-2000s (192 Mtoe in 2005). This period corresponds to the peak of the country's energy demand, supported by economic growth.

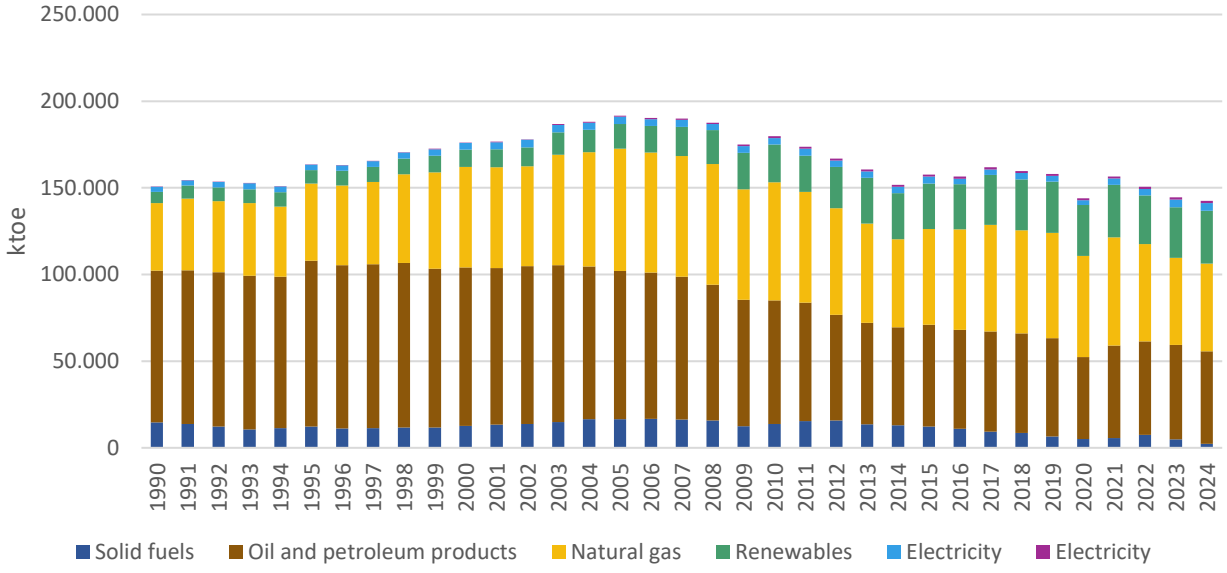
Starting in 2008, with the onset of the global financial crisis, GIC experienced a sharp decline: in 2009 it dropped by more than 10 Mtoe compared with the previous year, reflecting the contraction in industrial production and household consumption. The recovery observed in 2010 was not sufficient to bring gross inland consumption back to pre-crisis levels, and in the following years GIEC continued a gradual structural decline, also influenced by improvements in energy efficiency and the growing contribution of renewable energy sources.

The period 2012–2014 saw a progressive decline in overall energy demand, with GIC falling back to levels comparable to those of 1990 (152 Mtoe in 2014). Between 2015 and 2019 the indicator remained relatively stable, fluctuating around 160 Mtoe. The most pronounced change occurred in 2020, when the pandemic caused a sharp drop in GIEC to 144 Mtoe, the lowest level in the entire series. The partial recovery recorded in 2021 and 2022 was not sufficient to return GIC to pre-pandemic levels, and in the most recent two-year period (2023–2024), with values around 142 Mtoe, a further reduction can be observed.

Overall, compared with the peak recorded in 2005, Italy's gross inland energy consumption has decreased by almost 50 Mtoe, reflecting three structural dynamics: increased efficiency and reduced final consumption, particularly in the residential sector; the gradual phase-out of coal; and the growth of renewable energy sources.

Within this overall context of declining energy consumption, the role of natural gas has become increasingly central in the national energy mix, as illustrated in the following paragraphs.

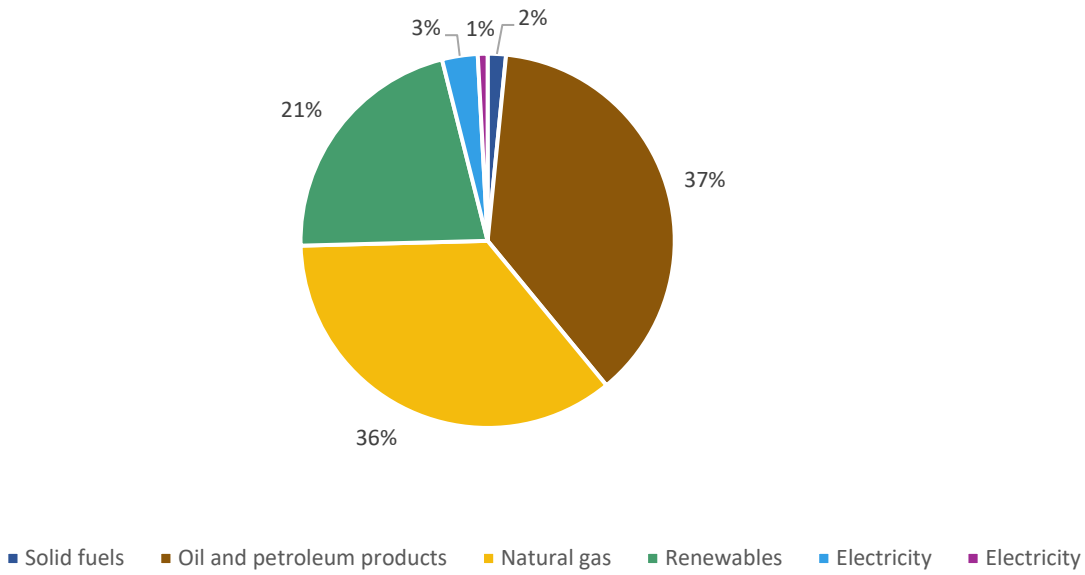
Figure 1: Italy's gross inland energy consumption, 1990 – 2024 (ktoe)



Source: Amici della Terra elaboration on Eurostat and MASE data.

The share of natural gas in gross inland energy consumption was 26% in 1990 and reached 36% in 2024. Over the same period, the share of oil and petroleum products declined from 58% to 37%. Renewable energy sources also recorded significant growth, increasing from 4% to 21%. The share of solid fuels has always remained below 10% and today stands at 2%. The data on Italy's energy mix do not include nuclear energy, although it represents a significant share of imported electricity.

Figure 2: Gross inland energy consumption in Italy, 2024 (%)



Source: Amici della Terra elaboration on Eurostat and MASE data.

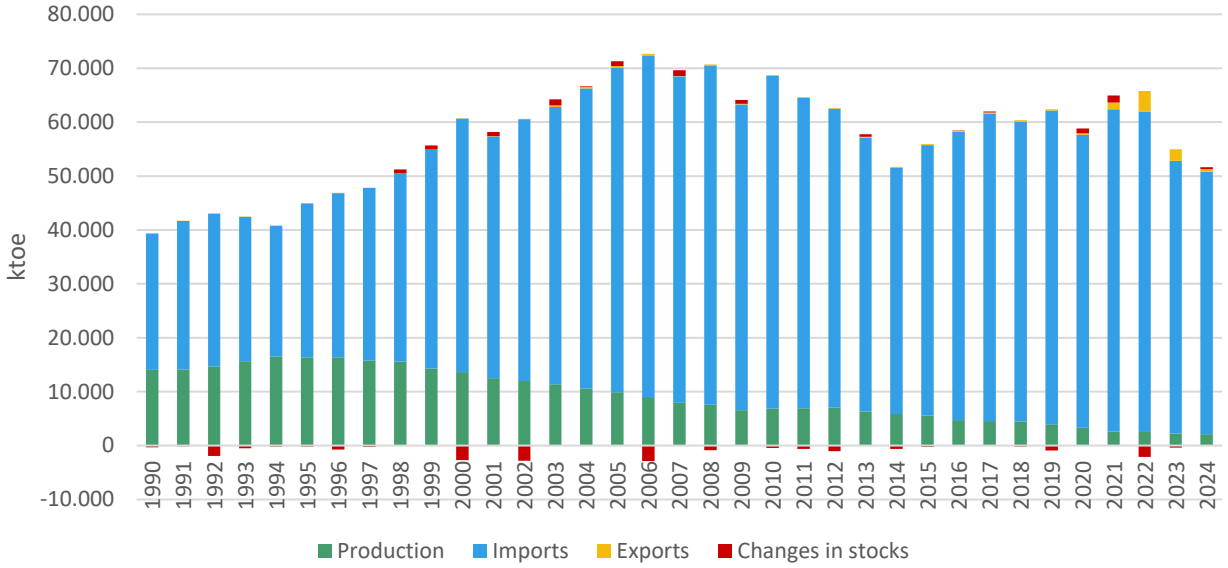
1.2. Gross inland consumption of natural gas

The natural gas balance shows that in Italy gross inland consumption of natural gas (50,6 Mtoe in 2024) consists largely and increasingly of imports (48,7 Mtoe in 2024), while domestic production represents a progressively smaller share of the total (2,1 Mtoe in 2024). The gradual decline in domestic production reflects the limited development of new extraction activities.

In the Italian case, export flows are generally modest and remain below 350 ktoe for most of the historical series. The years 2021–2023 are an exception, when exports exceeded 2,000 ktoe, highlighting the increased flexibility of the Italian network as a transit hub during the European energy crisis, the growth of flows from the Trans Adriatic Pipeline (TAP), and the rise in LNG supplies also destined for neighbouring countries. In 2024, outward flows returned to more moderate levels (507 ktoe).

This structure of the natural gas balance, strongly dependent on imports, has direct implications both in terms of energy security and with regard to the relevance of methane emissions along international supply chains.

Figure 3: Gross inland consumption of natural gas, 1990 – 2024 (ktoe)



Source: Amici della Terra elaboration on Eurostat and MASE data.

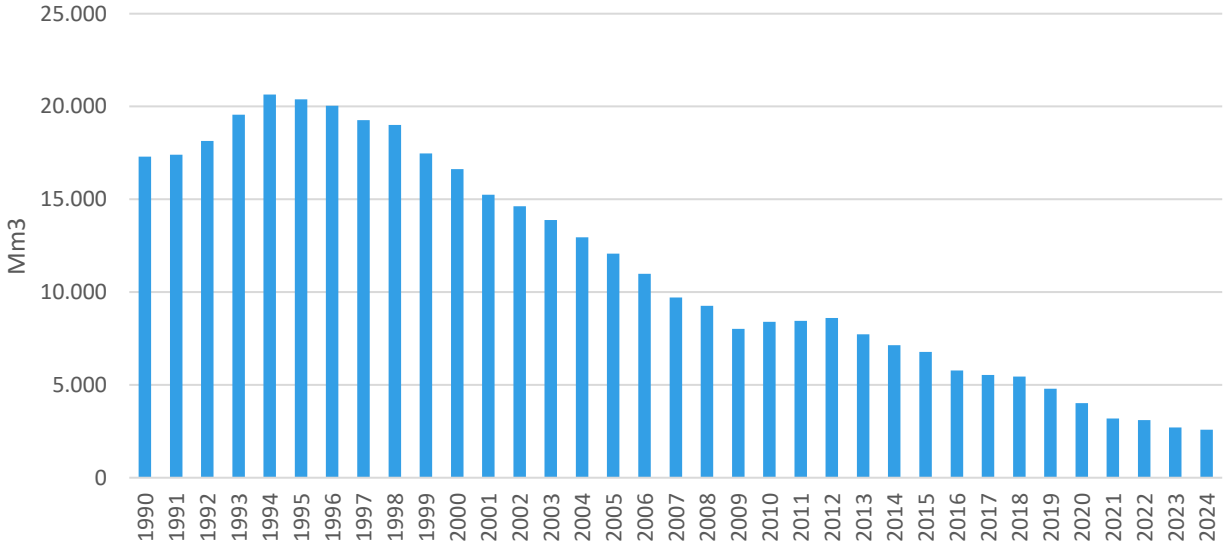
1.2.1. Natural gas production in Italy

Natural gas production in Italy amounted to about 17.300 Mm³ in 1990. It increased during the early years of the decade, reaching a peak of 20.637 Mm³ in 1994. From that point onward, a continuous downward trend can be observed, with production declining to a minimum of around 2.600 Mm³ in 2024. This decline reflects the natural depletion of mature fields, the reduction of exploration activities, and regulatory constraints that in recent decades have limited the development of new extraction initiatives.

As a consequence of this trend, the share of Italian production relative to total European Union production has progressively decreased, falling from an average share of 11% in the 1990s to around 7% in recent years.

Approximately 50% of Italy's natural gas production comes from offshore fields, mainly located in the Adriatic Sea, while the remaining 50% comes from onshore fields.

Figure 4: Natural gas production in Italy, 1990 – 2024 (Mm3)



Source: Amici della Terra elaboration on Eurostat and MASE data.

BOX 1: Natural gas and petroleum product producers in Italy

Official data on national hydrocarbon production are published by the Ministry of the Environment and Energy Security (MASE) – Directorate-General for Energy Sources and Licensing – as part of its monitoring activities related to mining titles.

The dataset reports the annual production of natural gas (Sm^3), crude oil (kg) and gasoline (kg) obtained from hydrocarbon production concessions located both onshore and offshore in Italy. The information is organised by individual concession and covers the historical series from 2004 to 2025.

MASE data represent the quantities effectively produced under each production concession and constitute the official basis for monitoring extraction activities in the national territory.

National hydrocarbon production from active concessions in 2024 is reported in **Table 1** for natural gas and in **Table 2** for petroleum products. The data confirm a strong concentration of natural gas production among a limited number of operators.

In the gas segment, total production amounted to 2.881,53 million Sm^3. Companies belonging to the ENI group maintain a largely dominant position: ENI alone accounts for 79,7% of national production (2.297 MSm^3), a share that rises to almost 90% when ENI Mediterranea Idrocarburi (9,5%) is also included. The other operators have significantly smaller shares, with TOTALENERGIES EP Italia (4,3%) and ENERGEAN Italy (2,2%) representing the main alternative producers. The remaining production is fragmented among operators with shares below 1%.

In the petroleum products segment (crude oil, gasoline and LPG), total production in 2024 amounted to 4.452,89 kt. A similarly high level of concentration can be observed: TOTALENERGIES EP Italia is the leading operator with 48,0% of national production, followed by ENI (37,1%). When ENI Mediterranea Idrocarburi (7,5%) is also considered, more than 92% of production is attributable to the three main operators. ENERGEAN Italy accounts for 7,1%, while the remaining shares are marginal.

Table 1: Natural gas producers in Italy, 2024

Operator	Quantity (MSmc)	Share (%)
ENI	2.297,00	79,7%
ENI MEDITERRANEA IDROCARBURI	274,79	9,5%
TOTALENERGIES EP ITALIA	124,32	4,3%
ENERGEAN ITALY	63,68	2,2%
SOCIETÀ PADANA ENERGIA	43,64	1,5%
PO VALLEY OPERATIONS PTY	27,56	1,0%
GAS PLUS ITALIANA	17,12	0,6%
STOCCAGGI GAS ITALIA (STOGIT)	13,10	0,5%
APENNINE ENERGY	6,96	0,2%
CANOEL ITALIA	4,46	0,2%
ENERGEAN SICILIA	4,36	0,2%
SIM	1,34	0,05%
LAZZI GAS	1,02	0,04%
AIMAG	0,91	0,03%
CH4 LIZZANO	0,44	0,02%
Altri	0,84	0,03%
TOTAL	**2.881,53**	

Source: Amici della Terra elaboration on MASE data.

Table 2: Petroleum product producers in Italy, 2024

Operator	Quantity (kt)	Share (%)
TOTALENERGIES EP ITALIA	2.136,15	47,9%
ENI	1.652,87	37,1%
ENI MEDITERRANEA IDROCARBURI	333,22	7,5%
ENERGEAN ITALY	315,83	7,1%
SOCIETÀ PADANA ENERGIA	14,82	0,3%
Altri	2,410	0,1%
TOTAL	**4.455,30**	

Source: Amici della Terra elaboration on MASE data.

1.2.2. Natural gas imports

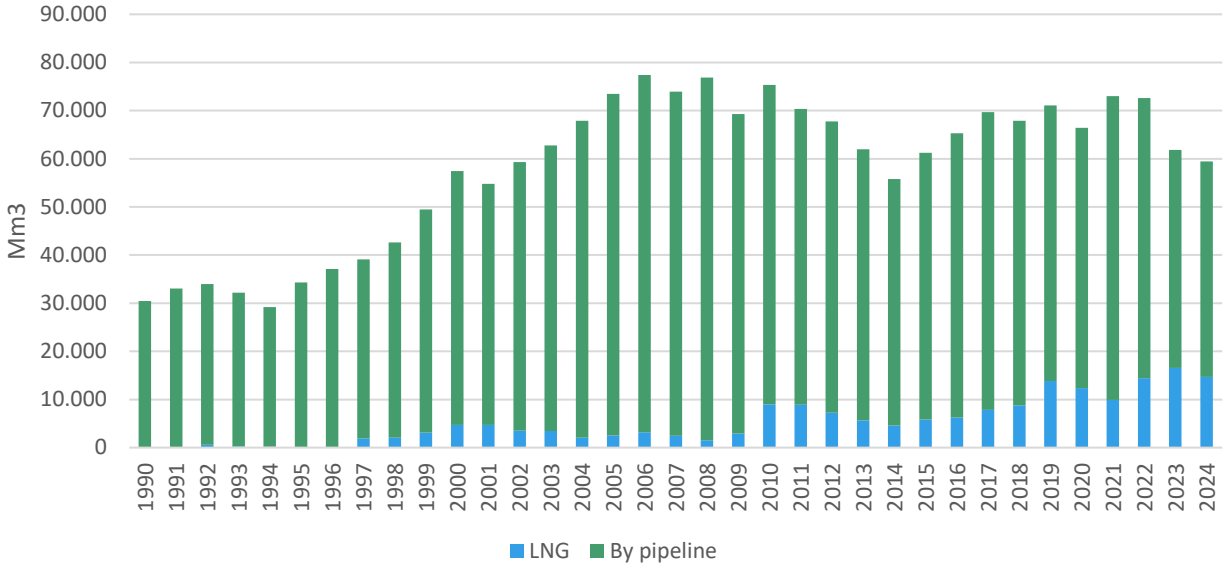
Natural gas imports into Italy amounted to approximately 30.500 Mm³ in 1990. This value remained almost unchanged until 1994, when a phase of continuous growth began, leading imports to reach a historical peak of around 77.400 Mm³ in 2006. Subsequently, a downward trend can be observed, with a minimum of about 55.800 Mm³ recorded in 2014, linked to the economic crisis, the decline in industrial consumption and improvements in energy efficiency. In more recent years, volumes increased again, approaching 73.000 Mm³ in 2022, before declining once more to around 59.500 Mm³ in 2024.

Overall, the share of imports in total natural gas availability has steadily increased, rising from an average of 65% in the early 1990s to around 95% in recent years, indicating that almost the entire national demand is met through foreign supplies.

The analysis of natural gas imports is also particularly relevant in light of Regulation (EU) 2024/1787, which includes within its scope not only activities carried out within the European Union, but also supplies of imported gas, progressively extending monitoring and reporting obligations to international supply chains.

As shown in **Figure 5**, natural gas imports into Italy take place through two main routes: international pipelines and regasification terminals, where liquefied natural gas (LNG) is delivered by LNG carriers. Until the late 1990s, almost all imports arrived via pipeline. From the second half of the 1990s to the late 2000s, regasification terminals accounted on average for about 5% of imports. Since 2010, this share has consistently exceeded 10%, reaching around 25% in the last two years, also thanks to the expansion of national regasification capacity and the growing need to diversify supply sources in the post-2022 context.

Figure 5: 1.2.2. Natural gas imports in Italy, 1990 – 2024 (Mm3)



Source: Amici della Terra elaboration on Eurostat and MASE data.

Up to 2024, natural gas imported into Italy arrives mainly through five international pipelines and four regasification terminals (see **Table 3**). The configuration of the entry points of the national network reflects the country's three main supply corridors: South, North and East.

Two entry points are located in Sicily: Mazara del Vallo, where gas from Algeria arrives through the Transmed pipeline, and Gela, where gas from Libya enters via the Greenstream pipeline. Two additional entry points are located along the Alpine border: Tarvisio, through which gas historically imported from Russia transits, and Passo Gries, a node for flows originating from Norway and from the Central European hub system. Finally, there is the Melendugno entry point in Apulia, the landing point of the Trans Adriatic Pipeline (TAP), which brings supplies from Azerbaijan to Italy, adding a new strategic supply corridor from the Caspian region.

Figure 6: Entry points for natural gas imports into Italy

Source: SNAM

Table 3: Natural gas imports into Italy by entry point, 2010–2019 (Mm³)

	2010	2012	2014	2016	2018	2020	2021	2022	2023	2024
MAZARA DEL VALLO	25.945	20.632	6.774	18.873	17.095	12.023	21.169	23.554	23.040	21.068
GELA	9.410	6.470	6.512	4.807	4.467	4.460	3.231	2.619	2.522	1.406
TARVISIO	22.492	23.851	26.154	28.267	29.688	28.420	29.061	13.989	2.844	5.607
PASSO GRIES	7.828	9.034	11.433	6.697	7.760	8.592	2.170	7.593	6.567	6.005
MELENDUGNO	-	-	-	-	-	11	7.214	10.325	9.988	10.315
PIOMBINO (LNG)	-	-	-	-	-	-	-	-	1.238	3.612
PANIGAGLIA (LNG)	2.012	1.131	70	207	895	2.554	1.054	2.244	2.603	962
CAVARZERE (LNG)	7.083	6.204	4.447	5.670	6.743	6.782	7.219	8.243	8.873	9.058
LIVORNO (LNG)	-	-	57	510	1.105	3.328	1.416	3.785	3.860	1.084
GORIZIA	135	155	0	6	25	3	39	26	41	25
OTHERS	450	249	309	247	96	33	19	25	29	21
IMPORTS TOTAL	75.354	67.725	55.757	65.284	67.872	66.207	72.592	72.403	61.604	59.163

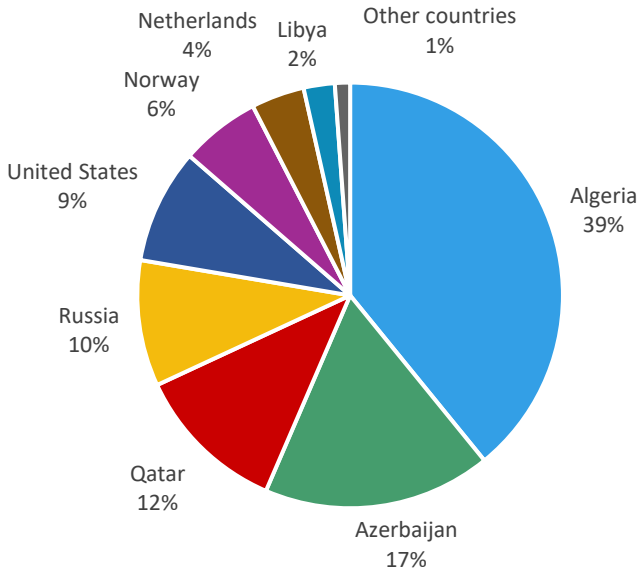
Source: MASE

An analysis of the country of origin of gas imported into Italy shows that the Russian invasion of Ukraine in February 2022 and the subsequent measures adopted by the European Union to reduce energy dependence on Moscow led to a rapid reconfiguration of national supply. Within a few years, the Italian system drastically reduced its dependence on Russian gas, rebalancing its supply towards a more diversified mix.

Until 2021, Russia had consistently been Italy's main supplier, with volumes of around 30 billion m³ per year (33,4 bcm in 2019 and 29,2 bcm in 2021). In 2022, imports fell to 13,99 bcm (–52% compared with 2021), and in 2023 the decline became almost complete, with only 2,93 bcm (–90% over two years). To ensure security of supply, Italy progressively increased imports from Algeria and Azerbaijan and expanded the use of LNG, particularly from the United States, taking advantage of the flexibility provided by national regasification terminals. The slight increase in Russian imports recorded in 2024 does not alter this structural shift and reflects temporary market dynamics.

In 2024, Algeria confirmed its dominant role, supplying around 23.300 Mm³ and covering 39% of total imports. Azerbaijan was the second-largest supplier with about 10.300 Mm³ (17%), followed by Qatar with about 6.900 Mm³ (12%), Russia with 5.700 Mm³ (10%), and the United States with 5.200 Mm³ (9%). The year 2024 therefore shows a supply mix that is significantly more diversified than in the pre-2022 period.

Figure 7: Natural gas imports into Italy by country of origin, 2024 (%)

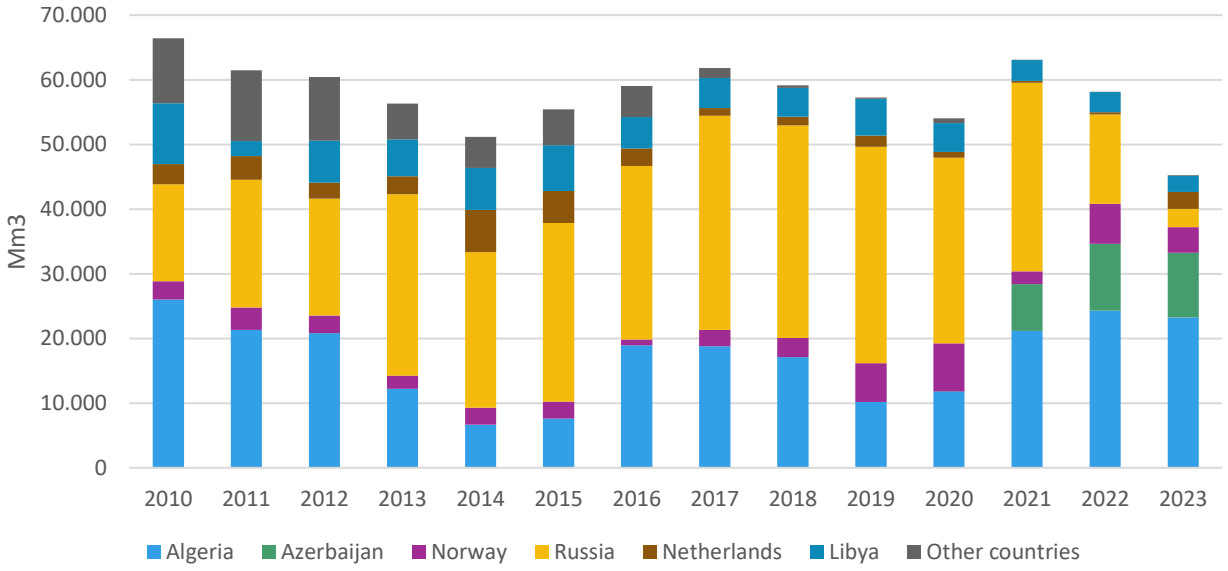


Source: Amici della Terra elaboration on Eurostat and MASE data.

1.2.2.1. Natural gas imports via pipeline by country of origin

Since 2010, natural gas imports via pipeline have mainly been supplied by Russia, Algeria and Libya, complemented by volumes arriving through Northern European pipeline systems, particularly from the Netherlands and Norway. These supplies have been supplemented, in a less continuous manner, by flows originating from Germany, the United Kingdom, Denmark and Croatia. With the commissioning of the Trans Adriatic Pipeline (TAP) in 2020, supplies from Azerbaijan have also assumed an increasingly significant role.

Figure 8: Natural gas imports into Italy via pipeline by country of origin, 1990–2023 (Mm³)



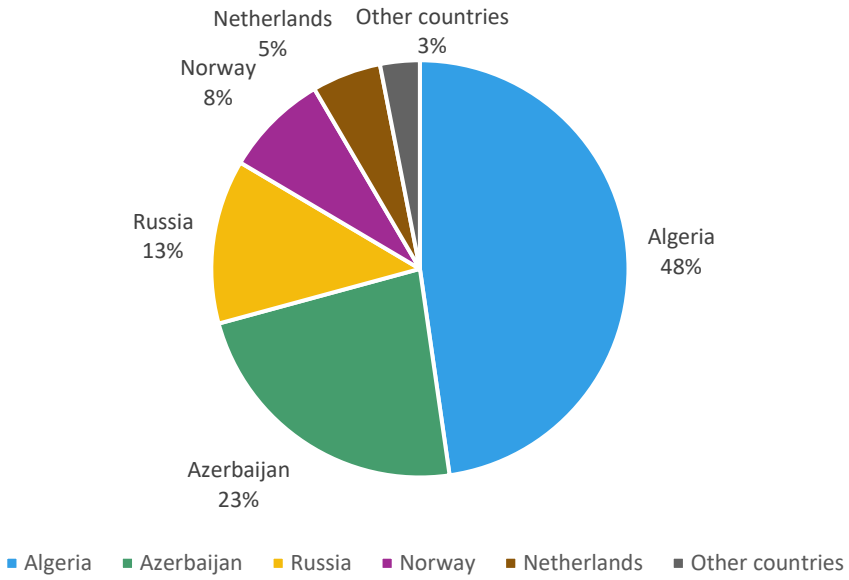
Source: Amici della Terra elaboration on Eurostat and MASE data.

In 2024, 48% of Italy's pipeline gas imports originated from Algeria, amounting to 21.300 Mm³ transported through the Transmed pipeline landing at Mazara del Vallo. Azerbaijan was the second-largest supplier, accounting for 23% of imports (10.300 Mm³) delivered through the TAP pipeline with entry at Melendugno.

Russia was the third supplier, with 5.700 Mm³, corresponding to 13% of pipeline imports, a value slightly higher than in 2023 but still far below pre-2022 levels.

These volumes are complemented by flows transiting through Passo Gries, originating from the Central European hub system, mainly consisting of Norwegian supplies (3.600 Mm³, equal to 8%) and Dutch supplies (about 2.400 Mm³, 5%). It should also be noted that both Algeria and Norway contribute to Italy's imports through LNG supplies as well, as illustrated in the following paragraph.

Figure 9: Natural gas imports into Italy via pipeline by country of origin, 2024 (%)



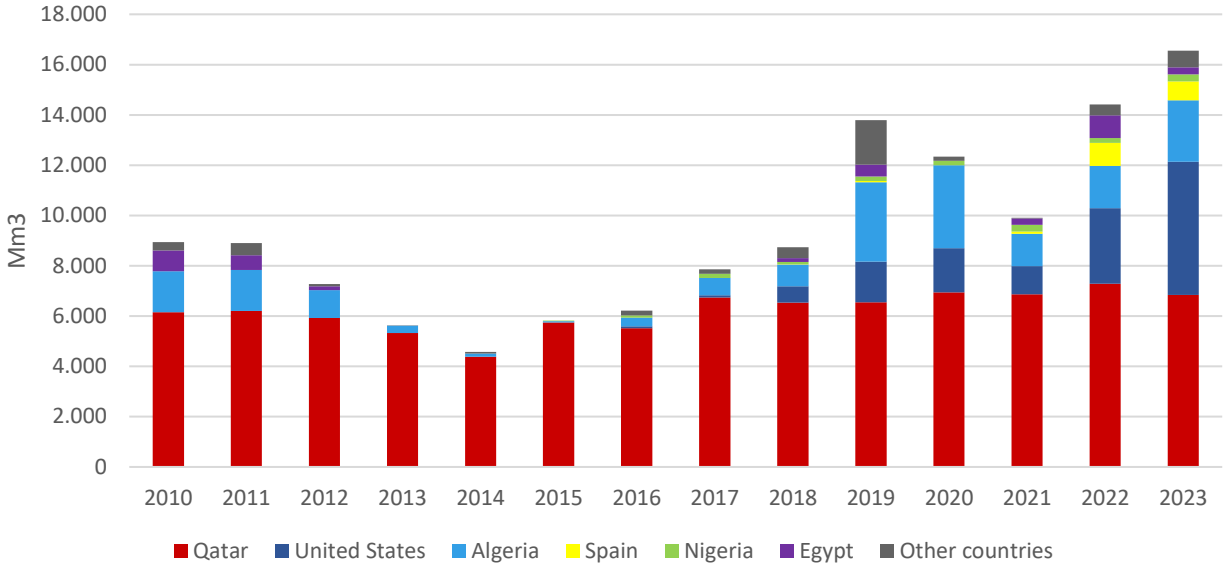
Source: Amici della Terra elaboration on Eurostat and MASE data.

1.2.2.2. LNG imports by country of origin

In Italy, five regasification terminals are in operation in 2025, consisting of one onshore facility and four offshore or floating units. The first is the Panigaglia terminal (La Spezia), operated by GNL Italia – Snam Group, which has been active since the 1970s. Subsequently, three offshore terminals entered into operation: the Adriatic LNG offshore terminal, located off the coast of Rovigo and operational since 2009; the OLT Offshore LNG Toscana FSRU (Floating Storage and Regasification Unit), located off Livorno and active since 2013; and the FSRU in the port of Piombino, which began operations in 2023. These are complemented by the recent FSRU in Ravenna, commissioned in 2025 and also operated by Snam.

During the first half of the 1990s, LNG imports were very limited. From the second half of the 1990s until the end of the 2000s, imports averaged about 3 billion m³ per year, mainly from Algeria and, to a lesser extent, from Nigeria. Between 2010 and 2018, the average volume rose to around 7 billion m³ per year, supplied primarily by Qatar. In recent years, imported volumes have increased significantly, reaching an average of about 13 billion m³ and a value of 14,7 billion m³ in 2024, thanks to higher deliveries from Qatar, the United States and Algeria. This increase reflects both the expansion of national regasification capacity and the need to diversify supply sources in the post-2022 context.

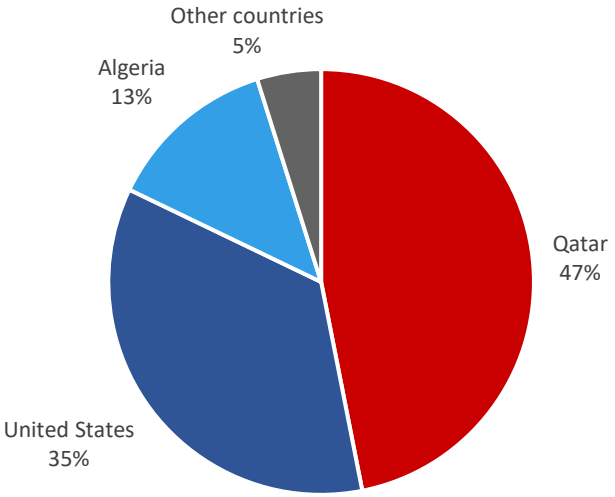
Figure 10: Natural gas imports into Italy through LNG terminals by country of origin, 1990–2023 (Mm³)



Source: Amici della Terra elaboration on Eurostat and MASE data.

In 2024, nearly half of the LNG imported into Italy (47%) originated from Qatar, while 35% came from the United States and 13% from Algeria. This was complemented by cargoes arriving from Norway, Nigeria and other countries (5%).

Figure 11: Natural gas imports into Italy through LNG terminals by country of origin, 2024 (%)



Source: Amici della Terra elaboration on Eurostat and MASE data.

BOX 2: Natural gas importers in Italy

The "Relazione annuale sullo stato dei Servizi" (Annual Report on the State of Services) is the main document through which the Italian Regulatory Authority for Energy, Networks and Environment (ARERA). It provides an updated overview of developments and key characteristics of the regulated sectors, including electricity, natural gas, the integrated water service and waste management. The report analyses market trends, service quality levels and economic and infrastructural aspects, offering a reference information base for public decision-makers, operators and citizens. The report includes a chapter dedicated to the natural gas sector, presenting data on supply sources, imports, market structure and the main operators.

