

COMMON FUTURES

Biomethane across borders

Exploring the possible trade barrier related to how biomethane is captured in emissions reporting

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Disclaimer

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Shaping Change

Executive Summary

The Biomethane Industrial Partnership (BIP) has assigned Common Futures to perform this study with the aim to analyse how EU Member States compile their greenhouse gas emission inventories for submission to the United Nations Framework Convention on Climate Change (UNFCCC). The reason for issuing this study was the identification by Task Force 2 of the BIP that cross-border trade of biomethane within the EU internal market is possibly hampered if emission savings from imported or exported flows of biomethane via pipelines cannot be properly reported in emission inventories used to monitor progress towards meeting climate targets under the Paris Agreement.[1]

Study aim and scope

This study aims to investigate the current practices by Member States to include biomethane import and export via pipelines in greenhouse gas emission inventories as submitted to the UNFCCC. Countries that are party to the UNFCCC-treaty must report their national emissions every year to the UNFCCC secretariat. In doing this, countries follow Guidelines set out by the International Panel on Climate Change (IPCC). The study also describes the potential misalignment between the current practice to create emission inventories under the IPCC Guidelines (i.e. based on energy balances without mass balancing) and how biomethane trade and use is reported for the purpose of compliance with the EU Renewable Energy Directive and EU-ETS (i.e. with mass balancing[2]). In the former context (UNFCCC), imports and exports of biomethane via pipelines are currently not taken into account in emissions inventories and thus not reported (i.e. the related emission savings are assumed to be entirely realised in the country of production). In the latter context (EU RED and ETS), emission savings from biomethane shall be reported in the Member States where this energy is consumed (i.e. the importing country), and mass balancing can be used to track imports and export of biomethane via pipelines. The Union Database will be used to track and assign consignments to economic operators across the EU.

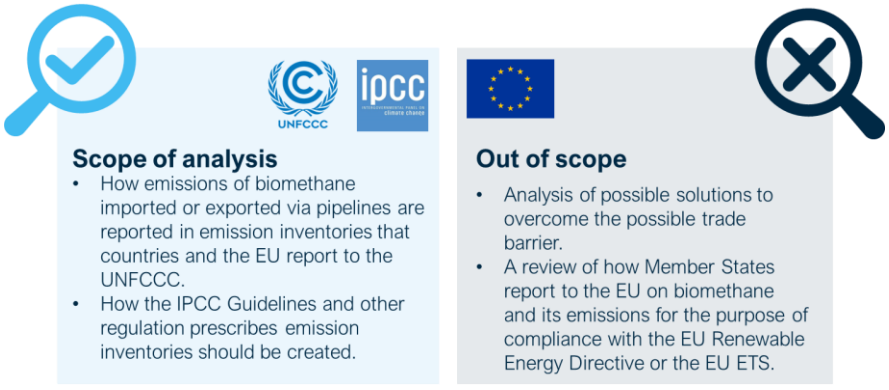

Figure 1: Overview of study scope and outlining what falls out of the study scope.

[1] Biomethane Industrial Partnership (2023). *A vision on how to accelerate biomethane project development*, p.29 (link).

[2] *Under the EU RED and ETS, mass balancing is permitted to record the trade flows via pipeline, i.e. the biomethane is considered to be consumed by the economic operator that holds documentary evidence for having paid for it and consumed it (e.g. a trade transaction, or a Guarantee of Origin). The emission savings from biomethane are thus recorded at the place of consumption, in the importing country. This requires a reliable mass balancing system in the importing and exporting countries to track the trade flows of biomethane and avoid double counting.*

Main conclusions

This study concludes that **a methodology for including emissions of imported and exported biomethane via pipelines in national greenhouse gas emission inventories in the EU is currently lacking**. The IPCC Guidelines advise that *'national emission inventories should include greenhouse gas emissions and removals that take place within the national territory'*, including imports (and subtracting exports). This is currently based on energy balances where imports and exports that can be physically tracked (e.g., via trucks) are taken into account, but not imports and exports via the gas grid (pipelines). This is because biomethane mixes with natural gas in pipelines and cannot be physically traced anymore. Biomethane molecules injected in the gas grid and mixed with natural gas would follow the same flows as natural gas and would be consumed proportionally to natural gas in different consumption sectors. The mass-balancing approach, as used for compliance with the EU-RED and ETS, allows biomethane injected to the grid to be accounted in the country of consumption (the importing country) i.e. where a customer pays for the molecule, irrespective of where the physical molecules of biomethane have travelled. This approach facilitates cross-border trade of biomethane. This report assumes that mass-balancing provides a reliable account of where the biomethane is consumed and thus can be used to determine where the emissions saved by biomethane take place. Therefore, when this report refers to imports and exports of biomethane via pipelines, it refers to "imports and exports of biomethane via pipelines using mass-balancing".

Currently in the EU, emission inventories that are reported to the UNFCCC under the IPCC Guidelines are created based on energy balances, which in turn are based on energy statistics (as further explained below) and imports and exports of biomethane via pipelines are not captured there. In energy statistics and balances, under the International Statistical Methodology, mass balancing is not an admitted practice. The EU prescribes Member States to use a method to create energy statistics which captures biomethane injected into the gas grid but captures biomethane imported or exported via pipelines as natural gas. All imports and exports of biomethane via pipelines (mixed with natural gas) are assumed to be natural gas in energy statistics. In this case, the emission savings from biomethane injected into the gas grid are assumed to be entirely consumed in the country of production. Biomethane that is imported or exported via pipelines is therefore not captured in emission inventories, unless some additional adjustment to energy balances is done for this purpose. This may be seen by Member States as an disincentive to facilitate cross-border trade of biomethane. While imports of traded biomethane via pipeline can reduce reported emissions under the EU ETS, they are not yet reflected in national greenhouse gas inventories. Without adjustment, this can result in a higher level of reported emissions under the Effort Sharing Regulation (ESR) for the importing country, potentially leading to a situation in which the importing country must take measures to achieve additional emission reduction.

These conclusions are further explained below.

IPPC Guidelines advise that 'national emission inventories should include greenhouse gas emissions and removals that take place within the national territory'.[3] This means for example that emissions from coal-fired power plants are accounted in the inventory of the country where the

[3] IPCC (2006). *Volume 1 Chapter 8 Reporting Guidance and Tables*, p.8.4 (link).

power plant is located because that is where emissions take place. If the produced electricity is exported to another country, the importing country does not include any emissions in its inventory. In the case of biomethane the emissions take place where it is combusted, rather than at the production location. According to the Guidelines, biomethane which is combusted and consumed within the country of production counts as zero CO_2 emissions in national emissions inventories. The Guidelines are clear that if biomass (or bioenergy) is *imported* into a territory and it is combusted there, their (zero) emissions should be accounted for in the importing rather than the exporting country.[4] However, the IPCC Guidelines are not explicit on which approaches can be used to determine the fossil and non-fossil fractions of the fuel, i.e., it is not explicitly specified whether the flows of pipeline-imported or exported biomethane which are used to calculate the emissions can be measured using a mass balancing approach.

EU regulation on creating emission inventories currently does not yet include the option to use mass balancing. When reporting energy statistics**, all imported or exported biomethane via pipelines counts as natural gas,** and the questionnaires sent by Eurostat to Member States do not include the option to report biomethane import or export measured via mass balancing. This is further explained below.

A very small quantity of biomethane is transported and traded across borders per truck. This is reported as exported and imported biomethane and subsequently has net zero associated emissions in emission inventories. Most biomethane is injected to gas networks. These biomethane molecules flow through the network, including through interconnectors across borders mixed with natural gas. As biomethane molecules are identical to natural gas molecules, it is impossible to physically track and reflect in energy statistics the specific flows of biomethane molecules through the interconnected gas network. National energy statistics do not take into account biomethane exported and imported via pipelines based on mass balancing, and subsequently, the emissions and emission savings linked to trade flows of biomethane via pipelines are currently not included in national emission inventories. However, trade flows of biomethane via pipelines are reported in a separate tool, the SHARES tool, established for the purpose of the EU RED. For the purpose of compliance with the EU-RED and EU-ETS, mass balancing is allowed, and the UDB will, once fully operational, attribute biomethane and its characteristics to consignments of gas that are traded as biomethane between economic operators across the EU. This information is currently not taken into account in national emission inventories.

EU Member States surveyed for the purpose of this study were not yet sure how they should deal with biomethane in creating emission inventories. Around half of the Member States that were surveyed as part of this study account for the emissions of biomethane which are produced nationally and injected into the grid (i.e. counting imports and exports as natural gas). Some Member States aim to use mass balancing approaches to account for import or export of biomethane via pipelines, while others have not yet developed a methodology or are unclear on what the methodology may be. More than half of the surveyed Member States indicated that import and export of biomethane is happening or expect this to happen in the future.

[4] This was made clear through email communication with the IPCC Task Force on National GHG Inventories: "*Regarding the aspect of imports, the criteria defined by the guidelines are clear: national inventories should include emissions from activities occurring within national territory. Therefore, if biomethane is produced in country X, imported, and then consumed by country Y, the GHG emissions from combustion of biomethane should be reported in the inventory of country Y".*

Method to create national emission inventories based on energy balances and statistics

The figure below explains the step by step method of how Member States create emission inventories on the basis of energy balances and statistics. It is done in the following steps:

1. Energy statistics
    a. Eurostat sends questionnaires prefilled with historic data to Member States in order to report energy statistics.
    b. Member States report on their energy statistics (revising historic data when needed and adding the new data for the last reference year) and send these to Eurostat. The rules for this and the rules for reporting energy statistics are laid down in Regulation 1099/2008 on Energy Statistics.[5]
2. Energy Balances.
    a. Based on statistics, Member States and Eurostat create energy balances.
3. Emission inventories
    a. Using these energy balances (which serve different purposes), Member States create emission inventories and send these to the EC via the European Environment Agency (EEA) and the UNFCCC Secretariat. This is done in rules laid down in the Governance Regulation 2018/1999.[6]
    b. The EEA compiles an emission inventory for the EU-27 and also sends this to the UNFCCC. This parallel reporting stems from the fact that both individual Member States and the EU as a whole are party to the UNFCCC.

