Facilitating cross-border trade of biomethane

COMMON FUTURES

Starting points for improved emission accounting

October 2024

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European Biogas Association

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Executive Summary (1/2) – Potential solutions

A recent report* of Common Futures for the Biomethane Industrial Partnership (BIP) has identified that the **emissions of imported or exported biomethane via pipelines is not being accurately tracked** between EU Member States for emission inventories prepared for the UNFCCC. **This brief report explores starting points for potential solutions** to the issues identified in the report. The main results are captured below.

Finding 1: IPCC Guidelines advise that inventories should capture the emissions emitted within the national territory.

Finding 2: Tracking the physical flows of biomethane through the interconnected gas grid is not possible.

Issues: Physical flows of biomethane are not connected to the emissions. As biomethane production grows this becomes increasingly problematic.

Potential solution: Include the biomethane grid share in import and export of methane. This better estimates the flows of biomethane but still cannot reflect the physical reality. Discrepancies between emission reporting may also be an issue for EU Member States.

Finding 3: EU regulation and reporting methodologies for creating national emission inventories does not yet facilitate mass balancing.

Issues: EU MS might be less likely support biomethane import and export as they cannot apply the emissions savings nationally.

Potential solution: Adopt a mass balancing step before emission inventories. This would require a tool to track biomethane trade for EU MS, and alignment with the Governance Regulation 2018 / 1999. The UDB could be used to avoid double counting.

Finding 4: EU Member States surveyed for the BIP study were not yet sure how to deal with biomethane in creating emission inventories.

Issues: Unclarity can lead to risks of double counting of emissions and lead to EU MS being less supportive of cross border trade.

Potential solution: Bring EU Member States together, with the goals of creating a basis of understanding of the issues at hand, formulating common goals on emission inventory reporting for biomethane and start the process of alignment.

* Common Futures (2025). *Biomethane across borders: exploring the possible trade barrier related to how biomethane is captured in emissions reporting*

Executive Summary (2/2) – Recommendations

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1. Communicate the current knowledge on how to report emissions of biomethane trade via pipelines with policy officers, energy ministries and national statistic offices of EU MS, and gather insights on the main concerns. This could be done through the BIP.

2. Formulate a way forward: Should reporting methodologies for traded biomethane be changed, and if so, how? This should be done in a larger forum with EU MS policymakers and inventory compilers, Eurostat and the EEA. For example, the European Statistical System Committee. The potential solutions below could be further solidified during these discussions.

3. Analyse how biomethane subsidies and incentives in EU MS interact with emission reporting methodologies and affect cross-border trade. Are these policies restrictive, and would they be adapted if reporting methodologies are streamlined and/or change?

Biomethane import and export in grid share %

4. Begin now with implementing this with Eurostat.

5. Analyse implications of emission discrepancies between different frameworks (ETS & ESR) through scenarios and communication with the EU MS, EC (ETS and ESR units of DG CLIMA), EEA and Eurostat.

Mass balancing adjustment step before emission inventories

6. Investigate 1) the functional requirements of a tool for this approach and 2) how to ensure alignment with the Governance Regulation.

7. Explore the implications of a mass balancing approach for biomethane internationally through discussions with IPCC and UNFCCC.

Contents

1. Introduction

Aim and scope

Introduction

Aim and scope of this brief report

This report **aims** to provide starting points to enhance cross border trade of biomethane. Currently this may be hindered due to issues regarding the emission accounting of imported or exported biomethane. **A recent report of Common Futures performed for the Biomethane Industrial Partnership (BIP)* has identified that** the emissions of imported or exported biomethane via pipelines is not being accurately tracked between EU Member States, because **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 aim of this report is to explore possible solutions to this issue.

The **scope** is to explore plausible solution pathways to these issues. This is done by examining the feasibility of the solutions, the benefits and challenges, and indicative timelines.

This report serves as a starting point for discussions to further develop the solutions. Further research and discussion is required with stakeholders to confirm the feasibility and validity of the proposed solutions.

* Common Futures (2025). *Biomethane across borders: exploring the possible trade barrier related to how biomethane is captured in emissions reporting*

1. Introduction

Background: summary of Common Futures report for the BIP

Summary of Common Futures report for the BIP: goal and scope

Research was conducted to understand how EU MS account the CO_2 emissions of pipeline-traded biomethane for the UNFCCC

The **aim of the Common Futures report for the BIP** was to understand how the **CO_2 emissions of biomethane** that is imported and exported via pipeline is included in national greenhouse gas emission inventories, and **to what extent this may constitute a barrier for cross border trade**. The scope was to analyse how the CO_2 emissions of gaseous biomethane, imported or exported via pipelines, is accounted for in national emission inventories of EU Member States which are sent to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat following Intergovernmental Panel on Climate Change (IPCC) Guidelines.

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.

Scope of analysis

- How emissions of biomethane imported or exported via pipelines are reported in emission inventories that countries and the EU report to the UNFCCC.
- How the IPCC Guidelines and other regulation prescribes emission inventories should be created.