ARERA's report provides a list of the main natural gas importers in 2024 (**Table 4**).

The list shows Eni in first place, with 17,8 bcm of gas imported (30,9%), followed by Edison in second place with 10.1 bcm (17,6%).

Azerbaijan Gas Supply Company, which imports Azerbaijani gas through the TAP pipeline, ranks third with a volume that reached 9,2 bcm in 2024 (15,9%).

The following positions are held by Enel Global Trading (6,3%), Shell Energy Europe (5,8%), Vitol (4,2%), Gunvor International (3,8%), ExxonMobil Gas Marketing Europe (3,4%), Axpo Solutions (1,6%) and BP Gas Marketing (1,2%).

Overall, the three largest importers supplied 37,1 of the 57,6 bcm of natural gas imported in 2024, accounting for 64,4% of the total.

Table 4: Top twenty gas importers in Italy in 2024

Operator	Quantity (Mm3)	Share (%)
Eni	17.772	30,9%
Edison	10.143	17,6%
Azerbaijan Gas Supply Company Limited	9.181	15,9%
Enel Global Trading	3.624	6,3%
Shell Energy Europe	3.316	5,8%
Vitol	2.441	4,2%
Gunvor International	2.177	3,8%
Exxonmobil Gas Marketing Europe	1.975	3,4%
Axpo Solutions	938	1,6%
Bp Gas Marketing	706	1,2%
Vng Handel & Vertrieb	529	0,9%
Hera Trading	460	0,8%
Dxt Commodities Enet Energy	438	0,8%
Geoplin	427	0,7%
A2A	421	0,7%
Engie Italia	418	0,7%
Totalenergies Gas & Power	375	0,7%
Enet Energy	366	0,6%
Centrica Energy Trading	276	0,5%
Cez	271	0,5%
Altri	1.341	2,3%
TOTALE	57.595	100,0%

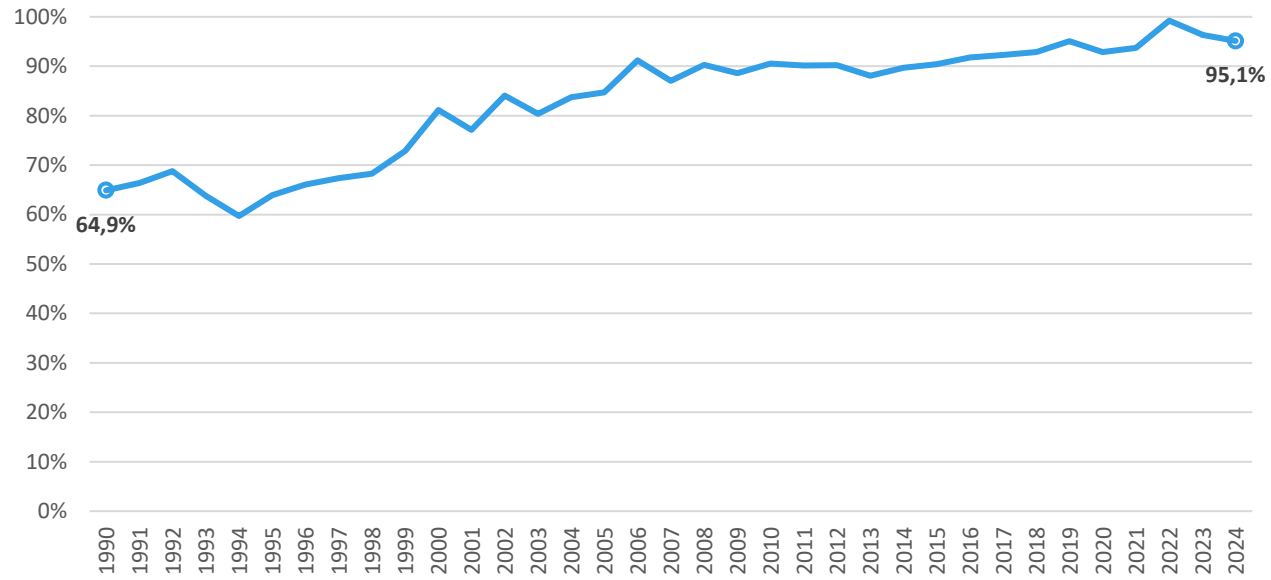
Source: Relazione annuale ARERA sullo Stato dei Servizi 2024

1.2.2.3. Energy dependence on natural gas imports

The European Union's energy dependence indicator measures the share of energy demand met through imports and has become increasingly central in the energy policy debate, particularly following geopolitical events that have highlighted the risks associated with excessive concentration of supply sources. High dependence on a limited number of supply routes exposes economies to price volatility and the risk of supply disruptions, as occurred in 2022 during the Russia–Ukraine crisis. In this context, the indicator makes it possible to assess a country's level of energy autonomy and the effectiveness of the strategies adopted to strengthen security of supply.

In the case of Italy, energy dependence on natural gas reached its peak in 2022 at 99,2%, before declining in the following two years to 95,1% in 2024. This level nevertheless remains structurally high, both because domestic production is limited and now accounts for only a few percentage points of national demand, and because Italy's dependence on natural gas is generally higher than the EU average. Over the last ten years, dependence has increased by about 6%, confirming that the Italian system continues to rely heavily on foreign imports, even in the context of increasing diversification of supply sources.

Figure 12: 1.2.2.3. Energy dependence on natural gas imports, 1990 – 2024 (%)



Source: Amici della Terra elaboration on Eurostat and MASE data.

1.3. Gross inland consumption of petroleum products

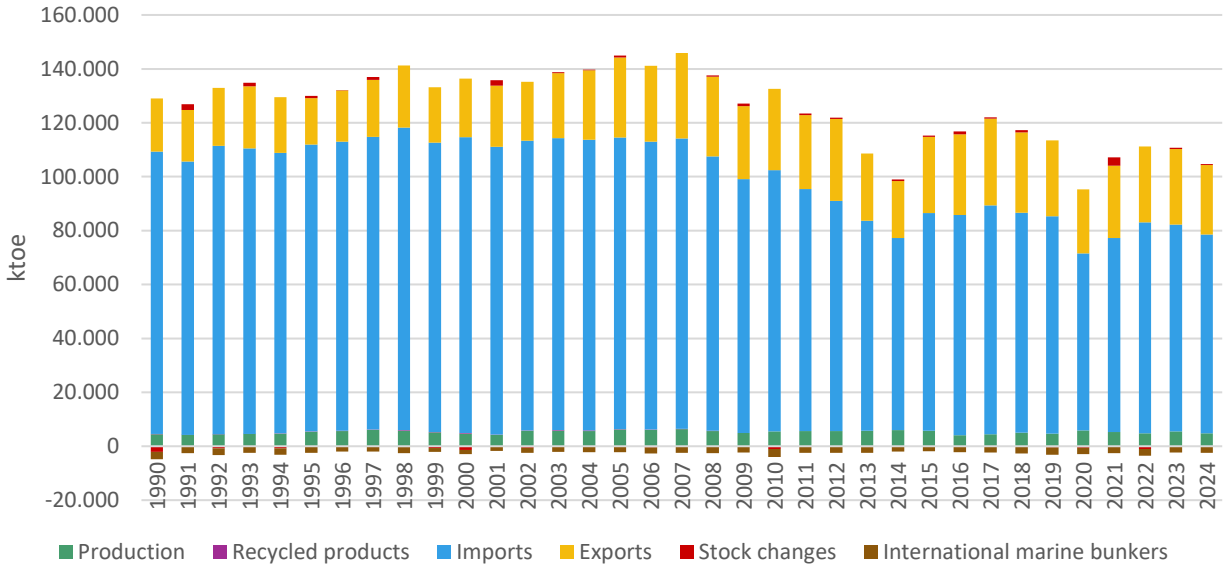
The balance of oil and petroleum products (such as gasoline, diesel, LPG and fuel oil) shows that, also in this case, Italy's gross inland consumption is structurally dominated by imports. In 2024, with domestic production amounting to about 4,8 Mtoe, imports exceeded 73,8 Mtoe, while exports stood at around 25,7 Mtoe. Domestic production therefore contributes only marginally to the overall availability of oil, confirming the limited role of national extraction activities relative to the country's demand.

Over the period considered, domestic oil production shows a relatively stable trend at low levels, with fluctuations linked to the start-up or decline of individual fields but without significant structural changes. This reflects the maturity of Italy's main oil fields and the limited development of new extraction initiatives, in a context characterised by technical, economic and regulatory constraints.

Exports of oil and petroleum products, on the other hand, are significant throughout the entire historical series and clearly higher than those observed for natural gas. They are mainly linked to the role of Italy's refining system, which imports crude oil from abroad, processes it and re-exports a significant share of the

refined products to international markets. Export flows remain high even in recent years, although showing some reduction compared with pre-crisis peaks.

Figure 13: Gross inland consumption of petroleum products in Italy, 1990 – 2024 (ktoe)



Source: Amici della Terra elaboration on Eurostat and MASE data.

1.3.1. Oil production in Italy

Crude oil production in Italy amounted to about 4.700 kt in 1990. In the early 1990s it showed moderate growth, exceeding 5.000 kt in 1994, and then increased further in the second half of the decade, surpassing 6.000 kt by the end of the 1990s. After a decline in the early 2000s, production rose again and reached the highest level in the historical series in 2007, at about 6.600 kt.

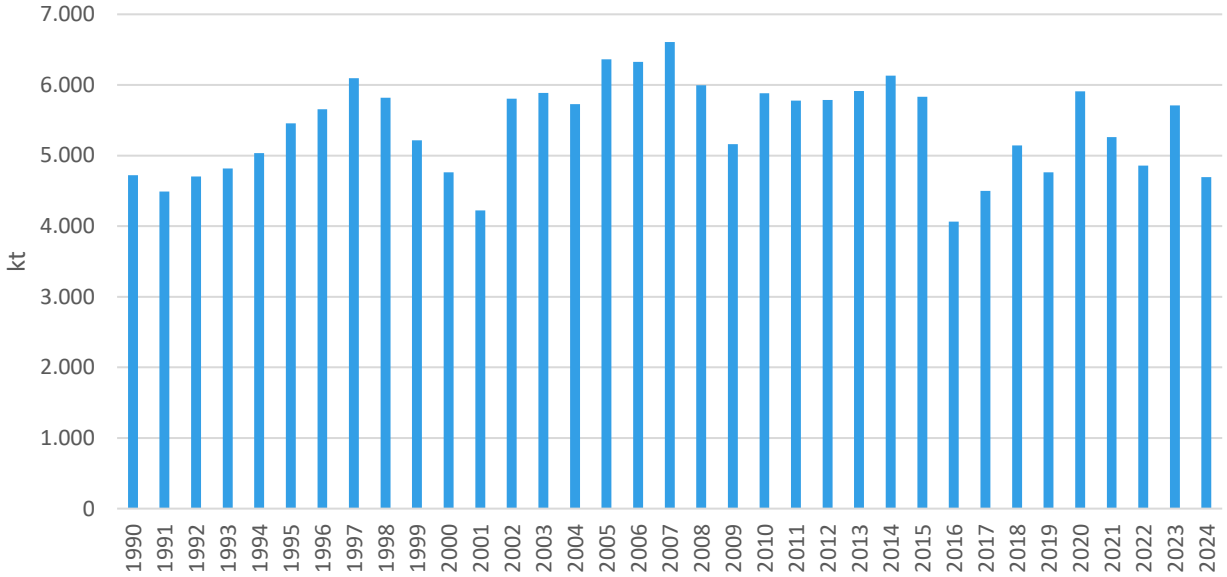
Starting in 2008, national oil production entered a phase of gradual decline, with year-to-year fluctuations linked to the performance of individual fields and to maintenance or development activities, but without returning to the previous peak levels. In 2024, production amounted to around 4.700 kt, comparable to the levels recorded in the early 1990s.

Overall, the trend in Italian oil production reflects the maturity of the main fields, limited exploration activity and the absence of new discoveries of significant size. Although there have been periods of growth linked to the start-up or expansion of specific fields, national production remains structurally limited and unable to significantly affect the country's overall demand.

Crude oil production in Italy is predominantly onshore. In 2024, more than 90% of national production originated from onshore fields, while the offshore share was marginal. Onshore production is highly concentrated in Basilicata, which by far represents the country's main extraction area (around 85% of national production), with much smaller contributions from Sicily, Emilia-Romagna and Molise. Offshore production, accounting for less than 10% of the national total in 2024, is located in the so-called Zones B and C and shows volumes significantly lower than those from onshore activities.

As a result of this trend, the share of Italian crude oil production within the European context has progressively declined over time, reinforcing the role of imports as the main source of supply and confirming the residual role of the national oil upstream sector in Italy's energy balance.

Figure 14: Oil production in Italy, 1990 – 2024 (kt)



Source: Amici della Terra elaboration on Eurostat and MASE data.

1.3.2. Oil imports in Italy

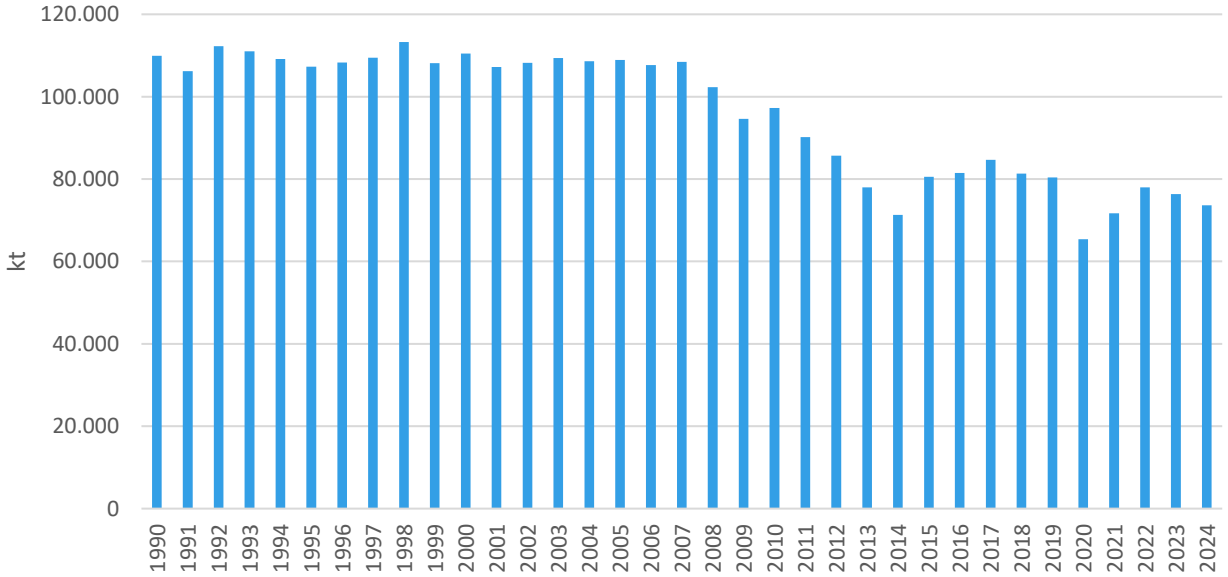
Imports of crude oil and petroleum products into Italy amounted to about 110,000 kt in 1990. During the first fifteen years of the historical series, imported volumes remained largely stable, fluctuating around 108–113 thousand kt, with a peak of about 113.300 kt in 1998. This trend reflects a high and relatively stable energy demand, supported in particular by the transport sector and refining activity.

From the second half of the 2000s onwards, imports began to decline gradually, with the decrease becoming more pronounced after 2008. The decline continued until reaching a minimum of around 71,300 kt in 2014, in conjunction with the economic and financial crisis, the contraction in fuel consumption, improvements in energy efficiency and the beginning of a progressive structural change in demand for petroleum products.

In the following years, imports showed a partial recovery, although remaining below pre-crisis levels. After another drop in 2020, linked to the effects of the pandemic, volumes temporarily increased in the period 2021–2022, before declining again to around 73.700 kt in 2024. Overall, the level of oil imports in 2024 is more than one third lower than the values recorded in the late 1990s.

Throughout the entire period considered, the share of imports in the total availability of oil and petroleum products remains structurally high, confirming Italy's strong dependence on foreign crude oil supplies. Unlike natural gas, this dependence is not mediated by a plurality of transport infrastructures but relies mainly on maritime imports of crude oil destined for national refineries. This has direct implications both for security of supply and for the relevance of methane emissions associated with the upstream stages of the oil supply chain in producing countries.

Figure 15: Oil imports into Italy, 1990 – 2024 (kt)



Source: Amici della Terra elaboration on Eurostat and MASE data.

1.3.2.1. Oil imports by country of origin

The analysis of the geographical origin of oil imports highlights a highly diversified structure. Similarly to the case of natural gas, the analysis of oil imports is also relevant for the implementation of Regulation (EU) 2024/1787, which considers emissions associated with energy commodities placed on the Union market, regardless of their place of extraction.

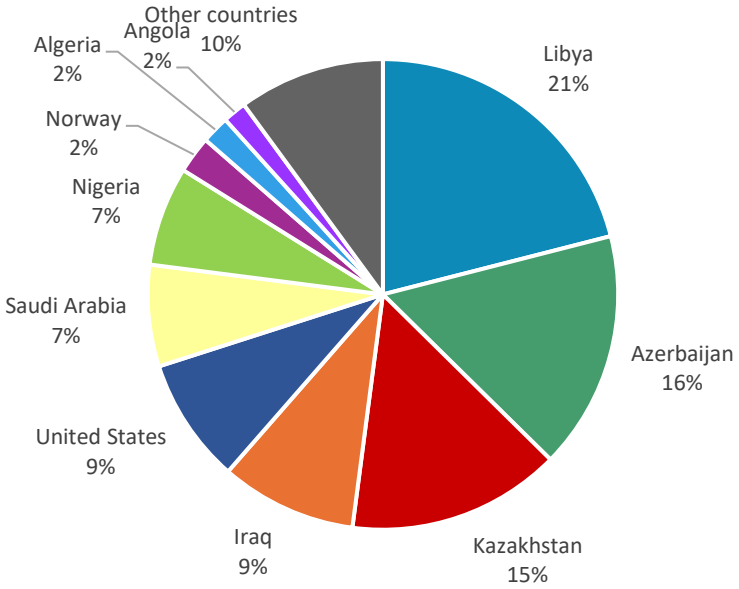
In 2024, crude oil imports into Italy amounted to approximately 56,7 million tonnes. The main supply area is Africa, which contributes about 21,0 Mt, accounting for more than one third of the total. Within this region, Libya remains the leading supplier, with nearly 12 Mt of crude oil, followed by Nigeria, Algeria and Angola.

The Middle East represents the second main area of origin, with approximately 9,4 Mt, mainly driven by Iraq and Saudi Arabia, which together account for almost all supplies from the region. Imports from Asia follow, amounting to around 17,6 Mt, largely concentrated in Azerbaijan and Kazakhstan, confirming the growing role of Caspian basin countries in Italy's supply mix.

Supplies from the Americas total about 6,7 Mt, mainly originating from the United States, with smaller contributions from Brazil, Mexico and Venezuela. Imports from Europe are more limited (around 2,0 Mt) and are mainly attributable to Norway and, to a lesser extent, the United Kingdom.

Overall, the geography of oil and petroleum product imports highlights the strong heterogeneity of Italy's supply chains. This diversification contributes to energy security but also implies that a significant share of methane emissions associated with the oil supply chain occurs outside the national territory, in production and regulatory contexts that differ considerably from one another, with direct implications for the implementation of the European Regulation on the reduction of methane emissions in the energy sector.

Figure 16: Crude oil imports into Italy by country of origin, 2024 (kt)



Source: Amici della Terra elaboration on Eurostat and MASE data.

1.4. Domestic natural gas consumption and final energy consumption by sector

1.4.1. Domestic consumption

Domestic consumption of natural gas, as reported in the energy balances published by the Ministry of the Environment and Energy Security (MASE), is broken down into energy transformation uses, energy sector consumption and the share available for final consumption, to which distribution losses are added.

Consumption for energy transformation, mainly for the production of electricity and derived heat, increased significantly from 1990 (8.267 ktoe) to a peak in 2007 (31.354 ktoe), in parallel with the expansion of gas-fired combined-cycle plants, which became a central component of the national electricity mix. In subsequent years, these uses declined slightly, stabilising at around 20 Mtoe (19.310 ktoe in 2024) as a result of lower electricity demand, the expansion of renewable energy sources and improvements in energy efficiency.

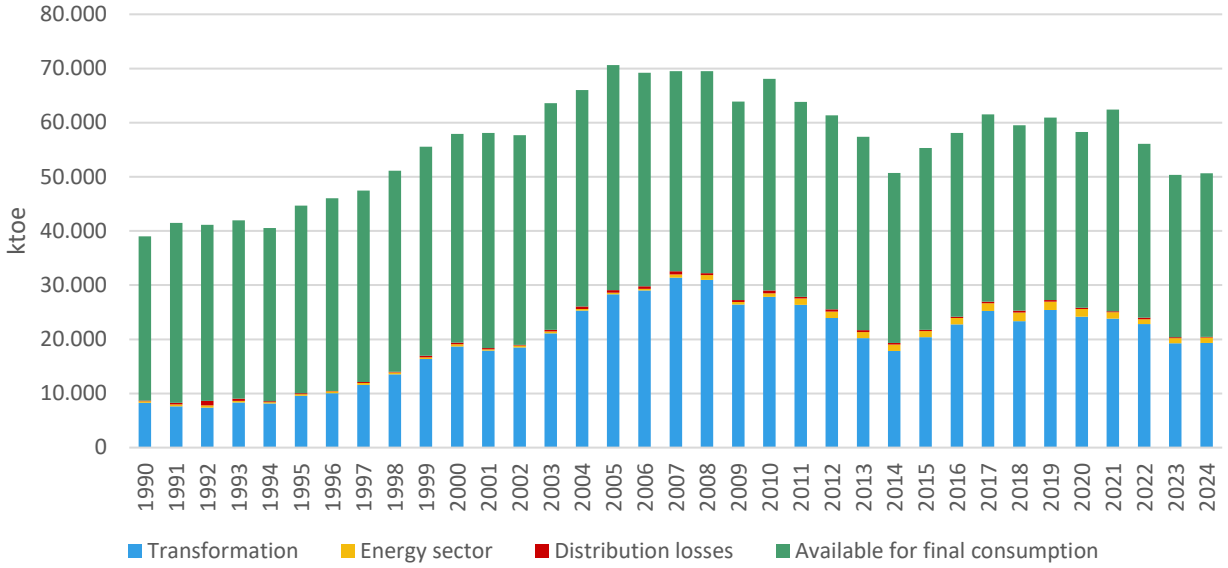
Energy sector consumption, which includes the use of gas in refining plants and other internal uses of the energy sector, increased from just under 300 ktoe in 1990 to almost 1.600 ktoe in 2018, before declining to around 1.000 ktoe in 2024.

Distribution losses showed high variability during the period 1990–2000, ranging from 61 ktoe (72 Mm^3) in 1996 to 808 ktoe (946 Mm^3[1]) in 1992. In the subsequent period, variability decreased, with values ranging between 116 ktoe in 2002 (136 Mm^3) and 555 ktoe in 2007 (650 Mm^3), and with an average of 209 ktoe (245 Mm^3) between 2020 and 2024, highlighting an overall improvement in network infrastructure.

The share of natural gas available for final consumption increased from 1990 (30,345 ktoe) to reach around 41 Mtoe between 2003 and 2005, before gradually declining and stabilising in the last two years at around 30 Mtoe, levels similar to those observed in the early 1990s. This reduction reflects the decline in industrial demand, increased efficiency in residential and commercial uses and structural changes in national energy demand.

[1] The conversion from ktoe to cubic metres of natural gas was carried out assuming an average lower heating value of 35.8 MJ/m^3, consistent with the conversion factors used by Eurostat and the IEA.

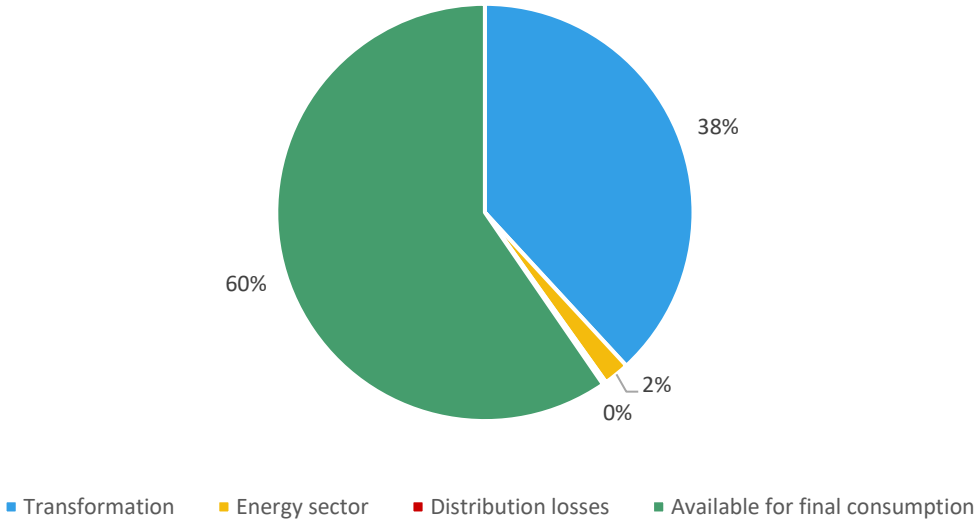
Figure 17: Domestic natural gas consumption in Italy by end use, 1990 – 2024 (ktoe)



Source: Amici della Terra elaboration on Eurostat and MASE data.

In 2024, 60% of domestic natural gas consumption consisted of the share of gas available for final consumption, while 38% was used for energy transformation processes. Excluding the marginal share of distribution losses, the remaining 2% was consumed by the energy sector.

Figure 18: Domestic natural gas consumption in Italy by end use, 2024 (%)



Source: Amici della Terra elaboration on Eurostat and MASE data.

1.4.2. Final energy consumption of natural gas by sector

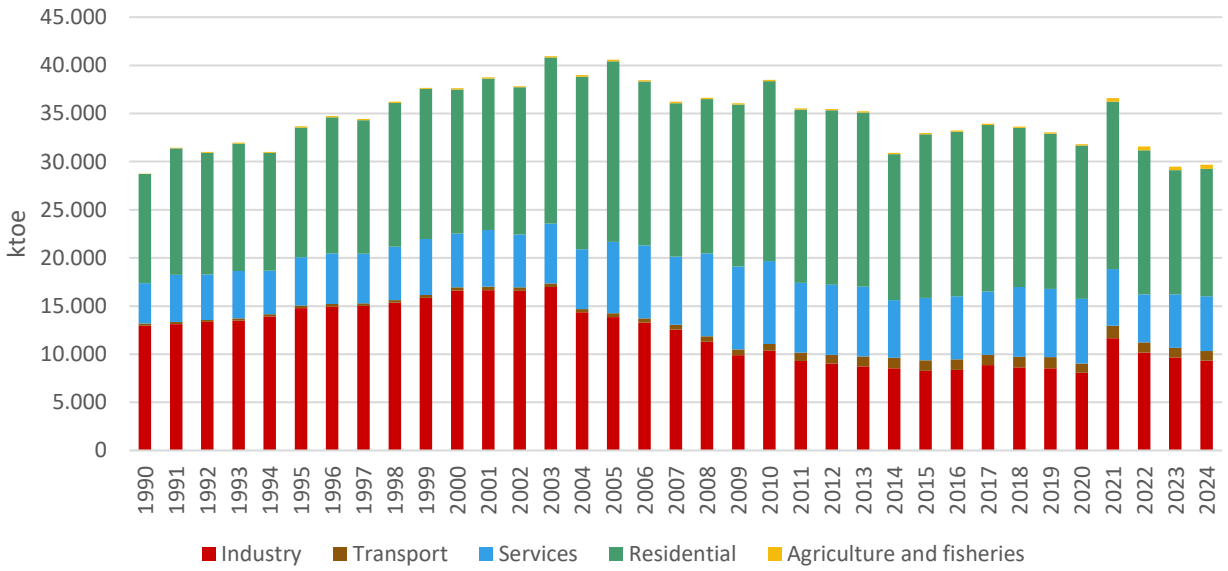
Final energy consumption (FEC) represents the energy actually used by end-users (households, industry, services and agriculture) and does not include the energy used by the energy sector for its own processes. It is a key indicator for assessing energy efficiency under Directive (EU) 2023/1791. In 2024, the Ministry of the Environment and Energy Security (MASE) estimates Italy's final energy consumption at 109 Mtoe, of which 27% (29,7 Mtoe) is covered by natural gas. Natural gas therefore continues to play a significant role, particularly in residential uses and industrial processes.

As shown in **Figure 19**, final consumption of natural gas increased from 1990 (28,7 Mtoe) until the mid-2000s, reaching levels close to 40 Mtoe, before gradually declining and stabilising over the last two years (2023–2024) at around 29 Mtoe.

Throughout the entire historical series, the largest contributions come from the residential and industrial sectors, which together account for around three quarters of final consumption. However, the two components show opposite trends: industrial consumption decreases from about 13 to 9,3 Mtoe, reflecting structural changes in the manufacturing sector and improvements in energy efficiency; whereas residential consumption increases from 11 to 13 Mtoe, supported by the widespread use of natural gas for domestic heating and by climatic and demographic dynamics.

This is followed by the services sector, which is also growing (from 4,2 to 5,7 Mtoe). The contributions from transport and agriculture remain smaller, although they have increased compared with 1990: from 208 to 978 ktoe in transport, and from 22 to 441 ktoe in agriculture and fisheries.

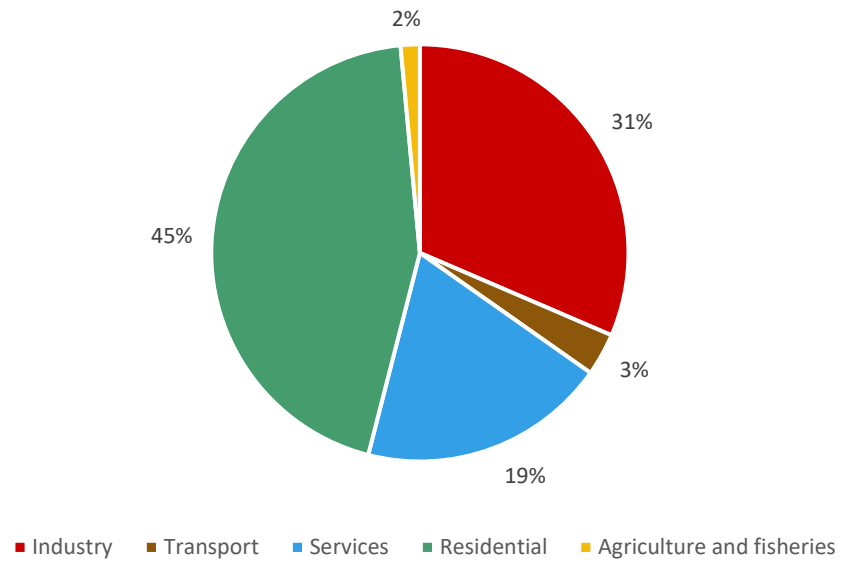
Figure 19: Final consumption of natural gas in Italy, 1990 – 2024 (ktoe)



Source: Amici della Terra elaboration on Eurostat and MASE data.

The overall distribution of natural gas consumption in 2024, shown in **Figure 20**, highlights the dominant role of the residential sector, which accounts for about 45% of national gas consumption. This is followed by industry with 31%, services with 19%, transport with 3%, and agriculture and fisheries with 2%. This configuration confirms that natural gas remains an essential energy source for both residential and productive uses, with a slight expansion in household and service sector consumption, alongside a slowdown in industrial activity.

Figure 20: Final consumption of natural gas, 2024 (%)



Source: Amici della Terra elaboration on Eurostat and MASE data.

BOX 3: Distribution losses, unaccounted-for natural gas, and methane emissions

In the analysis of data on the natural gas system and related greenhouse gas emissions, the terms distribution losses, unaccounted-for natural gas and methane emissions are sometimes used interchangeably inappropriately. In reality, these are distinct concepts that describe different phenomena and serve different analytical purposes, including within the broader assessment of the phenomenon more accurately referred to as Delta In/Out in relation to distribution networks[2].

Distribution losses

In energy statistics, distribution losses refer to the quantities of gas lost during transport and distribution along the network (e.g. pipeline leaks, dispersion, incidents or measurement discrepancies), from production to the point of delivery to the final consumer. In the national energy balance (e.g. MASE or Eurostat), distribution losses represent a statistical convention, aimed at reconstructing energy flows.

This category includes: leaks from pipelines, losses from joints, valves and equipment, releases associated with maintenance and network interventions, and measurement discrepancies.

Unlike unaccounted-for gas, distribution losses describe a real physical phenomenon. They constitute one component of unaccounted-for gas but do not fully capture its meaning.

Unaccounted-for natural gas

In technical and regulatory terminology, unaccounted-for natural gas represents the difference between the volumes of gas injected into the network and those measured and billed to final customers over a given period of time. It is therefore a regulatory and accounting concept, more precisely defined as Delta I/O, used by ARERA and network operators for various purposes, and it does not correspond to a direct measurement of physical natural gas losses.

This category includes heterogeneous components such as: actual technical losses (leaks and gas releases), measurement and estimation errors or uncertainties, fraudulent withdrawals, and variations in the mass of gas stored within the network (line-pack).

In recent years, Delta I/O has been subject to strict regulation by ARERA (Resolution 386/22) aimed at reducing its magnitude.

Methane emissions

Methane emissions include all releases of CH_4 into the atmosphere along the entire natural gas supply chain. These emissions may result from fugitive leaks, intentional venting, abnormal events or malfunctions, and uncombusted methane from flaring.

Methane emissions are not an indicator of system balance or efficiency, but rather an indicator of the environmental (and climate) impact of the natural gas supply chain, as methane is a gas with a high global warming potential and is subject to specific monitoring within climate policies and relevant international frameworks.

[2] For further reading: DELL'ISOLA, Marco; FICCO, Giorgio; ZUENA, Fabrizio. ANALISI DEL DELTA IN-OUT NELLE RETI DI DISTRIBUZIONE DEL GAS NATURALE IN ITALIA.

2. Methane emissions in the energy sector in Italy

This chapter provides an overview of greenhouse gas emissions, with a specific focus on methane emissions. Data for Italy are drawn from the National Greenhouse Gas Inventory prepared by ISPRA, while European-level data are sourced from the Eurostat database.

It should be noted that, in both cases, the reported emission values are largely estimates, calculated according to methodologies defined by the IPCC.

In this report, emissions are expressed either in tonnes (or kilotonnes – kt, equal to 1.000 tonnes) of greenhouse gases or in terms of tonnes of CO_2 equivalent. For the calculation of CO_2-equivalent emissions, Global Warming Potential (GWP) factors over a 100-year time horizon have been applied, using the values reported in the IPCC Fifth Assessment Report (AR5, 2014).

In other reporting frameworks, the GWP100 factors updated in the IPCC Sixth Assessment Report (AR6, 2020) are sometimes used; the methodological choice adopted in this report is explicitly stated in order to ensure consistency and transparency in the interpretation of results.

It is, however, important to recall that methane has a significantly higher climate impact in the short term: over a 20-year time horizon (GWP20), its global warming potential is equal to 84 according to AR5 and 82.5 according to AR6 (for fossil methane), values approximately three times higher than the corresponding GWP100 values.

A summary table of the main greenhouse gases and their 100-year CO_2-equivalent conversion factors is provided below.