Two EU regulations are strongly linked: the Governance Regulation 2018/1999 mandates that the energy balances used for creating the emission inventory must be consistent with energy balances that are created based on Energy Statistics Regulation 1099/2008.[7] This is done in order to create harmonised and comparable reporting for energy statistics and emissions, as energy balances serve different purposes.

[5] European Commission (2008). *REGULATION (EC) No 1099/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on energy statistics* (link).
[6] *REGULATION (EU) 2018/1999 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the Governance of the Energy Union and Climate Action* (link).
[7] Regulation 2018/1999, Articles 37(4), 26(3) and Annex V (j) (iii), and Regulation 1099/2008 Article 4 and Annex B.

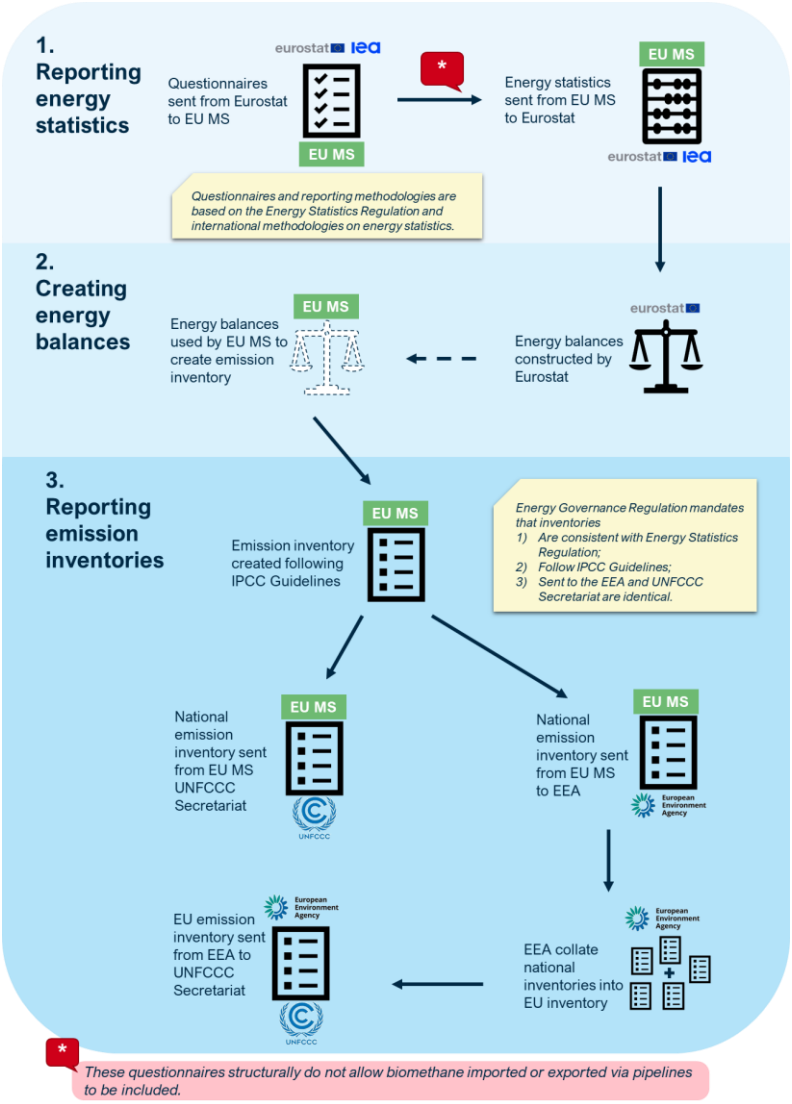

Figure 2: How EU MS prepare emission inventories. Step by step interaction between EU-MS, Eurostat, the EEA and the UNFCCC to create emission inventories. The different roles of EU regulations (in yellow boxes) and the IPCC Guidelines are included. The red box indicates the step in which biomethane imported or exported via pipelines cannot be included in emission inventories due to the international methodology on energy statistics.

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Glossary

EU MS	European Union Member State
Paris Agreement	Legally binding international treaty on climate change adopted under the UNFCCC to limit the temperature increase to 1.5°C above pre-industrial levels.
UNFCCC	United Nations United Nations Framework Convention on Climate Change. The UNFCCC is a global treaty with 198 countries to combat climate change, signed in 1992 and entered into force in 1994. It is the parent treaty of the Paris Agreement. The UNFCCC has a secretariat which is based in Bonn, Germany
IPCC (Guidelines)	International Panel on Climate Change. The IPCC is a UN scientific body which prepares assessments and reports on climate science to inform UNFCCC negotiations. The IPCC Guidelines are a set of internationally agreed methodologies intended for use by countries to estimate greenhouse gas inventories to report to the UNFCCC.
EEA	European Environment Agency, an agency of the European Union based in Copenhagen. The agency collects, analyses and disseminates environmental information, and is responsible for collating emission inventories for the EC.
Emission inventory	Emission inventories refer to the compilations of data on the emission of greenhouse gases into the atmosphere, collected annually on national territories. These inventories track the quantity and types of emissions released by various sources, such as energy, transportation, or agriculture.
Energy balances	Comprehensive statistical frameworks that present a detailed account of energy production, transformation, and consumption of different fuels within a country or region over a specific period.
AFOLU	Agriculture, forestry and other land use.
CRF Tables	Common Reporting Format Tables are standardised reporting templates used by Parties to the UNFCCC to submit their annual greenhouse gas inventories
IRES	International recommendations on energy statistics
GWh, TWh	Wh = Watthour, Giga = 10^9, Terra = 10^{12}
CO_2	Carbon dioxide
bcm	Billion cubic meters. 1 bcm biomethane = 9.8 TWh.
UDB	Union database for Biofuels, a global traceability tool created by the European Union with the aim to trace consignments of renewable and recycled carbon fuels and the respective raw materials used for their production - from the point of origin of the raw materials to the point where fuels are put on the EU market for final consumption. For biomethane the UDB will attribute biomethane and its characteristics to consignments of gas that are traded as biomethane between economic operators across the EU.
RED	Renewable Energy Directive (Directive EU/2023/2413). The legal framework for the development of clean energy across all sectors of the EU economy.

1. Introduction

The Biomethane Industrial Partnership (BIP) has identified the relevance of a functioning EU internal market for biomethane to increase investments in biomethane production capacity.[8] Developing an internal market allows consumers access to the most cost efficient production locations benefitting from competition among producers while also enabling producers to access the highest paying consumers across the EU, helping to create a positive business case and increase biomethane production. An EU internal market can also support in reaching the goal set by the European Commission for the production of 35 billion cubic meters of biomethane a year by 2030 as part of the RePowerEU Plan[9], which equals around 10% of natural gas use in the EU in 2023.[10] A well-functioning internal market is important for all Member States, yet in particular for large users in small Member States with limited domestic production.

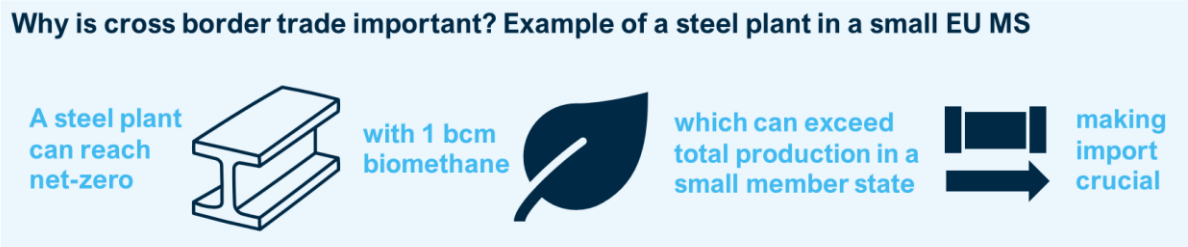

Figure 3: Example of why cross border trade is important.

The BIP has identified that a number of barriers exist that have prevented the creation of a functioning EU internal market for biomethane to date. One barrier is that biomethane production has often been incentivised by production subsidies and that Member States currently require subsidised biomethane to be consumed within the Member State.[11] Another barrier is that some Member States may not be inclined to promote or facilitate imports or exports of biomethane if the emissions of biomethane imported via pipelines cannot be used to meet the climate targets as agreed under the Paris Agreement.

Study aim and scope

The BIP requested Common Futures to perform this study, with the aim to understand how the CO_2 emissions of biomethane that is imported and exported via pipeline is included in national greenhouse gas emission inventories of EU Member States which are sent to the United Nations United Nations Framework Convention on Climate Change (UNFCCC) and to investigate how Member states create these emission inventories. In this study, 'biomethane imported or exported via pipelines' refers to biomethane which is traded between economic operators in different countries using the interconnected gas transmission network. The study also aims to provide clarity on whether some aspects of the current practice of emission accounting could pose a barrier to trade.

