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POLICY BRIEF

# *Methane Emission Reduction – An Important Step in Strengthening the Sustainability Dimension in Gas Network Companies*

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## Highlights

- The European Green Deal envisages an important role for gas in the energy transition. To follow this pathway, the gas value chain should be more oriented towards sustainability. Methane emission reduction should also be strongly pursued by gas network companies.
- A regulation to limit methane emissions by the gas sector should be established at the European level. It should strive to establish dynamic targets, create a robust and transparent Monitoring, Reporting and Verification (MRV) framework and incentivise the network companies to establish and realise ambitious action plans.
- The creation of a European Methane Emissions Observatory could provide an efficient tool for substantially reducing methane emissions. The Observatory would be well-placed to reconcile data from bottom-up corporate reporting and top-down aerial surveys and satellite measurements, creating the necessary transparency in the results obtained.
- National Regulatory Authorities (NRAs) should recognise the efficiently incurred costs for regulated entities. A form of incentive-based regulation oriented to minimising network losses based on the experiences of the electricity sector could provide a promising approach.

## 1. The Changing Role of the Regulated Gas Companies

So far, the policies and regulations addressing methane emissions adopted in oil- and gas-producing jurisdictions have mostly been characterised by a focus on emissions in the upstream part of the gas value chain. However, as a major gas importer with declining natural gas production, the European Union should in the first place concentrate its efforts on tackling emissions arising in transmission and distribution. The European Green Deal sets a clear direction for a reform of the EU gas market in the 2050 perspective. It not only calls for the EU gas sector to be decarbonised by supporting the development of renewable and low-carbon gases but also for "the issue of energy-related methane emissions" to be addressed.

Roughly 75% of the methane emissions in the EU oil and gas sector arise from refining, LNG regasification, transmission, storage and distribution.[1]

Following the liberalisation process initiated in the late 1990s, these segments of the gas value chain are operated by the regulated entities: liquefied natural gas (LNG) system operators, storage system operators (SSOs), transmission system operators (TSOs) and distribution system operators (DSOs). There are currently 44 transmission system operators, over 70 storage system operators, 25 LNG operators and over 1250 distribution system operators. DSOs are the most heterogenous group, with only approximately 180 of them serving more than 100,000 customers.[2] Within each category of gas network operators there are substantial differences in terms of the size of the companies, their customer bases, their ownership structures and corporate cultures, which has had an impact on the implementation of the EU regulations, such as Network Codes.

Despite the substantial differences, these entities have been entrusted with a concrete task: to facilitate the creation of a competitive internal energy market in Europe. In fact, the EU gas market could not function without the network operators providing non-discriminatory access to the gas infrastructure, at the same time ensuring "safe, secure, reliable and efficient" operation of the increasingly interconnected EU gas grids.[3] However, their mission has never been to pursue the decarbonisation of the EU gas system.

The European Green Deal changes the balance within the triangle of EU energy policy by moving the weight from competitiveness and security towards sustainability. What this could potentially mean for the regulated entities is that developing a liberalised internal energy market will no longer be their only objective.

This change results not only from the requirements of the EU climate policies, but also from changing market conditions. First, when we look at the modelling results of TYNDP 2020, all scenarios expect that the EU gas demand will decrease by 20% compared to today's levels and stabilise below 4,000 TWh in 2040.[4] This trend will not affect all parts of the EU in the same way, since in some regions, such as central and eastern Europe, gas demand is predicted to increase due to coal-to-gas switching for heating and electricity production.

1. Authors' own calculation based on data from the IEA's Methane Tracker.

2. Data source: ENTSOG, GIE, GD4S, AF-Mercados, REF-E and Indra. These numbers include the UK-based gas network operators. Changes concerning gas trading with the EU are expected to take place as of 01/01/2021. For more information see: <https://www.gov.uk> (consulted on 18/03/2020).

3. Art. 13 and Art. 25 of Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC.

4. ENTSO-E and ENTSOG Joint Ten-Year Network Development Plan (TYNDP) 2020 Scenario Report.

Second, between 2020 and 2025 gas imports are expected to increase due to the declining conventional gas production in the EU and a rather stable gas demand, yet imports could decrease by as much as 70% by 2050. Last but not least, the structure of the gas supply will change with the expected increase in biomethane, synthetic methane and hydrogen injection, which could account for as much as 65% of the gas supply according to the most optimistic scenario, leading to a substantial decentralisation of gas injection.