Table 5: Global Warming Potentials (GWP) relative to CO_2

Greenhouse gas	GWP100 (AR5)	GWP100 (AR6)
Carbon dioxide (CO_2)	1	1
Methane (CH_4)	28	29,8 (fossil) / 27 (non-fossil)
Nitrous oxide (N_2O)	265	273

Source: IPCC Fifth Assessment Report (AR5), 2014, and Sixth Assessment Report (AR6), 2020.

It should also be noted that the analysis of methane emissions for Italy presented in this chapter is based on ISPRA estimates contained in the National Inventory Document (NID) 2025, which covers the period up to 2023. However, following the completion of this analysis, the NID 2026 (with data updated to 2024) was published. This latest edition incorporates, for the first time, information derived from the Article 12 reports under Regulation (EU) 2024/1787, used to improve the representation of emissions in the oil and gas sector, particularly in terms of reallocation across emission categories and value chain segments. The most recent ISPRA data will be used in Chapter 5 for a direct comparison with emissions reported by operators for 2024 and will be further analysed in future updates of this report.

2.1. Greenhouse gas emissions by sector

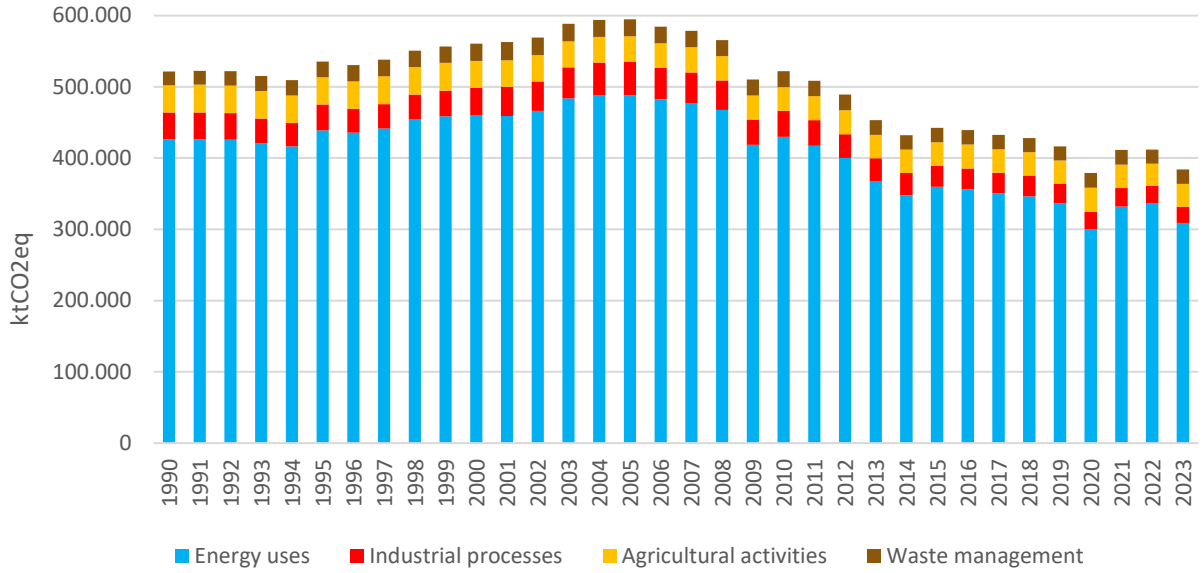
The historical series of greenhouse gas emissions in Italy shown in **Figure 21** highlights a growth trend from 1990 to 2005, rising from an initial level of almost 521 to about 595 million tonnes of CO_2 equivalent ($MtCO_2eq$), corresponding to an increase of 14,1% over 15 years. This was followed by a continuous decline, reaching approximately 384 $MtCO_2eq$ in 2023, representing a reduction of 26,4% compared with 1990 levels, a value still far from the EU target of a 55% reduction by 2030 compared with 1990.

All sectors show a reduction compared with 1990 levels, particularly industrial processes (–40,5% in 2023), followed by energy use (–27,5%) and agriculture (–15,6%). The only exception is emissions from waste management, which over the historical series considered have increased by 6,5% between 1990 and 2023.

A closer look at greenhouse gas emissions from the energy use sector shows that the reduction since 1990 has been driven by the decline in emissions from energy industries (–26% compared with 1990 levels) and

from manufacturing industries and construction (–45% compared with 1990 levels). These reductions are mainly linked to production cuts in some subsectors (such as chemicals, construction and building materials, and steel), due to the effects of the economic recession and a general improvement in efficiency. The residential sector has also recorded a decrease (–31% compared with 1990), while transport, particularly road transport, and the service sector have instead shown increases relative to 1990 (respectively +7% and +78%).

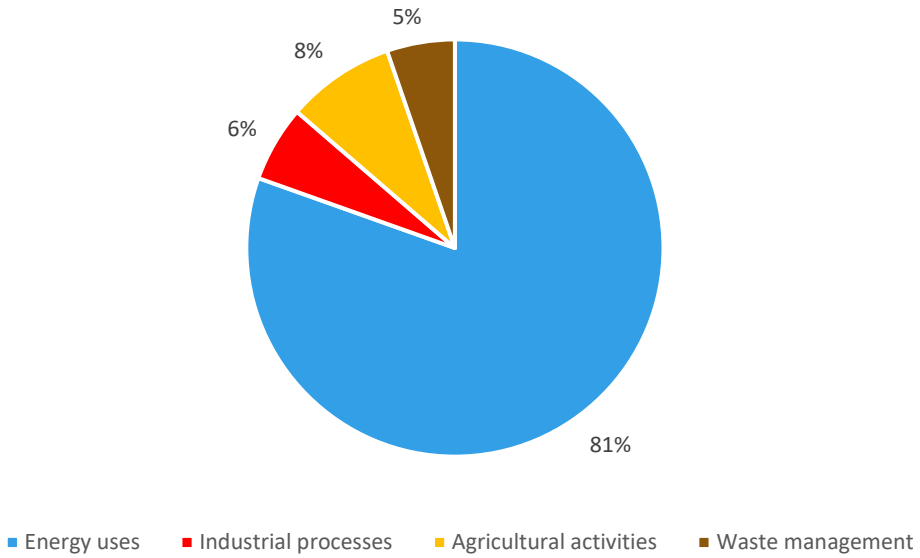
Figure 21: Greenhouse gas emissions in Italy by sector, 1990–2023 (ktCO₂eq)



Source: Amici della Terra elaboration on ISPRA data.

In Italy, greenhouse gas emissions throughout the historical series are predominantly generated by the energy use sector, which mainly produces CO_2 emissions and accounted for 81% of total emissions in 2023 (**Figure 22**). This is followed by emissions from agricultural activities, which account for 8%, emissions from non-energy industrial processes, representing 6% of the total, and finally emissions from waste management processes, including landfills, which account for 5% of greenhouse gas emissions recorded in Italy in 2023.

Figure 22: Greenhouse gas emissions in Italy by sector, 2023 (%)



Source: Amici della Terra elaboration on ISPRA data.

Overall, the decline in greenhouse gas emissions in Italy reflects a combination of structural factors, such as reduced industrial activity, improvements in energy efficiency and the growth of renewable energy sources, but does not automatically imply a uniform reduction across all types of greenhouse gases or across all sectors.

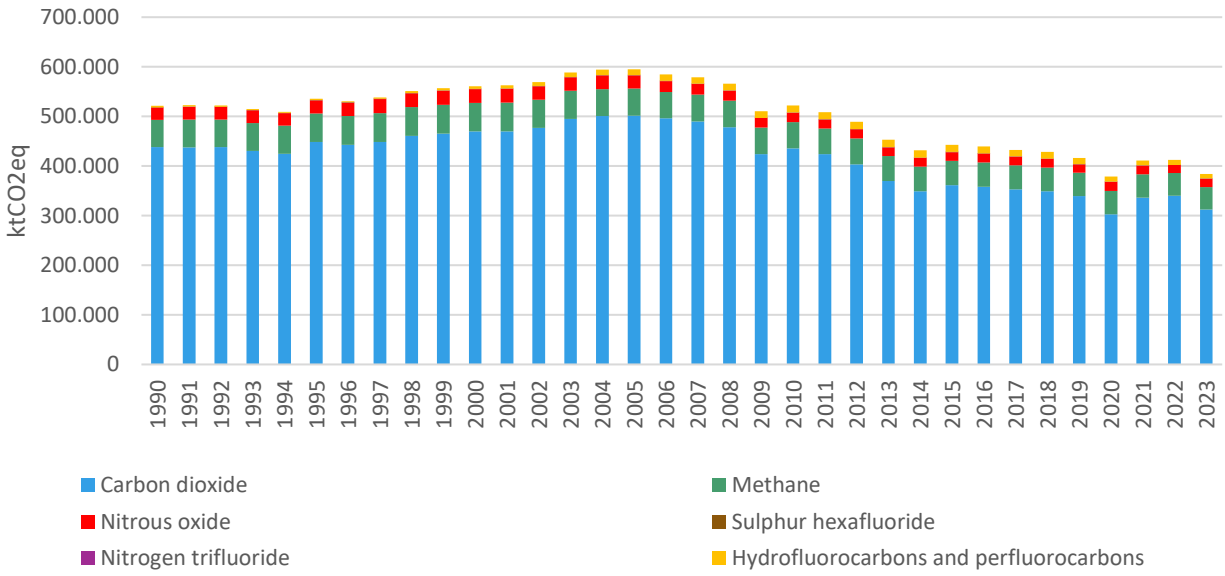
2.2. Greenhouse gas emissions by type of gas

Greenhouse gas emissions are largely driven by carbon dioxide (CO_2) emissions, which account for more than 80% of total greenhouse gas emissions throughout the entire historical series. These emissions are mainly associated, in the case of anthropogenic activities, with the use of fossil fuels.

The greenhouse effect is also influenced by methane (CH_4), whose emissions are primarily linked to livestock farming in the agricultural sector, waste management activities and leaks in the energy sector, and by nitrous oxide (N_2O), which mainly originates from agricultural activities and from the energy sector, including transport.

The overall contribution of fluorinated gases (F-gases), including HFCs, PFCs, SF_6 and NF_3, to the greenhouse effect is smaller compared with the aforementioned pollutants. Their presence is mainly associated with industrial processes and refrigeration activities.

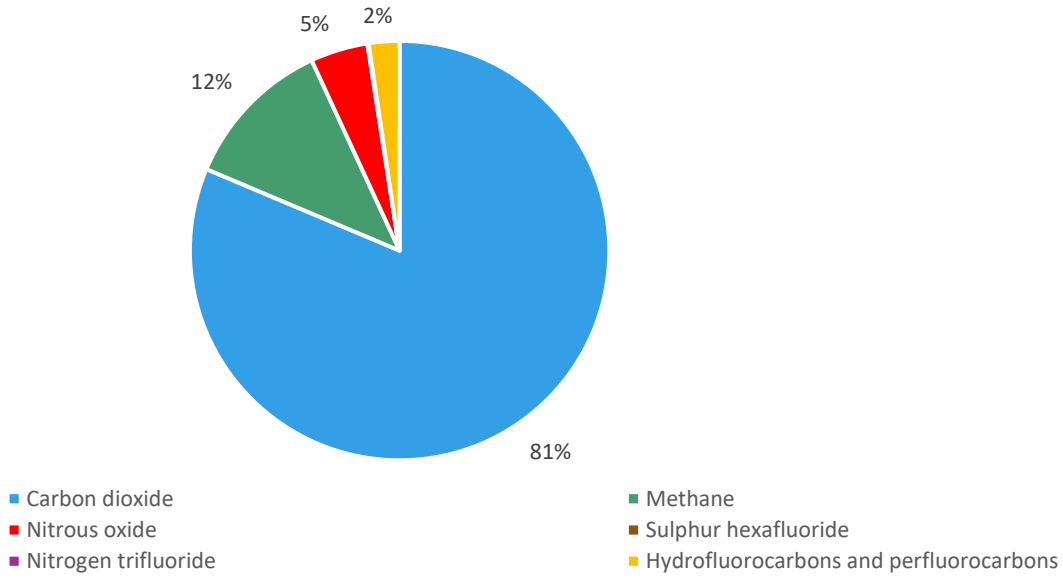
Figure 23: Greenhouse gas emissions in Italy by type of gas, 1990–2023 ($ktCO_2eq$)



Source: Amici della Terra elaboration on ISPRA data.

In Italy, carbon dioxide emissions accounted for 81% of total greenhouse gas emissions in 2023, while methane represented 12%, followed by nitrous oxide at 5%. Hydrofluorocarbons and perfluorocarbons accounted for 2%, while sulphur hexafluoride and nitrogen trifluoride contributed only marginal shares.

Figure 24: Greenhouse gas emissions in Italy by type of gas, 2023 (%)



Source: Amici della Terra elaboration on ISPRA data.

2.3. Methane emissions

Although methane emissions represent a smaller share in terms of CO_2 equivalent, they are strategically important for climate policy due to their high global warming potential in the short term and the possibility of achieving rapid and effective reductions.

The trend of methane emissions in Italy shows a significant decline over time, but also reveals strong sectoral heterogeneity, which makes a disaggregated analysis necessary in order to identify where the main opportunities for intervention lie.

2.3.1. Methane emissions by sector

Methane emissions over the historical series (**Figure 25**) follow a trend similar to that observed for overall greenhouse gas emissions, with an initial increase until the early 2000s followed by a phase of decline, falling from 55 $MtCO_2eq$ in 1990 to 45 $MtCO_2eq$ in 2023.

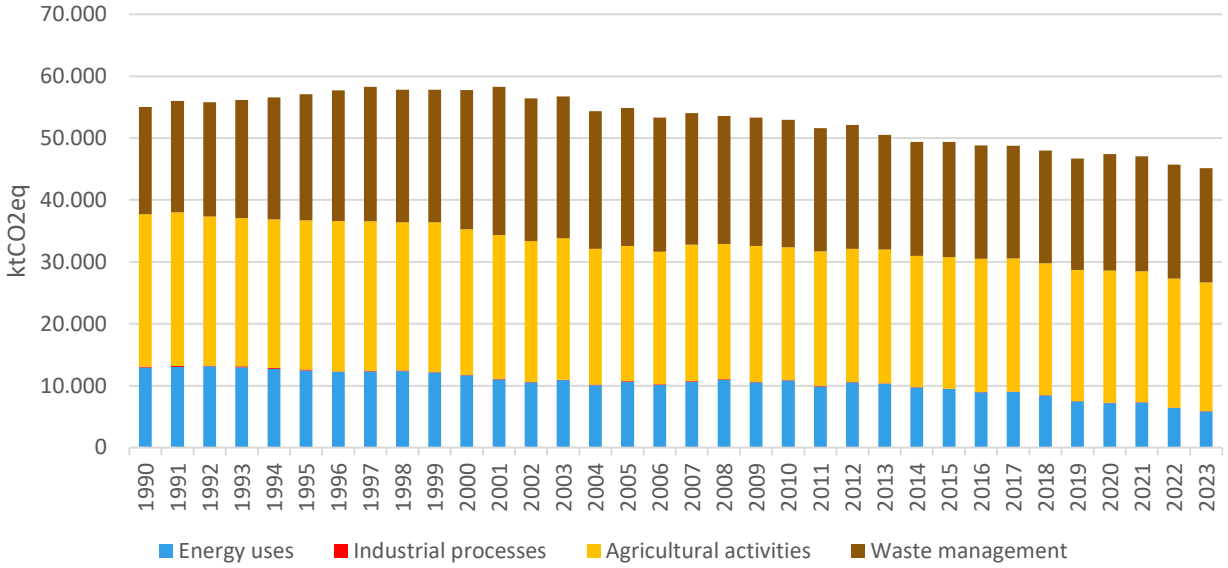
Throughout the period considered, the sectors that contribute most to these emissions are agriculture and waste management.

Emissions from agricultural activities declined from 24.633 $ktCO_2eq$ to 20.797 $ktCO_2eq$, corresponding to a reduction of 15,6%. In contrast, methane emissions related to waste management increased by 6,8%, reaching 18.491 $ktCO_2eq$ in 2023.

Emissions associated with energy use, which currently amount to 5.837 $ktCO_2eq$, have decreased by 54,8% compared with 1990 levels. Emissions related to the production and transport of imported gas are not included in this figure and will constitute one of the main points of attention for the implementation of the European Regulation on the reduction of methane emissions in the energy sector (Regulation (EU) 2024/1787), which progressively extends measurement, reporting and verification requirements to gas supplies originating outside the European Union.

Methane emissions from industrial processes, which have always represented a negligible share of the total, have also declined significantly, decreasing by 75% compared with 1990 levels.

Figure 25: Methane emissions in Italy by sector, 1990–2023 ($ktCO_2eq$)

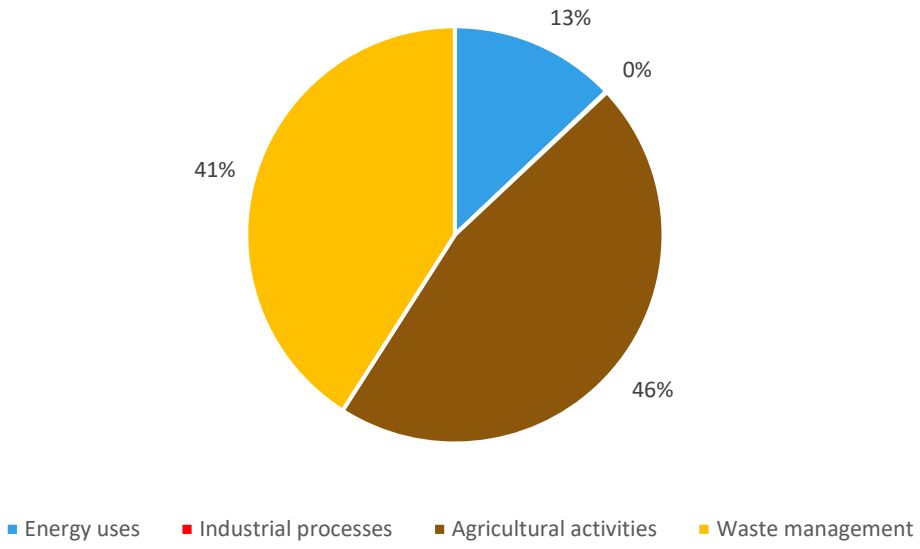


Source: Amici della Terra elaboration on ISPRA data.

In 2023, the agricultural sector was the main source of methane emissions, accounting for 46% of total methane emissions (**Figure 26**). This highlights the importance of agricultural activities in the generation of this greenhouse gas.

This is followed by waste management, which represents 41% of methane emissions. Energy uses, while still a significant source of methane emissions, contribute to a lesser extent throughout the historical series, accounting for 13% in 2023.

Figure 26: Methane emissions in Italy by sector, 2023 (%)



Source: Amici della Terra elaboration on ISPRA data.

2.3.2. Methane emissions from energy uses

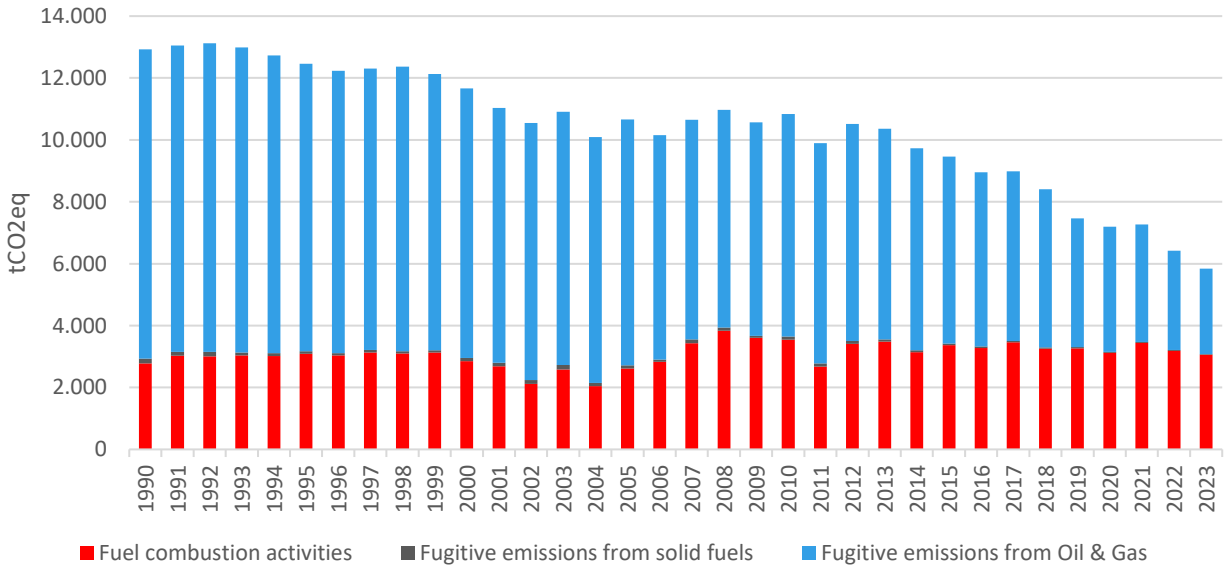
The category "Energy uses" is divided into the subcategories "Emissions from combustion" and "Fugitive emissions." Fugitive emissions include all emissions, both intentional and unintentional, originating from the different segments of the supply chains of solid fuels, natural gas and oil, excluding those resulting from combustion for energy uses. These emissions are further divided into fugitive emissions from solid fuels and fugitive emissions from natural gas and oil (oil & gas). Fugitive emissions from oil and gas also include venting and flaring emissions associated with oil and gas extraction and refining.

Throughout the historical series, although less markedly in recent years, the largest share of emissions in this sector consists of fugitive emissions from natural gas and oil. However, this category has recorded a 72,5% reduction since 1990, declining from 9.997 $ktCO_2eq$ in 1990 to 2.753 $ktCO_2eq$ in 2023.

Methane emissions deriving from combustion processes (the unburned share) have instead increased by 9,9% over the period considered, rising from 2.781 $ktCO_2eq$ in 1990 to 3.055 $ktCO_2eq$ in 2023.

The share of fugitive emissions from solid fuels, such as coal, is very limited in Italy, decreasing from 148 $ktCO_2eq$ in 1990 to 29 $ktCO_2eq$ in 2023.

Figure 27: Methane emissions in Italy from energy uses, 1990–2023 ($ktCO_2eq$)



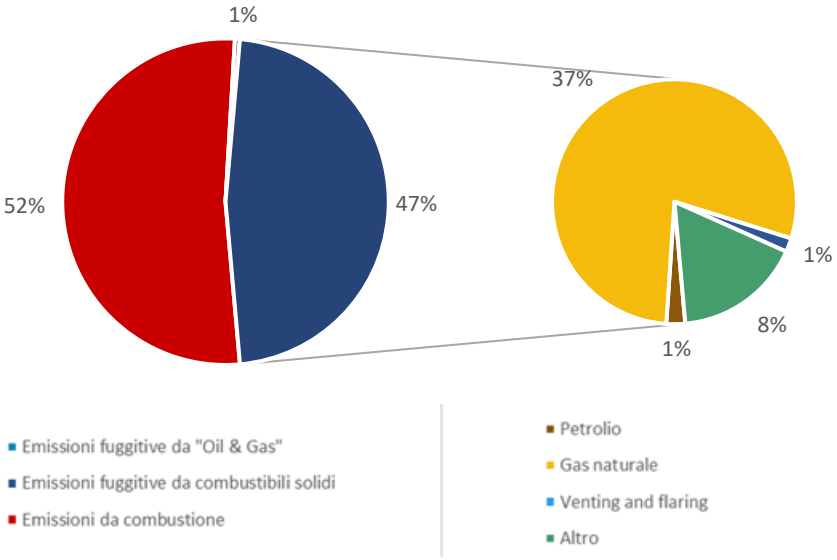
Source: Amici della Terra elaboration on ISPRA data.

The distribution of methane emissions from energy uses in 2023 shows that more than half of emissions originate from combustion processes (52%), while 47% are attributable to fugitive emissions.

Emissions related to the natural gas supply chain represent the largest share, accounting for 79% of fugitive methane emissions and 37% of total methane emissions in the energy use sector.

For further details on methane emissions from the natural gas supply chain in Italy, see the **section "Methane emissions from the natural gas supply chain."**

Figure 28: Methane emissions in Italy from energy uses, 2023 (%)



Source: Amici della Terra elaboration on ISPRA data.

BOX 4: Methane emissions from the energy sector in Italy: IEA estimates for 2024

In addition to the data reported in national greenhouse gas inventories, compiled by ISPRA in accordance with IPCC guidelines and limited to the national territorial scope, alternative estimates are available at the international level from independent organisations. Among these, a relevant reference is provided by the estimates of the International Energy Agency (IEA), which reconstruct methane emissions from the energy sector using an integrated top-down/bottom-up approach that combines activity data, emission factors, satellite observations and engineering models.

In its Global Methane Tracker, the IEA estimates methane emissions from the energy sector by distinguishing the main emission sources along the oil and gas supply chain, including both emissions associated with production and infrastructure and those related to abandoned facilities and large emission events detected via satellite.

Table 6: IEA estimates of methane emissions from the energy sector in Italy (kt CH_4 and kt CO_2eq)

IEA category	Emissions 2024 (kt CH_4)	Emissions 2024 (kt CO_2eq)
Abandoned facilities	1,57	43,96
Gas infrastructure (gas pipelines and LNG facilities)	70,2	1.965,6
Onshore gas production	0,87	24,36
Offshore gas production	0,89	24,92
Onshore oil production	7,84	219,52
Offshore oil production	0,66	18,48
Large emission events detected by satellite	0	0
Total energy sector	**≈ 82**	**≈ 2.297**

Source: Amici della Terra elaboration on IEA data.

IEA estimates indicate that in 2024 methane emissions from Italy's energy sector amount to approximately 82 kt of CH_4 (about 2.297 kt CO_2eq). The composition of these emissions is dominated by gas infrastructure (transport, storage and LNG terminals), which accounts for more than 85% of the total. Emissions associated with natural gas production are very limited, consistent with the sharp decline in domestic production over recent decades, while a more significant share is attributable to oil upstream activities, particularly onshore.

It should be emphasised that these estimates are not directly comparable with data from the ISPRA national inventory, as they differ in terms of sectoral scope (an energy-sector approach rather than the IPCC classification), estimation methodologies (integration of satellite data and global models) and analytical purpose (international comparative assessment).

Nevertheless, IEA data provide a useful order-of-magnitude estimate and a complementary perspective on methane emissions from Italy's energy sector. This perspective is particularly relevant in the context of the implementation of Regulation (EU) 2024/1787, which increasingly emphasises the integration of national inventories, independent estimates and top-down observations.

2.4. Methane emissions from the natural gas supply chain

The natural gas supply chain represents the main focus of policies aimed at reducing methane emissions in the energy sector, as it concentrates a significant share of fugitive emissions and is characterised by a high mitigation potential.

Fugitive emissions along the natural gas supply chain consist of:

- gradual leaks due to imperfect sealing of infrastructure components;
- emissions from controlled venting (resulting from maintenance activities or "pneumatic emissions" from regulation equipment) or uncontrolled venting (resulting from accidental ruptures); and
- emissions of unburned methane originating from the combustion of flaring equipment present in some facilities along the supply chain.

Overall, methane emissions from the natural gas supply chain in Italy have declined by 76% since 1990, decreasing from 9.225 $ktCO_2eq$ (329 kt of CH_4) to 2.169 $ktCO_2eq$ (77 kt of CH_4) in 2023. This trend reflects a combination of regulatory, technological and organisational factors. Starting from the early 2000s, the regulatory authority (ARERA) introduced incentive mechanisms and reporting obligations aimed at improving efficiency and reducing losses in gas networks. More recently, the participation of numerous Italian operators in the Oil and Gas Methane Partnership (OGMP 2.0) has strengthened practices related to the monitoring, measurement and management of emissions. Overall, the relatively early attention paid to gas losses and the quality of emission data has contributed to a gradual reduction in the emission intensity of the national supply chain.

Given the importance of fugitive methane emissions in the natural gas supply chain, as illustrated in **Figure 28**, it is important to analyse the contribution of the different components of the system. In national inventories, emissions from the natural gas supply chain are divided into six segments:

- Exploration;
- Production;
- Processing (treatment processes required to meet the specifications for injection into the transmission network);
- Transmission and storage (which also includes regasification terminal activities);
- Distribution; and
- Other (unspecified).

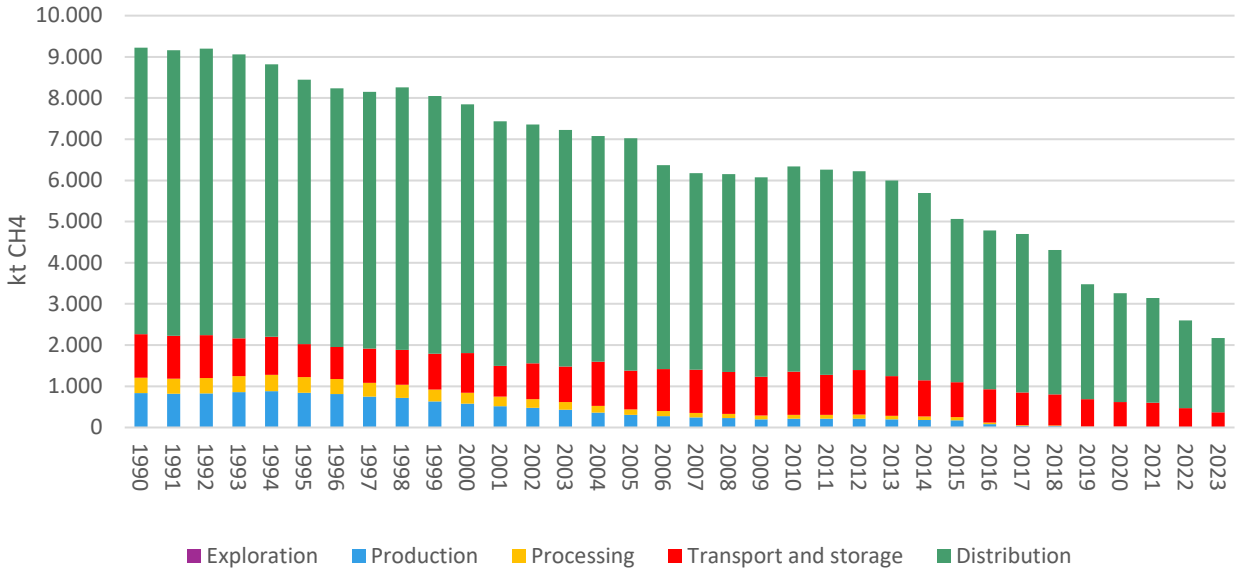
Figure 29 shows that throughout the entire historical series, emissions have predominantly originated from distribution networks, accounting for between 75% and over 80% of total emissions. However, these emissions have steadily declined over time, decreasing by 74% since 1990, from 6.962 $ktCO_2eq$ (249 kt CH_4) to 1.801 $ktCO_2eq$ (64 kt CH_4) in 2023.

The second most significant source consists of emissions from transmission and storage activities (including regasification terminals), which account for 10% to 20% of emissions throughout the historical series and have also declined significantly (–66%), falling from 1.052 $ktCO_2eq$ (38 kt CH_4) in 1990 to 359 $ktCO_2eq$ (13 kt CH_4) in 2023.

Emissions from natural gas production and gas processing activities represent only marginal shares and show reductions of 99% over the period considered, declining respectively from 836 $ktCO_2eq$ (30 kt CH_4) and 374 $ktCO_2eq$ (13 kt CH_4) in 1990 to 6 $ktCO_2eq$ (0.2 kt CH_4) and 2 $ktCO_2eq$ (0.1 kt CH_4) in 2023.

Methane fugitive emissions from natural gas exploration activities in Italy between 1990 and 2023 are extremely low and can be considered negligible, or even zero.

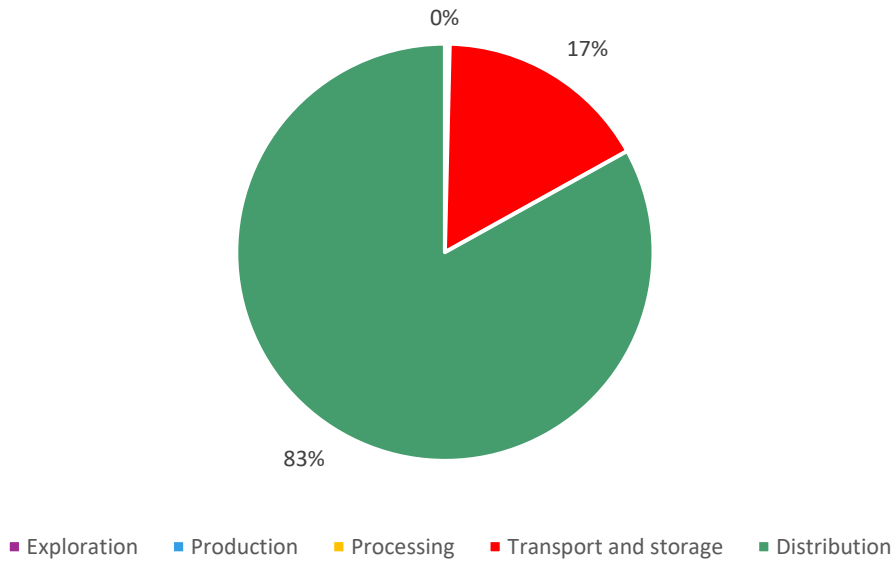
Figure 29: Methane emissions from the natural gas supply chain in Italy, 1990–2023 ($ktCO_2eq$)



Source: Amici della Terra elaboration on ISPRA data.

In 2023, the distribution of methane emissions along the natural gas supply chain in Italy shows a predominant role of distribution networks, which account for 83% of total emissions. This is followed by emissions from transmission and storage activities, representing 17%. Much smaller shares are attributable to natural gas production and gas processing activities, which account for 0,3% and 0,1%, respectively.

Figure 30: Methane emissions from the natural gas supply chain, 2023 (%)



Source: Amici della Terra elaboration on ISPRA data.

2.4.1. Activity levels for estimating methane emissions in the natural gas supply chain

Estimates of CH_4 emissions from the natural gas supply chain are based on activity data published by industry, national authorities and information collected annually by ISPRA from Italian gas operators. The most relevant information concerns the quantities of natural gas produced, transmitted and distributed, as well as methane emissions reported by operators in their environmental reports or communicated directly to ISPRA.

Emissions reported by the main operators are estimated by considering the known length and materials of pipelines, in order to calibrate the model used to estimate fugitive emissions from smaller operators.

Data on activity levels for the different segments of the natural gas supply chain (as for all other sectors covered by emission inventories) are reported in the national greenhouse gas inventory tables officially submitted to the United Nations Framework Convention on Climate Change (UNFCCC) by ISPRA for the years 1990–2023, according to the Common Reporting Format (CRF). For each activity segment defined in the reporting tables, it is necessary to specify the type of data used and the corresponding unit of measurement (see **Figure 31**).

Emission estimates take into account the following information:

- quantities of natural gas produced, transported and distributed (MASE, UNEM, ENI, SNAM);
- length of pipelines (35.381 km for the transmission network and 271.211 km for the distribution network in 2023), broken down by pressure level (low, medium and high) and by material type (cast iron, grey cast iron, steel or polyethylene) (ARERA);
- natural gas losses reported in the national energy balance (MASE);
- methane emissions reported by operators in environmental reports (ENI, EDISON, SNAM).

Finally, an essential parameter to consider for the main unit used to measure activity levels (Mm^3 of natural gas) is the average composition of natural gas, which for the purpose of estimating methane emissions and those of other gases contained in natural gas varies significantly from year to year, as shown in **Table 7**. In 2023, the average methane content in natural gas injected into the transmission and distribution networks was 8,.49%.