[8] Biomethane Industrial Partnership (2023), *A vision on how to accelerate biomethane project development*, p.5 (link).
[9] European Commission (2022). *RePowerEU* (link). 1 billion cubic meter (bcm) = 9.77 TWh = 35 PJ.
[10] Eurostat (2024). *Natural gas supply statistics* (link).
[11] Biomethane Industrial Partnership (2024), *Biomethane inventives and their effectiveness*, p. 12 (link).

The study evaluates the role and impact of the Guidelines on emission reporting as issued by the International Panel on Climate Change (IPCC) on how countries create emission inventories. Also, relevant EU regulations related to emission inventories such as the Governance Regulation 1999/2018 and the Energy Statistics Regulation 1099/2008 are assessed. Outside the scope of this study is IPCC guidance on estimating emissions associated with the lifecycle of biomethane production.[12]

The UNFCCC is the parent treaty of the 2015 Paris Agreement. The UNFCCC is party to 198 countries which must report their national emissions every year to the UNFCCC secretariat. In doing this, countries follow Guidelines set out by the International Panel on Climate Change (IPCC)[13]. The IPCC is the United Nations body for assessing the science related to climate change, and publish comprehensive Assessment Reports about the state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks, and options for reducing the rate at which climate change is taking place[14].

Within the IPCC, the Task Force on National Greenhouse Gas Inventories is responsible for the IPCC Guidelines. These guidelines are a set of internationally agreed methodologies intended for use by countries to estimate greenhouse gas inventories to report to the UNFCCC. They contain guidance on how to estimate the emissions resulting from different activities from different sectors within a country for different gases, including biomethane.[15] The guidelines were first set up in 1994 and have been updated with revisions in 2006 and 2019. A new revision could be expected from 2027 onwards, where new methodology reports will be published on Short-lived Climate Forcers and Carbon Dioxide Removal Technologies and Carbon Capture Utilisation and Storage.[16]

This study does not aim to provide a comprehensive analysis of how biomethane trade and use are reported by EU MS under other EU regulations and emission reporting frameworks such as the EU Renewable Energy Directive (RED)[17] and the EU Emission Trading System (ETS)[18]. Under these frameworks, import and export of biomethane via the interconnected EU gas grid using the mass-balance system can be tracked with the use of Guarantees of Origin (GoO)[19] and Proof of Sustainability (PoS) certificates.

However, a brief comparison is made between the UNFCCC emission inventories and the EU RED and EU ETS is made regarding the rules around accounting for the emissions of biomethane that is imported and exported via pipelines.

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[12] Biomethane lifecycle emissions can include for example, methane emissions of livestock production. In the IPCC Guidelines these are captured in Volume 4 AFOLU Chapter 10 Livestock Management (link).

[13] Reporting is done under the Paris Agreement following UNFCCC Decisions 18/CMA.1 (link) and 5/CMA.3 (link).

[14] IPCC. *About us* (link).

[15] IPCC (2006). *Volume 1 Chapter 4 Methodological Choice and Identification of Key Categories*, p.4.8 (link).

[16] IPCC (2024). *The Taskforce on National Greenhouse Gas inventories (TFI) plan for AR7* (link).

[17] European Commission (2018). *DIRECTIVE (EU) 2018/2001 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the promotion of the use of energy from renewable sources* (link).

[18] European Commission (2003). *DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC (link).*

[19] Guarantees of Origin are defined in the European Commission DIRECTIVE (EU) 2018/2001 on the promotion of the use of energy from renewable sources (link) as an electronic document which has the sole function of providing evidence to a final customer that a given share or quantity of energy was produced from renewable sources.

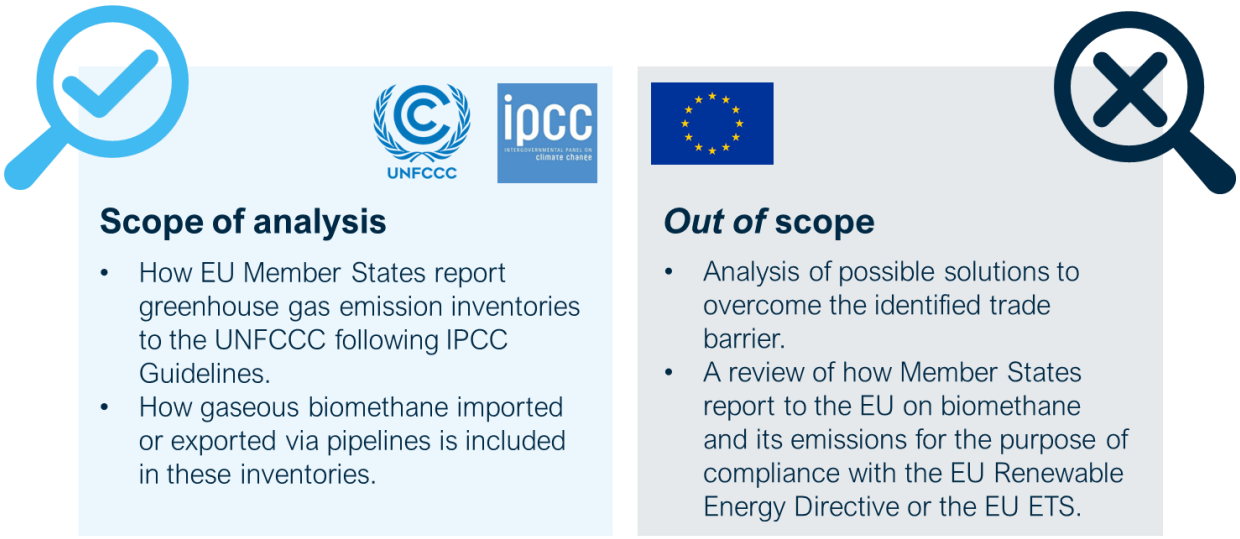

Figure 4: Overview of study scope and outlining what falls out of the study scope.

Approach

In conducting this study, insights were gathered from experts between May and August 2024 from the Intergovernmental Panel on Climate Change (IPCC), Eurostat, European Environment Agency, and experts from ministries and national statistic offices and agencies of 17 Member States: Belgium (Flanders), Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Slovenia, Spain. Additionally, desk research was completed on the IPCC Guidelines and relevant EU regulation.



Figure 5: Surveyed EU Member States in this study.

Report structure

The remainder of this report consists of the following chapters.

2. **Reporting emission inventories to the UNFCCC.** This chapter highlights which guidance is given on the emission reporting of biomethane and how EU MS report emission inventories.
3. **Reporting energy statistics and creating energy balances.** This chapter explains how energy balances are used to create emission inventories and how biomethane is considered.
4. **Why biomethane flows via pipelines is not currently included in emission inventories.** This chapter explains why mass balancing is currently not used in emission inventories, and explains the potential misalignment with other emission reporting frameworks.
5. **EU Member States' methods for accounting the emissions of biomethane traded via pipelines.** This chapter shows how Member States consider biomethane import and export via pipelines in their energy statistics.

In the appendix, summaries are provided of input from Member States on how they consider imported and exported biomethane via pipelines in greenhouse gas emission inventories.

2. Reporting emission inventories to the UNFCCC

This chapter first outlines how EU Member States adhere to IPCC Guidelines when reporting emission inventories to the UN and the European Environment Agency (EEA). It then describes the Guidelines' approach to measuring CO_2 emissions from (imported) biomass and biomethane combustion and how these emissions should be accounted for in inventories. Emission inventories refer to the compilations of data on the emission of greenhouse gases into the atmosphere on national territories. These inventories track the quantity and types of emissions released by various sectors, such as energy, waste, or industry.

The chapter concludes that the IPCC Guidelines do not specify how import and export of biomethane via pipelines should be included in calculating emission inventories. The Guidelines specify that emission inventories should be based on energy balances and statistics, which are assessed in the next chapter.

Countries must follow IPCC Guidelines when creating emission inventories

EU Member States as well as the EU itself are party to the UNFCCC and must send an emission inventory to the UNFCCC Secretariat on an annual basis. The EU does this based on the sum of national submissions which are sent to the EC via the European Environment Agency (EEA). This means that member states must submit to the UNFCCC directly, as well as to the EEA.

EU-Member States are mandated to send their emission inventories to the EC by the 2018/1999 Regulation on Governance of the Energy Union and Climate Action, where the EEA has the role of assisting Member States and the EC with compiling information[20]. The Governance Regulation forms the legal basis for reliable, inclusive, cost-efficient, transparent and predictable governance, which ensures the achievement of the long-term objectives and targets of the Energy Union in line with the 2015 Paris Agreement.

The Governance Regulation also has an Implementing Regulation[21] and a Delegated Regulation[22]. These ensure harmonisation in the inventories which are sent to the UNFCCC Secretariat and to the EEA: Inventories sent to the EEA must also follow IPCC Guidelines[23], and these inventories must then

[20] *REGULATION (EU) 2018/1999 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the Governance of the Energy Union and Climate Action* (link). Article 26(3) mandates that Member States must report inventories to the Commission, and Article 42 mandates that the EEA provides assistance to the Member States and the Commission to do so.

[21] European Commission (2020). *COMMISSION IMPLEMENTING REGULATION (EU) 2020/1208 of 7 August 2020 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) 2018/1999* (link).

[22] European Commission (2020). *COMMISSION DELEGATED REGULATION (EU) 2020/1044 supplementing Regulation (EU) 2018/1999 of the European Parliament and of the Council with regard to values for global warming potentials and the inventory guidelines and with regard to the Union inventory system* (link).