Out of scope

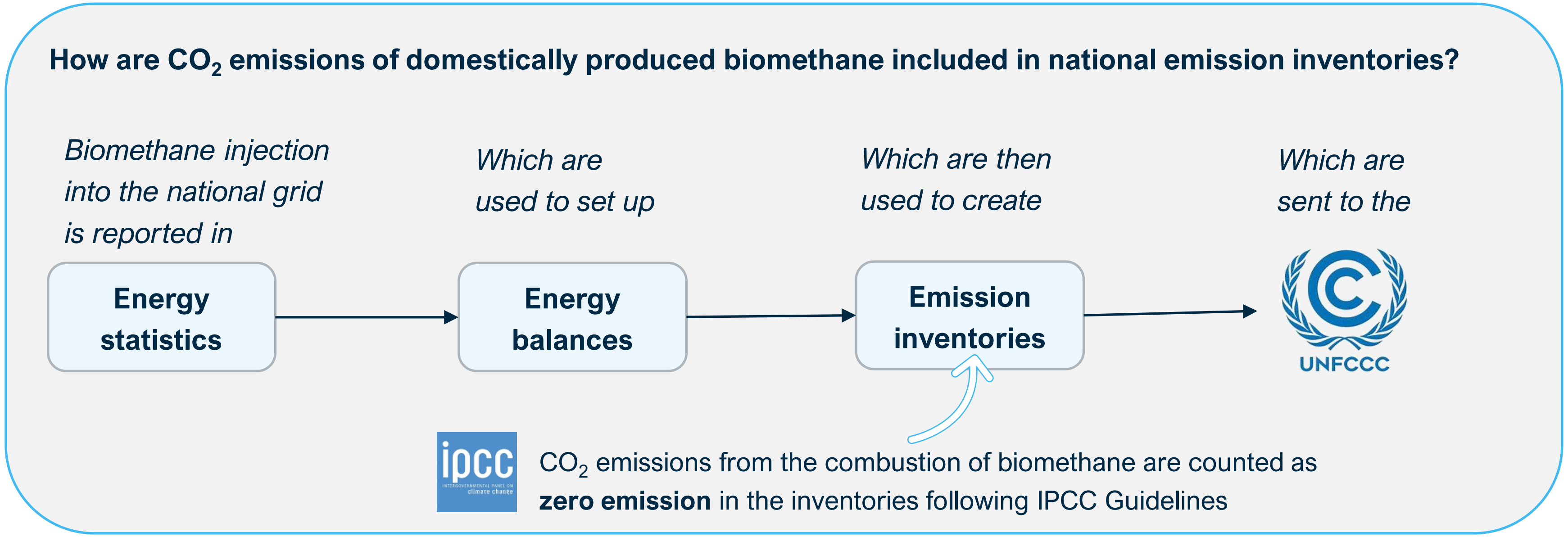
- Analysis of possible solutions to overcome the possible trade barrier.
- A review of how Member States report to the EU on biomethane and its emissions for the purpose of compliance with the EU Renewable Energy Directive or the EU ETS.

Scope of analysis Common Futures work for the BIP.

Summary of Common Futures report for the BIP: approach

Insights were gathered by consulting experts from 17 EU Member States, the IPCC, EC, Eurostat and the EEA

The **approach** was to gather insights between May and August 2024 by experts from the IPCC, the European Commission, Eurostat, European Environment Agency, and experts from ministries and national statistic offices of 17 EU-MS; Belgium (Flanders), Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Slovenia and Spain. This was supplemented with desk research on the IPCC Guidance and EU regulations.



How biomethane is included in emission inventories.

Cross-border trade of biomethane via pipelines is not being accurately tracked in emission inventories

Four main findings are presented from the Common Futures report for the BIP:

Finding 1: IPCC Guidelines advise that inventories should capture the emissions emitted within the national territory.

Finding 2: Tracking the specific physical flows of biomethane through the interconnected gas grid is not possible.

Finding 3: EU regulation and reporting methodologies for creating emission inventories does not yet facilitate mass balancing.

Finding 4: EU Member States surveyed for the BIP study were not yet sure how to deal with biomethane in creating emission inventories.

Summary of Common Futures report for the BIP: 4 main findings

Finding 1&2: IPCC Guidelines advise measuring physical emissions from a territory while physical biomethane trade via pipelines is impossible to track

Findings

IPCC Guidelines advise that inventories should capture the emissions emitted within the national territory.

Tracking the specific physical flows of biomethane through the interconnected gas grid is not possible.

IPCC Guidelines advise that inventories should include emissions that take place within national territories and that the appropriate fraction of fossil/non-fossil should be established in mixed fuels. However, the Guidelines are not explicit on whether mass balancing can be used. Meanwhile, it is impossible to properly reflect physical biomethane flows in energy statistics: the molecules flow through the interconnected gas 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.

Why is this an issue?

It is impossible to **reflect the physical reality of biomethane emissions**. As biomethane production grows, the link between physical flows and emissions becomes **increasingly weaker** when considering pipeline traded methane.

Summary of Common Futures report for the BIP: 4 main findings

Finding 3: Current EU legislation does not yet facilitate mass balancing to adjust for biomethane trade in emission inventories

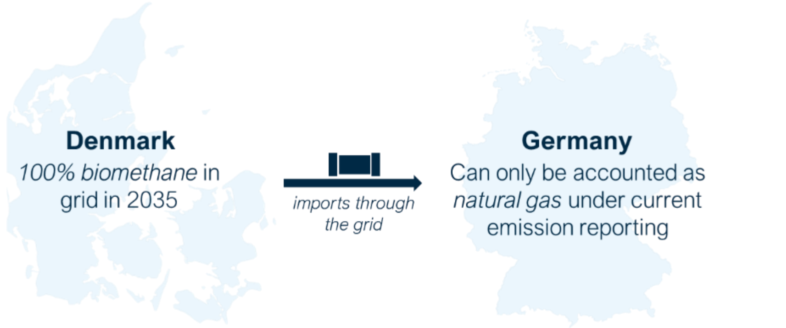
Finding

EU regulation and reporting methodologies for emission inventories does not yet facilitate mass balancing.

