Greenhouse gas and methane intensities along Equinor's Norwegian gas value chain

Foto: Ole Jørgen Bratland - Equinor

Summary

The objective of this report is to present Equinor's greenhouse gas (GHG) and methane intensities in the Norwegian gas value chain. This report covers piped gas to Europe, as well as LNG produced at the Hammerfest plant with results specific to 2020 and 2019 respectively. The results show that piped gas and LNG produced in Norway have low GHG and methane intensities from production to distribution. A comparison to different averages of consumed natural gas in Europe, show that Norwegian gas has the lowest GHG and methane intensities. These results may be used to demonstrate the emission intensities of Norwegian natural gas delivered to customers and as a basis for blue hydrogen life cycle analysis. Based on Equinor's climate ambition, the GHG intensity of Equinor's Norwegian gas will be reduced further and methane intensity remain near zero.

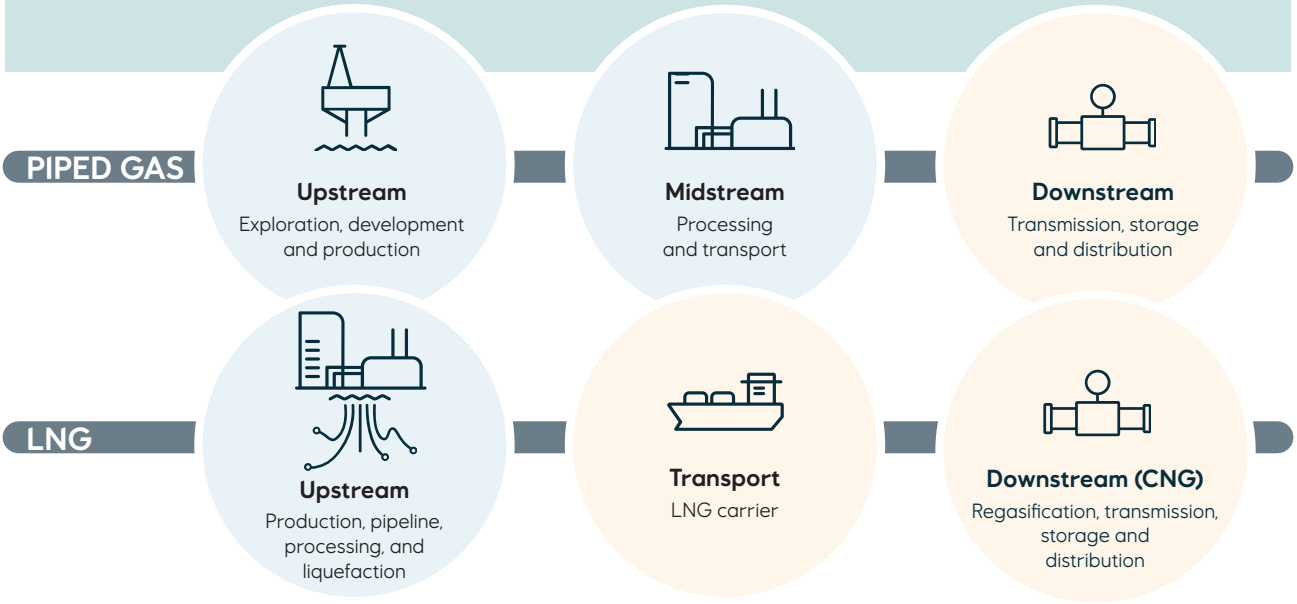

Figure 1

Schematic of Equinor's Norwegian piped gas and LNG value chains.

Introduction

This study presents GHG and methane intensities in Equinor's piped gas and LNG value chains. The value chains are divided into three segments consistent with literature and illustrated in Figure 1. An overview of the infrastructure of the upstream and midstream segment of the piped gas as well as the upstream segment of LNG is shown in Figure 2.

Equinor's Norwegian gas piped to Europe

Total gas export from Norway has remained stable over the last five years, averaging 114 million Sm^3oe yearly [1]. In 2020, gas imports from Norway represented 28% of Europe's gas consumption (EU&UK). Norway is the second largest gas supplier to Europe, after Russia. Approximately 80% of the Norwegian gas exported to Europe is produced from Equinor-operated licences. Rich gas from Equinor-operated NCS installations is piped to two Gassco operated onshore gas-processing facilities, Kårstø and Kollsnes. Here, the rich gas is separated into liquid products and natural gas. Gas from the Shell-operated Ormen Lange field is processed at the onshore processing facility Nyhamna, operated by Gassco. The liquid products are shipped to customers worldwide, while the natural gas is compressed and transported by subsea pipelines to Gassco operated gas terminals in Europe. Equinor's main markets for piped natural gas are Germany, the UK, France, and Belgium. The downstream segment of the gas value chain is characterized by its complexity, in part due to the distribution of the natural gas streams across countries and borders. Since Equinor is not directly involved in the downstream segment, neither as operator nor partner, the company does not have access to a primary set of emissions and activity data. GHG and methane intensities in the downstream segment are based on external sources and will inherently have a large variation within the reported averages, depending on infrastructure, distance, and maintenance.