[23] Implementing Regulation 2020/1208, Article 8(1) mandates that inventories are reported in accordance with 'greenhouse gas inventory guidelines'. These are defined in Article 3(8) as guidelines specified in the Delegated Regulation 2020/1044, Article (3). Here it is states that Member States and the Commission shall determine greenhouse gas inventories in accordance with the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories.

be sent to the UNFCCC Secretariat.[24] This allows the EC compile the data and submit an EU inventory which is consistent with the national inventories.

Biomethane consumption has zero emissions in emission reporting to the UN

Combustion and consumption of biomethane is considered to have zero emissions in national total emissions

In emission inventories, the CO_2 emissions from the combustion of all types of biomass, including biomethane[25], are not included in the sum of the national total emissions. They are captured as 'memo-items' in the Common Reporting Format Tables (CRT)[26], which are separate tables which are not used in the sum of total national emissions. This is done to avoid double counting, which can occur when emissions are counted twice, leading to inaccuracies in reporting and assessing progress towards emission reduction targets.

Instead, the CO_2 emissions of biomass are captured by measuring changes in the carbon stock pool changes. This is laid out in the IPCC Guidelines in the Agriculture, Forestry and Other Land Use (AFOLU) sector (Volume 4 of the IPCC Guidelines)[27]. In the AFOLU sector, emissions from biomass or biomass-based products used for energy purposes are calculated as an implicit component of carbon stock changes, e.g. from biomass harvest, even in cases where the emissions physically take place in other sectors (e.g. in the energy sector; see IPCC Guidelines Volume 2: Energy, where it is noted that CO_2 emissions from biomass combustion should be accounted for in the in AFOLU[28]).

Biomethane combustion therefore contributes zero CO_2 emissions to emission inventories. Instead, the CO_2 emissions of biomethane are taken into account in carbon stock changes, for example in changes to cropland or grassland (Volume 4, Chapter 5 and 6 of the IPCC Guidelines, respectively). Countries are therefore incentivised to increase the sustainable production and use of biomethane in order to replace fossil fuel emissions.

IPCC Guidelines steer towards measuring emissions occurring within national territories

The IPCC Guidelines state that national inventories should include greenhouse gas emissions and removals taking place within national territory and offshore areas over which the country has

[24] Delegated Regulation 2020/1044, Article 3 mentions that the Member States and the Commission shall determine inventories in accordance with IPCC Guidelines and with the modalities, procedures and guidelines for the transparency framework or action and support referred to in Article 13 of the Paris Agreement. In Regulation 2018/1999, Article 26 (4) it states that Member States shall submit to the UNFCCC Secretariat national inventories containing the information submitted to the Commission on the final greenhouse gas inventory data. Effectively this means that the same inventory is sent to the UNFCCC and to the EEA (Commission).

[25] IPCC (2006). *Volume 2 Chapter 1 Introduction*, p.1.16 (link). 'Sludge Gas - derived from the anaerobic fermentation of biomass and solid wastes from sewage and animal slurries and combusted to produce heat and/or power.'

[26] All emissions are captured in CRT. Biomass emissions are captured in Table1.D. And Table1s2 of the CRF. In each activity sector there is a place to capture these emissions, such as Table1.A(b) for combustion of biomass in the energy sector. The CRT tables are downloadable from the UNFCCC Website (link). Implementing Regulation 2020/1208 Article 8 (1) states that Member States report inventories by completing common reporting tables (CRT) which are defined in Article 3 (1) tables of information included in Annex II to Decision 24/CP.19 of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) (Decision 24/CP.19).

[27] IPCC (2019). *Volume 1 Chapter 1 Introduction*, p.1.5 (link).

[28] IPCC (2006). *Volume 2 Chapter 2 Stationary Combustion*, p.2.33 (link).

jurisdiction.[29] **Therefore, if biomass is imported into a territory and it is combusted there, the emission reduction should be accounted for in the importing rather than the exporting country**.[30] The Guidelines are also clear on mixes of biofuels and fossil fuels: the split between the fossil and non-fossil fraction of the fuel should be established and the emission factors applied to the appropriate fractions.[28] However, when biomethane is imported and exported via pipelines, it is molecularly indistinguishable from natural gas. As a result, it is not accounted for in energy statistics and energy balances which form the basis of emission inventories, amongst many other purposes. Therefore, without any further adjustment of these balances, this biomethane is not reported in emission inventories.[31] In Figure 6 this is shown, along with a comparison to emission accounting for liquid biomethane imports and electricity imports.

- In route I, biomethane is produced and combusted for electricity production in country A. The produced and electricity is exported to country B. Country A accounts for the biomethane emissions.
- In route II, biomethane is produced in country A and exported to country B in liquid form via trucks and ships. It is combusted in Country B for electricity production. Country B accounts for the emissions.
- In route III, biomethane is produced in Country A, injected into the gas grid where it mixes with natural gas, and exported to Country B . It is combusted in Country B to produce electricity. As the biomethane is indistinguishable from natural gas, it is assumed to be natural gas in energy statistics, hence the emissions from the combustion of this biomethane are accounted for as natural gas combustion in emissions inventories.

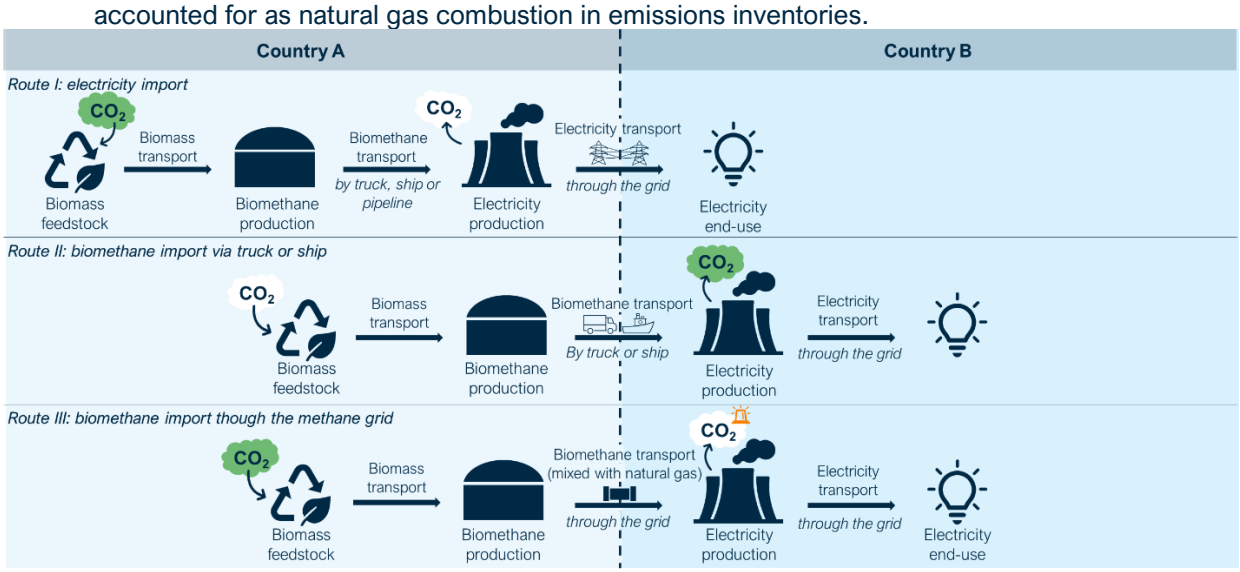

Figure 6: An example comparing where emissions (savings) from biomethane combustion are reported for the UNFCCC based on different export routes of biomethane and electricity. The green CO_2 cloud indicates where the emission reduction takes place. In route III the emission reduction takes place in country A and the emissions

[29] IPCC (2006). *Volume 1 Chapter 8 Reporting Guidance and Tables*, p.8.4 (link).

[30] This was made clear through email communication with the IPCC Task Force on National GHG Inventories: "*Regarding the aspect of imports, the criteria defined by the guidelines are clear: national inventories should include emissions from activities occurring within national territory. Therefore, if biomethane is produced in country X, imported, and then consumed by country Y, the GHG emissions from combustion of biomethane should be reported in the inventory of country Y*".

[31] The molecules of natural gas and biomethane are indistinguishable without specialised measuring equipment. It is possible to use radiocarbon methods to distinguish between fossil methane and biomethane, however, these instruments would need to be placed at every combustion point of methane to accurately track the consumption of biomethane.

from biomethane combustion are assumed to be from the combustion of natural gas.

IPCC Guidelines are not explicit on how to include biomethane which is imported or exported via pipelines in emission inventories

The IPCC Guidelines are not explicit on which approaches should be used to determine the fossil and non-fossil fractions of the fuel, i.e., it is not explicitly mentioned whether the flows of biomethane imported or exported via pipelines, which are used to calculate the emissions, can be measured via mass balance chain of custody approach.[32] There is no specific text pertaining to mass balancing.

The IPCC Guidelines do not give explicit guidance on how to account for the emissions related to imports or exports of biomethane via pipelines. To better understand how they should be included in GHG emission inventories, it is necessary to examine the preceding steps of creating energy statistics and the development of energy balances, which serve as the basis for calculating emission inventories. This analysis is conducted in the following chapter.

[32] See for explanation of the mass balance chain of custody approach here: Chain of Custody – ISCC System.

3. Reporting energy statistics and creating energy balances as a basis for inventories

This chapter describes the required steps leading up to reporting of emission inventories, including reporting energy statistics and creating energy balances, while highlighting the role of different EU regulations in these steps. This chapter highlights the issue on how biomethane reported to be imported or exported via pipelines based on mass-balancing is measured as natural gas in energy statistics.