Table 7: Composition of natural gas in transmission and distribution networks in Italy (% by mass)

	1990	1995	2000	2005	2010	2015	2020	2021	2022	2023
CH4 (%)	88,83	87,14	85,16	84,53	84,52	85,80	85,88	84,39	83,59	83,49
NMVOC (%)	7,33	8,62	10,00	10,73	11,27	10,34	10,78	11,91	12,89	13,11
CO2 (%)	0,57	0,51	0,47	1,23	1,89	1,78	2,25	2,29	2,09	1,86
Other (%)	3,27	3,74	4,37	3,51	2,30	2,10	1,09	1,41	1,43	1,54

Source: Amici della Terra elaboration on ISPRA data.

For exploration activities aimed at extracting natural gas from the subsurface, the activity data used to represent the level of activity correspond to the number of exploration wells drilled during the year, expressed as the number of wells reported by MASE.

For natural gas production, the activity level used is the total volume of “gas produced” (natural gas extracted) in the year, expressed in millions of cubic metres (Mm^3). In this case as well, the source of activity data is MASE. The values in the series used by ISPRA in the inventory as “gas produced” do not correspond exactly to the values reported under the “production” item in the National Energy Balance (see the section Natural gas production in Italy). They follow the same trend but are systematically slightly higher[3].

For the processing segment, which includes treatment processes required to make extracted gas compliant with the specifications necessary for injection into the transmission network, the activity level is also the annual volume of “gas produced”, expressed in Mm^3.

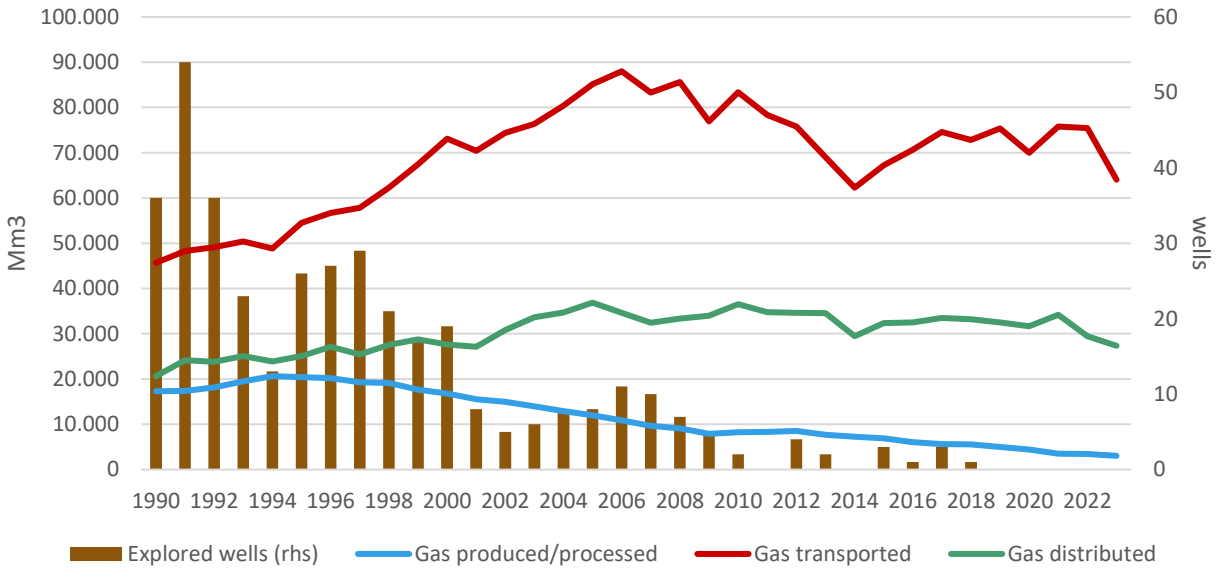
For emissions associated with the transmission and storage segment of natural gas (which also includes regasification terminals) and with the natural gas distribution network, the activity level is described in the inventory worksheets as “gas transported” and “gas distributed”, expressed in Mm^3.

[3] This difference can be explained by the fact that the volumes reported as “gas produced” refer to the raw gas extracted from wells, measured before accounting for fugitive emission losses during transport and the subsequent processing stages required before the gas is injected into the transmission network with the necessary specifications.

Volumes of "gas transported" amounted to 45.684 Mm³ in 1990 and showed a continuous upward trend until 2006, reaching a peak of 87,990 Mm³. In the following period, these volumes declined until 2014 (62,280 Mm³), followed by a period of relative stability, and then a significant decrease in 2023, reaching 64.070 Mm³ (as shown in **Figure 31**).

As for "gas distributed", volumes amounted to 20.632 Mm³ in 1990, then increased until 2005 (36.875 Mm³). In the subsequent period they stabilised with a slight downward trend, reaching 27.309 Mm³ in 2023, the lowest value recorded over the last decade considered.

Figure 31: Activity levels in the natural gas supply chain in the Italian emission inventory, 1990–2023 (Mm³ and number of wells)



Source: Amici della Terra elaboration on ISPRA data.

2.4.2. Emission factors and estimation methods

The estimation of CH_4 emissions along the natural gas supply chain is mainly based on the use of emission factors as inputs to the calculation model, in line with the IPCC Guidelines (2006). These factors are differentiated according to the segment of the supply chain, the material and pressure of the infrastructure, and the type of activity.

The values of these factors are at the core of emission estimation methodologies. For the natural gas supply chain, the Italian inventory uses a combination of IPCC default emission factors and national-specific emission factors. Default factors are applied only in residual cases, such as exploration activities, whereas for natural gas production, processing, transmission and distribution, national emission factors are used. These are differentiated by segment, infrastructure material and operating conditions, and are often calibrated on the basis of data provided by operators.

The IPCC Guidelines distinguish three methodological levels (Tier 1, Tier 2 and Tier 3), representing increasing levels of detail and specificity in the data used to estimate emissions. Tier 1 is based on default emission factors and aggregated activity data; Tier 2 uses national-specific emission factors and more detailed information; and Tier 3 involves the use of advanced models or measured data at the plant or operator level. The choice of the appropriate Tier depends on the relevance of the emission source and the availability of data, and does not in itself imply an assessment of environmental performance.

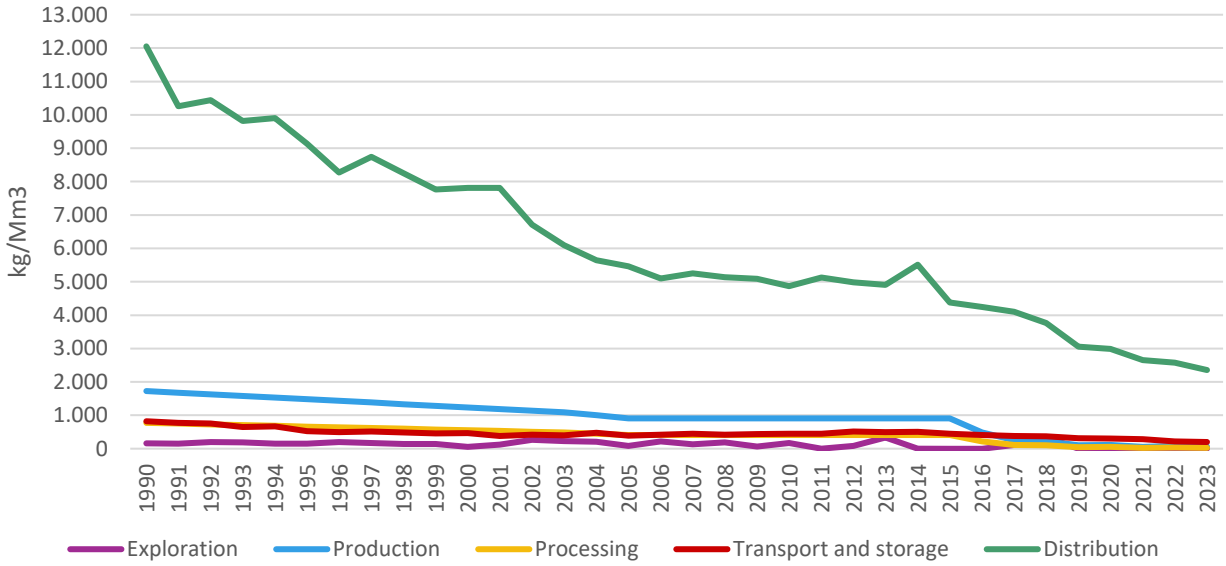
In the latest Italian National Inventory Report, the methodological Tier is not explicitly stated for fugitive emissions from the natural gas supply chain. However, from the detailed description of the methodologies adopted, it clearly emerges that a differentiated approach is used across the various segments of the supply

chain, based on national-specific emission factors, operator-provided data and dedicated calculation models. In IPCC terms, this approach can be considered an advanced Tier 2, while Tier 1 is applied only in residual cases such as exploration activities.

After the emission estimates are calculated, "implied emission factors" (IEFs) are derived as the ratio between estimated emissions and the corresponding activity data. These factors are not used to calculate emissions, but they play an important role in model calibration, quality control and the analysis of emission performance across the different segments of the supply chain.

In section 1.B.2.b, dedicated to the natural gas supply chain, the greenhouse gas inventory tables report not only emission values and activity data but also the corresponding implied emission factors. As shown in **Figure 32**, their trend over time reflects changes in the emission intensity of activities across the different segments of the natural gas supply chain. These data therefore highlight, more or less significantly, a trend of improvement in environmental efficiency in Italy with regard to fugitive methane emissions.

Figure 32: Implied CH_4 emission factors in the natural gas supply chain in Italy, 1990–2023 (kg/Mm³)



Source: Amici della Terra elaboration on ISPRA data.

The following review of implied CH_4 emission factors and methane emission estimation methods across the different segments of the natural gas supply chain is based on the information reported in the "Italian Greenhouse Gas Inventory 1990–2023. National Inventory Document 2025" prepared by ISPRA.

2.4.2.1. Exploration

As noted above, for the natural gas exploration segment (Exploration, IPCC code 1.B.2.b.1), the estimated emissions are minimal throughout the historical series, and the level of activity, represented in the inventory tables by the number of exploration wells drilled, is also very low, reaching zero in the most recent five-year period available (2019–2023).

For this segment of the natural gas supply chain, emissions are estimated using default emission factors provided in IPCC publications[4]. The estimation method corresponds to Tier 1. Since the IPCC Good Practice Guidelines define the default emission factor on the basis of the number of wells drilled, the emission factor itself has effectively become zero in recent years as exploration activity has ceased.

[4] IPCC Good Practice Guidance, 2000.

In this case, an analysis of the historical trend of the implied CH_4 emission factor is therefore of limited analytical significance.

2.4.2.2. Production

For the natural gas production segment (Production, IPCC code 1.B.2.b.2), the quantity of fugitive methane emissions (0,2 kt CH_4 in 2023, corresponding to 0,3% of total emissions from the supply chain) is estimated on the basis of the activity level represented by "gas produced" reported in the inventory (3.040 Mm^3 in 2023).

In this case, the estimation uses an emission factor derived from the IPCC Guidelines (2006)[5] and subsequently calibrated using national data and information provided by operators, in order to account for fugitive methane emissions associated with flaring within this segment of the supply chain. The estimation method corresponds to Tier 2.

As shown in **Figure 32**, the implied CH_4 emission factor in the historical inventory series shows an initial value of approximately 1.726 kg/Mm^3 in 1990, gradually declining to 1.006 kg/Mm^3 in 2004. From 2005 to 2015, the value remained constant at 906 kg/Mm^3, before decreasing sharply in subsequent years to reach 65 kg/Mm^3 in 2023.

2.4.2.3. Processing

In the natural gas processing segment (Processing, IPCC code 1.B.2.b.3), fugitive methane emissions (0.1 kt CH_4 in 2023, corresponding to 0,1% of total emissions from the supply chain) are also estimated on the basis of the activity level represented by "gas produced" reported in the inventory (3.040 Mm^3).

The emission factor used is again derived from the IPCC Guidelines (2006) and subsequently calibrated using national data and information provided by operators. The estimation method is therefore also attributable to Tier 2.

The historical trend of the implied CH_4 emission factor for this segment (see **Figure 32**) shows an initial value of approximately 773 kg/Mm^3 in 1990, gradually declining to 450 kg/Mm^3 in 2004. From 2005 to 2015, the value remained constant at 406 kg/Mm^3, before decreasing again to 29 kg/Mm^3 in 2023.

Regarding the reduction in implied CH_4 emission factors for both gas production and processing, ISPRA reports that companies operating in the gas sector have declared increased awareness of the need to reduce greenhouse gas emissions. To this end, new emergency management systems have progressively been implemented to reduce emissions from venting. In addition, with updates to management systems, the main gas company has periodically adopted more accurate methods for estimating gas released into the atmosphere.

2.4.2.4. Transmission and storage

For the transmission and storage segment (Transmission and storage, IPCC code 1.B.2.b.4), fugitive methane emissions (13 kt CH_4 in 2023, corresponding to 17% of total emissions from the supply chain) are estimated on the basis of the activity level represented by "gas transported", equal to 64.070 Mm^3 in 2023.

For this segment, the emission factor used is derived from an aggregation of national-specific factors and information relating to four sub-segments of fugitive methane emissions:

- regasification terminals
- transmission pipelines

[5] The IPCC guidelines for the compilation of inventories also provide default emission factor values for production activities, differentiated between offshore and onshore fields.

- compressor stations
- venting and other unpredictable emissions

The estimation method corresponds to an advanced Tier 2, using national-specific emission factors. Fugitive emissions are estimated using information reported by the main operators (in 2023, SNAM accounted for about 93% of the total length of the national transmission network and about 99% of the gas transported) on natural gas losses and gas composition.

For smaller operators, the estimation model is calibrated using lower data quality assumptions and higher specific emission factors for network materials, venting and accidental losses.

The national CH_4 emission factors for gas transmission fall within the range of IPCC default emission factors provided in the IPCC Guidelines (2006).

The quality of information on fugitive methane emissions in this segment has progressively improved thanks to the annual data collections on key network parameters carried out by ARERA among Italian operators.

The historical trend of the implied CH_4 emission factor (see **Figure 32**) shows an initial value of about 822 kg/Mm³ in 1990, which halved during the 2000s, followed by fluctuations in 2010–2015. The subsequent downward trend led to a value of 200 kg/Mm³ in 2023.

2.4.2.5. Distribution

For the natural gas distribution segment (Distribution, IPCC code 1.B.2.b.5), fugitive methane emissions (64 kt CH_4 in 2023, corresponding to 83% of total emissions from the supply chain) are estimated based on the activity level represented by "gas distributed", equal to 27.309 Mm³ in 2023.

For distribution networks, the emission factor used to estimate emissions is obtained from the aggregation of national-specific factors and information for two sub-segments:

- pipeline leakage from distribution networks
- venting and other unpredictable emissions

For these two sub-segments, the estimation procedures used by ISPRA in 2023 include:

- Pipeline emissions: methane emissions are estimated using emission factors depending on pipeline material and pressure, as shown in **Table 8**.

Table 8: Emission factors for natural gas losses in distribution pipelines by material and pressure, 2023 (m³/km)

Material	Emission factors (m3/km)	
	Pressure	
	Medium pressure	Medium pressure
Steel	258,7	167,9
Cast iron	307,9	264,4
Grey cast iron		5.544,5
Polyethylene		173,1

Source: Amici della Terra elaboration on ISPRA data (Italian Greenhouse Gas Inventory 1990-2023. National Inventory Document 2025).

- Venting and other events: emissions are estimated using factors specific to the assets of the main distribution network operators.

Emission factors for distribution are therefore derived by combining directly measured data from major gas operators (ITALGAS, 2i Rete Gas and Unareti account for approximately 54% of the distribution network length and about 62% of the gas distributed) with calibrated estimates for smaller operators.

As in the transmission segment, the estimation method corresponds to an advanced Tier 2. Here too, the quality of information on fugitive methane emissions has progressively improved thanks to data collected by ARERA from operators active in Italy.

The historical trend of the implied CH_4 emission factor for distribution networks (see **Figure 32**) shows an initial value of about 12,050 kg/Mm³ of gas distributed in 1990, gradually declining to roughly one fifth of the initial value, reaching 2,356 kg/Mm³ in 2023.

Table 9 provides an overall summary of implied CH_4 emission factors and the corresponding estimation methods used for methane emissions in the natural gas supply chain in 2023.

Table 9: Implied CH_4 emission factors and estimation methods for methane emissions in Italy, 2023

Activity segment (IPCC code)	Activity segment	Activity segment	Activity segment	Activity segment
Exploration (1.B.2.b.1)	n.d.	n.d.	n.d.	IPCC default EF (Tier 1)
Production (1.B.2.b.2)	65 ($kgCH_4/Mm^3$ of gas produced)	n.d.	n.d.	IPCC EF + national-specific factors (Tier 2)
Processing (1.B.2.b.3)	29 ($kgCH_4/Mm^3$ of gas produced)	n.d.	n.d.	IPCC EF + national-specific factors (Tier 2)
Transmission and storage (1.B.2.b.4)	200 ($kgCH_4/Mm^3$ of gas transported)	LNG regasification terminals	0,18 Mm^3/Gm^3 of gas imported	National-specific EF (advanced Tier 2)
		Compressor stations	0,13 Mm^3/Gm^3 of gas transported	
		Transmission network	292,3 m^3/km of transmission pipeline	
		Venting and other losses	0,022 Mm^3/Gm^3 of gas transported	
Distribution (1.B.2.b.5)	2.356 ($kgCH_4/Mm^3$ of gas distributed)	Distribution networks	See **Table 8**	IPCC EF + national-specific factors (Tier 2)
		Venting and other losses	0,150 Mm^3/Gm^3 of gas distributed (1,45 $kgCH_4/Mm^3$ of gas distributed)	

Source: Amici della Terra elaboration on ISPRA data (Italian Greenhouse Gas Inventory 1990-2023. National Inventory Document 2025).

The methodologies adopted in the national inventory show that methane emission estimates result from a balance between data availability, methodological detail and the relevance of emission sources, highlighting the growing importance of monitoring systems increasingly based on direct measurements.

2.4.3. Methane intensity in natural gas production

"Methane intensity" is an indicator expressing the ratio between methane emissions and a given unit of activity in the energy sector, particularly along the natural gas supply chain. Depending on the analytical or reporting context, the denominator may be represented by the volume of gas produced, transported or distributed. This indicator makes it possible to assess not only the absolute level of emissions but, more importantly, the environmental efficiency of natural gas production and management systems.

The growing attention to methane intensity is linked to the crucial role of methane in global warming. Although CH_4 has a relatively short atmospheric lifetime, it has a very high global warming potential in the short term, making the reduction of its emissions one of the most effective levers for limiting temperature increases in the medium term. Within this framework, methane intensity helps identify structural inefficiencies along energy supply chains, compare emission performance across countries, operators or infrastructures, and monitor over time the effectiveness of mitigation policies.

For these reasons, methane intensity is now widely used internationally. The International Energy Agency (IEA) employs it as a key indicator in its analyses of the oil and gas sector and in assessing the role of natural

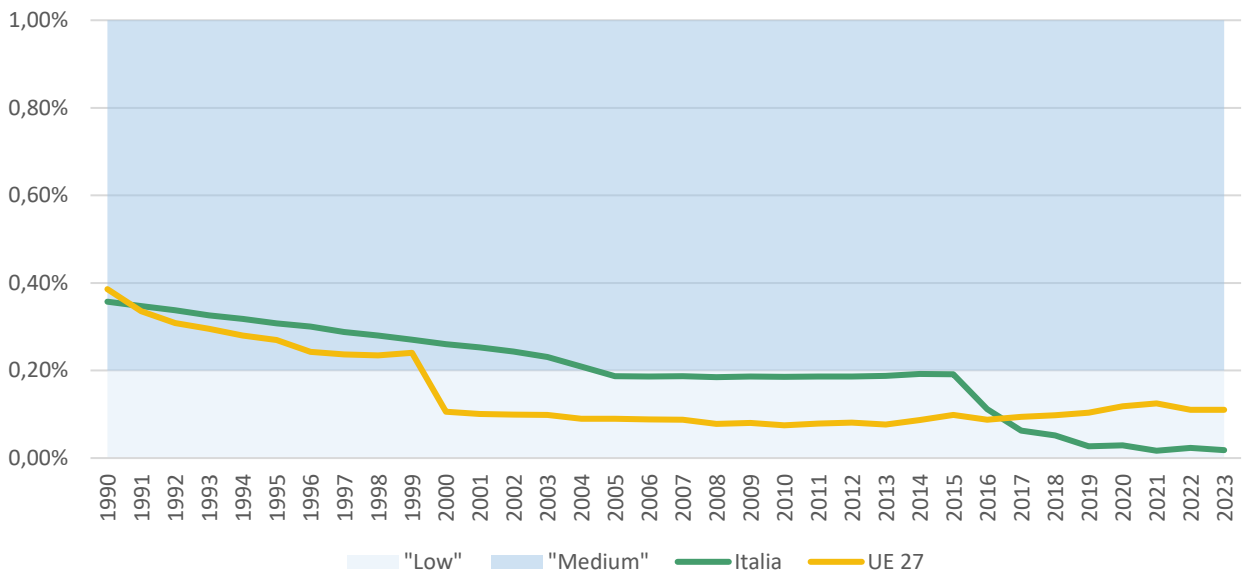
gas in the energy transition. The Oil and Gas Methane Partnership 2.0 (OGMP 2.0), an initiative promoted by UNEP, also places methane intensity at the core of corporate reporting on environmental performance, particularly in relation to the progressive improvement of monitoring practices and emission reduction strategies. Similarly, the Global Methane Pledge highlights the importance of comparable and verifiable indicators to measure progress in reducing methane emissions worldwide.

The European regulatory framework is also increasingly emphasizing this indicator. The recent EU Regulation on the reduction of methane emissions in the energy sector (Regulation (EU) 2024/1787) strengthens obligations for monitoring, reporting and reducing emissions along the oil and gas supply chains, laying the foundations for a more systematic use of emission intensity metrics, including in relation to gas imports into the European Union.

In line with the approach adopted by the IEA, this report calculates the methane intensity of natural gas production as the ratio between CH_4 emissions attributed to the production and processing segments of the natural gas supply chain, including flaring emissions associated with extraction and production activities, and the volume of natural gas produced. The volumes of natural gas produced were converted into mass using a standard average density of natural gas equal to 0,715 kg/m³ under standard conditions. The use of a uniform value ensures comparability of the indicator between Italy and the EU-27; possible differences in natural gas composition between countries are not considered, as they are relatively small compared with the uncertainties associated with methane emission estimates.

The trend in methane intensity over the period considered for Italy and the EU-27, based on the available data series, is broadly similar. As shown in **Figure 33**, the values are on the order of a few tenths of a percent, initially (1990) equal to 0,36% for Italy and 0,39% for the EU-27, while for the most recent available data (2023) they are 0,02% for Italy and 0,11% for the EU-27, also reflecting the strong contraction of natural gas production in recent years, particularly in Italy.

Figure 33: Methane intensity of natural gas production in Italy and the EU-27, 1990–2023 (%)



Source: Amici della Terra elaboration on ISPRA, Eurostat, MASE and IPCC data.

In **Figure 33**, the shaded areas represent indicative reference ranges used by the IEA for comparative and analytical purposes. The IEA uses a set of methane intensity reference values as interpretative parameters to assess the emission performance of natural gas supply chains, particularly in the upstream segment. Within this framework:

- a methane intensity below 0,2% is considered indicative of a well-managed supply chain from the perspective of methane emissions;

- values between 0,2% and 1% indicate significant room for improvement;
- values above 1% generally characterize a supply chain as climatically inefficient;
- levels above 2–3% are considered critical, as natural gas tends to lose much of its short-term climate advantage compared with other fossil fuels.

These thresholds do not have regulatory status, but are widely used by the IEA as comparative benchmarks across countries.

Within the limits associated with the interpretation of these benchmark values and with the robustness of methane emission estimates in national inventories for these segments of the natural gas supply chain, it can nevertheless be observed that methane intensity values for Italy and the EU-27 over the last twenty years have generally remained within the lowest range of the indicative benchmarks used by the IEA.

BOX 5: Methane intensity in Regulation (EU) 2024/1787

Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector introduces, for the first time in the European regulatory framework, the concept of methane intensity as a potential regulatory tool for assessing methane emissions associated with the production of crude oil, natural gas and coal placed on the Union market.

Article 29 of the Regulation is explicitly dedicated to the "Methane intensity of the production of crude oil, natural gas and coal". It establishes that:

«By 5 August 2028 and every year thereafter, for the supply contracts concluded or renewed on or after 4 August 2024, Union producers and […] importers shall report to the competent authorities of the Member State in which they are established the methane intensity of the production of crude oil, natural gas and coal placed by them on the Union market, calculated in accordance with the methodology set out pursuant to paragraph 4 of this Article».

For supply contracts concluded before 4 August 2024, the Regulation introduces a lighter obligation, providing that Union producers and importers shall "undertake all reasonable efforts" to report the methane intensity associated with the fuels placed on the EU market.

Under the Regulation, methane intensity is therefore conceived as an indicator calculated according to a methodology that the European Commission will define through delegated acts, pursuant to Article 29(4) and 29(6). This methodology will need to be based on monitoring, reporting and verification (MRV) systems consistent with the requirements established by the Regulation and should allow comparability between productions characterised by different emission levels.

At this stage, the obligation concerns the annual reporting of the indicator to the competent national authorities, rather than the immediate application of binding maximum thresholds.

However, the Regulation already outlines a possible evolution toward regulatory limits. By 5 August 2029, the Commission must assess the potential impacts of introducing maximum methane intensity levels for crude oil, natural gas and coal placed on the EU market. On the basis of that assessment, the Commission may subsequently adopt delegated acts establishing maximum methane intensity values, as well as different methane intensity classes for these fuels.

The provision therefore forms part of a broader strategy aimed at improving transparency and comparability of emission performance, which may provide the basis for future regulatory developments. In this perspective, methane intensity acquires a forward-looking role: not only an informational indicator, but also a potential instrument for guiding access to the European market for fossil fuels.

Within this framework, methane intensity does not replace national greenhouse gas inventories or the specific monitoring and emission reduction obligations imposed on operators. Rather, it functions as a complementary tool, intended to strengthen transparency along energy supply chains, including those outside the European Union.

3. Italy in the Oil & Gas Methane Partnership 2.0

In a context where reducing methane emissions requires increasingly accurate, comparable and verifiable data, the Oil & Gas Methane Partnership (OGMP) 2.0 now represents the main international operational reference for measuring and reporting methane emissions in the oil and gas sector, as well as the methodological backbone of the new European regulatory framework.

The initiative, promoted by UNEP/IMEO, has in just a few years become the methodological basis used by regulators, first and foremost the European Union, to define obligations for monitoring, reporting and mitigation of emissions.

For a country such as Italy, characterised by a relatively efficient domestic supply chain but a strong exposure to imports, OGMP 2.0 plays a central role not only in understanding the quality of data provided by the main companies operating in the country and assessing the degree of alignment of the national industry with the requirements of the new EU Regulation, but above all in bridging the information gap on methane emissions upstream of supply chains.

In 2025, OGMP 2.0 includes 153 member companies, operating in 90 countries and covering approximately 42% of global oil and gas production.

The OGMP 2.0 report – An Eye on Methane 2025 highlights that 32% of global production is already covered by companies that have reached or are on track to reach the Gold Standard for reporting (17% Gold Standard Reporting + 15% Gold Standard Pathway).

The report also highlights key indicators related to data quality: OGMP 2.0 companies in their third year of participation provide measured data for around 90% of emissions from their operated assets; Level 5 assets are rapidly increasing, reaching 289 in 2025 compared to 187 in the previous year; more than 80% of total reported emissions originate from the upstream segment, particularly from onshore facilities, confirming the importance of direct measurement in identifying emissions that are not properly estimated.

The European Union has adopted OGMP 2.0 as the official reference for Regulation (EU) 2024/1787, making the level of participation of European and Italian companies a key factor for future compliance with regulatory requirements. In this context, it becomes essential to understand how OGMP 2.0 structures reporting and how to interpret data quality levels.

3.1. Methane emissions reporting under OGMP 2.0: methodological framework

The Oil and Gas Methane Partnership 2.0 (OGMP 2.0) adopts a highly structured reporting system, based on standardised templates and detailed methodological guidance that precisely defines scope, reporting units, emission categories and data quality levels. For the upstream segment and the midstream and downstream segments, these elements are defined in the respective Guidance for Completing the Reporting Template, updated in April 2025.

Although the operational reporting approaches differ between upstream, midstream and downstream segments, the OGMP 2.0 methodology is based on a common conceptual framework, which consistently defines reporting units, emission categories, data quality levels and criteria for allocating emissions across the entire value chain.

From a methodological perspective, OGMP 2.0 reporting is distinguished by its explicit objective of moving beyond aggregated approaches and generic estimates, promoting a gradual transition toward measurement-based inventories, at both source and asset level, and greater transparency in the assumptions used.

The OGMP 2.0 framework does not require optimal data from the outset, but instead establishes a progressive improvement pathway for data quality, directing efforts toward the most relevant emission sources.

3.1.1. The asset as the reporting unit

A central element of the OGMP 2.0 framework is the definition of the **asset** as the reporting unit. An asset does not necessarily correspond to a single physical installation, but is understood as a coherent operational unit under common management, defined according to geographical, functional and organisational criteria. The framework specifies:

- an asset cannot extend beyond the borders of a single country;
- it cannot include activities belonging to different segments of the value chain;
- it cannot aggregate assets managed by different operators.

This definition aims to strike a balance between data granularity and operational feasibility, but also introduces a degree of discretion in asset delineation, which may affect the comparability of data across companies.

For each asset, adequate descriptions must be provided, including the number of each type of facility aggregated within the asset, its physical location, and any unique or non-standard characteristics relevant to understanding the installation.

The OGMP 2.0 Guidance documents provide, for each segment of the value chain, a list of asset types, as shown in the following tables:

Table 10: Asset types for the UPSTREAM segment

Asset type	Facilities type
Exploration	Wells
Abandoned wells	Abandoned wells
Production by basin: onshore – conventional	Wellheads
	Abandoned wells
	Tank batteries
	Gas processing units
	Gathering and compression facilities
Production by basin: onshore – unconventional	Wellheads
	Abandoned wells
	Tank batteries
	Gas processing units
	Gathering and compression facilities
Offshore production	Offshore platform
	Floating platform
	Fixed platform
	FSO (Floating Storage Offloading unit)
	Offshore gas transportation hub
Gas processing units	Gas processing units
Gathering and compression facilities	Gathering and compression facilities
Tank batteries	Tank batteries

Source: Amici della Terra elaboration on OGMP 2.0 Guidance documents.

Table 11: Asset types for the MIDSTREAM segment

Asset type	Facilities type
LNG liquefaction terminals	LNG liquefaction terminal
LNG maritime transport	LNG carrier
LNG transport	LNG truck or rail transport
LNG regasification terminals	LNG regasification terminal
Transmission – Main pipelines (same country/region)	Pipeline segments
Transmission – Stations (same country/region)	Pressure reduction and regulation stations / metering stations / valve stations / customer delivery stations for metering and regulation

Asset type	Facilities type
Transmission – Compression stations	Compression stations
Transmission – LNG peak shaving	LNG peak shaving facilities
Underground gas storage	Underground storage facilities

Source: Amici della Terra elaboration on OGMP 2.0 Guidance documents.

Table 12: Asset types for the DOWNSTREAM segment

Asset type	Plant type
Distribution – Pipelines and stations	Main pipelines and service lines, pressure reduction and/or metering stations; valve stations; injection stations
Distribution – LNG satellite stations	LNG satellite stations
Distribution – Compressors	Compressors

Source: Amici della Terra elaboration on OGMP 2.0 Guidance documents.

3.1.2. Classification of emission sources and prescriptive structure of the template

The OGMP 2.0 template provides, particularly for the **midstream and downstream segments**, a standardised classification of methane emissions into three main categories (see **Figure 34**):

- **Fugitive emissions (Fugitives)** – unintentional emissions that occur due to material properties or defects and leaks in system components. In the case of distribution networks, the latest *Technical Guidance Document* distinguishes between:
    - permeation from plastic pipelines (an intrinsic material phenomenon, generally not material for inventory purposes);
    - leaks identified through systematic leak detection campaigns (LDAR);
    - leaks identified following odour call warnings.
- **Vented emissions (Vents)** – releases of gas into the atmosphere. The document emphasises the responsibility of operators to record, quantify and report all venting sources. These are distinguished as:
    - operational/maintenance emissions (*operational emissions / maintenance venting*), which are intentional;
    - emissions from incidents, emergencies or third-party damage (*incident/emergency vents; third-party damages*), which are unintentional.
- **Incomplete combustion emissions (Incomplete combustion)** – referring to methane "slip" (unburned methane) from flaring systems or heat generation equipment present in the distribution network (e.g. portable flares used to avoid venting during operations, or pre-heating equipment in stations).

Figure 34 shows an example for the distribution segment.

Figure 34: Reporting levels and overview of main methane emission sources

Level 1 reporting		Level 2 reporting	Level 3 / Level 4 reporting		Quantification - Level 4 Reporting (most frequent method)
Distribution Grid	Main lines	Fugitives	Permeation	Unintentional (Property of the material)	Non-material / Level 3 reporting based on generic EFs
			Leaks derived from systematic survey	Unintentional	Measurements / Measurement based EFs
			Odour call warnings	Unintentional	Detailed Engineering Calculations or measurement based EFs
		Vents	Operational emissions / Maintenance	Intentional	Detailed Engineering Calculations
			Incident / Third party damages (incl. repair)	Unintentional	Detailed Engineering Calculations
		Incomplete Combustion		Intentional (portable flare to avoid vents)	Detailed Engineering Calculations + DRE of portable flare (98%)
	Service lines (Underground and aboveground)	Fugitives	Permeation	Unintentional (Property of the	Non-material / Level 3 reporting based on generic EFs
			Leaks derived from systematic survey	Unintentional	Measurements / Measurement based EFs
			Odour call warnings	Unintentional	Detailed Engineering Calculations or measurement based EFs
		Vents	Operational emissions / Maintenance	Intentional	Detailed Engineering Calculations
			Incident / Third party damages (incl. repair)	Unintentional	Detailed Engineering Calculations
			Change/Removal installation of Gas meters	Intentional	Detailed Engineering Calculations or Measurements based EFs (representative sample considering component type, environmental and operating conditions)
	Stations	Fugitives		Unintentional	Measurements / Measurement based EFs
		Vents	Operational emissions / Maintenance	Intentional	Detailed Engineering Calculations
			Incident / Emergency vents	Unintentional	Detailed Engineering Calculations
		Incomplete combustion		Intentional	Measurements / Measurement based EFs

Source: OGMP 2.0 Technical Guidance Document: Distribution Grids, 2026.

Within each category, a detailed list of **mandatory emission sources** is defined, structured by subsystems (*main lines, service lines, stations*) and linked to the OGMP reporting levels (Level 1–5). The system is designed to ensure that all relevant sources are accounted for, avoiding selective omissions and ensuring consistency with the structure of methodological robustness levels.

The template also imposes **strict formal requirements**:

- each cell must be completed with a numerical value, "MI" (*missing information*) or "N/A";
- the use of "zero emissions" must be justified through explanatory notes;
- empty cells are not permitted.