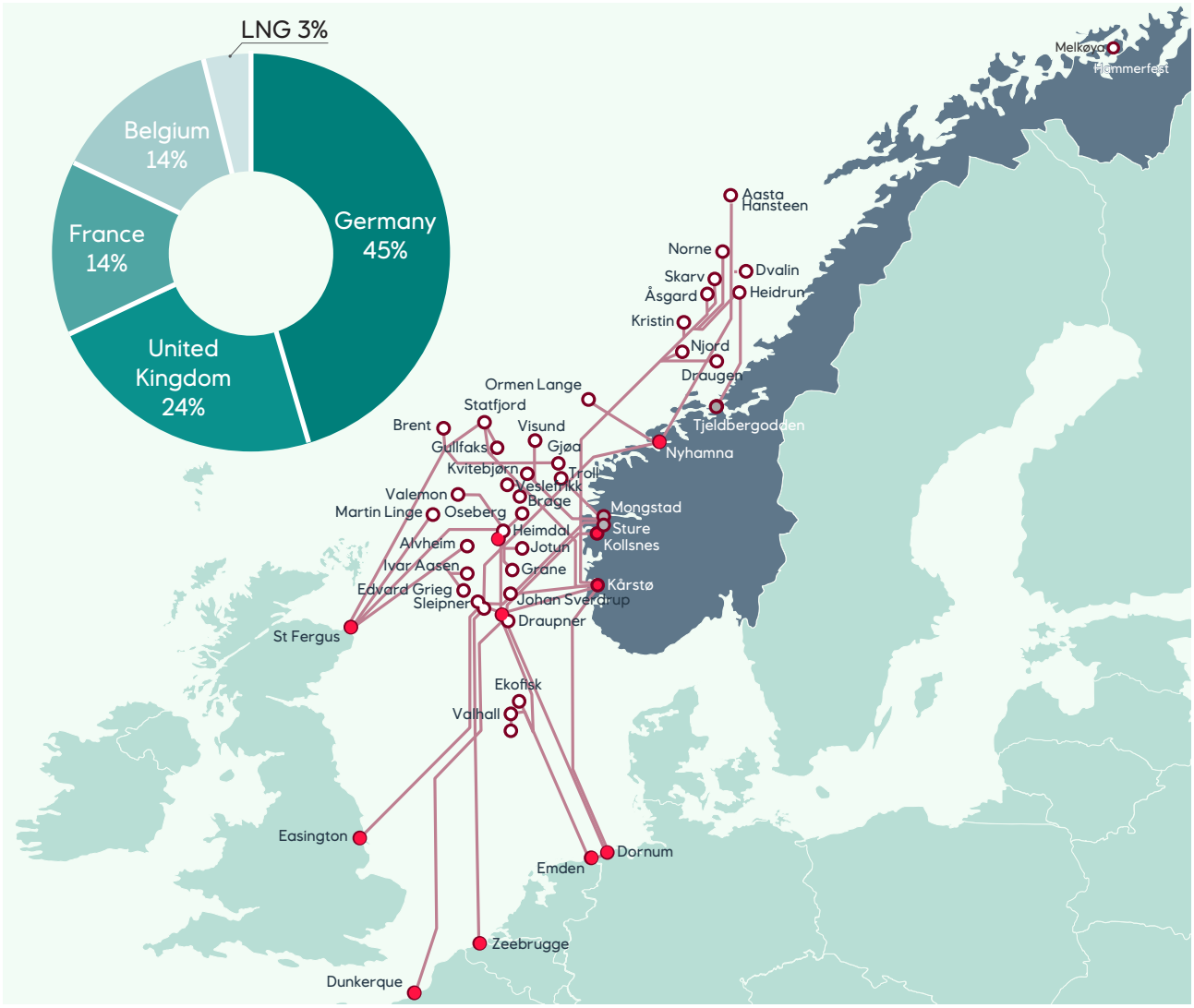

Figure 2

Overview of upstream and midstream infrastructure connected to Norwegian natural gas production. Upstream and midstream segments are indicated with white and red points respectively. The chart gives an overview of receiving countries in 2020.

LNG produced at Hammerfest (HLNG)

LNG represents up to 5% of the yearly natural gas export from Norway, with the Equinor-operated LNG plant at Melkøya, Hammerfest (HLNG) being the major contributor. In 2020 the production facility was shut down for several months, hence 2019 is chosen as basis year to ensure better representation of production and emissions. HLNG export amounted to 6.2 million Sm^3oe in 2019 [2]. Two-thirds of the LNG produced at HLNG is traded by Equinor. Traded volumes are transported by vessels to LNG terminals worldwide. The destination countries for the 2019 Equinor-traded HLNG volumes are shown in Figure 3. LNG can either be consumed in liquid state as LNG or be regasified and enter the compressed natural gas (CNG) system together with the piped gas. This report focuses on the latter. In Europe, LNG amounts for approximately 20% of the CNG consumption. In general, LNG has higher emission intensities in the upstream segment compared to piped gas due to liquefaction being an energy intensive process.