When reporting energy statistics in ‘questionnaires’*, all imported or exported biomethane via pipelines counts as natural gas and there is no option of reporting biomethane import or export via mass balancing. Energy statistics are used for energy balances, and energy balances are used to create emission inventories, without any further adjustment. Therefore, the exclusion of biomethane trade 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. This is due to the EC Energy Statistics Regulation**, the Governance Regulation***, and the International Recommendations on Energy Statistics****.

Why is this an issue?

Current methodologies may lead to **discrepancies** in the future. Also, this may lead to some countries **not supporting cross border trade** as the emissions of imported biomethane can not be accounted for.



Example of future discrepancies under current methodologies. Source: Common Futures report for the BIP.

* Eurostat creates questionnaires for energy statistics and sends these out on an annual basis to EU MS for different energy carriers and sources. EU MS use these as guidance to report energy statistics. The questionnaire referred to here is the Natural Gas Questionnaire (link).
** Regulation 1099/2008
*** Regulation 2018/1999
**** United Nations (2018). *IRES.*

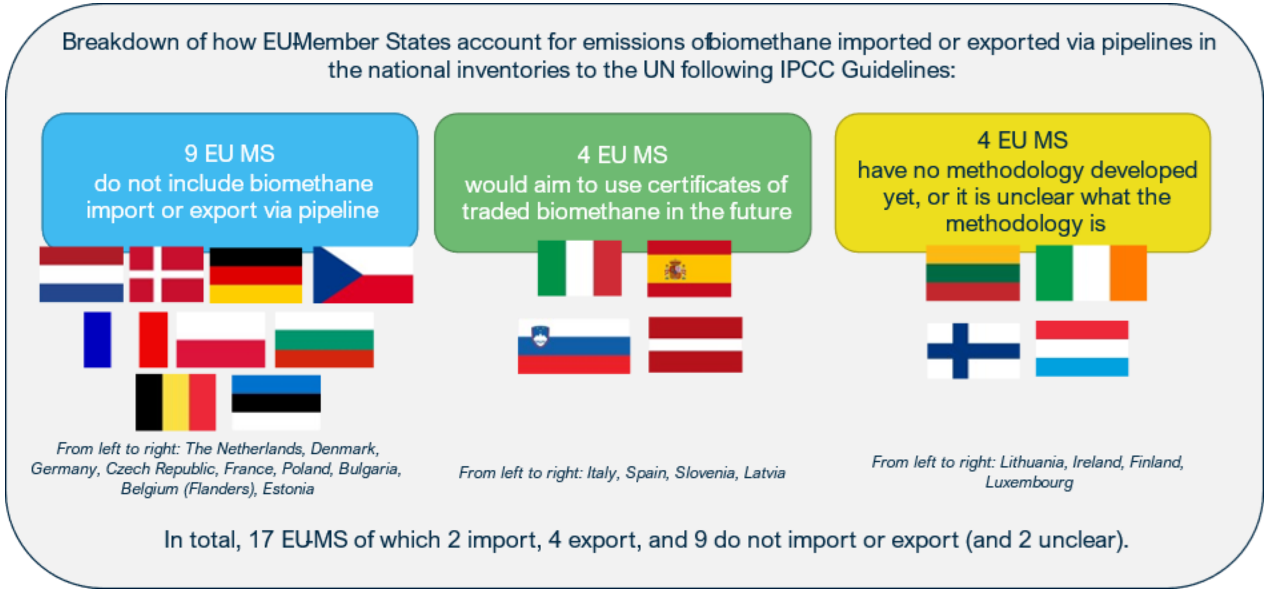
Summary of Common Futures report for the BIP: 4 main findings

Finding 4: Some EU member states not yet sure how to account for biomethane import/export in emission inventories

Finding

EU Member States surveyed for the BIP study were not yet sure how to deal with biomethane in creating emission inventories.

Some EU MS aim to use mass balancing to account for biomethane import and export via pipelines in emission inventories.



EU Member States results. Source: Common Futures report for the BIP.

Why is this an issue?

If EU MS would apply different approaches, this can lead to **double counting of emissions.** Additionally, uncertainty created by these different approaches may mean countries are **less likely to support border trade.**