These constraints strengthen **methodological transparency**, making both data gaps and exclusion choices explicit, and support the progressive transition from estimates based on generic emission factors (Level 1–2) to methodologies based on measurements and measurement-derived emission factors (Level 3–4), up to reconciliation with **site-level measurements** for achieving Level 5.

3.1.3. Bottom-up approach and reporting levels

OGMP 2.0 reporting is based on a **bottom-up approach**, whereby total emissions at asset level are built from the quantification of individual emission sources.

In the **upstream segment**, the nature of emission sources, often characterised by high temporal variability and episodic events, makes methane emission quantification particularly complex. The OGMP 2.0 Guidance explicitly acknowledges this challenge, providing for greater use of **direct measurements, targeted campaigns and uncertainty estimates**, especially at higher reporting levels.

Data quality is expressed through a system of **five reporting levels**, which reflect the level of detail and reliability of the methodologies used:

- **Level 1** consists of a single aggregated estimate at asset or network level, based on generic emission factors;
- **Level 2** distinguishes emissions by type (fugitive, venting, incomplete combustion), generally maintaining the use of average factors;
- **Level 3** requires a complete source-level inventory, with source-specific emission factors, though not necessarily asset-specific;
- **Level 4** introduces asset- or source-specific methodologies based on direct measurements, specific emission factors, engineering calculations or models, as detailed in the Technical Guidance Documents;
- **Level 5** adds reconciliation between the Level 4 bottom-up inventory and independent site-level measurements, with explicit quantification of associated uncertainty.

Within the OGMP 2.0 framework, Levels 1–3 are predominantly based on estimates using generic emission factors, while Levels 4 and 5 rely on **empirical data derived from measurements and/or advanced calculations**.

It is important to note that levels are assigned **at the level of individual emission sources**, and that a single asset may include sources reported at different levels. The overall asset-level classification is therefore derived from a **weighted aggregation of the different sources**. It is also important to distinguish between the recognition of **Level 5**, which is assigned at asset level, and **Gold Standard status**, which is granted annually at company level and may coexist with assets reported at different levels.

For the **distribution network segment**, the Technical Guidance Document updated in 2026 acknowledges the technical challenges of fully reconciling source-level inventories with independent site-level measurements, due to the geographical extent of networks, the dispersion of leaks and technological limitations of large-scale measurement systems.

In this context, OGMP 2.0 has introduced an **interim solution**, whereby Level 5 for distribution networks may be achieved when **vehicle-based measurements** (*Advanced Mobile Leak Detection – AMLD*), conducted on a representative sample of the network, are followed by attribution of emissions to individual sources and properly integrated into the annual inventory.

Sources that cannot be captured through site-level measurements (e.g. operational venting, third-party damage or odour call warnings) must nevertheless be quantified using **source-level methodologies** (direct measurements or engineering calculations) and included in the inventory.

This approach highlights how Level 5, in the **downstream segment**, takes on a configuration adapted to the operational specificities of distribution networks, while maintaining the objective of **inventory completeness and consistency** despite technical constraints.

A further key methodological element of the OGMP 2.0 framework, particularly clearly articulated in the Guidance for the upstream segment, is the role of **materiality analysis**. This analysis consists in assessing the emission relevance of individual methane sources at asset level, based on an initial comprehensive inventory, and guides the prioritisation of sources to which more advanced quantification methodologies should be applied.

In this way, the transition from intermediate to higher reporting levels is oriented toward concentrating **direct measurement efforts on the most significant emission sources**. This approach introduces a principle of **methodological proportionality**, improving operational efficiency and overall data quality, but it may also affect comparability across assets and companies, depending on initial assumptions and prioritisation choices.

BOX 7: What is materiality analysis in OGMP 2.0

Within the OGMP 2.0 framework, materiality analysis is a methodological tool used to determine which methane emission sources are most relevant within a given asset and, consequently, where to focus direct measurement efforts.

Unlike materiality assessments typically used in sustainability reporting, which evaluate the relevance of issues in economic, reputational or risk terms, the OGMP 2.0 materiality analysis has a strictly technical and emissions-based nature. A source is considered "material" when it contributes significantly to the total methane emissions of an asset.

The process is based on an initial comprehensive inventory of emission sources, generally constructed using standard emission factors or preliminary estimates (Levels 2 and 3). Based on this inventory, the sources that are dominant in terms of emissions are identified as priorities and are subject to more advanced quantification methodologies, such as direct measurements, targeted monitoring campaigns or site-specific methods (Levels 4 and 5).

This approach introduces a principle of methodological proportionality, allowing companies to allocate technical and financial resources where the impact on data quality is greatest. Particularly in the upstream segment, characterised by high emission variability and episodic events, materiality analysis represents an essential tool for improving the accuracy of estimates without making the system excessively burdensome.

However, since the identification of material sources depends on initial estimates and on methodological choices made at asset level, the use of materiality analysis may affect the comparability of data across assets and companies. For this reason, within OGMP 2.0, materiality analysis is accompanied by transparency requirements regarding the assumptions used and by a process of progressive improvement in data quality.

3.1.4. Integration of top-down measurements and uncertainty management

The OGMP 2.0 framework explicitly provides, for Level 5, the integration of top-down measurements (e.g. aerial surveys or other site-level observation techniques) to verify the consistency of the bottom-up inventory. This reconciliation is accompanied by the requirement to document the methodologies used and the associated uncertainty, which must be estimated and described in supporting documents uploaded to the OGMP platform.

This approach addresses one of the main limitations of traditional inventories, namely, the difficulty of capturing **intermittent emissions or emissions concentrated in single events**, while still leaving open issues of comparability related to the heterogeneity of the top-down techniques applied.

A further relevant methodological element is the **data assurance process** carried out by IMEO, integrated into OGMP 2.0 reporting. The report *An Eye on Methane 2025* describes a multi-step process that includes checks on data completeness and consistency, analysis of trends and anomalies, integration with independent sources (such as satellite data and scientific studies), and in-depth review of implementation plans and methodologies proposed for quantification and reconciliation.

This framework strengthens the **reliability of reporting** and enhances its relevance for regulators and stakeholders.

3.2. Italian companies participating in OGMP 2.0 and their reporting levels

Table 13: Italian companies participating in OGMP 2.0

Company	Segment	Year of OGMP membership	Gold standard	Average reporting level 2025 (operated assets)	Average reporting level 2025 (non-operated assets)	Reported methane emissions 2024 (kt)
2I RETE GAS S.P.A.	Downstream	2022	Yes (reporting)	5		10,3
ADRIATIC LNG	Midstream	2023	No	3,2		0,1
ADRIGAS SPA	Downstream	2020	Yes (reporting)	4		0,02
ENI	Upstream	2020	Yes (reporting)	4,2	3,7	14,5
G.E.I. GESTIONE ENERGETICA IMPIANTI SPA	Downstream	2020	Yes (reporting)	4		0,1
ITALGAS S.P.A.	Downstream	2020	Yes (reporting)	5	4	2,9
RETIPIU	Downstream	2025	Yes (pathway)	3		0,6
RETRAGAS SRL	Midstream	2020	No	3,1		0,04
SNAM S.P.A.	Midstream	2020	Yes (reporting)	4,7	4,2	11,6
UNARETI S.P.A.	Downstream	2020	Yes (reporting)	4		2,4

Source: Amici della Terra elaboration based on OGMP 2.0 data and information. "Gold Standard Reporting" refers to companies that meet OGMP 2.0 criteria for the highest reporting level; "Gold Standard Pathway" refers to companies that have submitted a formally recognised improvement plan to achieve Gold Standard status within the required timeframe.

The participation of Italian companies in the Oil & Gas Methane Partnership (OGMP) 2.0 involves different segments of the natural gas value chain, including upstream, midstream and downstream activities. This structure reflects the configuration of the national gas system, characterised by strong integration between transmission, regasification and distribution infrastructures, alongside a more limited, though not negligible, presence of production activities.

The participation of Italian operators in OGMP 2.0 is particularly relevant in the context of the implementation of Regulation (EU) 2024/1787, as the OGMP framework constitutes the main methodological reference for measurement-based methane emissions reporting and for assessing the quality of data reported by operators. Analysing the scope of participating companies, the segments in which they operate and the level of reporting achieved therefore provides a first indication of the degree of preparedness of the Italian industrial system with respect to the new European requirements on methane monitoring, reporting and mitigation.

The overall picture shows a participation concentrated mainly in the midstream and downstream segments, where the main operators of national gas infrastructures are active, alongside the presence of a major upstream operator active also at international level. The different reporting levels achieved by participating companies reflect both the specific characteristics of the activity segments and the level of maturity of the quantification methodologies adopted, providing a useful perspective on methane monitoring practices currently in use in Italy.

3.2.1. Italian upstream companies

The profiles presented below have been reconstructed on the basis of publicly available information contained in the OGMP 2.0 report An Eye on Methane 2025 and reorganised according to a consistent structure to facilitate comparison among Italian participating companies.

3.2.1.1. Eni

Eni is the main Italian operator active in the upstream segment of the natural gas value chain, with exploration and production activities both in Italy and abroad. The company joined OGMP 2.0 in 2020 and

participates in the framework with reference to both operated and non-operated assets included in its reporting perimeter.

Eni's OGMP 2.0 reporting mainly covers operated upstream assets, with a scope that includes both onshore and offshore production activities. The reporting perimeter reflects the wide geographical and operational diversification of the group's activities.

In the 2025 reporting cycle, Eni presents an average reporting level of Level 4–5 for operated assets, with a significant share of emissions quantified through direct measurements and measurement-based methodologies, integrated, for some assets, with top-down reconciliation approaches. Non-operated assets are reported at generally lower levels, in line with limitations in data access.

In 2025, Eni achieved Gold Standard Reporting status under OGMP 2.0, confirming compliance with the requirements for advanced methane emissions reporting.

Methane emissions reported by Eni under OGMP 2.0 for 2024 amount to approximately 14,5 kt CH_4, with reference to the declared reporting perimeter and the assets included in the framework.

Eni's reporting profile highlights a high level of methodological maturity, with extensive use of direct measurements and continuous improvement processes in data quality, fully consistent with the measurement-based approach adopted by Regulation (EU) 2024/1787.

3.2.2. Italian midstream companies

3.2.2.1. Adriatic LNG

Adriatic LNG is an operator active in the midstream segment of the natural gas value chain, responsible for managing the offshore regasification terminal located off the Venetian coast. The company joined OGMP 2.0 in 2023 and participates in the framework with reference to operated assets in Italy.

Adriatic LNG's OGMP 2.0 reporting concerns the regasification terminal, including the main emission sources associated with LNG reception, regasification and injection of gas into the national network. The reporting perimeter reflects the infrastructural and geographically limited nature of the operator's activities.

In the 2025 reporting cycle, Adriatic LNG presents an average reporting level of 3,2 for operated assets, based on a combination of specific estimates and structured emission quantification methodologies, with still limited use of direct measurements.

In 2025, Adriatic LNG did not achieve Gold Standard status under OGMP 2.0.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 0,1 kt CH_4, consistent with the limited scope of assets included in the reporting.

Overall, Adriatic LNG's reporting profile reflects an initial phase in the implementation of the OGMP 2.0 framework, with room for improvement especially in the extension of measurement-based methodologies, in line with the pathway of progressive strengthening of data quality envisaged by Regulation (EU) 2024/1787.

3.2.2.2. Retragas S.r.l.

Retragas S.r.l., a company of the A2A Group, is an operator active in the midstream segment of the natural gas value chain, specialising in regional gas transmission in Northern Italy. The company joined OGMP 2.0 in 2020 and participates in the framework with reference to operated assets.

Retragas' OGMP 2.0 reporting concerns its regional transmission network, interconnected downstream of the national network of the main transmission operator. The company manages more than 400 km of network and 8 primary interconnection stations, operating in Lombardy and Trentino-Alto Adige and transporting more than 360 million cubic metres of natural gas in 2022.

In the 2025 reporting cycle, Retragas presents an average reporting level of 3,1 for operated assets, based on structured estimation methodologies for the various emission sources, consistent with the operational characteristics of the managed regional network.

In 2025, Retragas did not hold Gold Standard status under the OGMP 2.0 framework.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 0,04 kt CH_4, reflecting the limited scope of the infrastructures included in the reporting.

Retragas' reporting profile highlights an intermediate level of methodological maturity, consistent with its activity segment and with potential for improvement linked to the transition towards greater use of direct measurements, in line with the indications of the European regulatory framework.

3.2.2.3. Snam S.p.A.

Snam S.p.A. is one of the leading European operators in the midstream segment of the natural gas value chain, active in transmission, storage and regasification. The company joined OGMP 2.0 in 2020 and participates in the framework with reference to both operated and non-operated assets included in the reporting perimeter.

Snam's OGMP 2.0 reporting covers a broad infrastructure perimeter, including a transmission network exceeding 40.000 km in Italy and abroad, significant storage capacity and regasification activities, for an estimated total annual capacity of 28 billion cubic metres, including the Piombino and Ravenna floating regasification units.

In the 2025 reporting cycle, Snam presents an average reporting level of 4,7 for operated assets and 4,2 for non-operated assets, with extensive application of measurement-based methodologies. For over twenty years, the company has developed a methane emissions accounting methodology based on emission factors derived from field measurements, progressively strengthened over time.

In 2025, Snam achieved Gold Standard Reporting status under OGMP 2.0.

Methane emissions reported by Snam under OGMP 2.0 for 2024 amount to approximately 11,6 kt CH_4, with reference to the declared reporting perimeter.

Snam's reporting profile highlights a high level of methodological maturity, supported by progressively more ambitious targets for reducing absolute methane emissions and consistent with OGMP 2.0 recommendations and with the measurement-based approach provided for by Regulation (EU) 2024/1787.

3.2.3. Italian downstream companies

3.2.3.1. 2i Rete Gas S.p.A.

2i Rete Gas S.p.A. was one of the main Italian operators in the downstream segment of the natural gas value chain, active in large-scale gas distribution. The company joined OGMP 2.0 in 2022 and participated in the framework with reference to operated assets in Italy. In 2025, 2i Rete Gas was merged into Italgas.

2i Rete Gas' OGMP 2.0 reporting covered the distribution network managed by the company until completion of the integration process, including more than 72.000 km of network, over 2.200 municipalities served and approximately 4,9 million customers, with a distributed gas volume of 5,3 billion cubic metres in 2024.

In the 2025 reporting cycle, 2i Rete Gas presents an average reporting level of 5 for operated assets, with extensive application of measurement-based methodologies supported by large-scale leak detection and repair (LDAR) campaigns carried out using advanced technologies.

In 2025, the company achieved Gold Standard Reporting status under OGMP 2.0.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 10,3 kt CH_4, with reference to the declared reporting perimeter.

Overall, the reporting profile of 2i Rete Gas highlights a high level of methodological maturity, characterised by systematic use of field data to improve emission quantification and define long-term reduction targets, consistent with the measurement-based approach of Regulation (EU) 2024/1787.

3.2.3.2. Adrigas S.p.A.

Adrigas S.p.A., a company belonging to the SGR Group, is an operator active in the downstream segment of the natural gas value chain, specialising in gas distribution. The company joined OGMP 2.0 in 2020 and participates in the framework with reference to operated assets.

Adrigas' OGMP 2.0 reporting concerns a distribution network extending over more than 2.700 km, mainly located in the Emilia-Romagna and Marche regions, with more than 800 reduction stations and approximately 175.000 delivery points.

In the 2025 reporting cycle, Adrigas presents an average reporting level of 4 for operated assets, based on structured emission quantification methodologies and on a progressive strengthening of network monitoring practices.

In 2025, Adrigas achieved Gold Standard Reporting status under OGMP 2.0.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 0,02 kt CH_4, with reference to the reporting perimeter.

Adrigas' reporting profile highlights a good level of methodological maturity, consistent with the size of the operator and with the broader commitment of the parent group towards energy transition and improving the environmental efficiency of infrastructures.

3.2.3.3. GEI Gestione Energetica Impianti S.p.A.

GEI Gestione Energetica Impianti S.p.A. is an Italian operator active in the downstream segment of the natural gas value chain, with over 70 years of experience in gas distribution in Northern Italy. The company joined OGMP 2.0 in 2020 and participates in the framework with reference to operated assets.

GEI's OGMP 2.0 reporting concerns a distribution network of approximately 2.600 km, including more than 1.000 reduction and metering stations and around 150.000 delivery points, mainly located in Lombardy, Piedmont and Veneto.

In the 2025 reporting cycle, GEI presents an average reporting level of 4 for operated assets, based on established estimation methodologies and on increasing attention to service quality, safety and environmental sustainability.

In 2025, GEI achieved Gold Standard Reporting status under OGMP 2.0.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 0,1 kt CH_4, with reference to the declared reporting perimeter.

Overall, GEI's reporting profile highlights a consolidated level of methodological maturity, consistent with the company's operational characteristics and with the continuous improvement approach promoted by the OGMP 2.0 framework.

3.2.3.4. Italgas S.p.A.

Italgas S.p.A. is the main Italian operator in the downstream segment of the natural gas value chain and, following the acquisition of 2i Rete Gas in 2025, the largest European distributor by number of delivery points. The company joined OGMP 2.0 in 2020 and participates in the framework with reference to both operated and non-operated assets.

Italgas' OGMP 2.0 reporting covers a distribution network exceeding 156.000 km, serving approximately 13 million users across more than 4.200 municipalities and distributing over 13 billion cubic metres of natural gas in 2024.

In the 2025 reporting cycle, Italgas presents an average reporting level of 5 for operated assets and 4 for non-operated assets, with extensive adoption of measurement-based methodologies supported by advanced digitalisation and network monitoring processes.

In 2025, Italgas achieved Gold Standard Reporting status under OGMP 2.0.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 2,9 kt CH_4, with reference to the declared reporting perimeter.

Italgas' reporting profile highlights a high level of methodological maturity, supported by investments in technological innovation, infrastructure digitalisation and the development of advanced emission monitoring practices, in line with the requirements of Regulation (EU) 2024/1787.

3.2.3.5. RetiPiù

RetiPiù S.p.A., a company of the A2A Group, is an operator active in the downstream segment of the natural gas value chain. The company joined OGMP 2.0 in 2025 and participates in the framework with reference to operated assets.

RetiPiù's OGMP 2.0 reporting concerns a distribution network of approximately 2.900 km, composed of 70% steel pipelines and 30% polyethylene pipelines, organised into 58 operational plants and serving 107 municipalities in the provinces of Milan, Monza and Brianza, Como and Bergamo.

In the 2025 reporting cycle, RetiPiù presents an average reporting level of 3 for operated assets, consistent with an initial phase of participation in the OGMP 2.0 framework.

In 2025, RetiPiù is included in the Gold Standard Pathway, having submitted a formally recognised improvement plan to achieve Gold Standard within the expected timeframe.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 0,6 kt CH_4.

Overall, RetiPiù's reporting profile reflects an early stage in the development of quantification methodologies, with potential for improvement linked to the expansion of monitoring activities and the progressive introduction of direct measurements.

3.2.3.6. Unareti S.p.A.

Unareti S.p.A. is an operator active in the downstream segment of the natural gas value chain, operating in several regions of Northern Italy. The company joined OGMP 2.0 in 2020 and participates in the framework with reference to operated assets.

Unareti's OGMP 2.0 reporting concerns a distribution network exceeding 5.130 km, through which the company supplies more than 480 million cubic metres of natural gas annually to approximately one million users.

In the 2025 reporting cycle, Unareti presents an average reporting level of 4 for operated assets, supported by intensified monitoring activities and improved emission quantification methodologies.

In 2025, Unareti achieved Gold Standard Reporting status under OGMP 2.0.

Methane emissions reported under OGMP 2.0 for 2024 amount to approximately 2,4 kt CH_4.

Unareti's reporting profile highlights a good level of methodological maturity, characterised by the use of advanced leak detection technologies (including high-sensitivity mobile systems) and structured network inspection and replacement programmes, in line with methane reduction targets defined in the OGMP implementation plan.

3.2.4. OGMP 2.0 best practices in Italy

Overall, the analysis of Italian companies participating in OGMP 2.0 highlights a structured level of engagement across the entire natural gas value chain, with differentiated reporting profiles depending on the segment of activity, operational scale and the maturity of the quantification methodologies adopted. The presence of a major upstream operator with an advanced level of reporting, alongside significant participation from midstream and downstream operators responsible for managing the main national gas infrastructures, consistently reflects the structure of the Italian gas system.

The average reporting levels achieved show that a substantial share of operators, particularly in the distribution and transmission segments, has already embarked on a pathway to strengthen data quality, with increasing use of measurement-based methodologies and structured leak detection and repair programmes. At the same time, the variability observed among participating companies indicates that there is still room for improvement, especially for operators with more recent participation in the framework or with more fragmented infrastructure perimeters.

In the An Eye on Methane 2025 report, several companies with operations in Italy are highlighted as examples of the application of measurement-based approaches and improvements in data quality, including cases related to advanced leak detection and repair campaigns and the strengthening of reporting in non-operated joint ventures (OGMP 2.0, 2025, pp. 4 and 10):

- **Italgas** is mentioned as a case study for having reduced leaks by 40% through advanced measurement campaigns across its entire network.
- **Snam** is listed among the companies that have accelerated data quality improvements and supported partners in non-operated joint ventures in adopting OGMP 2.0 reporting.
- **Eni** is reported as an example of significant improvement in NOJV reporting in North Africa, through site-level measurement campaigns and methodological support to local partners.

4. Methane emissions in countries from which Italy imports natural gas and oil

The analysis of methane emissions associated with the natural gas value chain cannot be limited to the national territorial scope alone, especially in the case of countries characterised by a high dependence on imports. As illustrated in **Chapter 1**, Italy consistently meets more than 90% of its natural gas demand through foreign supplies, while methane emissions accounted for in national inventories, in line with the rules of the United Nations Framework Convention on Climate Change (UNFCCC), include only emissions generated within national borders.

This asymmetry between the place of consumption and the place of production implies that a significant share of methane emissions associated with the use of natural gas in Italy is generated outside the national territory, along the upstream stages of the value chain, particularly extraction, processing and transport, and, in the case of LNG, liquefaction and maritime transport. Although these emissions are not included in territorial reporting obligations under national inventories, they contribute to the overall climate impact of the Italian energy system.

For this reason, the analysis of methane emissions in countries exporting natural gas to Italy represents a necessary complement to the interpretation of national data. It allows territorial emissions to be placed within a broader framework, consistent with the value-chain approach adopted at international level and with the evolution of the European regulatory framework on methane emissions reduction in the energy sector.

The analysis developed in this chapter has a descriptive and comparative purpose: to highlight the order of magnitude of methane emissions associated with different supply chains, their variability, and the main structural drivers influencing their emission intensity.

In this context, internationally available estimates, produced by organisations such as the International Methane Emissions Observatory (IMEO), the International Energy Agency (IEA), and independent sector studies, represent useful tools for building an indicative picture of upstream and midstream emissions in the main natural gas producing and exporting countries. Although these data are characterised by significant uncertainty and differing methodological approaches, they allow the strong heterogeneity of emission performance across countries, across production basins, and even within the same national context to be highlighted.

This heterogeneity represents one of the key elements underlying the design of Regulation (EU) 2024/1787, which for the first time introduces transparency and reporting obligations for methane emissions associated with fossil fuel imports.

4.1. Italy's main supplier countries: overview of methane emissions

The countries analysed in this section have been selected based on their relevance in Italy's energy supply mix, with particular reference to imports of natural gas and crude oil, as illustrated in **Chapter 1**.

Overall, Algeria, Azerbaijan, Qatar, Russia, the United States, Norway, the Netherlands and Libya account for almost all of Italy's natural gas imports in recent years, including both pipeline supplies and liquefied natural gas (LNG).

As regards crude oil, Italy's main supplier countries include Libya, Azerbaijan, Kazakhstan, Iraq, the United States, Saudi Arabia and Nigeria, with additional smaller contributions from Norway, Algeria and Angola. In this case as well, a relatively limited number of countries concentrates a significant share of total crude imports destined for the Italian refining system.

The selection of countries also aims to represent a heterogeneous set of production and infrastructure contexts, characterised by different geological conditions, types of assets (onshore and offshore, conventional and unconventional), levels of infrastructure maturity and regulatory frameworks. The

countries analysed also display varying degrees of availability and quality of methane emissions data, reflecting different levels of transparency, monitoring capacity and participation in international reporting initiatives.

The analysis does not aim to provide an exhaustive coverage of all countries exporting natural gas and oil to Italy, nor to offer prescriptive comparative assessments. Rather, it seeks to provide an indicative overview of the order of magnitude of methane emissions associated with the main supply chains, highlighting variability across countries and within individual national contexts, as well as the structural factors influencing the emission intensity of different energy value chains.

4.1.1. Methane emissions in the main countries from which Italy imports natural gas and oil

Available international estimates indicate that methane emissions associated with energy sector activities vary significantly across the main countries from which Italy imports natural gas and oil. These differences reflect a combination of factors, including the type and age of production assets, operational practices (particularly with regard to flaring and venting), the level of infrastructure maintenance, the presence of systematic leak detection and repair (LDAR) programmes, and the quality of monitoring and reporting systems.

In countries characterised by well-established production systems and stringent regulatory frameworks, such as Norway and the Netherlands, methane emissions associated with upstream activities are generally lower and supported by a good level of data availability. Conversely, contexts characterised by more mature infrastructure or more complex operating conditions, such as certain production areas in Algeria, Libya or Russia, tend to exhibit higher emission levels and greater uncertainty in the available estimates.

In the case of liquefied natural gas (LNG) suppliers, particularly Qatar and the United States, upstream emissions are complemented by those associated with liquefaction and maritime transport. These components can contribute significantly to the overall emission footprint of the supply chain and introduce additional sources of variability related to the efficiency of liquefaction plants, shipping distances and the technologies used along the logistics chain.

The analysis of estimates produced by the International Energy Agency (IEA) for the energy sector also shows that the emission profiles of Italy's main supplier countries differ not only in absolute terms but also in the composition of emission sources. In several cases, a significant share of methane emissions is associated with oil production activities rather than natural gas. This aspect is particularly evident in some major producing countries, where emissions from the upstream oil segment are predominant compared to those related to gas.

The strong integration between oil and gas value chains often makes it difficult to attribute methane emissions to individual supply chains. For this reason, the analysis presented in the following sections considers separately the emissions associated with natural gas and oil imported into Italy, while recognising that these emissions frequently originate from integrated production systems.

Table 14: Estimates of methane emissions from the oil & gas sector in the main countries supplying Italy (kt CH4), 2024

Country	Gas/Oil	Gas upstream	Gas infrastructure	Oil upstream	Other sources*
Algeria	Oil and gas	615	184	1.603	135
Angola	Oil	17	6	803	2
Saudi Arabia	Oil	169	79	1.389	51
Azerbaijan	Oil and gas	46	26	178	13
Iraq	Oil	29	26	2.128	37
Kazakhstan	Oil	113	41	561	199
Libya	Oil and gas	35	20	1.250	31
Nigeria	Oil	0	0	30	0
Norway	Oil and gas	8	1	8	0
Netherlands	Gas	5	8	1	2
Qatar	Gas	550	60	421	3
Russia	Gas	2.417	937	5.515	1.316
United States	Oil and gas	6.723	2.080	6.284	2.469
Italy		***2***	***70***	***9***	***2***

*Source: Amici della Terra elaboration on IEA data. * Other sources = abandoned facilities + large satellite-detected emissions.*

Libya. Libya is one of the main suppliers of crude oil for the Italian refining system and also provides natural gas through the Greenstream pipeline. Production is concentrated in onshore and offshore fields characterised by mature infrastructure and a complex operating context.

Available estimates indicate relatively high levels of methane emissions in Libya's energy sector, particularly in the oil upstream segment, while emissions associated with the gas value chain are more limited. These estimates are also characterised by a high degree of uncertainty, linked to the complexity of the operating context, the age of infrastructure and the limited availability of systematic public data on emission management practices.

Algeria. Algeria has for decades been one of Italy's main suppliers of natural gas, with significant volumes transported mainly via the Transmed pipeline and, to a lesser extent, in the form of LNG. Natural gas production is largely concentrated in large onshore fields, many of which have been in operation for a long time.
IEA data indicate that, within the energy sector, a significant share of methane emissions in Algeria is associated with oil upstream activities, while emissions related to gas are lower but still significant, particularly along transport infrastructure.

Azerbaijan. Azerbaijan has become a strategic supplier for Italy following the commissioning of the TAP pipeline, which delivers gas from the Caspian basin to the European market. In addition to natural gas, the country is also a relevant supplier of crude oil for the European market.

Production for export mainly comes from large offshore fields, developed relatively recently and operated by international consortia. IEA estimates indicate upstream methane emission levels generally lower than those of other major producing countries, consistent with the presence of relatively modern assets and the involvement of international operators.

United States. The United States is a major supplier of liquefied natural gas (LNG) to the European and Italian markets and is also a leading producer and exporter of oil.

Natural gas production is highly diversified, including both conventional fields and, to a significant extent, unconventional shale gas production. IEA estimates show high absolute emission levels in both the gas upstream and oil upstream segments, accompanied by a significant contribution from large emissions detected via satellite, confirming the high heterogeneity of operational practices across production basins.

Norway. Norway is one of the main suppliers of natural gas to the European and Italian markets and also contributes, albeit to a lesser extent, to crude oil supplies. Production takes place mainly offshore in the North Sea and the Norwegian Sea.

IEA estimates indicate very low methane emission levels for Norway in both the gas upstream and oil upstream segments. This outcome is generally attributed to the combination of relatively modern infrastructure, high operational standards and advanced monitoring and leak management systems.

Qatar. Qatar is one of the world's leading exporters of liquefied natural gas and accounts for a significant share of Italy's imports via regasification terminals. Natural gas production is highly concentrated in the North Field, one of the largest gas fields in the world, characterised by economies of scale and highly integrated infrastructure.
Upstream methane emissions estimated by the IEA for Qatar are generally low in terms of intensity, also due to the strong concentration of production in a single large field and the high level of infrastructure integration. In the case of LNG, however, the overall emission footprint is also influenced by liquefaction and maritime transport stages.

Russia. Until 2021, Russia was Italy's main supplier of natural gas. Although its share in imports has decreased significantly in recent years, Russian gas remains relevant for historical and comparative analysis of emissions associated with supply chains.

IEA estimates indicate very high emission levels in Russia's energy sector, with a particularly significant contribution from oil upstream activities and gas transport infrastructure. A portion of emissions is also associated with large releases detected through satellite observations, contributing to increased overall uncertainty in the estimates.

Netherlands. The Netherlands has historically been one of Europe's main natural gas producers. In recent years, however, domestic production has been progressively reduced, particularly following the shutdown of the Groningen field.

Despite declining domestic production, the Netherlands continues to play a key role in the European gas system as a commercial and infrastructural hub. IEA estimates indicate relatively low methane emission levels, with limited contributions from upstream activities and modest values associated with gas infrastructure.

Kazakhstan. Kazakhstan is one of the main suppliers of crude oil to the European market and to the Italian refining system. Production is concentrated in a few large fields, including Tengiz, Karachaganak and Kashagan, developed in recent decades with the involvement of international operators.

IEA estimates indicate that a significant share of methane emissions in Kazakhstan's energy sector is associated with oil upstream activities, while emissions related to gas are more limited. The presence of large integrated fields and the heterogeneity of operational practices across different consortia contribute to variability in the available estimates.

Iraq. Iraq is one of the largest oil producers in the Middle East and a major source of crude oil supply for the international market. Production is heavily concentrated in large onshore fields, particularly in the southern regions of the country.

IEA estimates indicate that methane emissions in Iraq's energy sector are dominated by oil upstream activities, often associated with significant levels of flaring and venting linked to the management of associated gas from oil production.

Saudi Arabia. Saudi Arabia is one of the world's leading producers and exporters of crude oil and represents a stable source of supply for many international markets, including European ones. Production is characterised by large fields and highly integrated infrastructure.

IEA estimates indicate relatively low methane emission levels compared to production volumes, partly due to strong infrastructure integration and centralised management of production operations.

Nigeria. Nigeria is one of the main oil producers in Sub-Saharan Africa and a significant source of crude oil for the European market. Production is concentrated mainly in the Niger Delta and includes both onshore and offshore activities.

Available estimates indicate relatively low levels of methane emissions attributed to the energy sector, although uncertainty remains significant due to the complex operating context and the presence of heterogeneous infrastructure.

Angola. Angola is one of Africa's main oil producers and a well-established supplier to the international crude market. Production is predominantly offshore and concentrated in large projects developed in recent decades with the involvement of international operators.

IEA estimates indicate that methane emissions in Angola's energy sector are mainly associated with oil upstream activities, while the contribution from gas infrastructure is more limited.

Overall, these data highlight that the emission profiles of Italy's main supplier countries are not homogeneous but reflect different production and infrastructure models. In some contexts, methane emissions are dominated by oil-related activities and the management of associated gas, while in others they are distributed across multiple segments of the energy value chain or remain relatively low thanks to more modern infrastructure and more advanced monitoring systems.

This heterogeneity confirms that the emission intensity of supply chains depends not only on production volumes but also on the technical characteristics of infrastructure, operational practices and the level of transparency in reporting systems. For a country highly dependent on fossil fuel imports such as Italy, these differences represent a key factor in understanding the variability of emissions associated with different supply chains.

4.1.2. Emissions associated with natural gas imports

Based on available international estimates and data on import flows, this section provides an indicative quantification of methane emissions associated with natural gas imported into Italy, with the aim of comparing orders of magnitude across the main supply areas.

Table 15: Preliminary estimate of methane emissions associated with natural gas imported into Italy (simplified allocative approach)

	Gas produced (bcm)	IEA emissions estimate – low (kt CH4)	IEA emissions estimate – high (kt CH4)	Average intensity – low (kt CH4/bcm)	Average intensity – high (kt CH4/bcm)	Gas imported into Italy (bcm)	Share of total imports into Italy (%)	Emissions attributed to Italy – low (kt CH4)	Emissions attributed to Italy – high (kt CH4)
Algeria	94,72	798,77	933,52	8,43	9,86	23,27	39%	196,21	229,31
Azerbaijan	37,76	71,93	85,30	1,90	2,26	10,13	17%	19,30	22,89
Qatar	179,45	610,63	614,00	3,40	3,42	6,90	12%	23,49	23,62
Russia	629,86	3.354,39	4.670,26	5,33	7,41	5,70	10%	30,33	42,23
United States	1.033	8.803,29	1.1271,87	8,52	10,91	5,19	9%	44,20	56,59
Norway	113,2	8,68	8,68	0,08	0,08	3,60	6%	0,28	0,28
Netherlands	8,07	13,10	15,50	1,62	1,92	2,40	4%	3,90	4,61
Libya	14,26	55,30	86,20	3,88	6,04	1,41	2%	5,46	8,51
Total emissions attributable to Italy								**323,16**	**388,04**

Source: Amici della Terra elaboration based on Energy Institute, IEA and MASE data. Note: Emissions attributed to Italy are indicative estimates obtained by applying an average national intensity to imported volumes; they do not represent direct measurements of emissions actually associated with individual supply flows.

Table 15 presents a preliminary estimate of methane emissions associated with natural gas imported into Italy, developed through a simplified allocative approach, consistent with the availability of data at the international level. The aim of this exercise is not to provide a precise quantification of the emission footprint of imported gas, but rather to identify comparable orders of magnitude and highlight differences across the main supply areas, based on aggregated national estimates.