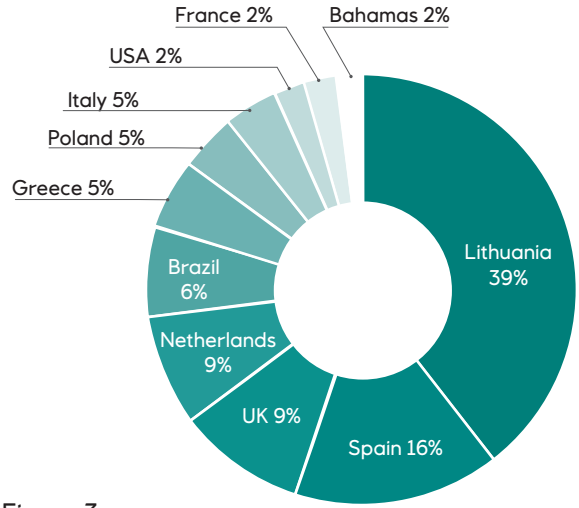

Figure 3

First destination of the LNG exported and traded from Hammerfest LNG by Equinor in 2019.

Emission intensities in the gas value chain

The GHG intensity consists of the sum of carbon dioxide equivalents (CO_2, CH_4 and nmVOC) in grams divided by the marketed natural gas in megajoules. The methane intensity is the percentage of methane emitted divided by the marketed natural gas. Global warming potential used for methane is 25 and for nmVOC 2.2, in line with factors applied by Norwegian authorities.

Intensities calculated by Equinor

For the upstream and midstream segments of Equinor piped gas, GHG emissions are allocated to gas and oil production based on the energy content of the different hydrocarbon streams produced. The GHG emissions and production data are sourced from annual reports provided to the Norwegian authorities [1,2,3]. The reporting of emissions follows stringent requirements from the Norwegian Environment Agency [4,5] and are verified by an independent third party. Carbon dioxide emission reporting follows EU ETS requirements. Methane emissions reported to the authorities are quantified by using a methodology developed by the Norwegian authorities with support from industry [6]. A comparison of reported methane emissions and third-party airborne measurements were conducted during 2019, focusing on 21 offshore oil and gas installations in the North Sea [7]. The comparison highlighted strong alignment and low uncertainty, with mean aircraft-measured fluxes 16% lower than annually reported values.

Emissions from electricity imported from the onshore national grid are included. Norwegian power production is mainly from hydropower, resulting in a very low location-based emission factor (17 g CO_2/kWh [8]). The market-based emission factor reflects the contractual arrangement in place between an organisation and its energy supplier, or, alternatively, reflects the fact that such an agreement does not exist. The market-based emission factor in Norway (396 g CO_2/kWh [9]) is more than twenty times higher than the location-based emission factor. For transparency, emissions from imported electricity have been calculated with both factors. The main results are presented as location based.

Since the piped gas is mixed in the midstream segment, importing countries and customers cannot distinguish gas from the producing entity (field, installation, or license). Equally, it is not possible to distinguish the operatorship of gas coming from Norway, subsequently the calculations have also been performed for Norwegian gas in its totality, independent of operatorship [1,3].

Intensities based on external sources

The downstream segment of piped gas, and the transport and downstream segment of HLNG are solely based on external studies, and a range of values have been sourced from [10, 11, 12]. The main results are presented using the highest alternative for conservativeness. A few differences in scope and boundaries are noted and further detailed in Appendix 1. The differences include baseline year and inclusion of emissions from production of raw materials. The latter is negligible as demonstrated in [13]. In addition, the product system "compressed natural gas" (CNG) referring to gas consumed in Europe, includes piped gas and LNG.

Piped gas to Europe

GHG and methane intensities per segment of Equinor's Norwegian piped gas value chain in 2020 are given in Figure 4.