Summary of Common Futures report for the BIP: 4 main findings

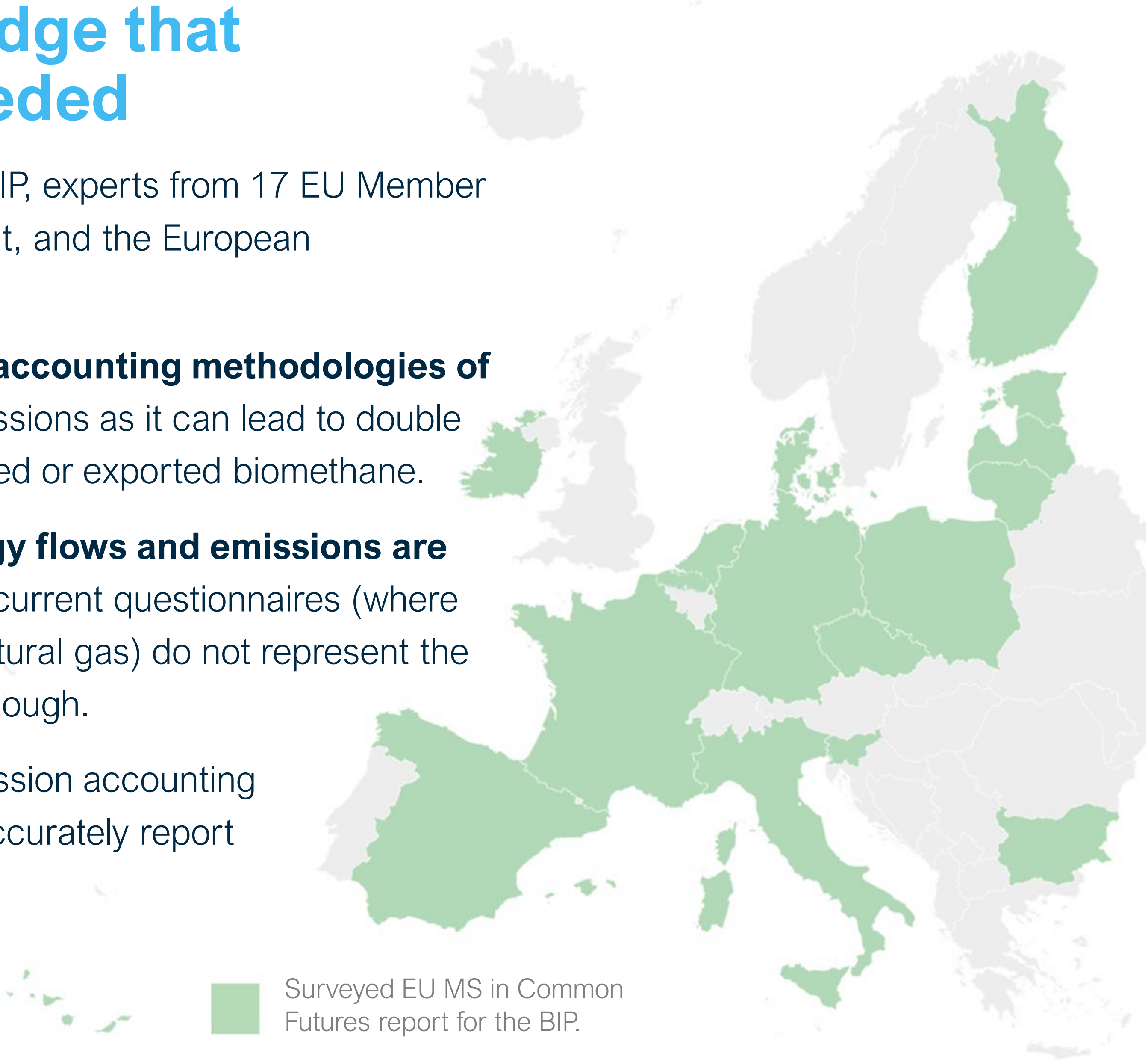
Experts interviewed acknowledge that harmonised solution(s) are needed

During the completion of Common Futures report for the BIP, experts from 17 EU Member States, the International Panel on Climate Change, Eurostat, and the European Environment Agency were consulted.

Among experts there was consensus that **differences in accounting methodologies of EU Member states** could be an issue for the national emissions as it can lead to double counting (or lack of accounting) of the emissions of imported or exported biomethane.

Additionally, there was agreement that **biomethane energy flows and emissions are difficult to track without mass balancing**, and that the current questionnaires (where there is **no biomethane share in import or export** of natural gas) do not represent the physical energy flows and emissions of biomethane well enough.

Concerning the use of a mass balancing approach for emission accounting there was not yet a unified view of how it can be used to accurately report cross border trade.



2. Exploring potential solutions

Bringing EU Member States together

Exploring potential solutions

Bringing EU Member States together to form common goals

As a first step it could be useful to **organise a meeting with EU Member States** to discuss the findings of the Common Futures report to the BIP with the aim to:

1. Creating a **common understanding** of the findings and the issues at hand;
2. Agreeing on how these issues should be addressed, and **which goals need to be achieved**;
3. **Formulating the process** needed to reach these goals including the needed stakeholders, information and analysis.

A meeting with EU MS will also be the **first step in a solution for finding 1** (that EU MS apply different methodologies for emission accounting of traded biomethane) by bringing parties together.

The remainder of this brief report *provides thoughts and suggestion on how to address the remaining findings, the involved stakeholders and the potential timelines.* ***Two potential solutions are explored:*** *1) including a biomethane share in import and export of natural gas and 2) allowing mass balancing before creating emission inventories.*

Addressing finding 4

2. Exploring potential solutions

Improving emission accounting with biomethane grid share in import and export of natural gas

Improving emission accounting through import/export biomethane grid share

Changing reporting methodologies to include the biomethane % in the import/export sectors of natural gas

Solution

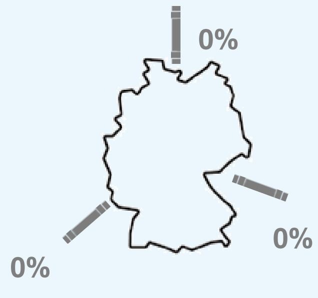
Modify the energy statistics reporting questionnaires and methodologies so that the **share of biomethane in the grid is also shared across the exports of natural gas.** This would also mean that a share of biomethane would be included in the measured natural gas imports. Required for this is the share of biomethane in the grid in each country and data on the import and export of methane (both are already reported separately in energy statistics). This data would then be used to calculate what the share of biomethane import and export is for each country.