Three steps to create emission inventories

Emission inventories are prepared following a step-by-step approach. Firstly energy statistics are reported in questionnaires and used to create energy balances. These energy balances are then used to set up emission inventories. These steps are elaborated below and illustrated in Figure 7.

1. **Reporting energy statistics**

Eurostat creates questionnaires on energy statistics and sends these to EU Member States.[33] EU MS report on energy statistics using these questionnaires and send the energy statistics back to Eurostat. Eurostat then create energy balances which are based on the energy statistics. The questionnaires by Eurostat for collecting energy statistics and the methodologies for creating energy balances are based on rules and structures as set out in Regulation 1099/2008 on Energy Statistics.[34] This regulation establishes a common framework for the production, transmission, evaluation and dissemination of comparable energy statistics.

2. **Energy balances are built using energy statistics**

Energy balances are comprehensive statistical accounting frameworks that present a detailed account of energy production, transformation, import and export and consumption of different fuels within a country or region over a specific period. They are created with energy statistics that must be consistent with the Energy Statistics Regulation 1099/2008.

3. **Emission inventories are created using energy balances**

Emission inventories are created by EU MS based on energy balances. In doing this, emission factors of specific fuels are multiplied with the amount of fuel used. The energy balances which EU Member States use to create emission inventories must be consistent with Regulation 1099/2008, as mandated

[33] Eurostat. *Energy – Methodology – Annual data* (link).

[34] European Commission (2008). *REGULATION (EC) No 1099/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on energy statistics* (link). Article 4 (1) states that the national statistics to be reported annually are set out in Annex B, which describes the scope, units, reported period, frequency, deadline and transmission modalities for the annual collection of energy statistics. It is noted in this annex that the transmission format for the data collection shall conform to an appropriate interchange standard specified by Eurostat. Article 5(1) states that Member States shall transmit the national statistics to the Commission via Eurostat, and Article 6(1) states that Member States must ensure the quality of data transmitted, where quality of data is defined in Article 2 (f) as relevance, accuracy, timeliness and punctuality, accessibility and clarity, comparability, coherence and completeness.

in the Energy Governance Regulation 2018/1999.[35] The EEA reviews the emission inventories of EU-MS, and uses the Eurostat energy balances to cross-reference. Discrepancies between the energy balances used by Member States to create emission inventories and the energy balances created by Eurostat must be explained and captured in the common reporting tables, specifically under *Set 1 (Energy, IPPU, Waste)* in *Table1.A(b)*. Discrepancies are allowed[36], but the EEA will determine whether the explanation is sufficient during reviewing.

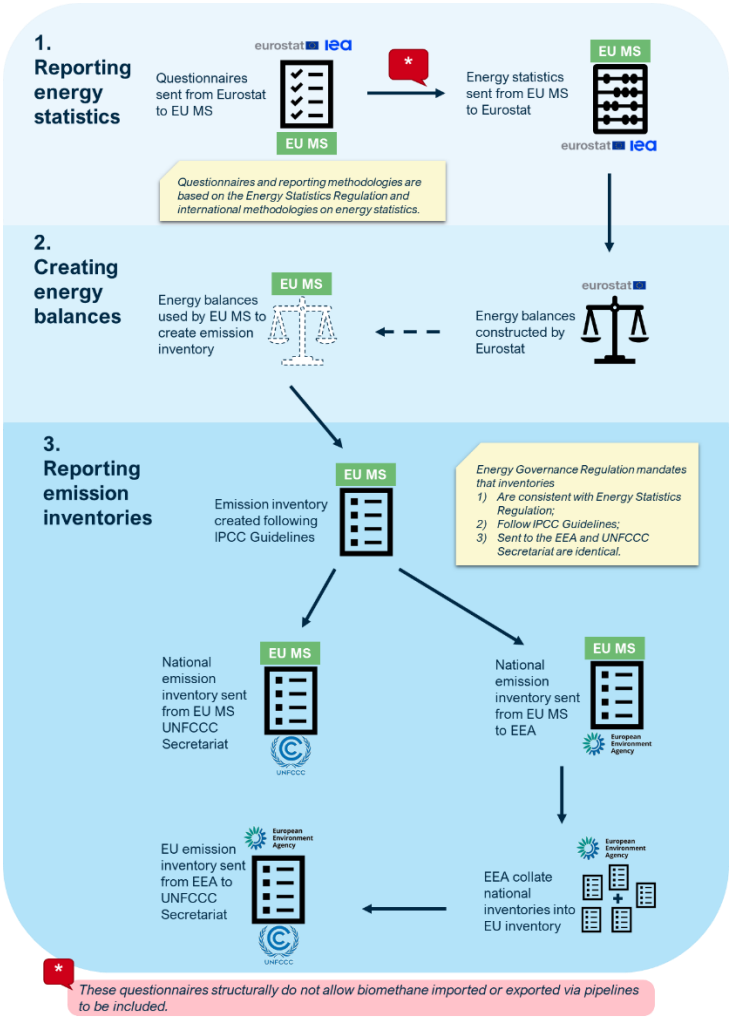

Figure 7: Step by step interaction between EU-MS, Eurostat, the EEA and the UNFCCC to create inventories. The different roles of EU regulation (in yellow boxes) and the IPCC Guidelines are included. Red box indicates the step in which biomethane imported or exported via pipelines can not be included in emission inventories due to limitations of the energy statistics questionnaires.

[35] In Regulation 2018/1999, Article 37(4) states that the Commission shall perform an initial check of the accuracy of the preliminary greenhouse gas inventory data to be submitted by Member States pursuant to Article 26(3), which refers to reporting inventory information in Annex V. Annex V Part 1 states the information to be included in the reports, and under (j) (iii), it states that results of the checks performed on the consistency of the data used to estimate emissions in preparation of the GHG inventories with the energy data reported pursuant to Article 4 of, and Annex B to, Regulation (EC) No 1099/2008.

[36] Implementing Regulation 2020/1208, Article 17(1) states that Member States must specify the differences between the reference approach calculated on the basis of the data included in the greenhouse gas inventory and the reference approach calculated on the basis of the energy statistics reported pursuant to Regulation 1099/2008. 'Reference approach' is defined in Article 3(2) as the reference approach by the Intergovernmental Panel on Climate Change (IPCC), as set out in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories ('2006 IPCC Guidelines'). Article 17(2) states that Member States shall report the quantitative information and explanations for differences of more than +/– 2 % in the total national apparent fossil fuel consumption.

Not possible to report biomethane imports or exports via pipelines in energy statistics

Biomethane import and export via pipelines cannot be included in energy statistics. This limitation arises during the first step of the reporting process, the completion of energy statistics questionnaires, which are structured in accordance with Regulation 1099/2008 on Energy Statistics.

In these questionnaires, there is no designated category for tracking biomethane as a separate entity when it is reported as imported or exported via pipelines using mass-balancing. Instead, it is implicitly assumed to be natural gas in the reporting framework, as the methodology does not provide a mechanism to differentiate the amount of biomethane in natural gas imports. **Since energy balances are constructed from these energy statistics, and emission inventories rely on energy balances, without any further adjustment based on mass balancing, the exclusion of biomethane from imports/exports via the gas grid at the initial reporting stage propagates through the entire system, making it impossible to account for biomethane trade within emission inventories**. Thus, while no regulation prevents the inclusion of biomethane traded via gas pipelines in emission inventories and the use of mass balancing for this purpose, the methodological framework established by the Governance and Statistics regulations currently prevents it from being reported.

This is further explained below based on the steps in the questionnaires to create energy statistics.

1. **Biomethane is captured in the renewables questionnaires for energy statistics**

Quantities of biomethane injected into the grid are collected in the renewables questionnaire.[37] This is captured in Table 4 of the questionnaires under number 11; 'Biogases – Other biogases from anaerobic fermentation', as shown in Figure 8 below.

Menu

E 4. PRODUCTION OF SOLID BIOFUELS AND BIOGASES

Country		Unit = TJ (net)
2023		A
Solid biofuels (excluding charcoal)	1	**0.000**
Fuelwood, wood residues and by-products	2	0.000
Wood pellets	3	0.000
Black liquor	4	0.000
Bagasse	5	0.000
Animal waste	6	0.000
Other vegetal materials and residues	7	0.000
Industrial Waste - renewable part	8	0.000
Biogases from anaerobic fermentation	9	**0.000**
Landfill gas	10	0.000
Sewage sludge gas	11	0.000
Other biogases from anaerobic fermentation	12	0.000
Biogases from thermal processes	13	**0.000**

Figure 8: Screenshot from the 'Renewables and wastes, annual questionnaire' Table 4 Production of solid biofuels and biogases. Biomethane can be accounted for under nr 12 'other biogases from anaerobic fermentation.

[37] Eurostat (2023). *Renewables Questionnaire Instructions 2022-23* (link).

Also in this questionnaire, the import and export of liquid biomethane and biomass products can be captured in Table 5 and 6 (see Figure 9 below).[38] However, the import and export of gaseous biomethane via the gas grid cannot.

The difference between imports in gaseous and liquid/solid form is that imports of solid or liquid biomass (including liquid biomethane) can be easily physically measured, whereas measuring biomethane imported or exported via pipeline requires using mass balancing as it is indistinguishable from natural gas. This is not permitted by the questionnaires. The difference is shown in Figure 6 above.