All these factors will affect the way the EU gas infrastructure is used, challenging the traditional business models of the EU grid operators. Currently, the system operators are not allowed to own the gas they transport or store (with the exception of, e.g., not unbundled DSOs) and they do not have sufficient incentives to reduce methane leaking from the facilities and pipelines they operate. Therefore, the upcoming EU Methane Strategy expected to be released in May should aim to direct the EU companies, and especially the regulated grid operators, to measure and reduce methane emissions according to a set of harmonised EU-wide standards.

This idea has already been brought up by the Agency for the Cooperation of Energy Regulators (ACER) and the Council of European Energy Regulators (CEER) and merits more thorough reflection.[5] In fact, the methane reduction framework should be efficient and at the same time reflect the changing role of the gas network companies well.

This paper is organised as follows. Section 2 reflects on the methane emissions abatement framework for regulated companies. Section 3 analyses the idea of creating a European Methane Emissions Observatory. Section 4 looks into the question of how to create the right incentives for the regulated entities to measure and minimise methane emissions stemming from their operations. The paper wraps up with some conclusions.

## 2. Methane Emission Monitoring and Action Plans for Regulated Companies

ACER and CEER suggest that "TSOs, storage operators and LNG operators, as well as DSOs above a size threshold, should be obliged to measure and report their methane emissions according to a standard methodology, with sufficient granularity to allow the identification of the highest emitters." Moreover, they envisage the measurements being followed by action plans for emission reductions prepared by the system operators.[6]

Today there is no methane-specific monitoring and mitigation regulation at the EU level. Each year, individual Member States (MSs) compile country data on greenhouse gas (GHG) emissions, including methane, in national inventory reports (NIRs) and submit them to the European Commission (DG CLIMA), with a copy to the European Environment Agency (EEA). The EEA together with Eurostat and Joint Research Centre (JRC) check and aggregate the data. The final EU GHG Inventory Report is submitted to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat.[7]

The NIRs are required to comply with the obligations established in the Intergovernmental Panel on Climate Change (IPCC) Guidelines.[8] However, this reporting framework has turned out to not be

5. ACER and CEER, Bridge Beyond 2025 Conclusions Paper on the future of gas regulation in the EU, 19 November 2019.

6. *Ibid.*, pp. 14-15.

7. Annual European Union greenhouse gas inventory 1990–2017 and inventory report 2019. Submission under the United Nations Framework Convention on Climate Change and the Kyoto Protocol, 27 May 2019, p. 8.

8. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Note that the 2006 Guidelines have been recently refined by the 2019 Refinement of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

specific enough and in order to avoid inaccuracy and misstatements, some government agencies and industry associations have developed more elaborate methodology manuals and reporting formats. Some countries, like the US have gone even further.

In 2009 the US Environmental Protection Agency (EPA) launched the GHG Reporting Program, which collects data from over 8,000 facilities in various industrial sectors, including the oil and gas industry.[9] The Reporting Program covers approximately 85-90% of total US emissions and supplements the US GHG Inventory. The data collected from the individual facilities on an annual basis help to continually improve estimates in the GHG Inventory and to inform regulatory efforts and the public, since the reported data is publicly available. No comparable undertaking has been put in place in the EU. Therefore, the accuracy of the data reported by the EU *en bloc* is questionable, partly due to the fact that different MSs and sectors use different tier approaches.

The 2006 IPCC Guidelines distinguish three tiers for estimating GHG emissions.[10] Tier 3 is the most detailed method, the use of which is subject to the availability of the actual results of measurements or at least sufficient data to estimate emissions by using rigorous source emission models and detailed infrastructure data, e.g. the number and type of facilities and the equipment used at each site. If such data are not available, the Tier 2 approach can be applied. In this case, emissions are calculated using country-specific emission factors.