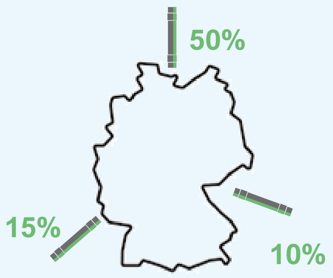
Who should be involved:

Eurostat has expressed an interest in this solution and noted that if chosen, might be feasible to implement within a short timeframe (2-3 years).

What is the difference between the current methodology and the proposed solution?

Current methodology: *grid share of domestically injected biomethane shared equally across all natural gas using sectors within the country, none in export of natural gas*





Potential methodology: *grid share of domestically injected biomethane shared equally across natural gas using sectors **and natural gas exports.***

Comparison of current and potential methodology for reporting biomethane in energy balances.

Addressing finding 1&2 – import/export grid share

Improving emission accounting through import/export biomethane grid share

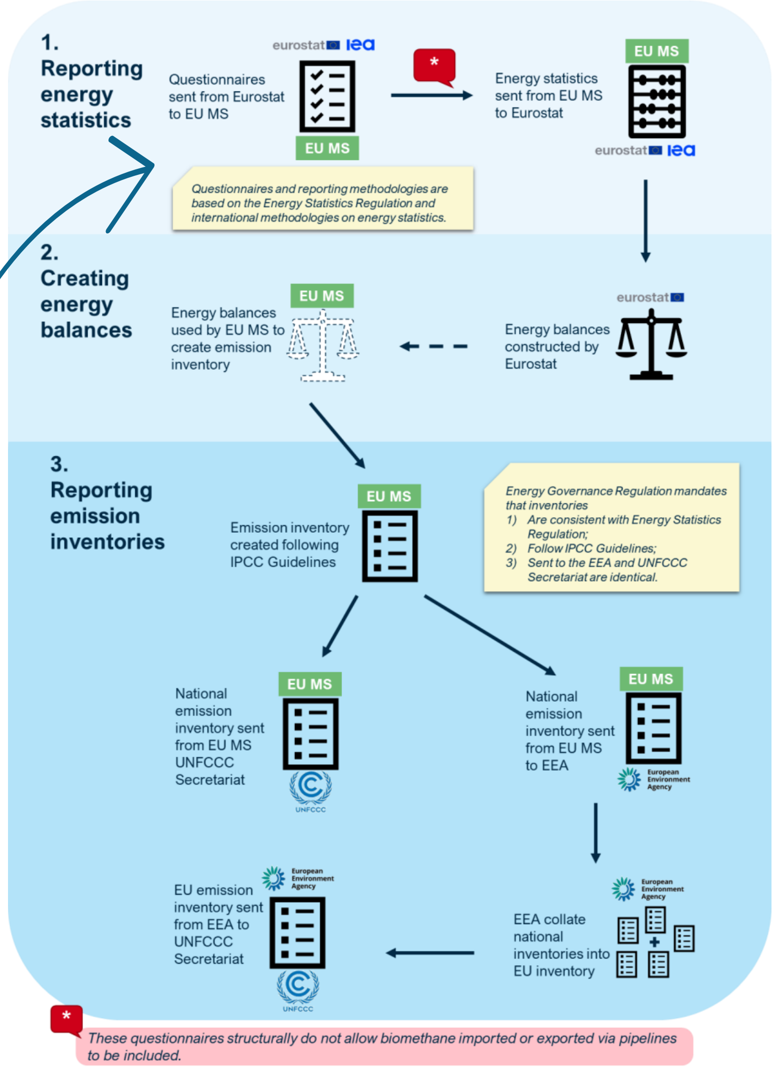
Grid share solution better represents the physical reality but can lead to discrepancies

Benefits

The physical situation of biomethane is more accurately represented in the grid. Indications from Eurostat suggest that it can be **easily implementable**; only reporting methodologies need changing.

Challenges

This could lead to **discrepancies between emission reporting frameworks (e.g., ETS & ESR)** as the amount of biomethane trade grows. These discrepancies will grow in time and could have serious implications for reporting nations. Additionally, this solution may raise concerns of decreased emission savings for countries with substantial biomethane production.



Steps followed to report emission inventories by EU MS. Source: Common Futures report for the BIP.

%

Addressing finding 1&2 – import/export grid share

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An example: how discrepancies in emission reporting will occur in the future following different emission accounting methods

ETS industries in country X import biomethane…

Total methane demand in country X is 100 TWh.

Methane demand of ETS industries in country X is 50 TWh. All methane use can be covered with biomethane certificates.

Biomethane share in the grid from domestic injection is 10%.

…and country X report their emissions under different calculation frameworks…

UNFCCC reporting – domestic production only

No mass balancing possible

10%

EU ETS reporting – mass balancing permitted***

Mass balancing allowed and covers 100% of methane use.