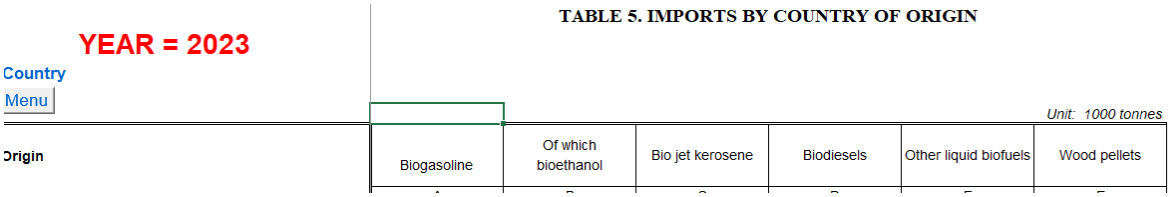

Figure 9: Screenshot from the 'Renewables and wastes, annual questionnaire'[39] Table 5 Import, where imports per country can be specified for liquid and solid biomass products, not for gaseous bioenergy.

2. Biomethane injected into the gas grid is transferred into the natural gas questionnaire and shared across all natural gas using sectors

While filling in the natural gas questionnaire[40], domestic biomethane production and injection into the grid is transferred from the renewables section into the natural gas questionnaire as 'receipts from other sources (from renewables)'. By transferring it from the renewables section, biomethane is not reported there anymore. In natural gas consumption, the part which is biomethane is shared proportionally across consumption sectors. It is not shared between import or export sectors of natural gas.

3. Biomethane imported/exported via pipelines is shown as natural gas in energy balances

Following these steps in the questionnaires means that biomethane imported or exported via pipelines cannot be included in the energy statistics used to create energy balances which in turn are used to calculate emission inventories. As biomethane production grows, challenges in emission reporting can occur under the current methodologies, as exemplified in Figure 10 below. Denmark has the ambition to have 100% biomethane in its gas grid before 2035. if some of this biomethane is exported to Germany, it cannot, under the current methodologies, be defined and captured in the national energy balances of Germany as biomethane and would be considered as natural gas imports, even if Denmark would export zero natural gas to Germany. This is specifically for the emission reporting under the UNFCCC and is not the case within the context of the EU RED and ETS.

[38] The imports and exports of gaseous biomethane via dedicated pipelines (i.e. not mixed with natural gas), if they were to happen, could also be included here.

[39] The 'Renewables and wastes, annual questionnaire' Excel can be downloaded from the Eurostat website (link).

[40] Eurostat (2023). *Natural Gas Annual Questionnaire 2022-23* (link).

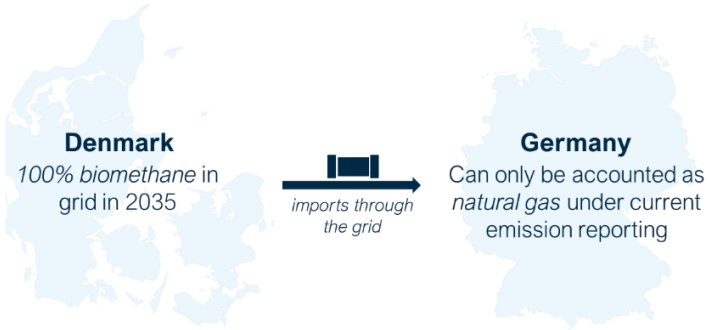

Figure 10: Possible future situation in which Denmark reports 100% biomethane exports as natural gas.[41]

[41] Danish Energy Agency. *Biogas in Denmark* (link).

4. Trade of biomethane via pipelines is currently not captured in emission inventories

As highlighted in the previous chapters, there is no regulation that prevents the inclusion of imported or exported biomethane mixed with natural gas via pipelines in emission inventories. However, the methodologies which lead to emission inventories (reporting from energy statistics and creating energy balances) do not facilitate its inclusion in the absence of any adjustment mechanism when translating energy balances into emission inventories. Specifically, this happens during reporting of energy statistics in questionnaires. Here, there is no designated category for reporting biomethane import and export via pipelines.

This chapter firstly elaborates on the methodological background and context of the questionnaires and energy balances and how this leads to the exclusion of biomethane imported or exported via pipelines. Then, it describes how mass balancing is currently not being used to measure import and export, and how this approach leads to a misalignment for the emission accounting of biomethane with other emission reporting frameworks.

Energy statistics and energy balances use on international methodologies that do not have an option to use mass balancing

Energy statistics questionnaires and energy balances set up by Eurostat are consistent with the International Recommendations on Energy Statistics (IRES), which are created by United Nations Statistical Division.[42] The IRES a set of internationally agreed recommendations on energy statistics. Maintaining consistency with IRES is important to ensure that energy statistics of the EU are also comparable and harmonised with international statistics.

The IRES are explicit that energy statistics should be collected by measuring physical flows of energy including the physical flows of energy import and export within national territories.[43] The methodologies as set out by Eurostat for creating energy balances are consistent with these recommendations.[44] Mass balancing is not used in this context.[45]

At the same time, it is not possible to track biomethane flows without a mass balancing approach: biomethane molecules flow through the network and through interconnectors across borders, mixed

[42] United Nations Statistical Division (2018). *International Recommendations for Energy Statistics* (link).

[43] The IRES make several recommendations on how to measure energy statistics in physical form. Most notably, in Chapter II.B, paragraph 2.14, it is mentioned that the criteria for allocating certain statistics to the country follow the physical location of the units [of energy products] involved. Also in Chapter V.C, paragraph 5.11 'imports' are defined as energy products entering national territories.

[44] Eurostat (2018). *Energy Balance Guide*, (link). This shows a large explicit link with IRES throughout the document, but also an explicit link on p.45 to paragraph 2.14 of IRES, which mentions the physical location of units should be covered.

[45] Using mass balancing implies that a reliable system is in place in both the importing and exporting countries, in order to ensure double counting is avoided. This system is being put in place in the EU, but not in many countries across the world, so using mass balancing for energy statistics could entail a risk of errors. Besides, it is essential that energy statistics are following the same methodological rules in all countries, in order to ensure comparability.

indistinguishably with natural gas. It is impossible to measure and reflect in energy statistics the specific, physical flows of biomethane molecules through the interconnected gas network.

Energy statistics are used for energy balances. Emission inventories are based on the energy balances, currently without any further adjustment/correction. This means that mass balancing is currently not being used for measuring the import and export of biomethane via pipelines in emission inventories. This is different to other energy and emission reporting frameworks such as the EU ETS[46] and the EU RED, where trade flows of biomethane are accounted for using mass balancing.

Difference in accounting biomethane emissions for international climate targets versus for compliance with the EU RED and ETS

Under the EU RED and EU ETS, mass balancing is permitted to record the trade flows via pipeline, i.e. the biomethane is considered to be consumed by the economic operator that holds documentary evidence for having paid for it and consumes the environmental value (e.g. a trade transaction from a recognised voluntary scheme or from the Union Database for Biofuels). For example, for the purpose of compliance with the EU RED, some Member States (e.g. Germany) allow the import of biomethane via pipeline. **Trade flows of biomethane via pipelines are reported in a separate tool, the SHARES tool, established for the purpose of the EU RED. Here, SHARES effectively acts as a layer on top of the standard energy balances, allowing an adjustment to account for the trade flows of biomethane towards the renewable energy targets.**

The emission savings from biomethane are thus, under the EU RED and EU ETS, recorded at the place of consumption, in the importing country. This requires a reliable mass balancing system in the importing and exporting countries to track the trade flows of biomethane and avoid double counting, which is already established in the EU as per Implementing Regulation 966/2022 and will be further facilitated by the use of the Union Database (UDB). The UDB will play a central role to track the production and sustainability of biomethane in the EU, ensuring compliance with the EU Renewable Energy Directive and preventing double counting. This enables the tracking of biomethane throughout the EU, which can improve the conditions for cross border trade.

Therefore, for biomethane import and export via pipelines, there is currently a misalignment between emission reporting to the UNFCCC and the EU RED and ETS. Under the former, biomethane import or export flows via pipelines cannot be reported, while it is possible under the latter. As biomethane production, import and export grows in the future, this could lead to discrepancies in emission accounting between different frameworks, as exemplified in Figure 11 below.

[46] European Commission (2023). *Commission Implementing Regulation (EU) 2023/2122 amending Implementing Regulation (EU) 2018/2066 as regards updating the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council* (link).

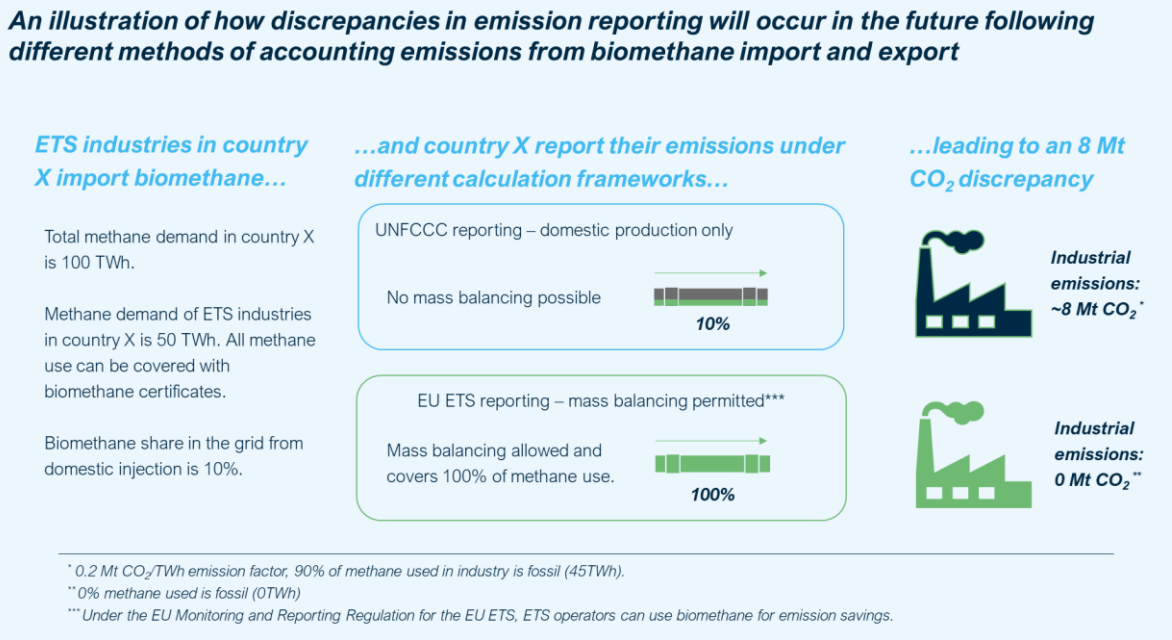

Figure 11: Example of how discrepancies in emissions between different calculation frameworks may occur in the future following the accounting of biomethane import and export. Source: EU monitoring and Reporting Regulation for the EU ETS.