Tier 1 is the simplest approach. It is based on generic calculations. As a result, it is subject to substantial uncertainties and "may easily be in error by an order of magnitude or more."[11] It may come as a surprise, but overall the EU uses Tier 1 as its methodological approach for determining its GHG emissions, despite the IPCC recommendation to use T1 only as a last resort. This will need to change, also because the Enhanced Transparency Framework introduced in art. 13 of the Paris Agreement and clarified in the Katowice Climate Package calls on all countries to apply higher tier methods to the major categories of emissions.[12]

Therefore, we recommend that the system of methane reporting should be harmonized at the EU level[13]. Only in this way can it be ensured that the data are comparable and that companies active in more than one MSs report their emissions according to the same standards across all the EU Member States. A recent study shows that even such basic elements as the determination of different parts of the gas value chain and the granularity of 'source' definition vary from one country to another.[14]

Moreover, as gas sector decarbonisation, including the reduction of methane emissions, should not be separated from internal gas market issues, European regulation of methane emission reduction seems the best approach to follow.

9. See: <https://www.epa.gov/ghgreporting> (consulted on 18/03/2020).

10. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy, Chapter 4 Fugitive Emissions.

11. *Ibid.*, p. 4.37.

12. Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement. FCCC/CP/2018/L.23.

13. It should be noted that currently the general EU framework for GHG monitoring and reporting is guided by Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC.

14. The study is Comparison of Methane Reporting Requirements by IOGP, Report 630, February 2020.

The centrepiece of European regulation of gas company methane emissions could be monitoring and action plans consisting of four steps.

**First step – identify and measure emissions.** In the first step, the system operators should identify the sources and potential sources of methane leaks by listing their equipment and its components. Different facilities could be categorized according to the level of emissions they produce, while the emissions should be classified as fugitive, vented or resulting from incomplete combustion. The facilities producing more methane emissions should be subject to more stringent requirements, e.g. more frequent Leak Detection and Repair (LDAR) programs.

Operators should then quantify their emissions according to a standard methodology or methodologies.[15] The Technical Association of the European Natural Gas Industry (Marcogaz) has already created a basis for the potential EU standard with its 'Assessment of methane emissions for Gas Transmission and Distribution System Operators' constituting a comprehensive list of the existing methodologies for emission detection and quantification and uncertainty calculation.[16]

A single methane reporting framework would provide improved transparency and comparability, which would be a good basis for setting credible reduction targets.

**Second step – reduction targets.** Measurements and reporting are important pillars of robust methane abatement, but in order to bring about concrete reductions the plan should include a concrete reduction target. The regulators in some countries, e.g. in Mexico, allow the regulated companies to set their own targets, which should be met within the next six years since the submission of a methane reduction program (PPCIEM) to the regulator.

This bottom-up system could be instrumental in ensuring industry buy-in and creating a durable system of continual improvement. The targets could be regularly adjusted upwards, for instance in 5-year cycles. The voluntary emission targets already proposed by a number of companies could serve as a point of reference.[17] However, it seems that for regulated companies the best approach would be to follow percentage reduction targets.

Even if the initial approach to different parts of the gas value chain differs, it should contribute to the concrete EU-wide methane reduction target.

**Third step – define actions for the upcoming year and the next 5 years.** Once a company's baseline emissions and target are set, each company should specify which technologies and best practices it is planning to apply. The European Commission could work with the industry to compile a list of technologies and practices together with cost estimates for implementing such technologies and the pay-back period assumed. The catalogue could be adopted as a non-legislative act in the form of a Commission Implementing Regulation in order to

15. The development of measurement techniques and a methodology is currently subject to investigation by a consortium of consulting companies (Wood, TNO, Carbon Limits, The Sniffers) appointed by the European Commission. The final report is due in August 2020.

16. The study is: Assessment of methane emissions for Gas Transmission & Distribution System Operators, Marcogaz 2019.

17. Apart from various methane reduction targets set by individual companies, there are also collective initiatives, for instance the Climate & Clean Air Coalition Mineral Methane Initiative calls on companies to commit to reducing oil and gas methane by 45% by 2025 and by 60% to 75% by 2030. The companies aligned within the Oil and Gas Climate Initiative (OGCI) aim at a methane intensity target of 0.25% by 2025.

ensure homogenous application in all MSs.[18] Regular leak detection and repair (LDAR) programmes should be an important part of the list.