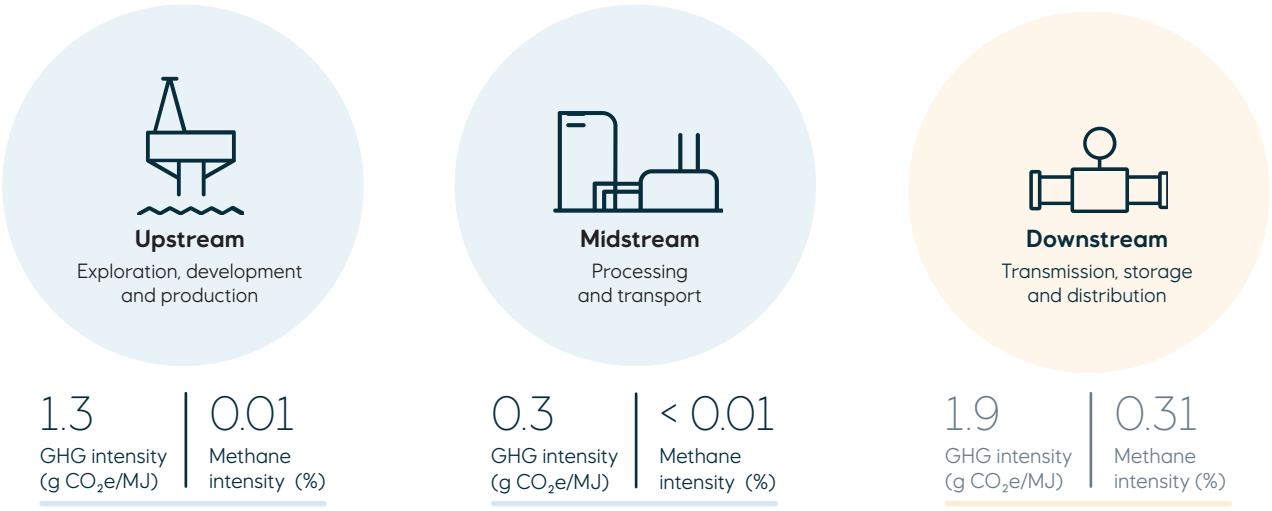

Figure 4

GHG and methane intensities per segment in the value chain for Equinor's Norwegian piped gas to Europe. The downstream segment is presented with values from "Central Europe" [10].

The GHG intensity for the upstream and midstream Equinor piped gas is 1.3 and 0.3 g CO_2e/MJ respectively. Using a market-based emission factor for imported grid electricity for Equinor's piped gas, the corresponding values are higher: 1.4 and 0.6 g CO_2e/MJ respectively.

The GHG intensity for Norwegian piped gas, independent of operatorship, is 1.2 g CO_2e/MJ in the upstream segment and identical in the midstream segment (using a location-based factor).

The results for the midstream GHG and methane intensities are presented as an average value to Europe, as the variation per receiving country is marginal.

The downstream segment is presented with values from Central Europe, with a GHG intensity of 1.9 g CO_2e/MJ and methane intensity of 0.31% [10]. The corresponding GHG intensities for Germany [9], EU total [11], EU North [11] range between 0.9 and 1.6 g CO_2e/MJ. Similarly, the methane intensities for the same regions range between 0.12 and 0.21 % [10, 11]. Despite a large range in GHG and methane intensities in the downstream values, the downstream segment is the largest contributor in the piped gas value chain.

As shown in Figure 5, methane emissions, in carbon dioxide equivalents, represent less than three percent of the combined up-and midstream GHG emissions of Equinor piped gas.

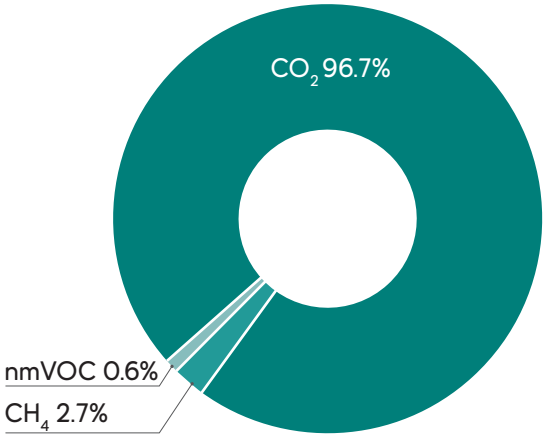

Figure 5

Contributors to the upstream and midstream GHG emissions of Equinor piped gas.

Comparison of piped natural gas value chains

As shown in Figures 6 and 7, Equinor's piped gas to Europe has considerably lower GHG and methane intensities compared to European averages of consumed CNG [10, 11]. A study from Rystad Energy on behalf of Norwegian Oil and Gas Association supports this conclusion, stating that Norwegian gas has the lowest CO_2 emission intensity for gas supplied to Europe [14].