EU Member States set up their own energy balances for calculating emission inventories. In practice the methodologies used to develop these energy balances are harmonised and aligned with those employed by Eurostat and the IEA. However, when it comes to reporting imports and exports of biomethane via pipelines, expertise and planned approaches vary across Member States. The following section examines how each contacted Member State deals with reporting the emissions associated with biomethane imported or exported via pipelines in its emission inventories.

5. How Member States account for emissions of biomethane traded via pipelines

The previous chapter summarises the regulations and methodologies related to emission inventories, and concludes that it is not currently possible to account for the emissions related to biomethane import and export via pipelines in energy statistics. This can lead to misalignments with other energy and emission reporting frameworks.

This chapter summarises insights by EU Member States on current and future import and export of biomethane via pipelines and how they (plan to) deal with the accounting of the emissions in inventories. A more detailed summary on the approach and background per country is provided in the appendix.

More than half of the surveyed EU Member States are already importing and exporting biomethane or expect this in the future

Biomethane is already being imported and exported via pipelines in several Member States as shown in Figure 12. Interestingly, in Eurostat energy balances of 'biogas' in 2022, there was 535 GWh of import yet 0 GWh of export[47], showing that energy balances of different Member States do not align yet. In other Member States there is an expectation for import and export via pipelines in the future as biomethane production develops and demand increases. Only two did not expect import or export in the future.

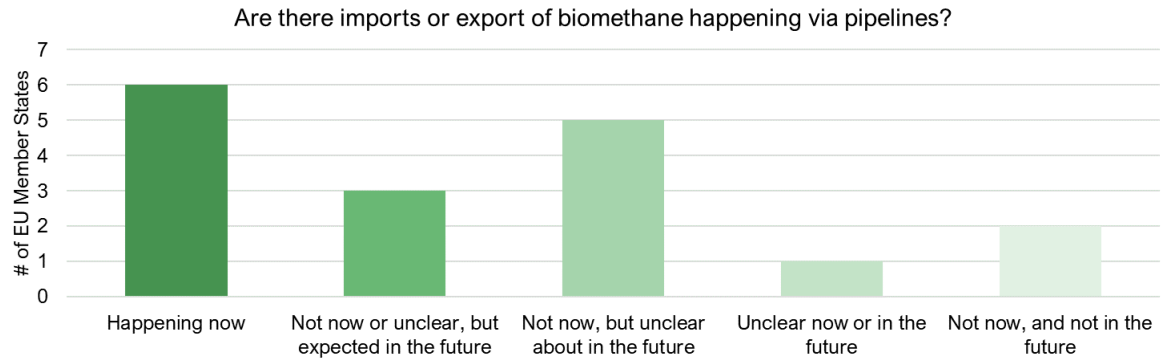

Figure 12: Results of surveyed EU MS on current import and export of biomethane via pipelines and on future expectations.

Most Member States only account for biomethane produced within own national territories

Most of the contacted EU Member States do not include the emissions from biomethane imports and exports via pipelines in emission inventories as it is not possible to do so via energy statistics and balances. Some EU MS would prefer to use mass balancing approaches in the future, while others are not yet clear on their approach. Without a common understanding and harmonised approach between EU MS, this could lead to a risk of double counting of the emissions related to biomethane import and export in the future. The EU MS are grouped in 3 main categories as captured in Figure 13 and explained further below.

[47] Eurostat Data Browser (link).

1. Import and export of biomethane via pipelines not included

Most EU Member States so far only rely on energy statistics and balances, without any further corrections, and thus only account for biomethane emissions when it is produced and injected into the grid within the national territories. Generally speaking, these are MS where biomethane production is more established and import and export has already been done or attempted at scale. Here, only the emissions from biomethane production within national territories are measured and included in the inventories. Import and export of biomethane via pipelines is not included. From these Member States, five are not importing or exporting biomethane via pipelines, two are importing and two are exporting. The Netherlands noted that this methodology could be a barrier to trade while Denmark recognised that this issue should be improved in the future to enable accurate accounting. France noted that measuring the physical biomethane flows would be unfeasible and a better option would be needed. Interestingly, Czech Republic corrected their energy statistics data after the interview, noting that they had previously used data from import certificates for imports of biomethane.

2. Preference to use mass balancing in the future

Secondly, there are four countries who aim to use mass balancing in the future to account for biomethane imported or exported via pipelines in inventories. These countries noted that without a reliable, harmonised mass balancing method, biomethane imports could not be accounted in emission inventories, leading to a risk of double counting.
Such an approach considers the use of mass balancing to track trade flows, based on certificates such as Guarantees of Origin (GoO) and Proof of Sustainability (PoS) which can be used to track the buying and selling of sustainable biomethane between economic operators. The volumes measured with these certificates would then be used to correct for the energy flows between countries when calculating the energy balances used for emission inventories, and the UDB could be used to ensure compliance with EU sustainability criteria. However, this would require a correction or adjustment to the energy balances as established by Eurostat.[48] The UDB is used for compliance under the EU RED, with the help of the SHARES tool, and currently has no connection to the energy balances used for emission inventories for the UNFCCC. Three of these Member States do not import or export, while one exports.

3. Methodology unclear or not yet developed

Many Member States have no or very little domestic biomethane production and consumption and the topic of international trade of biomethane has so far not been relevant for these Member States. This also means that these Member States have no experience on the question whether or not biomethane that is imported or exported via pipelines can be included in emission inventories.

[48] Although the UDB, GoO's and PoS do not currently align with methodologies leading to the preparation of emission inventories, they provide robust sustainability assurances under the EU RED, offering adequate compliance for renewable energy criteria.

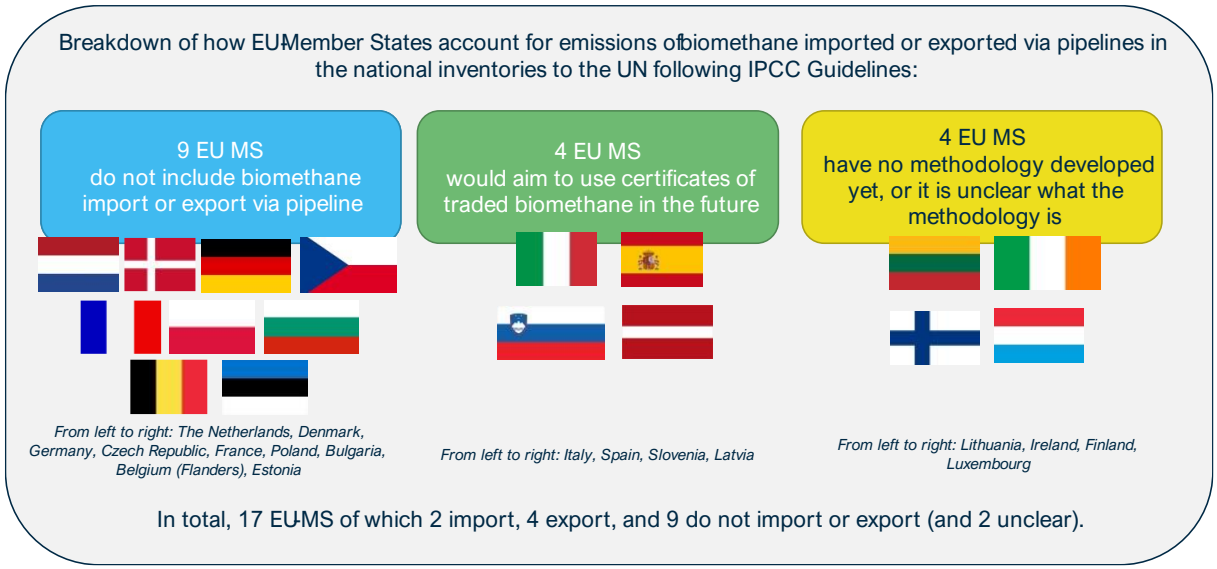

Figure 13: Different approaches used to account for imported or exported biomethane in emission inventories. Note that for Belgium, results are reported here for Flanders only.

Appendix: EU Member States summary

The appendix includes summaries from contact with EU Member states. Note that these result from contact with these countries in the form of interviews and email communication. The completeness of results varies per Member State, reflecting the fact that contact included a variation and combination of experts from national statistic offices, universities and ministries. The main points discussed with Member States were:

1. Are biomethane imports or exports happening, or are they expected in the future?
2. How are the imports or exports of biomethane via pipelines accounted for in emission inventories that are sent to the UNFCCC secretariat?