The estimate is based on methane emissions from the energy sector for 2024, as reported by the IEA for the countries of origin (considering only the segments attributable to the natural gas value chain: fugitive and vented emissions from onshore and offshore production, and emissions from gas transport and processing infrastructure within national boundaries), and on gas production volumes (in bcm) reported by the Energy Institute for the same year. For each exporting country, an average national intensity (kt CH_4 per bcm of gas produced) was calculated as the ratio between estimated emissions and national production. This emission intensity was then applied to the volumes of gas imported into Italy (in bcm), derived from MASE data (Report on the National Energy Situation in 2024), resulting in an estimate of emissions attributable to Italy for each supply area.

Two variants were considered: a “low” estimate and a “high” estimate, defined on the basis of the aggregation by segments adopted in the IEA estimates (the high estimate also includes additional categories such as abandoned infrastructure and emissions detected via satellite), and used here to construct an indicative range. The use of a range between low and high scenarios allows, in a precautionary manner, to account for the high level of uncertainty that characterises aggregated methane emission estimates, particularly in contexts with more limited availability of verifiable data.

In both cases, the scope of the analysis is limited to emissions estimated in the countries of origin and associated with upstream stages of the value chain (production and domestic transport). Emissions related to the international transport of gas to Italy, whether via pipeline or in the form of liquefied natural gas (LNG), as well as those associated with activities and infrastructure within Italian territory, are therefore excluded. Consequently, the results do not represent a comprehensive estimate of the emission footprint of imported gas, but rather a partial assessment useful for exploratory and comparative purposes.

Within this framework, Algeria, which accounts for approximately 39% of Italy’s natural gas imports, emerges as the main contributor to emissions attributed to Italy, with estimated values of around 196–229 kt of CH_4 (low–high scenarios). A significant contribution also emerges for the United States, which, despite representing a smaller share of imported volumes, shows high emission intensities and results in attributed emissions of approximately 44–57 kt of CH_4.

Russia shows a non-negligible average estimated intensity (around 5,33–7,41 kt/bcm) and, consequently, emissions attributed to Italy in the order of approximately 30–42 kt of CH_4, with an import share of about 10%. This result highlights how, within the adopted approach, considering import volumes alone is not sufficient: countries with similar shares may exhibit different emission profiles depending on their estimated average intensities.

Among other suppliers, Qatar shows relatively stable intensities between the low and high scenarios, with attributed emissions of approximately 23,5 kt of CH_4 in both cases, while Azerbaijan shows lower intensities and an attributed contribution in the range of approximately 19–23 kt of CH_4. Norway and the Netherlands are associated with much lower attributed emissions (on the order of a few kt or less), while Libya, despite relatively small volumes, shows high intensities and therefore proportionally more significant attributed emissions compared to its share of imports.

By way of comparison, applying the same methodological approach used for exporting countries, IEA estimates indicate methane emissions associated with the gas sector in Italy of approximately 71,96–73,53 kt of CH_4. These values, referring only to the domestic value chain, are significantly lower than the total emissions attributed to natural gas imports, which, even when limited to upstream stages in the countries of origin, are estimated to be of a considerably higher order of magnitude.

This comparison highlights how, for a country characterised by a strong dependence on gas imports, considering only domestic emissions provides a partial and potentially misleading representation of the

overall climate impact associated with natural gas consumption. A significant share of methane emissions linked to gas used in Italy occurs outside national borders, during production and transport stages in exporting countries, and is not captured by national emission statistics.

In this sense, the exercise carried out, despite its preliminary nature and reliance on aggregated estimates, highlights the importance of complementing the analysis of national emissions with an assessment of emissions "embedded" in imports, in line with the evolving European regulatory framework on methane emissions in the energy sector. For net importing countries such as Italy, attention to emissions along international supply chains represents an essential element for understanding and effectively addressing the overall climate impact of natural gas.

4.1.3. Emissions associated with crude oil imports

Similarly to what has been illustrated for natural gas, it is possible to develop a preliminary estimate of methane emissions associated with crude oil imported into Italy by combining data on supply flows with international estimates of emissions in the oil upstream sector. The aim of this exercise is to provide a comparable order of magnitude across the main regions of origin of the crude oil used in the national energy system.

Table 16: Preliminary estimate of methane emissions associated with crude oil imported into Italy (simplified allocative approach)

	Oil produced (ktoe)	IEA emissions estimate – low (kt CH4)	IEA emissions estimate – high (kt CH4)	Average intensity – low (kt CH4/toe)	Average intensity – high (kt CH4/toe)	Oil imported into Italy (ktoe)	Share of total imports into Italy (%)	Emissions attributed to Italy – low (kt CH4)	Emissions attributed to Italy – high (kt CH4)
Libya	63.306,2304	1.250,48	1.281,38	0,02	0,02	11.916	21%	235,38	241,19
Azerbaijan	31.868,3664	178,31	191,68	0,006	0,006	9.282	16%	51,93	55,83
Kazakhstan	97.821,5472	561,3	759,81	0,006	0,008	8.331	15%	47,80	64,71
Iraq	234.330,2352	2.128,47	2.165,49	0,009	0,009	5.310	9%	48,23	49,07
United States	1.072.799,194	6.283,73	8.752,31	0,006	0,008	4.887	9%	28,62	39,87
Saudi Arabia	578.410,8768	1.389,15	1.439,72	0,002	0,002	3.956	7%	9,50	9,85
Nigeria	87.422,3568	29,65	29,65	0,0003	0,0003	3.874	7%	1,31	1,31
Norway	97.657,9776	8,34	8,34	0,0001	0,0001	1.442	3%	0,12	0,12
Algeria	73.551,4416	1.602,85	1.737,6	0,02	0,02	1.087	2%	23,69	25,68
Angola	62.921,016	802,9	804,54	0,01	0,01	915	2%	11,68	11,70
Total emissions attributable to Italy								**446,60**	**487,63**

Source: Amici della Terra elaboration based on Energy Institute, IEA and MASE data. Note: Emissions attributed to Italy are indicative estimates obtained by applying an average national intensity to imported oil volumes; they do not represent direct measurements of emissions actually associated with individual supply flows. Production values, originally expressed in kb/d in the source, have been converted into ktep/year using the conversion factor 1 kb/d = 53,3 ktoe/year, based on standard energy equivalences (1 toe = 41,868 GJ; approximately 6,1 GJ per barrel). Oil import data are expressed in the source in kilotonnes (kt) and, for comparison with production data, are considered equivalent (1 kt ≈ 1 ktoe), in line with the convention used in international energy balances for oil.

Table 16 presents a preliminary estimate of methane emissions associated with crude oil imported into Italy, developed through a simplified allocative approach analogous to that used for natural gas. The aim of the analysis is not to provide a precise quantification of the emission footprint of individual supply chains, but rather to identify comparable orders of magnitude and highlight differences across the main supplier countries, based on aggregated national estimates.

The estimate is based on methane emissions from the upstream oil sector for 2024, as reported by the IEA for the countries of origin, and on national crude oil production data reported by the Energy Institute. For

each exporting country, an average national emission intensity (kt CH_4 per ktep of oil produced) was calculated as the ratio between estimated emissions and national production. This intensity was then applied to the volumes of crude oil imported into Italy, expressed in ktep and derived from the MASE Report on the National Energy Situation, in order to estimate emissions attributable to Italy associated with different countries of origin.

As in the case of natural gas, two variants were considered: a “low” estimate and a “high” estimate, derived from the different emission categories included in the IEA datasets. The high estimate includes additional components, such as emissions from abandoned infrastructure and large emissions detected via satellite observations, thus allowing the construction of an indicative range that reflects the high uncertainty associated with aggregated methane emission estimates.

The scope of the analysis is limited to emissions estimated in producing countries and associated with the upstream stage of the oil value chain. Emissions related to the international transport of crude oil to Italy (by sea or pipeline), as well as those associated with refining activities and infrastructure within Italian territory, are therefore excluded. The results should thus be interpreted as a partial assessment, useful for comparative and exploratory purposes.

Within this framework, Libya emerges as the main contributor to emissions attributed to Italy, due both to its large share of crude imports (around 21% of the total) and to the relatively high emission intensity estimated for the country’s oil upstream sector. Attributed emissions are estimated to range between approximately 235 and 241 kt of CH_4.

Significant contributions also emerge from Azerbaijan, Kazakhstan and Iraq, which account for substantial shares of Italy’s crude oil imports. For these countries, attributed emissions range, depending on the scenario considered, between approximately 48 and 65 kt of CH_4, highlighting how, also in the case of oil, the estimated average emission intensity can significantly influence the overall contribution associated with import flows.

The United States, although representing a relatively smaller share of Italy’s crude oil imports, shows attributed emissions ranging between approximately 29 and 40 kt of CH_4, reflecting the high absolute levels of upstream emissions estimated by the IEA for the U.S. oil sector.

For other relevant suppliers, such as Saudi Arabia and Nigeria, attributed emissions are significantly lower, both due to lower estimated emission intensities and to relatively smaller volumes imported by Italy. Similarly, Norway shows extremely low values, consistent with international estimates indicating that the Norwegian oil sector has among the lowest methane emission levels globally.

Overall, methane emissions associated with crude oil imported into Italy are estimated at approximately 423–462 kt of CH_4 under the low and high scenarios considered, compared to significantly lower IEA estimates for the Italian oil value chain (0.51–2.91 kt CH_4). This represents a relevant order of magnitude, highlighting that a substantial share of emissions associated with national consumption of petroleum products occurs in upstream stages of the value chain and outside national borders.

Similarly to what has been observed for natural gas, this exercise shows that, for a country highly dependent on fossil fuel imports, considering domestic emissions alone is not sufficient to represent the overall climate impact of the national energy system. A significant portion of methane emissions is generated in producing countries during extraction and processing stages.

The comparison between estimates for natural gas and oil highlights that, in the Italian case, methane emissions associated with oil imports may be comparable to, or even higher than, those attributed to gas imports. This result reflects the dominant role of emissions generated in oil upstream activities, particularly in contexts where the management of associated gas involves practices such as flaring, venting or leakage.

Although this is a preliminary estimate based on aggregated national data, the analysis highlights the importance of considering emissions along the entire supply chain of fossil fuels. In this context, the growing focus of the European regulatory framework on methane emissions in the energy sector, including

international supply chains, represents an important step toward improving transparency and comparability of emission data across global energy value chains.

4.2. Quality of OGMP 2.0 reporting by upstream companies in supplier countries

In addition to the aggregated estimates based on IEA data, it is useful to consider the information available within the framework of the International Methane Emissions Observatory (IMEO).

IMEO develops an open data platform, "Eye on Methane", which integrates emissions from satellite sources, OGMP 2.0 company reports and scientific studies, with the aim of improving transparency on methane emissions at the global scale. Although the platform includes interactive views that can also be aggregated by country, there is currently no comprehensive national methane emission inventory comparable to those published by the IEA or under the UNFCCC.

However, OGMP 2.0 data provide detailed insights into the quality of corporate reporting in the oil & gas sector in countries supplying the Italian energy market.

Table 17: Upstream companies in selected supplier countries of natural gas and oil participating in OGMP 2.0

Company	Country	Year of joining	Emissions 2024 (kt)	L1	L2	L3	L4	L5	Gold Standard
Azule Energy	Angola	2023	6			100			Pathway
SOCAR	Azerbaijan	2024	197			83	17		No GS
Karachaganak Petroleum Operating	Kazakhstan	2024	0,5			2	98		Pathway
KazMunayGas	Kazakhstan	2023	117		14	35	51		No GS
North Caspian Operating Company N.V.	Kazakhstan	2023	0,6			21	79		Pathway
ONE-Dyas B.V.	Netherlands	2023	0,4			100			Pathway
Shell	Netherlands	2020	28,3			5	16	79	Reporting
NNPC	Nigeria	2024	41,1	100					No GS
akerbp	Norway	2023	1			4	96		Pathway
Equinor	Norway	2020	8,4			2	67	31	Reporting
Vår Energi	Norway	2024	0,6			21	57	22	Pathway
QatarEnergy	Qatar	2021	2,2			100			No GS
APA Corporation	USA	2023	12			78	22		Pathway
Chevron	USA	2024	69,5			100			No GS
Civitas Resources	USA	2022	12,6			50		50	Reporting
ConocoPhillips	USA	2022	123			2	5	93	Reporting
Coterra Energy	USA	2023	11,1			10	90		Pathway
Crescent Energy	USA	2022	11,8			31	24	44	Reporting
Devon Energy	USA	2022	99,5					100	Reporting
Diamondback Energy	USA	2023	15,2			100			No GS
Diversified Energy Company, PLC	USA	2022	21			1	61	38	Reporting
Encino Energy	USA	2024	6,3			94	6		Pathway
EOG Resources	USA	2023	11,4			85	15		Pathway
EQT Corporation	USA	2021	29,6			9	17	74	Reporting
Expand Energy	USA	2025	16,3			81	19		Pathway
ExxonMobil	USA	2024	106			100			Pathway
Jonah Energy LLC	USA	2020	3,9					100	Reporting
Oxy	USA	2022	26,5			17	33	50	Reporting
Presidio Petroleum LLC	USA	2023	2,5			100			Pathway
QB Energy Operating, LLC	USA	2024	10,7			100			Pathway
Triple Crown Resources	USA	2023	4,6					100	Reporting
Vital Energy	USA	2024	5,8			100			Pathway
Wapiti Energy	USA	2023	3,5			95	5		Pathway

Source: AdT elaboration based on IMEO data

The analysis of OGMP 2.0 data relating to operators active in the main countries supplying Italy highlights a marked heterogeneity both in the coverage and in the quality of methane emissions reporting along the upstream oil & gas value chain. This heterogeneity helps explain the differences observed in aggregate estimates and represents a relevant element for interpreting the results of preliminary assessments of emissions associated with energy imports.

In the case of the United States, which is a major supplier of both liquefied natural gas and crude oil to the European market, there is a particularly high number of operators participating in OGMP 2.0. However, the quality of reporting appears uneven: alongside companies reporting primarily measurement-based data at the most advanced levels (Levels 4 and 5), there remain operators in improvement pathways ("Pathway") or not yet aligned with the Gold Standard. Overall, the U.S. context shows relatively broad data availability compared to other supplier countries, but not yet consistent across operators and production basins.

Norway, by contrast, represents a case of high reporting maturity. Operators included in the table (such as Equinor, Aker BP and Vår Energi) generally report at high levels, with a significant share of data based on direct measurements at Levels 4 and 5. This profile is consistent with the low emission intensities estimated at the national level and reflects a stringent regulatory environment supported by advanced monitoring and emissions management systems.

For the Netherlands, participation in OGMP 2.0 includes some upstream operators and major international companies, including Shell. Reporting levels are generally high, with a substantial share of measurement-based data. However, the role of the Netherlands in the European energy system is increasingly linked to gas infrastructure and its function as a trading hub, while domestic production has been progressively reduced in recent years.

In the case of Kazakhstan, one of the main crude oil suppliers to the European market, OGMP 2.0 participation includes some large operators active in the country's major fields, such as Karachaganak Petroleum Operating and North Caspian Operating Company. Reporting levels are generally in the intermediate to advanced range, but overall coverage remains limited compared to the total size of the national oil sector.

For Azerbaijan and Qatar, both relevant suppliers of natural gas to the European market, participation in OGMP 2.0 is concentrated in a very limited number of national operators, namely SOCAR and QatarEnergy. While reporting exists, coverage remains partial and not yet fully aligned with the most advanced standards of the programme, making it still necessary to rely on aggregate estimates to assess emissions associated with exports.

Coverage is even more limited in some major oil-exporting countries. In Nigeria, for example, OGMP 2.0 participation currently involves the national company NNPC, with reporting levels still in the early stages of the improvement pathway. Similar situations can be observed in other production contexts, such as Angola, where participation is limited to a very small number of operators.

Overall, these elements show that, for a significant share of fossil fuels imported into Italy, knowledge of upstream methane emissions remains incomplete or heterogeneous. OGMP 2.0 reporting coverage appears more advanced in countries with established regulatory frameworks or a stronger presence of international operators, while it remains more limited in several major oil and gas exporting countries.

Strengthening monitoring, reporting and verification requirements along international supply chains therefore represents a key step toward improving transparency and comparability of information on methane emissions associated with national energy consumption.

5. State of implementation of the Regulation in Italy

5.1. Implementation of key deadlines for institutions and companies in Italy

This section analyses how the relevant Italian stakeholders have addressed the framework of multiple deadlines set for the first year of implementation of Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector.

The timeline of these deadlines is summarised in **Table 18**, which presents chronologically the eleven main deadlines, five of which concern Italian institutions and six companies operating in Italy across the fossil fuel value chains involved in the initial phase of implementation of the Regulation. The structure of **Table 18** is consistent with the approach adopted in the implementation monitoring Tracker developed by the Civil Society Observatory on Methane emissions in the energy sector (CSO-M).

At the institutional level, in the absence of the formal designation of competent authorities, the obligations set by the Regulation have been managed through initiatives undertaken by the Government, and in particular by the relevant offices of the Energy Department of the Ministry of the Environment and Energy Security (MASE).

On the industry side, compliance with the Regulation's deadlines has involved operators across the various segments concerned, including: operators from all main segments of the natural gas value chain managing installations (upstream, transmission and distribution); upstream oil operators; and importers of natural gas, oil and coal.

It should be noted that, in this first year of implementation of the Regulation, the efforts made by the relevant MASE offices and by operators across almost all affected segments have enabled Italy to achieve an advanced level of compliance with many of the obligations set out in the Regulation. This places Italy among the more advanced countries in Europe, as illustrated in **Section 7.2**.

Table 18: 2025 deadlines for the implementation of Regulation (EU) 2024/1787 on the reduction of methane emissions in the energy sector

Obligation	Responsible entities	Scope of application	Deadline
Designation of Competent Authorities (CAs) responsible for monitoring and ensuring compliance with the Regulation	Member State	Designation of Competent Authorities at national level as required by the Regulation	05/02/2025
Submission of Leak Detection and Repair (LDAR) programmes to the Competent Authorities	Companies operating oil & gas installations in Italy requiring LDAR activities	Gas value chain installations (wells, processing, transmission, storage and distribution) and oil (wells and refineries)	05/05/2025
Submission of information on import flows pursuant to Article 27 of the Regulation to the Competent Authorities	Importers of gas, oil and coal	Import flows of gas, oil and coal into Italy	05/05/2025
Publication of inventories of inactive, temporarily plugged, permanently plugged and abandoned wells; and closed or abandoned underground mines	Member State	Inactive, temporarily plugged, permanently plugged and abandoned oil and gas wells; and closed or abandoned coal mines	05/08/2025
Adoption of rules on penalties to be applied in case of violations of the Regulation	Member State	Penalty framework under Article 33	05/08/2025
Submission of the report on source-level methane emissions quantification to the Competent Authorities	Companies operating gas, oil and coal installations in Italy	Gas value chain installations (wells, processing, transmission, storage and distribution), oil (wells and refineries) and active coal mines	05/08/2025
Completion of the first Type 2 LDAR survey	Companies operating oil and gas installations in Italy requiring Type 2 LDAR activities	Gas value chain installations (wells, processing, transmission, storage and distribution) and oil (wells and refineries)	05/08/2025
Transmission to the Commission of information received from importers pursuant to Article 27 and Annex IX	Member State	Import flows of gas, oil and coal into Italy	05/08/2025
Publication of information (reports under Articles 12 and 20) on the website provided for in Article 5(4)	Competent Authority	Reports on emissions from gas value chain installations (wells, processing, transmission, storage and distribution), oil (wells and refineries) and coal mines	05/11/2025
Submission of the repair and monitoring schedule and report on LDAR survey results for the previous year to the Competent Authorities	Companies operating oil and gas installations in Italy requiring LDAR activities	Gas value chain installations (wells, processing, transmission, storage and distribution) and oil (wells and refineries)	31/12/2025
Submission of the annual report on venting and flaring events to the Competent Authorities	Companies operating oil and gas installations in Italy	Report on venting and flaring events	31/12/2025

Source: Amici della Terra elaboration based on Regulation (EU) 2024/1787 of 13 June 2024 on the reduction of methane emissions in the energy sector.

5.1.1. Designation of Competent Authorities (5/2/2025)

By 5 February 2025, Regulation (EU) 2024/1787 required Member States to designate Competent Authorities (CAs) responsible for the implementation and enforcement of measures for monitoring, reporting and reducing methane emissions in the energy sector. More than a year after the deadline, Italy has not yet completed the formal process for this designation.

On 30 June 2025, the Council of Ministers preliminarily approved a provision identifying the Competent Authorities for the implementation of the Regulation, but the measure has not yet been submitted to

Parliament to initiate the legislative process. Due to this delay, the European Commission launched a preliminary infringement procedure against Italy. Subsequently, although the formal designation has not yet been completed through specific legislation, the Ministry for the Environment and Energy Security (MASE) has de facto assumed the role of Competent Authority, participating in meetings of the European Expert Group composed of the various national authorities. This has led to the suspension of the infringement procedure.

The draft law was submitted by the Government to Parliament for approval in mid-March 2026. The proposed text defines the organisational structure of the Competent Authorities, assigning a central role to the Ministry for the Environment and Energy Security (MASE), supported by ISPRA, the National System for Environmental Protection (SNPA – ARPA/APPA), Acquirente Unico, as well as the two Autonomous Provinces of Trento and Bolzano. While the draft outlines the institutional framework in its essential elements, its continued lack of formal adoption prevents the full operationalisation of the system envisaged by the Regulation.

The delay is particularly significant given the scale and complexity of the activities covered by the Regulation in Italy, which include tens of thousands of kilometres of gas pipelines, thousands of oil and gas wells, and numerous processing facilities, involving producers, transmission and distribution operators, and importers. Looking ahead, importers will also be required to demonstrate that imported supplies meet European emissions performance requirements, based on MRV (Monitoring, Reporting and Verification) equivalence criteria[6].

Although the national gas system shows relatively low emission levels and companies have generally demonstrated a proactive approach in adapting to the Regulation's requirements, the lack of formal designation of the Competent Authorities risks undermining the country's overall credibility. In particular, it weakens the Italian government's role in ongoing discussions at EU level on the definition of technologies and technical procedures for methane emissions monitoring and quantification.

Overall, the delay in the designation of the Competent Authorities represents a significant and difficult-to-justify critical issue, especially considering that the institutional framework has already been identified and that a swift completion of the legislative process would allow Italy to strengthen national governance of the Regulation's implementation.

5.1.2. Submission of LDAR programmes

By 5 May 2025, companies subject to methane leak detection and repair (LDAR) obligations were required to submit their activity programmes to the Competent Authorities, in accordance with Article 14 of the Regulation.

In the absence of a formal designation of the Competent Authorities, MASE adopted transitional measures, activating dedicated certified email channels, organised by activity segment, to enable companies to comply with the regulatory deadline. According to available information, around one hundred companies operating in the extraction, processing, transmission, storage and distribution of natural gas, as well as in oil extraction and refining, submitted their LDAR programmes within the required timeframe.

Overall, the response from companies was significant and demonstrated their ability to adapt to the requirements of the Regulation, despite a context characterised by the absence of fully harmonised technical guidance at the European level.

[6] Article 28 establishes that the monitoring, reporting and verification measures applicable to imported gas must be equivalent to those applicable to gas produced within the Union. For contracts concluded before the entry into force of the Regulation (4 August 2024), importers are required to make all reasonable efforts to ensure that the gas is subject to measures equivalent to those set out in the Regulation.

5.1.3. Submission of information on import flows

The Regulation requires importers of natural gas, oil and coal to submit information on import flows to the Competent Authorities by 5 May 2025, and subsequently by 31 May each year, in accordance with Article 27 and Annex IX. For this requirement as well, MASE made dedicated certified email channels available for the submission of documentation. In addition, in compliance with the 5 August 2025 deadline[7], MASE forwarded the information received from importers to the European Commission.

Based on available information, around thirty importers submitted the required data within the prescribed timeframe. Given the complexity of the data and the novelty of the obligations introduced by the Regulation, the level of compliance observed in this initial phase can be assessed positively, despite the absence of a fully structured institutional framework.

5.1.4. Submission of inventories of inactive, temporarily plugged and abandoned wells

Article 18(1) of the Regulation requires Member States, by 5 August 2025, to prepare and submit to the European Commission an inventory of all inactive, temporarily plugged, permanently plugged and abandoned oil and gas wells, for which an assessment of potential methane emissions is required. The inventory must include a detailed set of elements, as specified in Part 1 of Annex V, such as the name of the well, the associated field, the operator, geographic location (latitude and longitude), depth, orientation and year of drilling, along with other relevant technical parameters.

In Italy, the UNMIG[8] offices within MASE prepared this inventory within the required timeframe, submitting it by the deadline and publishing it on the Ministry's institutional website starting from 1 August 2025. (Ministry of the Environment and Energy Security – Ministerial notice of 1 August 2025). In this case, Italy was among the few countries to meet the deadline.

The preparation of the inventory was based not only on Annex V, but also on the criteria set out in recitals (46) and (47) of the Regulation. MASE adopted a 30-year reference period, thus including wells closed from 1 January 1994 onwards, covering 346 fields (mining titles)[9].

According to the analysis, a total of 1,614 non-operational wells were identified, of which 538 offshore and 1.067 onshore, mainly located in rural areas. These include 866 inactive wells, 123 temporarily plugged wells and 625 permanently plugged and abandoned wells.

The number and distribution of non-operational wells highlight the organisational and technological complexity of monitoring and verifying their integrity, particularly for offshore wells. As indicated by the Government, these activities will involve, in addition to MASE, ISPRA, regional environmental agencies and the two Autonomous Provinces. In this context, the Regulation allows for the application of simplified

[7] After the initial deadline of 5 August 2025, Member States shall submit the information by 31 August each year.

[8] Ufficio Nazionale Minerario per gli Idrocarburi e le Georisorse (National Office for Hydrocarbons and Georesources)

[9] MASE maintains its own inventory, but requested updated information from operators on closed wells (abandoned, permanently closed and temporarily closed) in order to perform data matching. In addition, MASE manages two databases:

1. a historical wells database (around 7,000 entries), which records all drilling activities dating back to the early 20th century (covering all wells at the time of drilling, without subsequent updates);
2. an active wells database, whose data are reported by operators every six months and are updated and published by the Ministry.

The analysis of closed wells, which enabled the inventory to be completed within the deadline, highlighted several challenges:

- Side-track issue: when new lateral drilling paths originate from an original wellhead, leading to potential changes in the counting of wells. For official counting purposes, MASE considers the most recently drilled well. Moreover, closures of lower sections of wells that have subsequently been re-drilled at higher levels are not considered as actual mining closures, since the well still exists or remains in production.
- Multiple operators over time: different operators may succeed one another on the same well due to ownership changes, creating difficulties in uniquely identifying individual wells.
- Data reconciliation: in addition to cross-checking data with those provided by operators, comparisons were also carried out with data from the Sicilian Regional Office for Hydrocarbons and Geothermal Resources (URIG).

regulatory approaches, while technical guidance from the European Commission on intervention procedures is still awaited.

Overall, the timely preparation and publication of the inventory represent a positive and structurally important step in the implementation of the Regulation in Italy, providing the knowledge base for defining monitoring and mitigation plans for methane emissions associated with non-operational wells.

Furthermore, from 5 May 2026, and subsequently by 31 May each year, operators will be required to submit reports containing information on the quantification of methane emissions from these wells to the Competent Authorities.

5.1.5. Adoption of sanctioning rules

Article 33 of the Regulation governs penalties. "Member States shall lay down the rules on penalties applicable to infringements of this Regulation and shall take all measures necessary to ensure that they are implemented" (Art. 33(1)). The penalty regime must be effective, proportionate and dissuasive, and includes proportionate fines and periodic penalty payments for operators.

By 5 August 2025, Member States were required to notify the Commission of these rules and measures relating to penalties, and to promptly notify any subsequent amendments.

In Italy, the sanctioning framework is included in the government's draft law currently under examination by the Senate. Although the text provides a structured set of provisions on penalties, the absence of an enacted legal instrument means that, at the time of this report, the penalties required by the Regulation are not yet in force. This situation represents a significant limitation for the effective functioning of the implementation system, particularly in view of the upcoming deadlines set by the Regulation.

5.1.6. Submission of the report on methane emissions quantification

5 August 2025 represented a key deadline for companies subject to the Regulation, which were required to submit to the Competent Authorities "a report to the competent authorities containing the quantification of source-level methane emissions estimated using at least generic emission factors for all sources. That report may contain quantification of source-level methane emissions in accordance with the requirements set out in paragraph 2 for some or all sources" (Art. 12(1)).

The companies concerned include operators in the oil sector (wells and refineries) and natural gas sector (wells, processing plants, transmission, storage and distribution).

Reports must cover the latest available calendar year and must include (Article 12(4)) at least the following information:

- type and location of emission sources;
- detailed data for each type of emission source (in tonnes of CH_4 and tonnes of CO_2 equivalent)[10];
- detailed information on quantification methodologies;
- all methane emissions from operated assets;
- ownership share and methane emissions from non-operated assets multiplied by the ownership share;
- a list of entities exercising operational control over non-operated assets.

According to available information, the response from companies has been overall significant. At this initial stage, emissions quantification based on estimates derived from generic emission factors is allowed, with the objective of progressively moving towards measurement-based approaches. The data submitted may also

[10] Using the global warming potentials defined by the IPCC.

contribute to strengthening the information base of the national greenhouse gas inventory prepared annually by ISPRA.

Article 12(4) also specifies that: "the Commission shall, by means of implementing acts, lay down a reporting template for the reports provided for in this Article, taking into account the national inventory reports already in place and the latest technical guidance documents and reporting templates of the OGMP. Those implementing acts shall be adopted in accordance with the advisory procedure referred to in Article 35(2). Until the adoption of the relevant implementing acts, operators and undertakings shall use the technical guidance documents and reporting templates for upstream and mid- and downstream operations, as applicable, of the OGMP 2.0."

As noted, the Commission is delayed in adopting these implementing acts, lacking the definition of contextual criteria and technical documentation necessary for operators to carry out the required activities. This refers to the continued absence of tools and standards which, under the applicable procedure, require a formal mandate to CEN (European Committee for Standardization). At present, at least two critical issues can be identified:

- first, the development of technical standards requires a specific request from the European Commission to CEN (the so-called "standardization request"), issued at the end of 2024. Given that the contract provides for a three-year period to develop the standards, they are not expected to be available before 2028 (while, in the meantime, regulatory obligations and deadlines continue to apply; in particular, more stringent requirements will enter into force in 2027);
- second, the Regulation has taken on the task of defining in detail several technical requirements, which creates an additional operational bottleneck. In particular, it requires the European Commission to adopt a delegated act specifying the Minimum Detection Limits (MDLs) for the technologies to be used, as well as thresholds for pre-localisation activities. These values have not yet been defined[11].

MASE complied with this requirement as well, collecting the Article 12 reports and subsequently publishing them on its website[12].

Following the initial deadline of 5 August 2025, Article 12 establishes subsequent deadlines requiring progressively more detailed reporting. In particular, operators must submit to the relevant Competent Authorities a report with source-level methane emissions quantification:

- for operated assets by 5 February 2026;
- for non-operated assets by 5 February 2027.

In this case, quantification requires direct measurement of emissions; where this is not feasible, "reporting shall involve the use of specific emission factors based on source-level quantification or sampling" (Article 12(2)). Compared to the 5 August 2025 deadline, estimates based on generic emission factors are no longer sufficient.

Article 12(3) introduces further deadlines, requiring operators to prepare reports with source-level quantification integrated with site-level measurements, in order to assess and reconcile aggregated source-level estimates at site level. The obligation includes two deadlines:

- for operated assets by 5 February 2027, and subsequently by 31 May each year;
- for non-operated assets by 5 August 2028, and subsequently by 31 May each year.

[11] To date, the situation is as follows: • technical standards are not yet available due to delays in the issuance of the relevant documents by the European Commission. • At the same time, operators are subject to obligations that cannot be postponed; compliance requires practical actions, measurements and surveys, which in turn require investments in technologies and equipment selected without yet having clear and uniform guidance. Some of these investments represent a gamble, made in the hope that current industrial best practices will be reflected in the delegated act. Uncertainty therefore persists.

[12] In the following section, "Publication of reports on methane emissions quantification," the activities carried out by MASE in collecting and publishing the reports are described

5.1.7. Transmission to the Commission of information received from importers

The Regulation requires Member States to transmit to the European Commission the information received from importers on import flows of natural gas, oil and coal. According to MASE, Italy complied with the 5 August 2025 deadline by forwarding the information received from importers within the required timeframe.

Overall, despite the critical issues related to the delay in the designation of Competent Authorities, Italy has demonstrated sufficient operational capacity to ensure compliance with the main reporting deadlines set by the Regulation in this initial phase of implementation. The Regulation also provided that such information would be published by the Commission on a dedicated website starting from 5 February 2026.

5.1.8. Publication of reports on methane emissions quantification

The Regulation establishes that, by 5 November 2025, Member States shall make public the reports on methane emissions quantification submitted by companies in the energy sector. In Italy, this deadline was met by MASE, which published the reports received on its institutional website on 5 November 2025.

The 86 reports collected (as of February 2026) were grouped by sector: upstream (oil and gas), storage, regasification, transmission and distribution. In particular, reports were published from 66 gas distribution companies, 5 transmission companies, one regasification operator, one storage operator and 11 upstream oil and gas operators[13].

These reports represent the first systematic exercise in methane emissions reporting across the Italian gas value chain and constitute a relevant indicator both of system coverage and of the methodological maturity of operators, as further illustrated in **Section 5.2.2**.

Despite differences across segments, the reports cover a very large share of the system and provide a solid information base for monitoring and the progressive harmonisation of methane emissions quantification methodologies. While the assessment of infrastructure and volume coverage helps frame the representativeness of the reports, the informational quality of the data depends to a large extent on the methodologies adopted by operators, an aspect that requires further analysis.

The publication of the reports is a significant step in terms of transparency and monitoring of the Regulation's implementation. It enables, for the first time, systematic access to data on methane emissions in the national energy sector, although the information is still largely based on estimates using emission factors. Overall, timely publication represents a positive element in the implementation process in Italy and provides an essential basis for improving data quality and accuracy in subsequent phases.

5.1.9. Submission of LDAR activity schedules and results

The Regulation requires operators to submit to the Competent Authorities both the schedules and the results of LDAR activities. In the initial phase of implementation, companies submitted their LDAR programmes, while the reporting of results from the first campaigns is closely linked to the execution of the required surveys and to the definition, at EU level, of the relevant technical requirements.

The absence of the Commission's implementing act on detection limits and LDAR techniques has led to a transitional approach based on the use of best available technologies. This has taken place with the expectation that such technologies will be included in the forthcoming act, and with the risk that operators may have invested in solutions that could later not be recognised as compliant.

[13] The number of individual sections does not correspond to the overall total due to operators appearing in more than one segment of the value chain.

5.1.10. Submission of annual reports on venting and flaring events

In general terms, Article 15 regulates restrictions on venting and flaring, prohibiting routine practices and allowing their use only in cases of emergency or malfunction.

The Regulation introduces specific reporting obligations for venting and flaring events. Operators must notify the Competent Authorities of any release or flaring events caused by an emergency or malfunction with a total duration, for a single event, of 8 hours or more within a 24-hour period (Art. 16(1)). In the initial phase of implementation, these obligations are integrated into the broader framework of methane emissions quantification reports submitted by companies by 5 August 2025. From 5 February 2026, the provisions of the Regulation imposing stricter limits on venting and flaring events have entered into force.

However, the full structuring of annual reporting for such events remains dependent on the definition of European technical standards and reporting templates to be developed by the Commission. Uncertainty also remains regarding the minimum technical requirements for flaring efficiency, which must not fall below specified thresholds[14].

5.2. Assessment of the state of implementation: analysis of reports under Article 12

A quantitative assessment of the implementation of Regulation (EU) 2024/1787 can, at this stage, be carried out through the analysis of the 86 reports submitted by operators in the natural gas and oil value chains pursuant to Article 12.[15].