100%

…leading to an 8 Mt CO_2 discrepancy

Industrial emissions: ~8 Mt CO_2* [*]

Industrial emissions: 0 Mt CO_2* [**]

** Emission factor of 0.2 Mt CO_2/TWh natural gas. Assumption that 90% of methane used in industry is fossil (45 TWh).*
*** 0% methane used is fossil (0 TWh)*
**** Under the EU Monitoring and Reporting Regulation for the EU ETS, ETS operators can use biomethane for emission savings.*

%

Addressing finding 1&2 – import/export grid share

Improving emission accounting through import/export biomethane grid share

Grid share solution is an improvement but is not a solution which supports the cross border trade of biomethane

Implementing the grid share solution is a **better representation of the physical reality** of biomethane in the grid and the flows between countries when compared to current approach of domestic only consumption.

Nevertheless, it is **still an administrative method and does not reflect real biomethane flows**. As biomethane molecules are identical to natural gas molecules, it it is impossible to physically track and reflect in energy statistics the specific flows of biomethane molecules through the interconnected gas network and to link this with emission reporting.

Where this occurs today a deviation from the physical reality in emission reporting already exists. This will increase in the future without action. Solving this is crucial to enabling cross-border trade. Additionally, this solution may still lead to **discrepancies with other emission or energy reporting frameworks** which may mean countries are less inclined to allow import or export of biomethane.

*In our view this solution does not accurately track the physical flows of cross border trade, which is not possible. Therefore, it is **not a solution which will enable or enhance cross border trade**, and a **different approach** might be required to track cross border trade **through mass balancing**.*

%

Addressing finding 1&2 – import/export grid share

2. Exploring potential solutions

Mass balancing before emission inventories

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A mass balancing approach could be introduced for tracking biomethane import and export

This solution does not aim to increase the administrative/trading nature of emission reporting, but specifically introduce an adjustment measure for the emission reporting of imported and exported biomethane. This can be done in a way that aligns with the EU vision that views interconnected EU pipelines as one connected infrastructure.

Potential solution

Include a mass balancing adjustment step between creating energy balances and creating emission inventories to allow for tracking the imports and exports of biomethane via pipelines

In the EU

Internationally

Key stakeholders

European Commission

European Environment Agency

eurostat

UNFCCC

ipcc

Estimated timeline for implementation

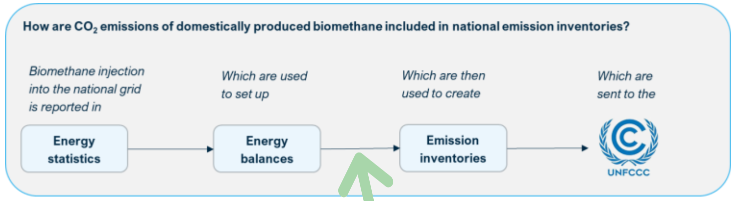
1-3 years

5+ years

Addressing finding 3 – mass balancing

An adjustment step could be included before emission inventories for biomethane import/export in the EU

Indication of where the adjustment step could be implemented in the preparation of emission inventories.



Solution

Develop a method to track the trade of biomethane between EU Member States based on a mass balancing approach. These trades could be included before reporting emissions to the UNFCCC. This could be done by adding a step between creating energy balances and creating emission inventories. A tool, similar to the SHARES tool as developed for the Renewable Energy Directive, could be used to account for pipeline imported/exported biomethane tracked in the Union Database to adjust the energy balances. The adjusted energy balances are then used to create the emission inventories. This solution needs to fit within the interpretation of the Energy Governance Regulation 2018/1999.

Who should be involved:

Key stakeholders here are **Eurostat** (who set up energy balances and have created the SHARES tool), the **EEA** (who collate the reporting of national inventories to an EU inventory), the **EC**, and the **UNFCCC**. The EEA/EC could communicate these changes to the UNFCCC to ensure success.

Addressing finding 3 – mass balancing

Example: how mass balancing of biomethane is done accurately under the EU RED using the UDB and the SHARES tool

The UDB (Union Database for Biofuels) and the SHARES (SHort Assessment of Renewable Energy Sources) tool **facilitate the cross border trade of biomethane**. The UDB focuses on the traceability and legal compliance, while the SHARES tool allows for statistical assessments of renewable energy targets for EU Member States.

The goal of the **UDB** is to track the production and sustainability of biofuels in the EU and ensures compliance under the EU Renewable Energy Directive II. It improves the traceability of gaseous and liquid fuels with the objective to avoid double counting. By the end of 2024 the UDB can used for biomethane, and so will allow the accurate tracking of trading of biomethane for complying under EU targets and regulation.

The **SHARES** tool assesses EU Member States progress in reaching renewable energy targets, by tracking and reporting the production and trade of renewable energy. This includes tracking biomethane use traded via gas grids using certificates. For correct tracking, the importing and exporting countries report consistent figures and this trade has to be registered in the Union Database.

Further analysis is required to test whether these tools are appropriate for the approach suggested in this document.