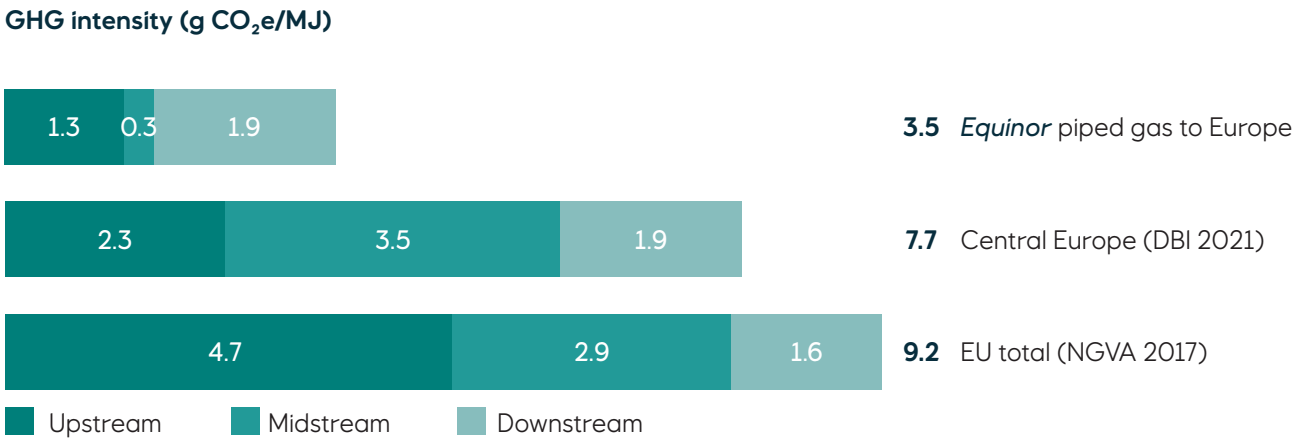

Figure 6

Comparison of GHG intensity of Equinor's piped gas to Europe in 2020 and European averages of consumed CNG [10,11]. European averages are further detailed in appendix 1. Values for the Equinor downstream segment is derived from Central Europe (DBI 2021) [10]. Labels to the right show the sum of each value chain.

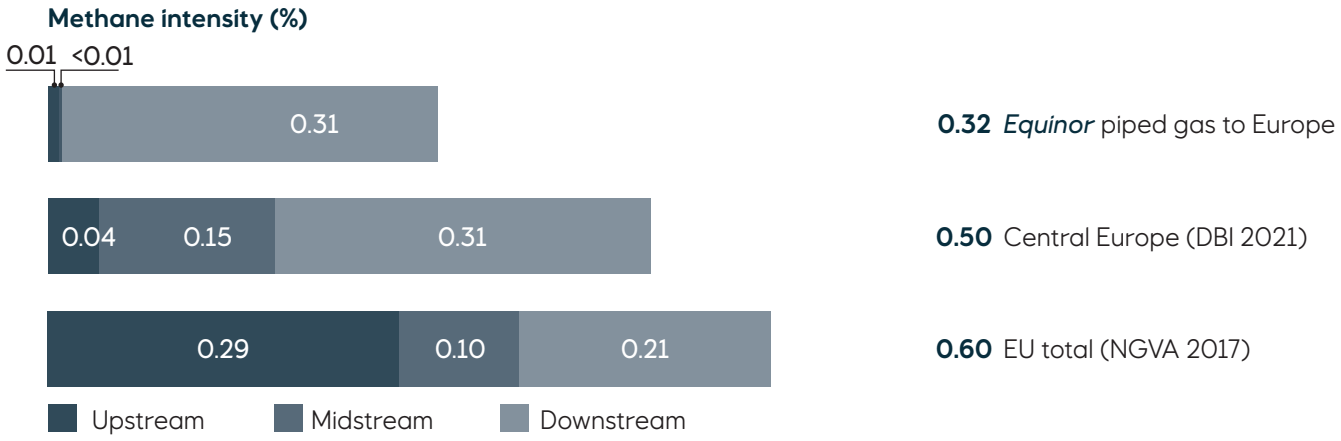

Figure 7

Comparison of methane intensity of Equinor's piped gas to Europe in 2020 and European averages of consumed CNG [10,11]. European averages are further detailed in appendix 1. Values for the Equinor downstream segment is derived from Central Europe (DBI 2021) [10]. Labels to the right show the sum of each value chain.

Focus on Germany

As shown in Figure 8, the GHG intensity of Equinor's piped gas to Germany in 2020 is compared to the German piped gas supply by country in 2018 [10].