Table 19: Article 12 reports submitted to MASE and reported emissions

SEGMENT	Reports submitted (no.)	Emissions reported for 2024 (t CH4/year)
Upstream (oil & gas)	12	3.265
Storage (gas)	2	3.041
Regasification (gas)	1	2.133
Transmission (gas)	7	7.297
Distribution (gas)	65	29.538

Source: AdT elaboration based on MASE data

These reports represent the first systematic exercise of methane emissions reporting along the national gas value chain and therefore constitute a relevant indicator of both the level of system coverage and the degree of methodological maturity achieved by operators.

The analysis was developed along two complementary lines:

- systemic coverage of the value chain, assessed not only in terms of the number of operators, but also through metrics representative of the infrastructural and operational weight of the different segments;
- methodological profile of the reported estimates, with particular reference to the degree of alignment with the OGMP 2.0 approach.

[14] Article 17 sets out requirements regarding flaring efficiency. In particular, operators "shall install only flare stacks or combustion devices with an auto-igniter or continuous pilot burner and with a destruction and removal efficiency by design level of at least 99%" (Article 17(1)). Furthermore, "Operators shall ensure that all flare stacks or other combustion devices comply with the requirements of paragraph 1 by 5 February 2026" (Article 17(2)). Every 15 days, operators are required to inspect such devices in accordance with Annex IV, which specifies that inspections shall include external visual checks, listening for pressure leaks and liquid releases, and the detection of unusual or strong odours.

[15] The 86 reports analysed represent the full set of communications published by MASE at the time of drafting this report (February 2026). AIMAG submitted a report covering both upstream and distribution activities and has therefore been counted twice.

5.2.1. Systemic coverage of the value chain

As a first step, the effective coverage of the national gas system was assessed. The mere percentage of operators that submitted reports may in fact be of limited significance, especially in segments characterised by a high level of industrial concentration. For this reason, coverage was also analysed with respect to systemic metrics (such as number of wells, storage capacity, network length or volumes handled) suitable for representing the infrastructural and operational weight of the different segments.

The assessment was carried out, for each segment of the value chain, using the most appropriate official sources available, consistent with the scope of Regulation (EU) 2024/1787.

5.2.1.1. Upstream oil&gas

With regard to the upstream segment, the reporting obligation under the Regulation applies to both the natural gas and oil sectors. The analysis was developed based on data published by MASE concerning mining titles, registered wells, and national production of natural gas (Sm^3) and petroleum products (kg) obtained from hydrocarbon production concessions onshore and offshore in Italy in 2024.

By cross-referencing these datasets, operators active in the segment were identified. Coverage was estimated using, as proxies, the number of titles, the number of wells, and the production associated with each operator.

Table 20: Coverage of the upstream oil & gas segment

Indicator	National Total	Covered by Reports	Coverage (%)	Source
Operators (no.)	19	11	58%	MASE
Titles (no.)	175	155	89%	MASE
Wells (no.)	1.490	1.413	95%	MASE
Natural gas production 2024 (MSmc)	2.868	2.828	99%	MASE
Petroleum products production 2024 (kt)	4.455	4.455	100%	MASE

Source: AdT elaboration based on MASE data

In the upstream segment, 11 out of 19 operators (58%) submitted reports. However, these operators account for:

- 89% of production titles;
- 95% of registered wells;
- 99% of gas production;
- nearly 100% of petroleum products production.

Systemic coverage of the segment is therefore very high, despite numerical coverage being half of the operators.

5.2.1.2. Storage

Operators active in 2024 were identified based on ARERA's annual report on the state of services, while total capacity was estimated using data reported on operators' institutional websites, referring to technical capacity expressed in billion cubic metres (bcm).

Table 21: Coverage of the gas storage segment

Indicator	National Total	Covered by Reports	Coverage (%)	Source
Operators (no.)	3	2	67%	ARERA
Estimated capacity (bcm)	18	17	94%	Company websites

Source: AdT elaboration based on MASE data

In 2024, three operators were active, of which two submitted reports (67%).

In terms of total estimated capacity, the operators that submitted reports cover 94% of national capacity.

Systemic coverage of the segment can therefore be considered substantially complete.

5.2.1.3. Regasification

Operators active in 2024 were identified through ARERA's annual report, while actual regasified volumes were derived from data published by MASE.

Table 22: Coverage of the LNG regasification segment

Indicator	National Total	Covered by Reports	Coverage (%)	Source
Operators (no.)	3	1	33%	ARERA
Plants (no.)	4	2	50%	ARERA
Regasified volumes 2024 (bcm)	15	5	31%	MASE

Source: AdT elaboration based on MASE data

In this segment, three operators were active, of which one submitted a report (33%), corresponding to two plants out of four (50%).

In terms of regasified volumes in 2024, coverage stands at approximately 31% of the national total.

Unlike other segments of the value chain, systemic coverage of regasification appears significantly more limited due to the lack of reporting by OLT Offshore LNG Toscana S.p.A. and Terminale GNL Adriatico S.r.l., which account for 7% and 62% of regasified volumes in 2024, respectively.

5.2.1.4. Transmission

Active operators and the total length of the networks (km) were derived from ARERA's 2024 annual report.

Table 23: Coverage of the gas transmission segment

Indicator	National Total	Covered by Reports	Coverage (%)	Source
Operators (no.)	8	4	50%	ARERA
Network length (km)	35.436	35.132	99%	ARERA

Source: AdT elaboration based on MASE data

In the transmission segment, four out of eight operators (50%) submitted reports. However, in terms of infrastructural coverage, the operators that submitted reports account for approximately 99% of the national network.

The segment can therefore be considered almost entirely covered from an infrastructural perspective.

5.2.1.5. Distribution

For the distribution segment, operators were identified based on ARERA lists. In its report on the state of services, ARERA also provides a list of the main operators aggregated by industrial group, together with the volumes of gas distributed (Mm^3). The analysis was therefore carried out at group level: a group was considered covered if at least one company within it submitted an Article 12 report.

Table 24: Coverage of the gas distribution segment

Indicator	National Total	Covered by Reports	Coverage (%)	Source
Operators (no.)	184	65	35%	ARERA
Main groups (no.)	20	20	100%	ARERA
Distributed volumes 2024 (bcm)	25.801	22.896	89%	ARERA

Fonte: elaborazione AdT su dati MASE e ARERA

In the distribution segment, 65 out of 184 operators (35%) submitted reports. However, considering the 20 main industrial groups identified by ARERA, which account for over 88% of distributed volumes, all groups are covered.

In terms of total national volumes, coverage reaches 89% of the total.

Even in the most fragmented segment of the value chain, systemic coverage is therefore high, despite the significant numerical dispersion of operators.

5.2.1.6. Overall summary

The analysis highlights a differentiated picture across the gas value chain.

In segments characterised by greater industrial concentration (in particular transmission and storage), systemic representativeness is close to covering the entirety of infrastructures. In the upstream segment, despite limited numerical coverage of operators, the share of titles and wells included in the reports appears high.

In the distribution segment, corporate fragmentation results in a low numerical share of operators submitting reports; however, when considering the main industrial groups, the share of volumes effectively covered is substantial.

Regasification is the only segment where, in this initial phase of implementation, systemic representativeness appears significantly lower compared to other parts of the value chain.

Overall, despite differences across segments, Article 12 reports cover a very large share of the infrastructures and volumes of the national gas system, providing a solid information base for monitoring and for the progressive harmonisation of methane emissions quantification methodologies along the entire value chain.

The assessment of infrastructural and volumetric coverage makes it possible to frame the representativeness of the reports; however, the informational quality of the data depends to a decisive extent on the methodologies adopted, which are the subject of the following analysis.

5.2.2. Methodological profile of the reports

Alongside the assessment of the level of coverage, it is useful to evaluate the methodological profile of the reports submitted by 5 August pursuant to Article 12 of Regulation (EU) 2024/1787, referring to 2024 emissions.

In order to make the heterogeneity of methodologies reported by operators comparable, an analytical classification consistent with the OGMP 2.0 framework was adopted.

The classification was not limited to the OGMP level formally declared by operators, but instead jointly considered:

- the presence or absence of direct emissions measurements;
- the level of coverage of emission sources;
- the possible implementation of structured LDAR campaigns;
- the use of generic or specific emission factors;
- the use of engineering models;
- the reporting level (asset-level, site-level).

Based on these criteria, the reports were grouped into five methodological categories:

A – Systematic measurement-based (OGMP 2.0 Levels 4–5): Includes operators that adopt systematic direct measurements of emissions, with broad source coverage and site-level reporting. The approach is not limited to partial sampling but is based on a structured measurement-based framework.

B – Sample-based measurement (OGMP 2.0 Level 4): Includes operators that carry out direct measurements on representative samples of sources or assets, subsequently extrapolating results using specific emission factors. The OGMP framework is declared, but coverage does not extend to the entire operational scope.

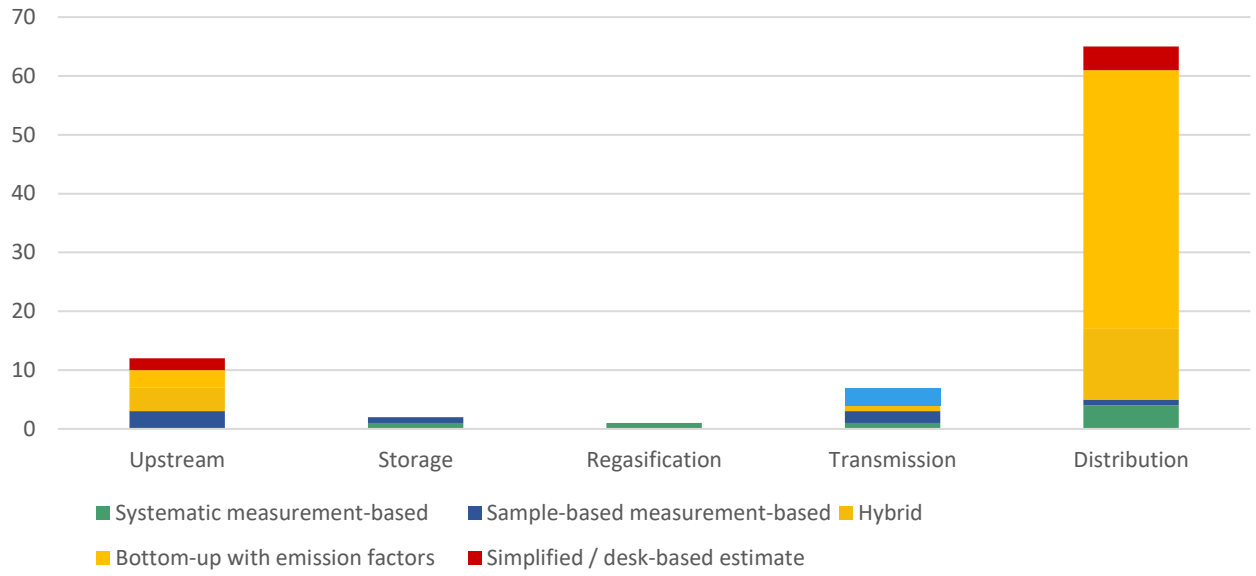
C – Hybrid (OGMP 2.0 Levels 3–4): Includes reports characterised by systematic LDAR campaigns and source-level inventories, integrated with emission factors and engineering calculations. Extensive direct mass measurements are not present, but the approach goes beyond the simple application of generic factors.

D – Bottom-up with emission factors (OGMP 2.0 Level 3): Includes source-level estimates based on standard emission factors (e.g. MARCOGAZ, EPA, UNI EN), possibly accompanied by LDAR activities that are not quantitatively integrated or are of a qualitative nature. The approach is consistent with OGMP Level 3 but does not include systematic direct measurements.

E – Simplified / desk-based estimate (OGMP 2.0 Levels 1–2): Includes reports lacking a detailed source-level inventory or based on loss percentages or aggregated tables, without evidence of structured LDAR or a complete methodological description.

It should be noted that this classification has an analytical and comparative purpose within the scope of this report and does not constitute a formal assessment of compliance with the Regulation. The classification is based exclusively on the information provided by operators in the submitted reports.

Figure 35: Distribution of methodological categories of Article 12 reports by segment of the natural gas value chain



Source: Amici della Terra elaboration based on Article 12 reports published by MASE

The classification of the 86 reports analysed highlights significant methodological heterogeneity along the value chain. Overall:

- 7 reports (8%) fall under the systematic measurement-based category;
- 7 reports (8%) adopt a sample-based measurement approach;
- 17 reports (20%) present a hybrid profile with structured LDAR;
- 50 reports (58%) are based on a bottom-up approach using emission factors;
- 6 reports (6%) can be classified as simplified or desk-based estimates.

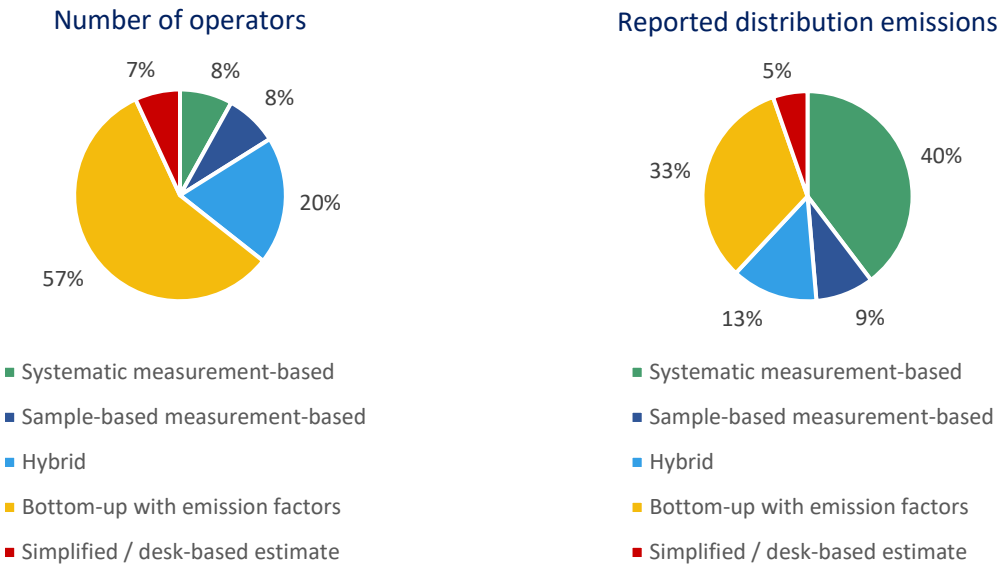
The distribution varies significantly across segments.

In segments with higher industrial concentration (storage, regasification and transmission), reports are predominantly associated with measurement-based categories (A and B), whereas in distribution, characterised by strong corporate fragmentation, the bottom-up factor-based approach prevails (44 reports out of 65).

In the upstream segment, an intermediate situation emerges, with the presence of large operators adopting Level 4 approaches (category B), alongside smaller operators that mainly rely on Level 3 methodologies or simplified estimates.

Overall, the picture highlights a methodological transition already underway among major operators, though not yet fully uniform across the entire national value chain.

Figure 36: Distribution of operators and reported emissions by methodological category



Source: Amici della Terra elaboration based on Article 12 reports published by MASE

The joint analysis of the number of reports and the reported emissions reveals a significant gap between the numerical weight of operators and the emissions weight of the different methodological categories.

Reports associated with a systematic measurement-based approach (7 operators, 8% of the total) account for 40% of total reported emissions.

Reports classified as sample-based measurement (7 operators, 8%) account for a further 9% of emissions.

The hybrid category, combining structured LDAR, non-generic emission factors and engineering calculations (17 operators, 20%), accounts for 13% of total emissions.

Overall, approaches corresponding to advanced OGMP 2.0 levels (categories A, B and C) account for over 60% of total reported emissions, despite involving only 36% of operators. This confirms that emissions are concentrated among larger operators, which also exhibit higher methodological maturity.

By contrast, reports based on a bottom-up approach using emission factors represent the numerical majority (50 operators, 57%), but account for 33% of reported emissions.

Simplified or desk-based estimates (5 operators, 6%) account for 5% of the total.

Overall, the data show that, despite the numerical prevalence of factor-based approaches, a significant share of emissions in the national system is already quantified using measurement-based methodologies, primarily adopted by operators with larger infrastructural scale.

5.2.2.1. Focus on the distribution segment

The distribution segment, which according to the national greenhouse gas inventory represents the main source of fugitive emissions along the natural gas value chain, shows a methodological configuration distinct from other segments.

Out of 64 operators that submitted reports:

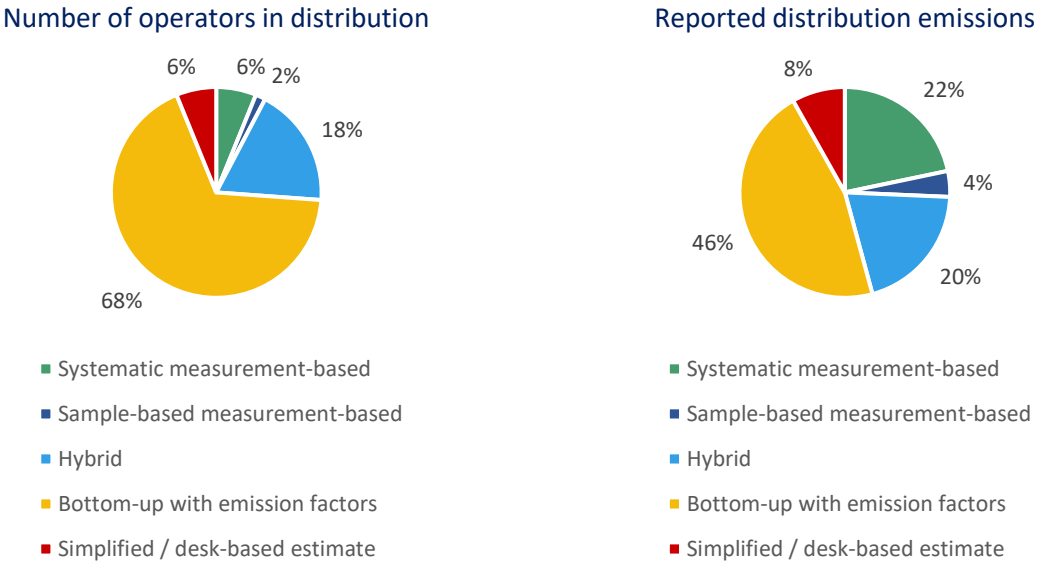
- 4 (6%) adopt a systematic measurement-based approach;
- 1 (2%) falls under the sample-based measurement category;
- 12 (18%) present a hybrid profile with structured LDAR;
- 44 (68%) rely on bottom-up estimates based on emission factors;

- 4 (6%) can be classified as simplified or desk-based estimates.

In terms of emissions, the picture is only partially different. Measurement-based reports (A+B) account for 26% of total emissions in the segment, while hybrid approaches account for 20%. Bottom-up estimates based on emission factors cover 46% of reported emissions, confirming their prevalence also from an emissions perspective. This configuration reflects the industrial structure of the segment, characterised by a high number of small- and medium-sized operators.

The data show that, in the distribution segment, the transition towards measurement-based methodologies is still in a consolidation phase. Unlike segments with higher industrial concentration, where major operators have already adopted Level 4–5 approaches, the corporate fragmentation of the distribution sector is reflected in a wider use of Level 3 methodologies based on standard emission factors.

Figure 37: Distribution of distribution operators and their reported emissions by methodological category



Source: Amici della Terra elaboration based on Article 12 reports published by MASE

5.2.3. Assessment of emissions disaggregation by emission type: fugitive, venting and incomplete combustion

Based on the analysis of the Article 12 reports, a subgroup of operators can be identified that provides a complete disaggregation of methane emissions across all three macro-categories defined by the OGMP 2.0 framework: fugitive emissions, vented emissions, and emissions from incomplete combustion (including flaring).

This disaggregation represents a relevant element of reporting quality, as it allows for analysis of the composition of emissions along the value chain and the identification of the main emission sources within each segment.

Table 25: Percentage breakdown of methane emissions by fugitive, venting and incomplete combustion, by operator and segment, 2024 (operators with complete reporting)

Operator	Segment	Emissions (t)	Fugitive (%)	Venting (%)	Incomplete combustion (%)
ENERGEAN ITALY (oil&gas)	Upstream	**363**	74%	22%	4%
ENERGEAN SICILIA (gas)	Upstream	**12**	100%	0%	0%
TOTALENERGIES EP ITALIA (oil&gas)	Upstream	**56**	3%	1%	96%
STOGIT	Storage	**2.963**	55%	44%	0%
ITAL GAS STORAGE (IGS)	Storage	**78**	18%	82%	0%
SNAM Energy Terminals	Regasification	**2.133**	1%	50%	49%
ITG S.p.A	Transmission	**12**	90%	10%	0%
SGI	Transmission	**793**	90%	10%	0%
SNAM Rete Gas	Transmission	**6.450**	38%	61%	0%
Retragas S.r.l.	Transmission	**37**	25%	75%	0%
Acegas	Distribution	**740**	99%	1%	0%
ASM Vercelli S.p.A	Distribution	**107**	100%	0%	0%
EROGASMET S.p.A	Distribution	**727**	99%	1%	0%
Giudicarie Gas S.p.A	Distribution	**6**	0%	100%	0%
INRETE Distribuzione Energia S.p.A	Distribution	**3.759**	93%	7%	0%
IRETIGasSpA	Distribution	**2.465**	94%	6%	0%
Italgas S.p.A (include 2i Rete Gas)	Distribution	**3.844**	96%	4%	0%
Martesana Reti Srl	Distribution	**12**	74%	26%	0%
MMS-Marche Multiservizi	Distribution	**446**	99%	1%	0%
Molise Gestioni s.r.l	Distribution	**109**	98%	2%	0%
Novareti	Distribution	**160**	2%	98%	0%
SEAB	Distribution	**230**	100%	0%	0%
Südtirolgas S.p.A. (STG)	Distribution	**1607**	100%	0%	0%

Source: Amici della Terra elaboration based on Article 12 reports published by MASE

The table, which includes only operators reporting all three categories (fugitive emissions, venting and incomplete combustion), represents a meaningful subset and, although not representative of the entire system, allows for a consistent comparison across emission types.

A first relevant finding concerns the relationship between reporting completeness and the methodology adopted. The availability of disaggregated data is mainly observed among operators applying the OGMP 2.0 framework and generally positioned at medium-to-high methodological levels (categories A, B and C), although some exceptions exist where full disaggregation is provided even with simpler approaches (category D). This suggests that the standardisation of reporting is progressing independently of the level of accuracy of the estimation methodologies.

From a sectoral perspective, the upstream segment confirms a marked heterogeneity of emission profiles, also depending on whether oil or gas production is the dominant activity. Energean Italy shows a prevalence of fugitive emissions, combined with a significant share of venting and a non-negligible contribution from incomplete combustion. Energean Sicilia, by contrast, exhibits an almost exclusively fugitive profile. TotalEnergies EP Italia presents the opposite configuration, where incomplete combustion is the dominant component, while the other categories are marginal. This confirms that, in the upstream segment, there is no uniform emission profile and that the structure of emissions strongly depends on plant characteristics and operational processes.

In the storage segment, a more balanced distribution across emission components is observed. Stogit shows high volumes of both fugitive and vented emissions, with a negligible share of incomplete combustion,

consistent with the presence of turbines and heating systems. Ital Gas Storage (IGS), on the other hand, shows a predominance of venting emissions and no incomplete combustion, indicating differences in plant configurations and operational practices.

The regasification segment presents a particularly distinctive configuration. In the case of Snam Energy Terminals, referring to emissions from the Panigaglia LNG terminal and the Piombino FSRU, emissions are almost entirely attributable to venting and incomplete combustion, with very similar shares, while fugitive emissions are negligible. This highlights the central role of combustion systems and operational processes in determining emissions in this type of infrastructure.

In transmission, significant variability emerges across operators. SNAM Rete Gas shows the highest overall volumes, with venting as the dominant component and a substantial share of fugitive emissions, while incomplete combustion remains negligible. SGI shows a prevalence of fugitive emissions, whereas Retragas presents the opposite profile, with emissions concentrated in venting. The case of TAP, which reports zero values across all categories, illustrates how the absence of emissions can be explicitly reported within the OGMP framework.

The distribution segment presents a generally more uniform picture, although with some notable differences. In most cases, including Italgas, Inrete, Ireti Gas, Acegas and Südtirolgas, emissions are almost entirely attributable to fugitive losses, which consistently represent the dominant component. However, some relevant exceptions emerge: Novareti and Giudicarie Gas show a predominance of venting emissions over fugitive ones, highlighting the role of operational and maintenance activities in specific network configurations. Overall, incomplete combustion remains negligible across all distribution operators, with values generally close to zero.

Overall, the analysis confirms that incomplete combustion is a relevant component only in specific contexts, particularly in the upstream and regasification segments, while its contribution is negligible in transmission and distribution. By contrast, fugitive emissions constitute the structural component of emissions in distribution and, in many cases, also in transmission, while venting plays a significant role mainly in operational and maintenance activities.

5.2.3.1. Reports with partial disaggregation: analysis of fugitive and venting emissions

Alongside operators that provide a complete disaggregation of emissions across the three categories defined by the OGMP 2.0 framework, a further group of reports can be observed in which only fugitive and vented emissions are reported, while the incomplete combustion component is not quantified or not explicitly reported.

The absence of incomplete combustion may reflect different situations: the actual absence of such emission sources in the assets considered, difficulties in quantification, or a reporting choice prioritising the most relevant components. However, this omission limits comparability with reports providing full disaggregation, as it does not allow exclusion of the possibility that a share, albeit small, of emissions is associated with unaccounted combustion systems.

Table 26: Percentage breakdown of methane emissions between fugitive and venting by operator and segment, 2024 (operators with partial disaggregation)

Operator	Segment	Emissions (t)	Fugitive (%)	Venting (%)
ENI – Distretto centro settentrionale (oil&gas)	Upstream	**2.046**	15%	85%
ENI – Distretto meridionale (oil&gas)	Upstream	**319**	63%	37%
ENI MEDITERRANEA IDROCARBURI (oil&gas)	Upstream	**434**	27%	73%
Transmediterranean Pipeline Company L.t.d	Transmission	**4**	20%	80%
ADRIGAS	Distribution	**17**	93%	7%
Azienda Servizi Valtrompia S.p.A. (ASVT)	Distribution	**7**	20%	80%
DOLOMITI GNL SRL	Distribution	**1**	0%	100%
G.E.I. S.p.a	Distribution	**57**	100%	0%
Lereti S.p.A	Distribution	**134**	62%	38%
Reti Valtellina Valchiavenna S.r.l. (Re.V.V.)	Distribution	**42**	95%	5%
RetiPiù S.r.l.	Distribution	**26**	31%	69%
UNARETI spa	Distribution	**2.499**	91%	9%

Source: Amici della Terra elaboration based on Article 12 reports published by MASE

This group includes operators active across different segments of the value chain, including upstream (ENI districts), transmission (Transmediterranean Pipeline Company), and especially distribution, where most cases are concentrated. The cross-cutting presence of this configuration suggests that the absence of reporting on incomplete combustion is not limited to a specific segment, but rather reflects differences in the level of detail and structure of reporting.

From a quantitative perspective, in the upstream segment represented by ENI districts, a clear predominance of venting over fugitive emissions emerges, particularly in the Northern Central District, where operational releases constitute the main component. This result is consistent with the nature of upstream activities, where gas management operations may involve more significant intentional releases.

In the transmission segment, the case of Transmediterranean Pipeline Company shows an emission structure dominated by venting, albeit with relatively low total volumes, confirming the role of operational activities in this segment as well.

The distribution segment shows greater variability. In many cases, such as Unareti, Adrigas and Reti Valtellina Valchiavenna, emissions are predominantly fugitive, consistent with findings for operators with complete reporting. However, different configurations also emerge: companies such as RetiPiù and ASVT show a predominance of venting, while Lereti presents a more balanced distribution between the two components. These results indicate that, even within the distribution segment, the relative weight of operational emissions can vary significantly depending on management practices and network characteristics.

5.2.4. Preliminary comparison with the national inventory (NIR)

An additional element of analysis consists in comparing the emissions reported by operators with the national estimates provided by ISPRA in the National Inventory Document (NID), with reference to category 1.B.2 – Fugitive emissions from fuels.

Unlike **Chapter 2**, which is based on ISPRA estimates from the NID 2025 (data up to 2023), this comparison uses the more recent estimates contained in the NID 2026 (data updated to 2024), which for the first time incorporate information derived from the Article 12 reports under Regulation (EU) 2024/1787. These data have been used by ISPRA to improve the representation of emissions in the oil and gas sector, particularly through the reallocation across emission categories and value chain segments, integrating operator-reported data into the inventory model.

Table 27: Comparison between emissions reported in Article 12 reports and NIR estimates

SEGMENT	Emissions reported (t CH4, 2024)		NIR emissions (t CH4, 2024)	
Upstream	*3.265*	*Emissions reported by upstream oil & gas operators*	*3.263*	*Emissions estimated by ISPRA under the following categories: Oil – Exploration + Production and upgrading Natural gas – Exploration + Production and gathering + Processing Venting and flaring*
Transmission, regasification and storage	*12.466*	*Emissions reported by gas operators in regasification, storage and transmission*	*12.747*	*Emissions estimated by ISPRA under the category: Natural gas – Transmission and storage*
Distribution	*29.538*	*Emissions reported by gas distribution operators*	*64.221*	*Emissions estimated by ISPRA under the category: Natural gas – Distribution*
TOTAL	**45.269**		**80.232**	

Source: AdT elaboration based on MASE and ISPRA data

This comparison should be interpreted as an exercise in systemic consistency rather than as a point-by-point verification of the data. The two quantification systems are based on different underlying approaches.

The NID is developed in accordance with IPCC guidelines and relies primarily on average emission factors (IPCC, CORINAIR, country-specific) applied to national activity data (top-down approach or Tier 1–2), with the aim of ensuring international reporting consistency and time-series comparability.

By contrast, the Article 12 reports are prepared at company level following the OGMP 2.0 framework and are based on source-level inventories, LDAR campaigns and, in some cases, direct measurements (bottom-up or measurement-based approach). Even where reports adopt an emission factor-based approach (OGMP Level 3), the coefficients used (e.g. MARCOGAZ, GERG/MEEM, UNI EN, EPA/API or company-specific factors) do not necessarily coincide with those used by ISPRA in the national inventory, which follows IPCC criteria and time-series consistency requirements. Differences in applied factors may therefore lead to discrepancies even where methodological approaches appear formally similar.

It should also be considered that the Common Reporting Format (CRF 1.B.2) categories do not perfectly align with the segmentation adopted in Regulation (EU) 2024/1787 or with the OGMP 2.0 structure. CRF categories aggregate activities according to IPCC classifications (exploration, production, processing, transmission and storage, distribution), whereas the reports are organised by operator and by asset, with source-level detail. This results in unavoidable differences in scope and in the allocation of emissions across categories.

In light of these elements, the comparison should be interpreted in terms of orders of magnitude.

- From this perspective, the following picture emerges:
  Upstream – Reported emissions (3.265 t CH_4) are essentially aligned with NID estimates (3,263 t CH_4), showing an almost complete consistency between the two systems.
  Transmission, regasification and storage – A high level of consistency is also observed between reported data (12.466 t CH_4) and the national inventory (12.747 t CH_4), with only a very limited deviation.
  Distribution – In the distribution segment, a significant divergence persists: reported emissions (29.538 t CH_4) are less than half of NID estimates (64.221 t CH_4). According to ISPRA, this gap is primarily attributable to incomplete reporting coverage, due to the presence of non-reporting operators, rather than to methodological differences or emission factors, which play a secondary role. In this sense, inventory estimates incorporate adjustments to account for the full scope of the sector.

According to ISPRA, overall, several indicators point to a good level of consistency between national inventory estimates and operator-reported data, once reporting coverage limitations are taken into account.

The comparison does not therefore constitute a validation of data accuracy, but rather provides a preliminary indication of structural consistency between company reporting and the national inventory, highlighting the segments where further methodological alignment and improved coverage will be needed in future reporting cycles.

5.2.5. Concluding remarks

Overall, the analysis of the Article 12 reports for 2024 activities, submitted in 2025, provides a picture of a system which, despite differences across segments and marked methodological heterogeneity, shows a broadly significant infrastructural and quantitative coverage across the entire gas value chain.

Alongside this first level of interpretation, the analysis highlights an additional layer of complexity, related not only to the methodologies adopted but also to the structure and level of detail of reporting. In particular, the distinction between reports that provide a complete disaggregation of emissions across the three categories defined by the OGMP 2.0 framework and those that report only fugitive and vented emissions reveals important differences in the informational quality of the data.

From the perspective of emission composition, a highly differentiated picture emerges across the value chain. Distribution is confirmed as the segment in which emissions are predominantly attributable to fugitive losses, albeit with some exceptions where venting plays a significant role. In the transmission and storage segments, greater variability is observed, with a relevant contribution from both fugitive and operational emissions. The upstream segment shows the highest levels of heterogeneity across operators, while regasification exhibits specific configurations in which emissions are largely driven by incomplete combustion and operational processes.

The combined analysis of reports with full and partial disaggregation also shows that variability in emission structure is accompanied by a similar variability in reporting completeness, confirming that the implementation of the OGMP 2.0 framework is still in a consolidation phase. In several cases, the absence of the incomplete combustion component cannot be unambiguously interpreted as the absence of such emission sources, but may reflect limitations in quantification or reporting choices. This introduces an element of uncertainty in the comparability of data across operators and segments.

The methodological profile confirms that emissions are concentrated among larger operators, which also exhibit higher levels of methodological maturity (measurement-based or hybrid approaches), while in more fragmented segments, particularly distribution, there remains a prevalence of bottom-up methodologies based on emission factors. However, the composition of emissions is primarily determined by the technical characteristics of assets and operational practices, whereas the methodological level mainly affects the completeness and robustness of the data.

The preliminary comparison with the national inventory, updated to ISPRA 2026 estimates, shows overall consistency in orders of magnitude for the upstream and midstream segments. In the distribution segment, a significant divergence remains between reported emissions and inventory estimates; however, based on available information, this gap appears to be mainly attributable to incomplete reporting coverage, linked to the presence of non-reporting operators,

rather than to methodological differences or emission factors. Taking this into account, an overall consistent picture emerges between reported data and national estimates.

Overall, the first reporting cycle highlights the existence of a broad and structured information base, though not yet fully homogeneous. The implementation phase of the Regulation therefore appears to be oriented less towards building a system from scratch and more towards consolidating monitoring practices, progressively extending disaggregation by emission type, and strengthening data comparability across the entire value chain.

6. Initiatives by environmental organisations, CIG and industry associations

6.1. Amici della Terra campaign

6.1.1. The Amici della Terra Methane Roundtable

The Methane Roundtable is an initiative promoted by Amici della Terra (AdT) in collaboration with Environmental Defense Fund Europe (EDFE). Established in 2021, it typically meets on a monthly basis, with both plenary sessions and thematic working sessions. It represents the only forum in Italy bringing together institutions, public bodies, operators across the gas value chain and environmental organisations, with the aim of facilitating the implementation of the Regulation. Its activities have contributed to deepening and advancing the issue at both national and international level, positioning Italy as an active player in Europe's efforts to reduce methane emissions.

At the end of 2021, the work of the Roundtable led to the drafting of the document *"*Guidelines for an Italian Strategy to Reduce Methane Emissions from the Natural Gas Value Chain*"*, which was shared and endorsed by all participants. This represented the first case in which companies, associations and environmental NGOs jointly committed to reducing methane emissions, setting both qualitative and quantitative targets.