**Fourth step – verify and publish.** The data reported by the companies and their progress towards the achievement of the reduction target should be verified by accredited verifiers according to a standardized methodology as is the case of emissions monitoring under the EU Emissions Trading System.[19] The verified data together with the individual methane reduction plans should be publicly available on companies' websites and also be submitted to a centralised database such as at a European Methane Emissions Observatory.

## 3. Is there a Need for a European Methane Emissions Observatory?

ACER and CEER suggest that the data obtained from measurements conducted by operators "should be publicly available through a European Methane Emissions Observatory (…)"

There are at least three elements which merit further examination: the European Methane Emissions Observatory itself; the scope of the data available through the Observatory; and the issue of data validation or transparency.

We believe that no new institution is needed. The European Methane Emissions Observatory could be founded within the existing EU institutional architecture. In fact, the choice is between the European Environment Agency and ACER. The Copenhagen-based institution is *de facto* "responsible for the collection, processing and analysis of data" on the environment.[20] The EEA is a part of a network of 300 institutions across Europe – Eionet – and is cooperating with MSs' national focal points and with European and international organisations. On the other hand, ACER's mandate is to develop the European energy market to the benefit of all EU consumers. Benefits for consumers also include a clean energy supply. It seems that the best approach would be to site EMEO at the EEA with the close involvement of ACER.

It is important for the Observatory to be dynamic and able to follow new initiatives. It should be aligned with the Oil and Gas Methane Partnership (OGMP) Reporting Framework. This UN-led voluntary initiative has been designed to support oil and gas companies in reporting and reducing their methane emissions. The reporting framework has recently been updated and its scope has been extended to cover the entire gas value chain (except end-users) and both operated and non-operated assets. Companies will report their emissions according to five reporting levels. The reporting framework has been enhanced with voluntary reduction targets to be announced by the individual companies participating in Reporting

18. The legal basis for adopting Implementing Acts comes from Art. 291 of the Treaty on the functioning of the EU (TFEU). See also Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers. L. Hancher, A.M. Kehoe, J. Rumpf, The EU Electricity Network Codes and Guidelines: a legal perspective. Research Report. March 2020, pp. 25-26.

19. Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012. Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the verification of data and on the accreditation of verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

20. Art. 2 and Art. 3 of Regulation (EC) No 401/2009 of the European Parliament and of the Council of 23 April 2009 on the European Environment Agency and the European Environment Information and Observation Network.

Framework 2.0.[21] Participation in this initiative offers many advantages for the regulated companies: access to know-how and capacity building in the area of methane reporting and mitigation.

However, the scope of the Observatory should not be limited to energy-related methane emissions (stemming from oil, natural gas and coal mines) but it should be gradually extended to include data from agriculture and waste, which are two major sources of emissions in the EU.

The methane emission monitoring approaches should be specified in the form of an Implementing Act, in order to ensure homogenous application in the EU.

Moreover, the Observatory seems to be a suitable place to reconcile the data reported by the individual companies or facilities based on bottom-up measurement and monitoring methods with top-down methods such as satellite and aerial surveys as only data coming from both sources can provide a complete picture of the methane emissions landscape and reduce some uncertainties, e.g. those related to 'super-emitters'.[22] The data gathered in the Observatory should be publicly available.

## 4. How to Create the Right Incentives for Regulated Companies to Effectively Reduce Methane Emissions?

According to a suggestion by ACER and CEER, "NRAs should recognise efficiently-incurred costs [related to measurement and mitigation of methane leaks] to regulated entities."

Fugitive methane emissions are just one of the factors contributing to the emergence of imbalances or gas losses in natural gas networks.[23] In general, we can divide network losses into two categories: technical (e.g. network leakages, including those resulting from third-party damage) and commercial (e.g. theft or meter tampering, measurement and accounting errors).[24] All these types of losses are known as "lost and unaccounted for" (LAUF) gas or "unaccounted for" gas (Ufg) and defined as "the difference between the gas injected into a distribution system and the gas measured at customers' meters."[25]

So far, the treatment of network losses has been subject to national regulation and there have been no attempts to harmonise it at the EU level.[26] As a result, there are substantial differences concerning, first, definitions and how 'losses' or 'balance sheet differences' are determined – they can be measured or calculated. Moreover, some DSOs provide information on the percentage of gas losses (e.g. in Croatia and Poland), some on the volume of losses

21. For more information, see: <https://www.ccacoalition.org/en/activity/ccac-oil-gas-methane-partnership> (consulted on 13/03/2020).