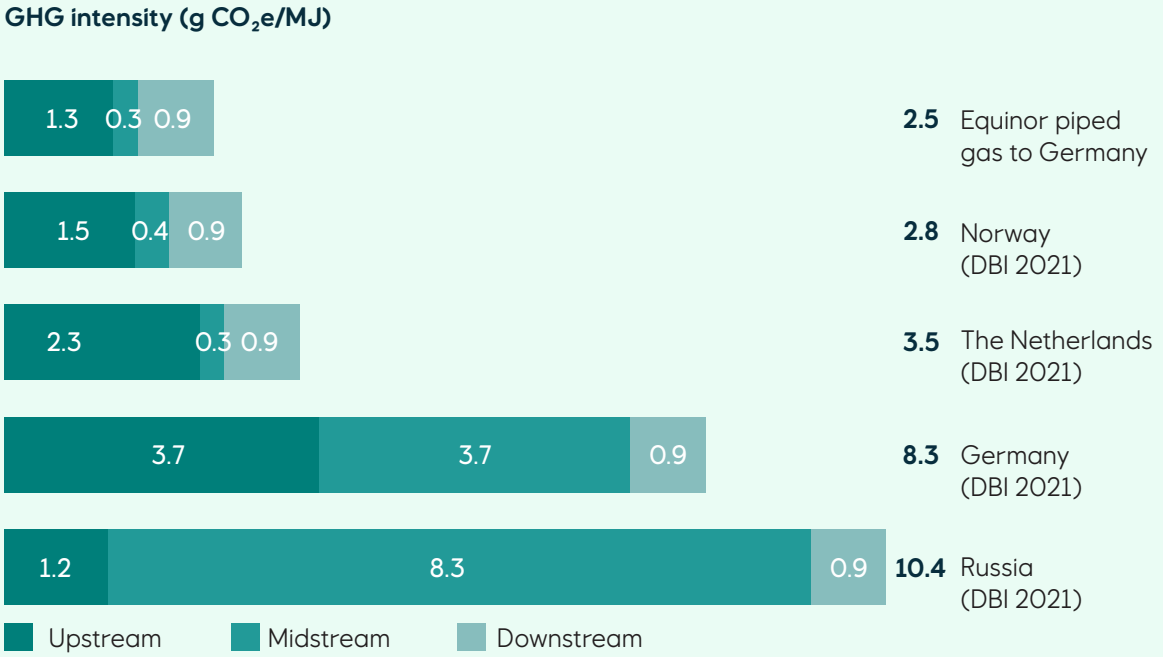

Figure 8

Comparison of GHG intensity of Equinor's Norwegian piped gas to Germany in 2020 and the German piped gas supply. Downstream data for Equinor's piped gas to Germany is derived from DBI 2021 [10]. Labels to the right show the sum of each value chain.

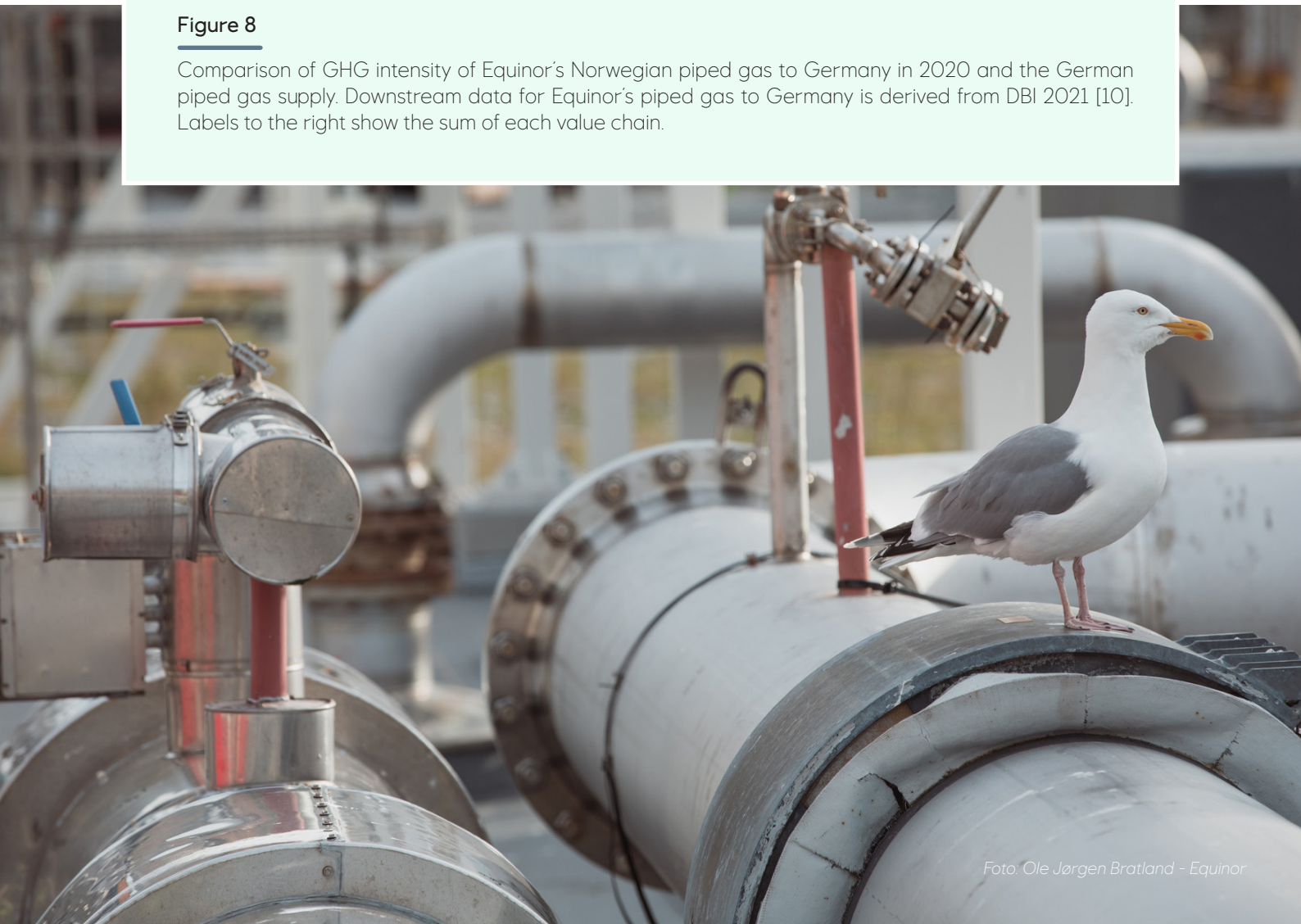

Foto: Ole Jørgen Bratland - Equinor

Equinor's LNG from Hammerfest

GHG and methane intensities per segment of Equinor's LNG value chain in 2019 are shown in Figure 9.