BELGIUM (FLANDERS)

There is no import of biomethane into Flanders – the registry holder does not allow this. Export is happening (not via the registry holder) for voluntary schemes. It is expected that there will be biomethane import and exported in the future, yet there are no policy related initiatives on the topic. Only domestically produced biomethane in the Flemish region is accounted for in emission inventories, with no import or export measured. ETS installations can use imported biomethane in installations, yet none are using this option yet due to the administrative burden.

BULGARIA

There are no import or export of biomethane happening in Bulgaria, and all import or export of gas and LNG is assumed to be natural gas; none is considered to be biomethane or biogas. The amount of biogas production is Bulgaria is small at the moment, with 2098 TJ in 2022, mostly in the transformation sector, agriculture sector and commercial and public services sector.

CZECH REPUBLIC

There is a goal to produce 0.7 bcm of biomethane, and to use this directly in the transport sector, with the rest being injected into the grid. Imports of biomethane certificates started in 2021 to reach goals in the transport sector. These imports were captured in energy balances and emission inventories.

After consultations with the national expert from the statistical offices, it was recognized that this approach might distort energy balances and emissions inventories. It was decided that, to prevent these inaccuracies, corrections would be made in the energy balances. Only the biomethane nationally injected into the grid would be counted in the energy balances.

DENMARK

GoO certificates of biomethane injected into the grid are exported to Sweden and Germany, and it is unclear how the importing countries account for this. All biomethane is assumed to be used in Denmark in emission inventories. Most biomethane is used in the distribution network in Denmark, and Danish energy statistics does not include information on export of biomethane. Energy statistics are the primary basis for inventories are sent to the UNFCCC Secretariat along with ETS installation data. ETS installations in Denmark are not permitted to use certificates for measuring the biomethane use – it must be physically traceable.

There is uncertainty about whether there is a system in place to prevent double counting. If it can be demonstrated that biomethane is not used in the Danish network, it should be correctly accounted for under the IPCC Guidelines. The future implications of this are unclear, but it could be problematic if Denmark's biomethane production could not be used in emission reporting as it undermines support schemes. There is an ambition is to produce more biomethane than the consumption of natural gas by 2035. In all future scenarios, it is assumed that biomethane is used within the country. Physical tracking of biomethane import and export via pipelines could allow tracking of imported or exported biomethane in Denmark as there are only a few import or export pipelines.

ESTONIA

Statistically there are no import or export of biomethane in Estonia. In actuality this might be happening, as biomethane is pumped into the gas grid, but it is not accounted in national energy statistics. According to the Energy Management Act, the production and consumption of biomethane in Estonia are certified through biomethane certificates of origin in the national biomethane registry. Biomethane certificates of origin have not been imported or exported through the national registry, but a growing interest from market participants is seen.

FINLAND

All fuels, including biomethane import are included in the inventories. It was not clear whether this was pipeline or truck-imported biomethane.

FRANCE

The amount of biomethane in the gas grid is around 2%. This is used in emission inventories, along with data from biomethane plant operators on the production and data by the national gas TSO GRTgaz on the injection into the grid. There are no imports or exports of biomethane in the energy balances. It would be difficult for the TSO to measure the amount of import and export as it would require measuring isotopes, which would be expensive.

Concern was raised on double counting of emissions of biomethane import or export under the UN, however it could be avoided if all EU countries adopted a similar approach. Additionally, concerns were raised about discrepancies between the EU ETS and national statistics emission reporting, where the total emission of ETS installations from importing biomethane could be less than under national emission inventories to the UN.

GERMANY

Germany considers that there already is internal EU trade of biomethane fuelled by support mechanisms voluntary demand for renewable energy sources. Biomethane trade verified with mass balance and RED sustainability criteria is also part of Germany's renewable energy reporting in accordance with EU RED. Certificates of biomethane are imported to reach transport renewable targets. However, certificates for gas (natural or bio) are not considered in the inventories that are sent to the UNFCCC.

Every year, Germany calculates an emissions inventory for greenhouse gases and air pollutants to report it internationally. As it is technically impossible to measure all relevant emissions directly, let alone for an entire year, a number of methods have been developed at international level (IPCC and UNECE) to calculate them.

They follow the “polluter-pays and territorial principles”: the emission sources for all greenhouse gases and air pollutants were determined within national borders. For these sources, the level of emissions and the conditions under which they were released were analysed. Specific emission factors can be derived from this. Multiplying the activity data of a source by the emission factor gives the emission quantity, or emission for short. In order to compile the emissions inventory, very large amounts of data have to be collected and processed. For this purpose, the Federal Environment Agency maintains a detailed database system, the ‘Central Emissions System’. The Federal Environment Agency (Umweltbundesamt, UBA) has set up the national coordination centre for emissions reporting in Germany for this purpose.

IRELAND

Imports of biomethane are happening in Ireland for use in the transport sector. It was unclear whether these are emissions via pipelines and whether they are captured in emission inventories.

ITALY

Currently, the energy balance for emission inventories accounts for production and stock changes for biogas/biomethane but does not include data on imports or exports. Only biomethanol and biodiesel are exported, while biomass and wood are imported. Biogas and biomethane are only produced domestically – there have not been imports or exports until lately, where contracts have emerged for producing biogas in the country and using it in Germany via pipeline or as bioLNG transported by truck. Although there are pilot projects, they currently lack statistical relevance. In the future, as import and export grows, Italy aim to include this in the energy balance which is used for accounting emissions for the UN. Certificates should be considered to measure this, with use of the UDB or another clear and transparent mechanism within the EU. This is necessary to explain these actions to the UN.

Concerns were also raised on the misalignment between ETS reporting and emission inventory reporting when considering imported or exported biomethane, as the Energy Governance Regulation requires full consistency. The quantity of biomethane certificates bought by ETS operators should be included to ensure consistency with ETS and energy balances. Concerns were also raised on ETS 2 and how certificates can be included in end use sectors.

LATVIA

Latvia has not had to report emissions from biomethane production until now as 2024 is the first year of biomethane injection. This injection will be captured from emission reporting starting in 2026. It is unclear whether this biomethane was used domestically, or if certificates were exported. Import and export will be likely in the future, as with other open markets, price will be the main dictating factor. ETS installations are permitted to import certificates of biomethane to reach emission goals.

The emissions from biomethane will be based on the consumption (and will include production, imports and exports). It is hoped that UDB and certificates can be used to track biomethane import and export in the future for reporting emissions. However, it is unclear what methodology will be used to capture this in emission inventories.

LITHUANIA

Biomethane production started in 2023, producing 47 GWh. The GoOs of this production were exported, and it is unclear as of yet how these will be captured in energy balances that are used to report the emission inventories. The future ambition is 1 TWh of production. There is potential interest in future trading of biomethane, but no immediate ambition for import/export as the government is expected to support and prioritize using domestically produced biomethane within the country. Surpluses or deficits in production could make import/export feasible.

LUXEMBOURG

For the moment Luxembourg is not engaged in the cross-border trade of biomethane. The biomethane produced by producers in Luxembourg is consumed on the national territory. In consequence, the environment agency in charge of greenhouse gas inventory has no experience in accounting the GHG-emissions of exported/imported biomethane.

NETHERLANDS

For calculating inventories under the IPCC, firstly the amount of natural gas use is calculated. The share of biomethane is also calculated in this and is subtracted from the natural gas. This is calculated based on how much biomethane is injected into the natural gas grid in the Netherlands, assuming no import or export of biomethane. There are no certificates attached to this calculation, it is purely physical flows. This is different for example for the framework calculation for the RED for example, where certificates are used to track biomethane use across countries. When the Netherlands imports biomethane it cannot account for the emission savings attached to that under the IPCC. The emission savings are realised in the exporting countries, where the biomethane is injected. When biomethane is imported at scale, this becomes more of a problem. Within the Netherlands itself certificates are used to share biomethane among end-use sectors.

POLAND

No export/import of biogas has occurred in Poland recently, as captured in the energy balances. It is unclear if this is due to the methodology or whether it is because it is not happening. GHG emissions are calculated based on fuels consumption taken from the national energy balances.

SLOVENIA

Slovenia aims to produce 120 GWh of biomethane by 2030, prioritising domestic use. A support scheme for domestic consumption will be implemented and this is expected to restrict the export of biomethane. There are no regulatory restrictions on imports or exports, but none are expected in the future. However, if imports take place in the future, imported certificates of biomethane will be shown in the statistics and can be used in the calculation for the greenhouse gas inventory for the UN, provided it is injected to the gas grid. The UDB can ensure that that double counting is avoided.

SPAIN

There are currently no statistical reports from the trade ministry statistics for imports or exports of biomethane. With respect to natural gas imports that include blended biomethane, the information on amounts that would be available from the statistical reports would be used and would be taken into account in the national total consumption.

Biomethane is currently around 0.1% of the total gas volumes. Although it is foreseeable a growing biomethane production in Spain, it is expected to be consumed in the facilities where it is produced, while remainders would be injected into the gas grid. Exports are not foreseen as Spain is not a natural gas producer.

In the future the UDB should be able to help with improving the traceability of the import and export of biomethane. While this tracking of certificates is intended for use for RED and SHARES accounting in the EU, it could also be used for emission accounting under the UN. Spain has already connected to the European platform for the automatic import/export of guarantees of origin (Association of Issuing Bodies, AIB), but for now there are only 5 Member States connected. The Technical Manager of the Spanish gas transmission system, Enagás, as the responsible entity, has developed an alternative procedure.

COMMON FUTURES

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