In 2022, the Roundtable expanded its participation and began addressing the issue of imported gas. On 21 December, an updated version of the Guidelines document was presented.

In 2023, activities continued and enabled participation in consultations on Italy's updated National Energy and Climate Plan (NECP), with a shared position based on the 2022 updated Guidelines. These contributions were taken into account, and the updated NECP recognised both the importance of methane emissions reduction and the need to address emissions associated with imports. In November 2023, the Roundtable organised, at MASE, the event *"*Methane emissions in Italy's climate policies*"*

- In 2024, the Roundtable held seven meetings, addressing various topics both in plenary and through focused thematic discussions. Some sessions were dedicated to post-meter methane emissions, resulting in a technical document shared by all participants. Plenary discussions focused mainly on: the update of the NECP, drawing on inputs from the Strategy developed within the Roundtable;
- preliminary assessments of the future Methane Regulation, including related challenges. Following its entry into force, two dedicated sessions were held: one focused on upstream activities and one on infrastructure (distribution, transmission, terminals and storage).

In 2025, the Roundtable held seven meetings, addressing key issues, starting with imports. During the meeting of 22 January 2025, several critical issues related to upcoming deadlines were discussed, including:

- the tight timeline of regulatory deadlines;
- challenges related to existing supply contracts concluded before the Regulation's entry into force (4 August 2024);
- MRV equivalence for imported gas (from 1 January 2027), including the requirement of *all reasonable effort* to ensure comparability with EU production;
- methane intensity reporting (from August 2028) and the introduction of methane intensity standards with maximum thresholds (from 2030);
- the interpretation of "renewed" contracts, increasingly understood as those where several (more than two) key elements (price, duration, quantity) are modified;
- the issue of importers without legal presence in the EU, and the lack of a clear reference Competent Authority. A possible solution discussed is the role of the declarant, the entity responsible for customs declarations within the EU.

Throughout the year, meetings also monitored ongoing developments in the implementation of the Regulation.

In the most recent sessions, discussions have focused on updates in implementation, particularly on the Article 12 emissions quantification reports submitted to MASE and published on its official website. At the

same time, a clearer picture has begun to emerge regarding unresolved critical issues. Key topics identified for future dedicated sessions include:

- venting and flaring, particularly minimum efficiency thresholds for flaring and the availability of compliant technologies;
- inspections (Article 6, applicable from 5 May 2026), highlighting the need for stronger involvement of MASE, ISPRA and other relevant bodies;
- the independent verification and accreditation system for reports, which will become mandatory from 2027, requiring the involvement of Accredia;
- imports and security of supply, increasingly linked not only to volumes but also to reliability, diversification and transparency. The Regulation contributes to improving this framework by reducing hidden risks and introducing a market-based mechanism for comparing supplier performance.

6.1.2. MonitorCH4

MonitorCH4[16] is an event organised by Amici della Terra in Bologna on 23 October 2025. The initiative, structured around an exhibition space and dedicated conferences, represents the first event entirely focused on technologies and systems for reducing methane emissions. The second edition is scheduled to take place in Bologna on 9 July 2026.

Italy is a European leader in the development and management of gas infrastructure and is positioning itself at the forefront of methane emissions reduction, including in atmospheric emissions, marine environments and LNG-based transport. To facilitate interaction between demand, supply and technological developments in methane monitoring and mitigation, AdT promoted this event as a platform for showcasing market solutions and fostering dialogue among institutions, associations and companies.

Particular attention is also given to research and technological innovation, with the aim of maintaining a balanced relationship between costs and benefits, both economic and environmental, of monitoring and mitigation activities.

6.2. Le attività del CIG per l'attuazione del Regolamento

In Italy, the Italian Gas Committee (Comitato Italiano Gas, CIG)[17] develops technical standards for gaseous fuels, in coordination with relevant European bodies. The Committee also produces technical guidelines and carries out training activities. The former traditionally play a key role in managing safety aspects of the natural gas value chain, which are closely linked to environmental aspects, as in the case of methane emissions.

CIG contributes to the development of technical standards relevant to the gas value chain, which are essential tools for operators. In particular, through its experts, it is participating in the ongoing work of the "CEN/TC 234/WG 14 Methane emissions" group for the development of three EN standards supporting the EU Regulation, covering:

a) emissions quantification and reporting (MRV);

b) leak detection and repair (LDAR);

c) venting and flaring.

[16] MONITORCH4

[17] The Committee studies scientific and technical issues and develops technical regulatory documents for the entire gaseous fuels sector, including hydrogen, natural and synthetic gas, and renewable gases. Its areas of work cover: production, marketing, regasification, storage, processing, transmission, distribution, odorisation, measurement and quality, as well as gas telemetering and remote management.

CIG has also developed a proposal for the practical interpretation of the Regulation, to be shared with the Competent Authority once formally designated, with the aim of enabling its practical implementation in Italy and ensuring consistency with existing national legislation and regulation. In this context, CIG plays a key supporting role for companies in the energy value chains affected by the Regulation, as well as for their associations, starting from the development of technical guidelines to address the challenges identified in this initial phase. This work has been carried out in collaboration with Assogas, Proxigas and Utilitalia.

6.3. Initiatives by industry associations

6.3.1. Assogas

Assogas[18] has contributed by representing the needs and technical-operational challenges faced by its members in this initial phase. Given the heterogeneity of its members, particularly in organisational terms, the association proposed to support them through guidance on the interpretation and practical application of the Regulation, with the aim of ensuring as uniform an implementation as possible.

In this context, alongside the valuable input from companies sharing their experience and operational practices, the technical support provided by CIG, through participation in working groups, has been particularly important.

Assogas has developed a handbook (*Vademecum*) for its members, largely composed of small and medium-sized distribution companies. The document, shared and accessible to all, was developed drawing on the expertise of more structured companies in the sector. It is a technical document, not intended to be exhaustive, which highlights critical issues and proposes practical solutions. Its content is aligned with the guidelines developed jointly with CIG.

The handbook aims to make the Regulation's requirements accessible to smaller companies, which face the greatest challenges, facilitating their understanding. It is a shared effort designed to help less structured companies grasp the basic principles of the Regulation and apply them in practice. It serves as an operational guide that:

- provides a clear and structured reference framework;
- highlights areas of the Regulation that pose objective interpretation challenges;
- offers practical guidance for companies;
- promotes the dissemination of best practices;
- proposes ways to align implementation with existing regulatory provisions;
- fosters a culture of environmental protection and operational efficiency.

The document includes an initial analysis of the Regulation and provides reflections and practical suggestions, addressing individual articles and their application in detail. It also highlights the roles of two new actors introduced by the Regulation: the Competent Authorities and the Verifier, the latter required to be independent and accredited under Article 9, with a significant impact on the sector.

The handbook also outlines additional activities linked to regulatory deadlines, particularly with regard to:

- defining operational approaches for LDAR activities (standardised models, repair timelines, etc.);
- identifying technologies and methodologies for emissions quantification.

An updated version of the handbook is expected, reflecting the experience gained nearly two years after the Regulation's entry into force.

[18] National trade association that promotes and protects the interests of companies operating in the gas and energy services sector. It represents around 60 member companies, mainly active in the natural gas market (distribution and retail supply). Its members operate independently of dominant Italian or European operators, thereby contributing to the development of competitive market dynamics, in line with the association's mission to promote competition.

6.3.2. Proxigas

Proxigas[19] has promoted the dissemination of knowledge and experience developed by its member companies, many of which have long participated in the OGMP 2.0 initiative. The Regulation requires operators to adopt advanced industrial practices and the best available technologies for methane emissions quantification, as well as OGMP 2.0 technical guidance. Participation in international working groups on OGMP 2.0 standards has provided an important contribution to identifying practical implementation approaches for the Regulation.

6.3.3. Utilitalia

Utilitalia[20] has contributed within the framework of its support activities for gas distribution operators in implementing the Regulation. Its efforts have focused on facilitating the understanding of operational requirements and helping companies translate new provisions into concrete actions, despite an evolving and still uncertain framework.

In the initial phase, Utilitalia promoted technical discussions to clarify the meaning and scope of binding provisions, supporting operators in defining initial compliance processes. It also contributed significantly to methane monitoring and leak detection, promoting the dissemination of advanced methodologies and tools to harmonise approaches and improve the timely identification of leaks.

With the support of CIG, Utilitalia analysed the main implications of the new regulatory framework for gas distribution in Italy, guiding companies towards the provisional use of voluntary technical standards, such as OGMP 2.0, pending the formal definition of requirements by the European Commission. Activities also included the shared definition of criteria for data collection and traceability, and the preparation of required reporting, enabling DSOs to operate consistently and maintain an adequate level of compliance during the transitional phase.

A particularly sensitive area concerns investments in infrastructure and technologies. The Federation facilitated the exchange of experiences among companies and the sharing of operational solutions, supporting the sector in modernising direct measurement systems. This takes place in a context of uncertainty, due to the lack of formal EU recognition of compliant technologies and challenges related to the possible tariff recognition of associated costs.

6.3.4. Assorisorse

In this context, Assorisorse[21] has established a dedicated Working Group, coordinated by RINA, involving technology providers, designers, manufacturers, operators, inspection, testing and certification bodies, and consulting firms.

At the end of 2024, the association also launched a discussion platform with MASE focused on the implementation of the Regulation in the upstream sector, with the aim of identifying and sharing practical approaches to ensure compliance.

[19] Confindustria association representing the main companies operating in the natural gas sector in Italy, across the entire value chain, from import and production to transmission, storage and sales.
[20] Federation bringing together companies operating in public services in water, environment, electricity and gas, representing them at national and European level. It was established through the merger of Federutility (energy and water services) and Federambiente (environmental services).
[21] Confindustria association composed of around 80 companies engaged in enhancing natural resources and intellectual capabilities through technological innovation and the circular economy, with the objective of decarbonising industrial processes and promoting environmental, economic and social sustainability. Its members supply raw materials and develop technologies.

7. State of implementation at EU level

7.1. Actions by the Commission, CEN and associations

Within the European Commission, the implementation of Regulation (EU) 2024/1787 is entrusted to the Directorate-General for Energy (DG ENER), and in particular to the Unit "Decarbonisation and sustainability of energy sources."

Among the main tasks assigned to the Commission, particularly relevant in the initial phase of implementation, are: the establishment of a network of national Competent Authorities; the definition of technical rules and requirements for companies operating within the Union; the development of reporting templates for companies; the activation of transparency and information tools; and the preparation of guidelines for the application of provisions concerning imports.

Information on the implementation activities of the Regulation is also made available by the Commission through a dedicated webpage: Methane emissions - European Commission.

7.1.1. Network of Competent Authorities for the implementation of the Regulation

Article 5 of the Regulation provides that national Competent Authorities shall cooperate with each other, with the Commission, and with the authorities of relevant third countries, particularly with regard to provisions on imports.

To this end, the Commission is tasked with establishing a network of Competent Authorities, aimed at promoting the exchange of information on monitoring, regulation and compliance, facilitating the sharing of best practices, and enabling consultations among stakeholders.

The network was established on 19 March 2025. Information on its activities is available in the Commission's Register of Expert Groups, which also includes documentation related to official meetings.

As of March 2026, four meetings have taken place: 30 April 2025, 20 September 2025, 26 November 2025 and 4 March 2026.

The network of Competent Authorities represents a key governance tool for coordination between the Commission and Member States in the implementation of the Regulation.

7.1.2. Technical standardisation and development of reporting templates

The Regulation requires that leak detection and repair (LDAR) activities and methane emissions quantification be carried out based on specific technical standards and accuracy thresholds. These elements are partly defined directly in the Regulation, but to a large extent must be further detailed through:

1. European technical standards to be developed by CEN (European Committee for Standardization) under a mandate from the Commission;
2. an implementing act of the Commission, particularly for LDAR activities.

The Commission is also responsible for developing standardised templates for emissions quantification reports to be submitted by operators to national Competent Authorities.

7.1.2.1. Commission mandate to CEN for the development of technical standards

Pursuant to Article 32, the Commission must request European standardisation organisations to develop harmonised standards, in particular for:

a) the measurement and quantification of methane emissions referred to in Article 12(5) (annual emissions quantification reports);
b) LDAR surveys referred to in Article 14(1);
c) equipment referred to in Article 15(3) and (5) (venting and flaring);

d) the quantification of methane emissions referred to in Article 18(3) (abandoned or inactive wells);
e) the measurement and quantification of methane emissions referred to in Article 20(4) and Article 25(2) (coal mines).

For these activities, the Commission has correctly identified CEN as the European technical reference body for standardisation in the natural gas value chain. However, the formal mandate to CEN has not yet been issued.

Given the time required for the development of technical standards, which involves the participation of operators and stakeholders, even if the mandate were formalised by the first half of 2026, it is likely that the standards would not be available before the end of 2027. In the meantime, CEN has initiated preparatory work at the level of technical committees.

7.1.2.2. Commission implementing act on technical requirements for LDAR activities

Article 14 provides that the Commission shall adopt an implementing act to define minimum detection limits and detection techniques for LDAR activities.

In particular, Article 14(7) requires that, by 5 August 2025, the Commission specify through such act:

a) the minimum detection limits and detection techniques to be used for the different detection devices employed to meet the requirements set out in paragraph 8, for all components;

b) the thresholds applicable to the first phase of LDAR surveys, to be used to meet the requirements set out in paragraph 8 for underground components.

These minimum detection limits, techniques and thresholds are to be based on best available technologies and best available detection techniques, taking into account different types of components and LDAR surveys.

This implementing act has not yet been adopted. To date, the Commission has initiated preparatory activities, including the circulation of a stakeholder questionnaire (April 2025), but has not yet launched a formal public consultation.

7.1.2.3. Commission implementing act on templates for Article 12 reports

Article 12(4) provides for the adoption of an implementing act to define a standard template for emissions quantification reports. No specific deadline is set for this requirement.

The absence of such a template creates significant challenges: it introduces uncertainty for companies in preparing reports, complicates digital submission to Competent Authorities, and limits data comparability. It also hinders the subsequent transmission of information to the Commission, as required under Article 12(8).

Overall, delays in adopting the implementing act on LDAR activities and in formalising the mandate to CEN are creating uncertainty both for operators subject to the Regulation and for technology and service providers.

Moreover, in the absence of these elements, it is not yet possible to fully activate the independent verification system for Article 12 reports, which is expected to become mandatory from 2027.

7.1.3. Commission database for methane emissions transparency

Article 30 of the Regulation requires the Commission to establish, from 5 February 2026, a database to ensure transparency on methane emissions in the energy sector and on related performance profiles.

The database is intended to provide information on compliance with the Regulation, both at national level and with regard to imports of natural gas, oil and coal.

To date, the database is not yet operational. According to the dedicated Commission webpage, its launch is expected in September 2026.

7.1.4. Commission guidelines for the implementation of import-related provisions

Chapter V of the Regulation addresses methane emissions associated with imports of natural gas, oil and coal, with the objective of aligning environmental standards of supplier countries with those applied within the European Union.

The implementation pathway is structured in several phases. During the period 2025–2026, importers are required to report to Competent Authorities information on emissions and environmental standards associated with imported products.

From 2027 onwards (Art. 28), importers will have to demonstrate that producers in third countries apply monitoring, reporting and verification (MRV) systems equivalent to those required in the EU. This equivalence must be demonstrated through supply contracts, with different requirements depending on whether contracts were concluded after 4 August 2024 (the entry into force of the Regulation) or earlier.

From 2028, the reporting of methane emission intensity will be required, while from 2030 maximum thresholds will apply, to be defined by the Commission by 2029.

In this initial phase, the Commission has published a Q&A document to support the interpretation of the provisions, updated in March 2026.

Article 28(3) also provides for the adoption of non-binding recommendations on contractual clauses related to MRV requirements. These guidelines are particularly relevant for the implementation of obligations starting from 2027.

In December 2025, the Commission presented an information note on the implementation of MRV requirements for imports. The note, discussed within the network of Competent Authorities and subsequently at the EU Energy Council on 15 December, highlights that no amendments to the Regulation are required and that it is up to Member States to define how MRV equivalence should be verified, taking into account different possible approaches, such as direct or indirect relationships between importers and producers, and potential concerns related to security of supply.

At the beginning of 2026, a first informal draft of recommendations also circulated, while the Q&A document updated on 24 March 2026 confirms that these recommendations are still under development.

7.2. State of implementation across the 27 EU Member States in the EU Methane Regulation Implementation Tracker

To understand the state of implementation of Regulation 1787/2024, it is useful to look at the monitoring work carried out by civil society at the European level. In this context, an important role is played by the Civil Society Observatory on Methane (CSO-M), an initiative promoted by Environmental Defense Fund and launched in April 2025. It brings together civil society organizations engaged at the European level in monitoring methane-related policies and promoting greater transparency from governments and industry. Supporting the observatory is Time for CH4nge, a communication and advocacy campaign aimed at increasing public awareness of the impact of methane emissions and the need to adopt effective policies for their reduction (link).

Within the Civil Society Observatory on Methane (CSO-M), a central question emerged from the outset: how civil society could concretely contribute to monitoring the implementation of the European regulation on methane emissions reduction. With the establishment of a European civil society observatory on methane, it was in fact essential that it could systematically track the implementation of the regulation across Member States. In the absence of a monitoring tool for the numerous obligations and deadlines, it was difficult to identify which countries were progressing more quickly, where delays were occurring, and which good practices could serve as replicable examples.

In response to this need, the European Methane Regulation Tracker was launched in July 2025. It is an interactive dashboard that provides information and updates on the implementation of the regulation, while

also offering a comparable assessment of the state of implementation across Member States (link). The tool is designed to be used by a wide range of stakeholders, including national and European institutions, companies, civil society organizations, researchers, and others interested in monitoring EU methane policies. From the early stages, Amici della Terra was actively involved in the conception, design, and updating of the tool, which aims not only to improve transparency but also to facilitate information exchange and the identification of best practices among European countries.

The functioning of the Methane Regulation Tracker is based on four main elements. The first concerns the mapping and standardization of the deadlines and obligations set by the regulation. The second element concerns data collection, which follows a hybrid approach. On the one hand, institutional websites and official portals of different countries are monitored. On the other hand, the CSO-M network includes national focal points that provide updates and verification of information for individual Member States. The third element involves the qualitative assessment of the collected information. The data are synthesized into textual evaluations describing the state of implementation of each obligation, based on a predefined assessment grid that ensures consistency. Finally, each obligation is assigned an implementation level, indicating the degree of compliance with the regulation, ranging from full implementation to the lowest levels. This assignment also follows defined and shared criteria, ensuring consistency and comparability across countries.

The collected information is then presented through the tracker interface, organized into two main panels. The first is the map panel, which allows users to quickly visualize the implementation status of a given deadline across European countries. The second is the data panel, where information is presented in the form of cards. Each card contains information related to a specific obligation under the regulation, including the Member State, the level of implementation, a brief description of progress, the legal reference, and the source of the information used.

Although still under development, the tracker already allows for an overall assessment of the implementation status of the regulation across European countries. As illustrated in **Figure 38**, a classification system was developed to graphically represent the level of implementation of the various provisions across the 27 Member States as of 31 December 2025. Each obligation was assigned a score on a scale from 1 to 4, where:

- 4 = Fully Met (full implementation, dark green)
- 3 = Mostly Met
- 2 = Moderate
- 1 = Low (low level of implementation, yellow)

For other cases included in the Tracker, such as No Data or Not Applicable, a value of 0 (grey) was assigned, in order to clearly distinguish situations where it is not possible to assess implementation. This system enables a concise and comparable representation of the level of implementation of the regulation across European countries.

Figure 38: State of implementation across the 27 EU Member States in the EU Methane Regulation Implementation Tracker

Obligation	Hungary	Italy	Denmark	Poland	Germany	Sweden	Romania	Netherlands	Belgium	Lithuania	Croatia	Luxembourg	France	Austria	Czech Republic	Ireland	Slovakia	Spain	Greece	Slovenia	Malta	Estonia	Portugal	Bulgaria	Cyprus	Latvia	Finland
Adoption of sanctioning framework	4	3	4	0	0	1	3	3	0	2	3	3	3	0	2	0	4	0	0	0	0	2	0	0	0	0	0
Conducting the first Type 2 LDAR investigation (oil and gas)	0	0	2	0	0	1	0	0	1	2	0	0	1	0	0	2	0	0	1	0	0	0	0	0	0	0	0
Designation of national competent authorities	4	3	4	4	2	4	3	4	3	4	3	3	3	1	3	2	4	3	3	3	3	2	3	1	3	3	1
Publication of an inventory of closed or abandoned underground mines	4	1	0	2	2	2	1	1	2	0	1	0	1	4	2	2	1	2	0	2	0	0	1	1	0	0	0
Publication of an inventory of inactive, plugged and abandoned oil and gas wells	4	4	4	2	1	3	3	1	2	1	4	0	1	3	2	2	1	2	1	2	4	0	1	2	1	1	0
Publication of annual information on penalties imposed	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Publication of methane emissions reports (active coal mines)	4	0	0	4	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0
Publication of methane emissions reports (oil and gas)	4	4	1	4	1	1	1	1	1	1	1	3	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1
Submission of LDAR programmes (oil and gas)	3	3	2	0	1	3	2	3	1	2	0	0	1	0	0	0	0	0	2	0	0	1	1	0	0	0	0
Submission of LDAR repair and monitoring results (oil and gas)	0	3	2	0	2	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submission of information on gas, oil and coal import flows	3	2	2	0	4	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submission of the annual methane emissions report (active coal mines)	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Submission of the annual methane emissions report (oil and gas)	4	4	2	4	2	1	3	3	0	2	0	3	1	0	0	2	0	2	1	0	0	1	0	0	0	0	0
Submission of the annual report on venting and flaring events	0	2	2	0	2	2	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Transmission of import flow information to the EU Commission	0	4	3	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	42	34	29	25	23	23	22	20	15	15	13	13	13	12	12	12	12	11	11	10	9	8	8	7	6	6	3

Source: AdT elaboration based on Methane Regulation Tracker data

From an initial reading of the data, Italy appears to rank second overall in this analysis, with a total of 34 points, preceded by Hungary (42 points) and followed by Denmark (29), Poland (25), and Germany and Sweden (23). At the bottom of the ranking are Cyprus and Latvia (6 points), while Finland records the lowest score, with 3 points.

However, the data highlight three distinct dynamics that significantly influence the positioning of different countries. The first key factor concerns the availability of information. A significant portion of the differences between higher-ranking countries and those at the bottom is due more to the lack of publicly available data than to an actual lack of implementation of the regulation's provisions. In many cases, a low score does not necessarily reflect poor implementation of the required measures, but rather the difficulty in accessing official information or public updates on activities carried out at the national level. This therefore also points to an issue of transparency and accessibility of information, which is a key component of monitoring. In Italy, the availability of information has been facilitated by dialogue between institutions and companies, largely thanks to the work carried out by Amici della Terra through its stakeholder roundtable, which has seen the continuous and systematic participation of the relevant offices of the Ministry of Environment and Energy Security (MASE).

The second dynamic influencing country rankings, as shown in **Figure 38**, concerns the overall assessment that can be made based on the available information. Among countries with more complete data, Italy shows a relatively advanced level of implementation, reflecting both the technical preparedness of the sector and the operational capacity of MASE, although it has not yet been officially designated as the national competent authority.

A third element relates to the nature of the obligations monitored by the Tracker. Some of the deadlines set by the regulation mainly involve obligations to publish or transmit information. At this stage, the Tracker assesses whether these obligations have been formally fulfilled, but it does not yet evaluate the quality or completeness of the information provided. This can lead to situations where different countries receive the same score despite having provided information of varying quality. For example, in the case of methane emissions reporting, both Italy and Poland are considered fully compliant with the formal publication requirement, even though the content and level of detail of their reports differ significantly. This methodological limitation is partly linked to the nature of the tool, which at this stage is primarily designed to monitor formal compliance with the deadlines set by the regulation and to provide relevant references.

A detailed analysis of the main deadlines of the Regulation has already been developed in **Section 5.1** with reference to the national context. In this section, the objective is instead to place Italy's performance within a comparative European perspective, highlighting both areas where significant delays emerge compared to other Member States and those where more advanced levels of implementation are observed.

One area in which Italy shows significantly better performance than most other Member States concerns the publication of inventories of inactive, plugged, and abandoned wells under Article 18(1). Unlike many European countries, where information on wells exists but has not been structured or published as official inventories in line with the regulation, Italy fully met the requirement within the deadline by publishing a complete and accessible national inventory. This places the country among the small group of fully compliant Member States, together with Denmark, Croatia, Hungary, and Malta.

Another area in which Italy ranks among the most advanced countries concerns the publication of methane emissions reports under Article 12(8). At the European level, this obligation is one of the least implemented. In the vast majority of Member States, there is no public evidence of the publication of source-level reports on the institutional websites of competent authorities, despite this being an explicit requirement of the regulation. In this context, Italy stands out alongside Hungary and Poland, but with a higher level of transparency and data completeness, also thanks to the consistent use of OGMP 2.0 formats and guidelines in the absence of finalized EU templates.

Alongside obligations that explicitly require the publication of information on institutional websites, other areas also emerge where Italy shows positive performance in terms of data availability and accessibility, even without a formal obligation for structured publication. In several cases, the information needed to assess implementation (for example, the transmission of import-related information from the competent authority to the European Commission) is still available through AdT's stakeholder roundtable activities and exchanges with competent institutions or operators. This has made it possible to reconstruct, in a relatively comprehensive way, the state of progress of many obligations and to assign them an overall evaluation for the purposes of Tracker monitoring.

As for the main delays registered in Italy, the European comparison first highlights the existence of a small group of countries that have already fully completed the implementation of Article 4(1), concerning the formal designation of Competent Authorities. By the end of 2025, Denmark, Hungary, Lithuania, the Netherlands, Poland, Slovakia, and Sweden had adopted binding national legal acts clearly identifying the responsible authorities and defining their powers for implementing the Regulation. In these cases, the designation was not limited to communication of the designated competent authority to the European Commission. A further step was in fact performed with a formalization through laws or administrative acts, thus ensuring a complete and operational institutional framework. The situation is different for most other Member States, including Italy, which are in an intermediate phase: although they have often communicated the competent authorities to the European Commission, they have not yet completed the formal process through a national legal act. Overall, the comparison shows that the key distinguishing factor is the ability to translate this into a formalized and fully operational regulatory framework.

Closely linked to the designation of competent authorities is the adoption of penalty regimes under Article 33(1), where Italy is, at the time of analysis, lagging behind some European countries. Notably, Denmark, Slovakia, and Hungary stand out, with Hungary being the only country in Europe to have also published annual information on imposed penalties (Article 33(8)). A second group of countries, including Italy, France, the Netherlands, Romania, Croatia, and Luxembourg, is in an intermediate stage: the penalty framework has been defined at the level of legislative proposals or draft laws but has not yet entered into force. In these cases, although the structure of the penalty system has been outlined, it is not yet operational.

A similar pattern also emerges with regard to the publication of inventories of closed or abandoned underground mines under Article 25(1). In this case, however, the European comparison is strongly influenced by the varying relevance of the obligation across Member States. A significant number of countries are not subject to this requirement due to the historical absence of underground coal mining activities. Among the countries where the obligation applies, only Austria and Hungary have fully complied, publishing national inventories that meet regulatory requirements and are publicly accessible. In most other cases, although technical information and even detailed mining archives exist, they are not structured or published as official inventories in line with the regulation. Italy falls into this lagging group: despite the availability of data and technical expertise, an official inventory compliant with the regulation has not yet been published.

Concluding remarks and recommendations

Implementation of the Methane Regulation in Italy and the EU

The analysis of the implementation of Regulation (EU) 2024/1787 on methane emissions reduction in the energy sector in Italy shows that the deadlines set for 2025, covering installations across the relevant value chains and importers of oil, natural gas and coal, have been largely met, despite the absence of the formal designation of Competent Authorities and of an operational sanctioning regime. These two elements, currently included in a government draft law under parliamentary review, represent the main critical issue.

The Ministry for the Environment and Energy Security (MASE) has played an active role, ensuring compliance with the main deadlines. In this context, the timely publication of the national inventory of inactive, temporarily plugged and abandoned wells (August 2025), covering 1,614 sites, represents a significant informational basis for monitoring activities.

Particularly relevant are the Article 12 reports on emissions quantification submitted by operators and published on the MASE website. Their analysis shows near-complete coverage of national value chains (99% of gas and oil production, 94% of gas storage capacity, 99% of gas transmission networks and 90% of distributed gas volumes), with the only exception being the regasification segment, covered for only 31% of regasified volumes. The response of companies to 2025 deadlines on LDAR and imports has also been significant.

Several factors contributed to these results:

1. the commitment of Italian companies, many of which participate in the OGMP 2.0 initiative, which have proactively embraced methane reduction objectives;
2. the role of the energy regulator (ARERA), which had already oriented its regulatory action towards methane emissions reduction;
3. the contribution of the national technical standardisation body (CIG), which has a strong track record in safety standards.

In Italy, fossil fuels still account for more than three-quarters of energy consumption in 2024: 37% oil and petroleum products, 36% natural gas and 3% coal.

The historical trend of fugitive methane emissions from oil and gas value chains shows a reduction of 72% since 1990, decreasing from 358 kt in 1990 to 98 kt in 2024.

In this initial phase, a key role has also been played by dialogue and cooperation initiatives among companies, industry associations and environmental organisations. In particular, the Methane Roundtable promoted by Amici della Terra in collaboration with Environmental Defense Fund Europe represents a unique experience at European level, fostering structured dialogue among institutions, operators and stakeholders. In parallel, the technical work carried out by CIG and industry associations (Proxigas, Assogas, Utilitalia and Assorisorse) has contributed to the development of operational guidelines and coordination mechanisms supporting companies in this early stage.

Among EU countries, Italy ranks among the most advanced in the implementation of the Regulation (as also confirmed by the CSO-M Methane Regulation Implementation Tracker), thanks to the transparency of data made available by MASE and the level of engagement of operators.

At EU level, the Commission has key responsibilities in the initial implementation phase, including: establishing the network of Competent Authorities, defining technical standards and requirements, preparing reporting templates, activating transparency tools, and issuing guidance on import-related provisions. To date, the Commission has established the network and published initial guidance on imports. However, several key elements are still missing: technical standards (LDAR and MRV), reporting templates, transparency tools and comprehensive guidelines on imports. These gaps represent a major constraint for both companies and authorities and point to an underestimation of the Commission's governance role in the implementation process.

Implementation of the Regulation for import-related emissions

The most challenging objective of the Regulation is to ensure that imported natural gas, oil and coal are produced under environmental standards, particularly in terms of methane emissions, equivalent to those required within the EU (MRV equivalence). The Regulation defines a stepwise pathway from 2025 to 2030 to achieve this objective.

Current global efforts to reduce methane emissions in the energy sector are now confronted with additional challenges, including the effects of the recent Middle East crisis. This situation risks disrupting key fossil fuel supply chains, with implications for both EU energy security and the implementation of import-related provisions.

The issue is rooted in Europe's high dependence on imports: 84.9% for natural gas, 96.9% for oil and 34.2% for coal. Italy shows even higher levels of dependence (2024): 95% for gas, 91% for oil and 100% for coal.

For natural gas, over three-quarters of Italy's imports come from four countries: Algeria (39%), Azerbaijan (17%), Qatar (12%) and Russia (10%). Oil imports are similarly concentrated, with over three-quarters coming from seven countries: Libya (21%), Azerbaijan (16%), Kazakhstan (15%), Iraq (9%), the United States (9%), Saudi Arabia (7%) and Nigeria (7%).

Based on IEA data, methane emissions associated with the production of imported gas and oil can be estimated at between 769 and 875 kt CH_4, an order of magnitude higher than the approximately 93 kt of methane emissions from domestic oil and gas value chains reported by ISPRA.

It is important to note that the Regulation's objectives for imported emissions build on ongoing international initiatives, including the Global Methane Pledge (GMP), OGMP 2.0 and the Oil and Gas Decarbonization Charter (OGDC), to which Italy and major Italian operators have adhered.

A key enabling factor is the recognition of OGMP 2.0 MRV standards as compliant with the Regulation's requirements from 2027. Recent data show increasing participation by operators and growing volumes of oil and gas production meeting these standards.

For Italy's main supplier countries, relevant producers in the United States, Qatar, Azerbaijan and Norway (for gas), and in Azerbaijan, Kazakhstan and the United States (for oil), have either achieved or are progressing towards compliance with OGMP 2.0 MRV standards. However, critical issues remain, particularly for imports from Libya (oil) and Algeria (gas). In the latter case, cooperation initiatives are underway at both governmental and industry level to support the adoption of MRV standards in upstream activities.

Recommendations and policy directions

In light of the strengths and challenges identified, several priority actions can be outlined to support methane emissions reduction in the EU and globally.

Italy's experience shows that implementation of the Regulation for domestic installations is feasible and can represent an opportunity to leverage both industrial know-how and technological innovation.

For Italy, the urgent priority is the adoption of the draft law formally designating MASE as Competent Authority, enabling full operational capacity, including inspections and environmental controls by the National System for Environmental Protection (SNPA).

At the same time, Italy should play a more proactive role at EU level, advocating for stronger Commission leadership, particularly in enhancing the effectiveness of the network of Competent Authorities.

The Government should prioritise cooperation initiatives with oil and gas producing countries as a key component of energy and climate policy.

At EU level, the Commission must urgently strengthen its role by delivering:

1. the technical standards to be developed by CEN;
2. the implementing act on LDAR technical requirements;
3. the implementing act defining reporting templates;
4. the EU methane transparency database;
5. guidelines on import-related provisions.

Delays in these areas are undermining effective implementation.

The Commission should also relaunch the “you collect, we buy” programme to support cooperation with producing countries aimed at recovering and valorising gas from methane mitigation measures.

Furthermore, clear guidance is needed on flexibility mechanisms for Member States to address energy security challenges, particularly in the current geopolitical context, without compromising climate objectives.

Strengthening the network of Competent Authorities is essential as a core governance mechanism for implementation.

Italy’s experience, together with the growing uptake of voluntary international initiatives, confirms that methane emissions reduction is one of the most effective and efficient strategies for reducing greenhouse gas emissions in the short to medium term.

The main challenge for the EU today is to manage the implementation of Regulation (EU) 2024/1787 in a way that balances energy security concerns with the need to sustain progress in methane emissions reduction, both within the EU and globally.

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National and international datasets

MASE Hydrocarbons Portal – https://www.mase.gov.it/portale/ricerca-e-produzione-idrocarburi

Article 12 reports (Regulation (EU) 2024/1787), Upstream – https://unmig.mase.gov.it/regolamento-ue-2024-1787-disposizioni-articolo-12/

Article 12 reports (Regulation (EU) 2024/1787), Storage / Regasification / Transmission / Distribution – https://www.mase.gov.it/portale/-/relazioni-quantificazione-emissioni-di-metano-ricevute-dalle-imprese-che-gestiscono-impianti-della-filiera-del-gas-in-italia-ex-art.-12-c.-8.-del-regolamento-ue-2024/1787-

ARERA Operators Registry – https://www.arera.it/dati-e-statistiche

IMEO Dataset – https://methanedata.unep.org/download-dataset

OGMP 2.0 – https://www.ogmpartnership.org/resources

Methane Regulation Tracker – https://tracker.timeforch4nge.org

Eurostat – https://ec.europa.eu/eurostat

Energy Institute – https://www.energyinst.org/statistical-review/energy-charting-tool/energy-charting-tool

Enerdata – https://yearbook.enerdata.net

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