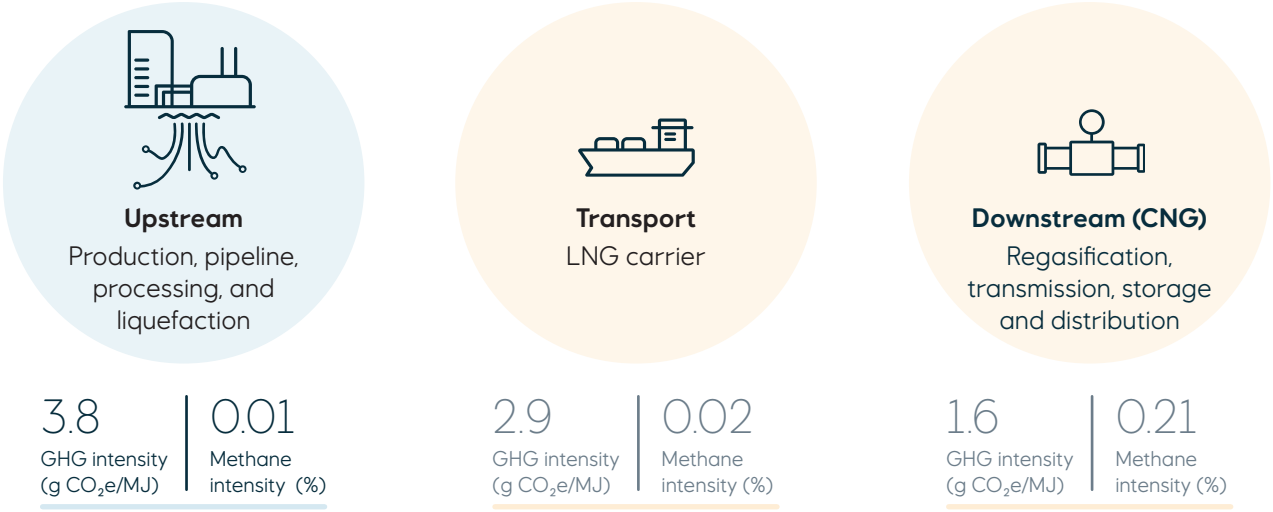

Figure 9

GHG and methane intensities per segment in the HLNG value chain to the European market. Transport and downstream segments are presented with European averages for GHG and methane intensities [11].

Calculated by Equinor

Based on external sources

The GHG intensity for the upstream segment of LNG from Equinor is 3.8 g CO_2e/MJ, by using a location-based emission factor. As a sensitivity, using a market-based emission factor, the corresponding value is 4.1 g CO_2e/MJ.

For the transport segment, the GHG intensity is presented with a European average with GHG intensity of 2.9 CO_2e/MJ and methane intensity of 0.02 % [11]. In global averages, GHG and methane intensities are given as 2.4 CO_2e/MJ and 0.04% respectively [12].

For the downstream segment with LNG regasified in the CNG product system, the GHG intensity is 1.6 CO_2e/MJ and methane intensity 0.21 % [11]. When the LNG is consumed in liquid state, the downstream intensities are lower. The GHG and methane intensities range between 0.4 and 0.7 g CO_2e/MJ and 0.02 and 0.04 % respectively [11,12].

Methane emissions, in carbon dioxide equivalents, represent one percent of the upstream GHG emissions of LNG from Hammerfest (Figure 10).

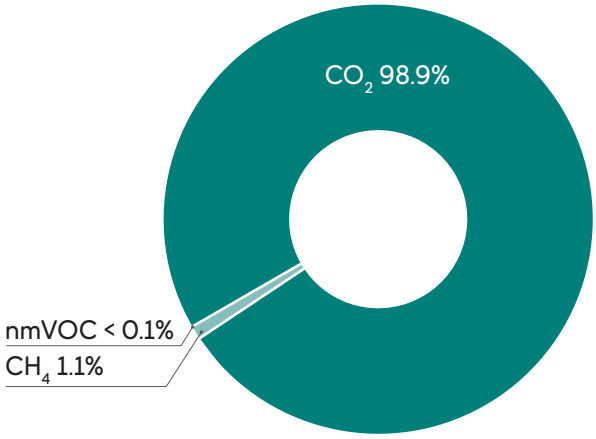

Figure 10

Contributors to the upstream GHG emissions of LNG from Hammerfest.

Comparison LNG

As shown in Figure 11 and 12, LNG from Hammerfest has considerably lower upstream GHG and methane intensities compared to European [11] and global [12] averages of LNG value chains.