Addressing finding 3 – mass balancing

Improving emission accounting through mass balancing

Changes might be needed for emission reporting, and ensure alignment with the Energy Governance Regulation

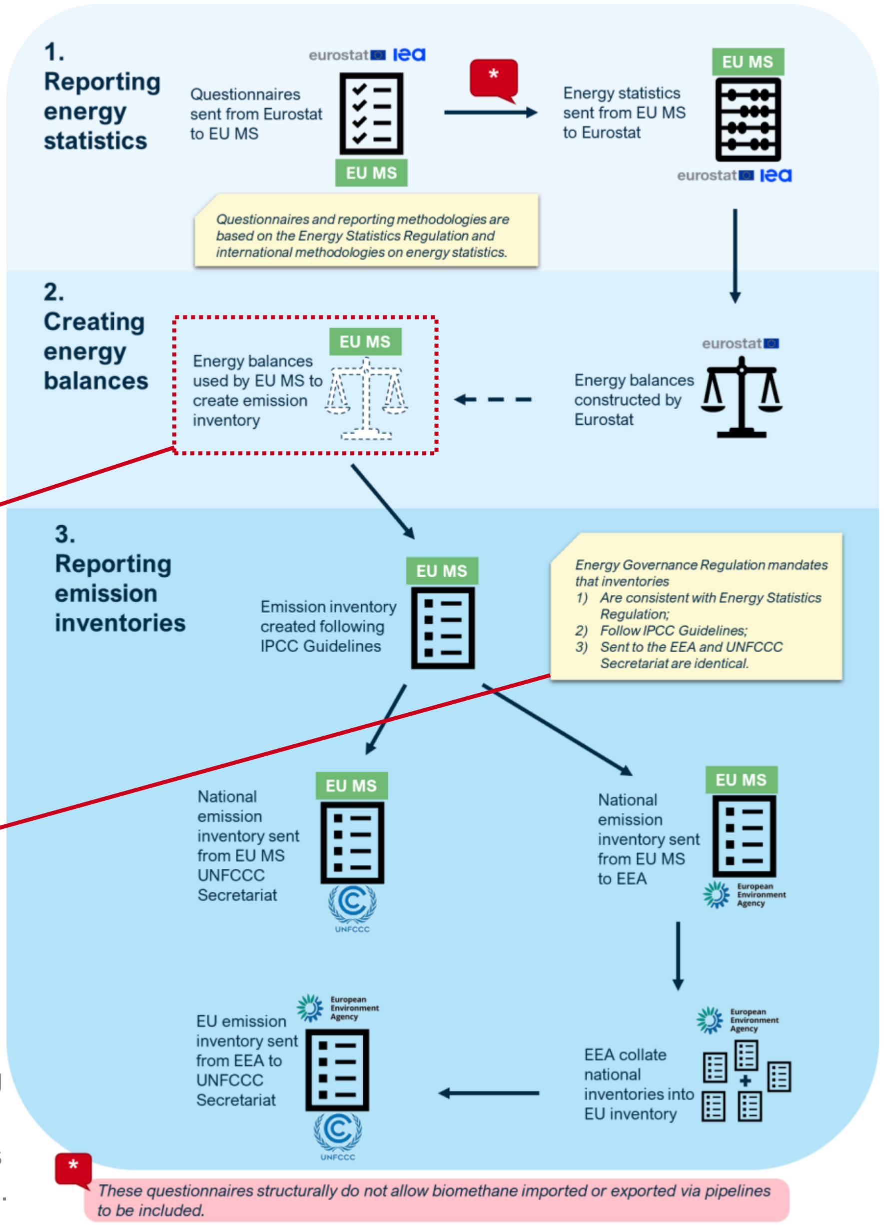
Adjustment step for energy balances used for inventories

The energy balances used for emission inventories would be adapted using a SHARES-like tool which tracks the trading and consumption of biomethane through mass balancing. The UDB could be used to avoid double counting and ensure compliance with sustainability criteria.

Alignment with Governance Regulation required

It should be ensured that the chosen solution fits within the interpretation of the European Governance Regulation. This means that 1) in the energy balances used for EU MS emission inventories for the EEA, biomethane certificates* can be used and 2) that EU MS emission inventories sent to the EEA are allowed to differ from the one sent to the UNFCCC.

** A reliable and accurate way of reporting is assumed, such as is done using Guarantees of Origin (GoO) and Proof of Sustainability (PoS) under the EU RED and EU ETS.*



Steps followed to report emission inventories by EU MS. Source: Common Futures report for the BIP.

Addressing finding 3 – mass balancing

If deemed feasible, mass balancing approach could be adopted in the EU on a short time period

Benefits

Allows full trade of biomethane in the EU. The total sum of EU emissions would still follow IPCC Guidelines.

This will lead to a situation where the EU MS sends different emission inventories to the EEA and the UNFCCC, yet the total European Emissions will still be the same.

Challenges

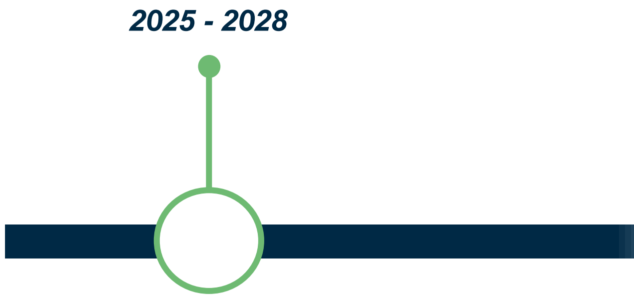
Would require close alignment with the Governance Regulation to allow the emission inventories sent to the EEA and the UNFCCC to be different. A new tool and system might have to be developed similar to SHARES.

It does not provide solutions for imports coming from 3rd countries outside of the EU. When these are recognised by the EC in the UDB their inclusion will be possible.