22. National Academies of Science, Engineering and Medicine 2018. Improving the Characterization of Anthropogenic Methane Emissions in the United States. Washington, DC: The National Academies Press, pp. 77-138.

23. This part will focus on losses in distribution systems, unless otherwise stated. Due to the limited number of studies on this topic, some examples refer to the situation in the Energy Community.

24. Study on Tariff Design for Distribution Systems commissioned by DG Energy (Directorate B – Internal Energy Market) from the consortium of AF-Mercados, REF-E and Indra. Final report, 28 January 2015, p. 30.

25. K. Costello, Lost and Unaccounted-for Gas: Practices of State Utility Commissions, Report No. 13-06, June 2013, p. 4.

26. Energy (electricity & gas) sector performance assessment and improvement under the regulatory perspective. The study was prepared in the framework of the INOGATE Programme by a consortium led by Ramboll Denmark A/S. Contract No 2011/278827. March 2015.

(e.g. in Moldova and Ukraine) and others on both (e.g. Austria).[27] Second, the party responsible for the procurement of lost quantities varies. In the case of transmission systems, the lost gas can be provided by the network users or network operators or both; in the case of losses in the distribution system, it is usually the responsibility of the system operator. Another issue is whether the procurement of losses is market-based, that is whether the procured gas is purchased at wholesale or retail prices or the price of the procured gas is subject to regulation.

Regulatory frameworks regarding network losses may consist of many elements and variables. However, there are two which can potentially have the biggest impact on the reduction of methane emissions.[28] The first is the maximum quantity of losses tolerated by the NRA which can be passed from the system operator to the system users and final customers. The second is how transparent the system operators are in terms of the level of the incurred losses, the causes of the losses and the cost to the final customers.

Despite significant differences, the existence of network losses is a problem occurring in both the electricity and gas sectors. As a result, the regulatory approach to power losses could be of interest of the gas sector.

The major regulatory instrument to incentivise network loss reduction is an incentive-based regulation.[29] The exact design of regulatory incentives varies between countries. In Italy, there is a preset target level (standard losses) and the DSOs are rewarded or penalised depending on whether or not the losses exceed the target level. A similar but more stringent scheme is used in the Slovak Republic, where the maximum allowed amount of losses (in %) is set for each voltage level and is subject to annual reduction by an efficiency factor set by an officially determined formula. Danish DSOs are assigned a certain amount to cover their cost-related grid losses as part of the revenue cap. The amount depends on the historic relationship between the level of losses and the volume of energy delivered.

The use of regulatory incentives to reduce losses in power transmission is less common due to the fact that the losses in transmission are technical and thus more difficult to avoid. However, some countries regulate losses in transmission. An interesting example is Montenegro, which introduced a system where the TSO's rate of return on planned investments depends on the reduction of technical losses.

We should not underestimate the significance of information. Greater transparency leading to an increase in consumer awareness could also be an important element supporting a regulatory framework to reduce network losses. So far, only four countries (Austria, Montenegro, Norway and Slovakia) have introduced an obligation to disclose losses as a separate item on electricity invoices. However, in 31 out of 35 responding countries the data on non-technical losses is incorporated in published values and in regulation.[30]

The challenge in the gas sector is to correctly estimate losses of methane in networks, which is why regulators should also encourage gas companies to make substantial improvements by establishing robust MRV frameworks.

27. Regulatory Treatment of Distribution Network Losses in the Energy Community, Energy Community Regulatory Board, December 2016.

28. Energy (electricity & gas) sector performance assessment and improvement under the regulatory perspective, *op. cit.,* p. 140.

29. The second CEER Report on Power Losses, Ref: C19-EQS-101-03, 21 February 2020.

30. *Ibid.,* p. 35.

## Conclusions

Anticipating the publication of the EU Methane Strategy, this paper has presented some suggestions on how the EU framework on methane emissions could look. It should be emphasised that the development of methane-specific regulations in Europe will require the European Commission to make some challenging choices: to find the right balance between the stringency of the MRV framework and the cost to the regulated entities, and to create a framework that embraces technological development and is rigid at the same time.

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