Time window 2025:

Revision of the Governance Regulation in 2025.

Comprehensive review by EEA on EU MS GHG inventories for the purpose of compliance under Effort Sharing Regulation and LULUCF Regulations in 2025.



Addressing finding 3 – mass balancing

International emission reporting could also apply a similar approach for consistency outside the EU

Solution:

Allowing mass-balancing in reporting should be implemented internationally to ensure the fair inclusion and treatment of 3rd countries connected to the EU via pipelines. Without this these countries with large potentials e.g., Ukraine may be at a disadvantage. The EU conditions to certificates e.g., Proof of Sustainability (PoS) / Guarantees of Origin (GOO) could still be applied.

Who should be involved:

IPCC Guidelines are updated and revised over time since their inception. The next revision is happening in 2027, which will focus on short-lived climate forcers, carbon dioxide removals, and carbon capture and utilisation*. The inventory reporting guidelines (MPGs) will also be updated in 2028. One of these could include specific text which allows mass balancing of biomethane when calculating energy balances for emissions inventories. Additional dialogue with the IPCC and the UNFCCC is needed to explore this.

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

International aligning of methodologies can prove difficult and time consuming

Benefits

Internationally agreeing on methodologies would allow proper accounting of import and exports inside and outside of the EU and allow a streamlined approach.

This would ensure that all inventories are implemented correctly in reporting to the UNFCCC.

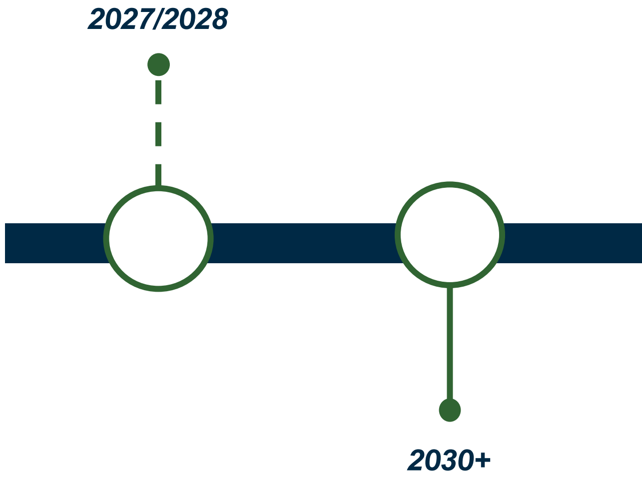
Challenges

Must be agreed upon with (a share of) 198 countries which will likely lead to opposition.

There is also a long lead time to adapt IPCC Guidelines. For example, the revision of the 2006 Guidelines started officially in 2014 and ended in 2019.*

Time window 2027/28:

Revision and update of inventory reporting rules in 2028. The IPCC Guidelines will also be revised in 2027. Rules would not be changed until after 2030.



* IPCC (2019). *Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*

3. Conclusions and recommendations

Conclusions

Common Futures work for the BIP has **identified issues regarding the national GHG emission reporting of traded biomethane** to the UNFCCC that may hinder the cross-border trade. In this brief report, starting points to **potential solutions** are explored.

One issue is that EU MS were not yet sure how they should deal with biomethane in creating emission inventories, which may lead to risk of double counting and unclarity.

Addressing this requires **bringing EU MS together** to form a basis of understanding of the issues at hand, formulating common goals and start the process of alignment of emission reporting.

The other issues identified are that I) the physical emissions of biomethane are not connected to the energy flows of biomethane trade and that II) these cannot be adjusted for using mass balancing, which may lead to EU MS being less likely to support import and trade as they cannot apply the emissions savings nationally. Two potential solutions are explored in this report for this issue:

% **Changing the reporting questionnaires to include biomethane in import/export**, will better represent the physical reality of biomethane in the grid. However, as biomethane production grows in the EU, discrepancies between different emission reporting frameworks will arise such as the EU ETS & ESR and the inventories sent to the UNFCCC, which is problematic for EU MS.

The other explored solution is to adopting a **mass balancing adjustment step for biomethane trade** when creating the energy balances which are used for emission inventories.

To further solidify these potential solutions, a number of recommendations are given.

Recommendations

1 Communicate the current knowledge on how to report emissions of biomethane trade via pipelines with policy officers, energy ministries and national statistic offices of EU MS, and gather insights on the main concerns. This could be done through the BIP.

2 Formulate a way forward: Should reporting methodologies for traded biomethane be changed, and if so, how? This should be done in a larger forum with EU MS policymakers and inventory compilers, Eurostat and the EEA. For example, the European Statistical System Committee. The potential solutions below could be further solidified during these discussions.

3 Analyse how biomethane subsidies and incentives in EU MS interact with emission reporting methodologies and affect cross-border trade. Are these policies restrictive, and would they be adapted if reporting methodologies are streamlined and/or change?

Biomethane import and export in grid share %

4 Begin now with implementing this with Eurostat.

5 Analyse implications of emission discrepancies between different frameworks (ETS & ESR) through scenarios and communication with the EU MS, EC (ETS and ESR units of DG CLIMA), EEA and Eurostat.

Mass balancing adjustment step before emission inventories

6 Investigate 1) the functional requirements of a tool for this approach and 2) how to ensure alignment with the Governance Regulation.

7 Explore the implications of a mass balancing approach for biomethane internationally through discussions with IPCC and UNFCCC.