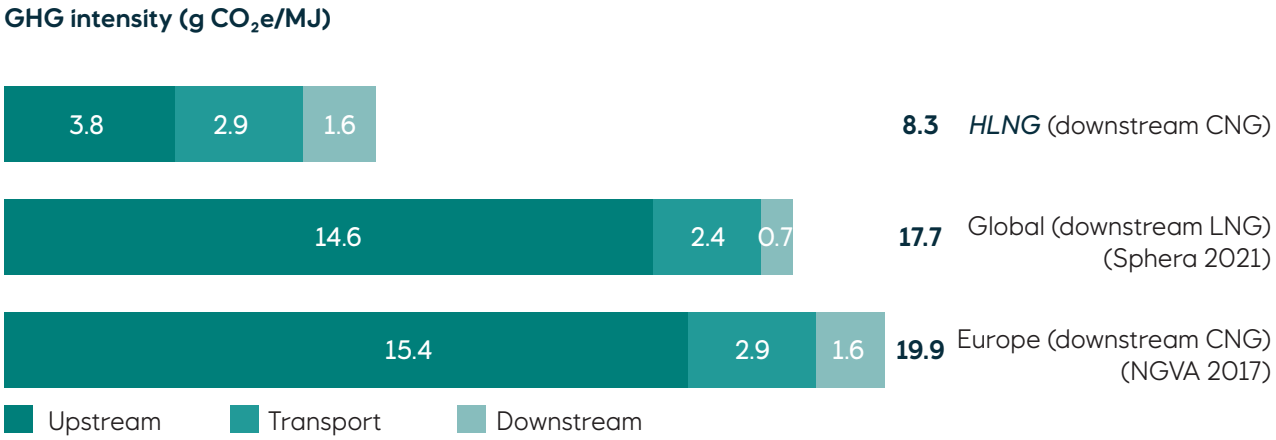

Figure 11

GHG intensity along the HLNG value chain (downstream CNG) compared to global average (downstream LNG) [12] and European average (downstream CNG) [11]. Transport and downstream data for HLNG are derived from European average [11]. Labels to the right show the sum of each value chain.

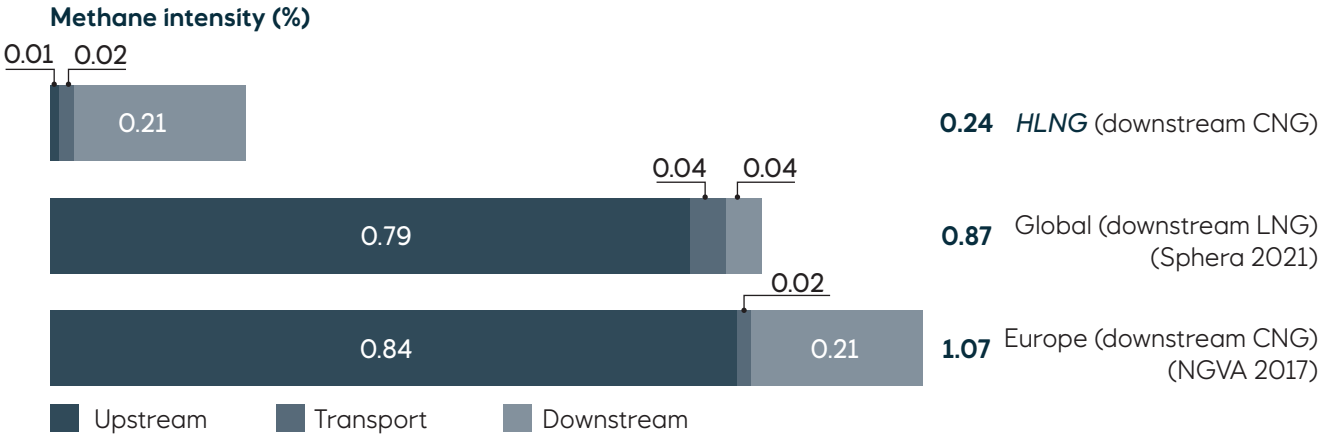

Figure 12

Methane intensity along the HLNG value chain (downstream CNG) compared to global average (downstream LNG) [12] and European average (downstream CNG) [11]. Transport and downstream data for HLNG are derived from European average [11]. Labels to the right show the sum of each value chain.

Drivers to low GHG and methane intensities

As summarised in Table 1, several factors contribute to lower GHG and methane intensities in the upstream and midstream segment of Equinor's Norwegian gas. Longstanding ban on routine flaring and carbon taxation are key drivers to the low upstream intensities and are valid to Norwegian gas in general. Subsea welded pipelines, short distances to main markets and hydropower electricity at onshore facilities result in low intensities in the midstream segment.

Equinor's climate ambition includes becoming a net-zero company and reduce absolute emissions in Norway to near zero in 2050, consequently the GHG intensity of Equinor's Norwegian gas will be reduced further in the future [15].

Table 1

Drivers to the low GHG intensity with focus on CO_2 and CH_4 in the upstream and midstream segment of Equinor's Norwegian gas.

		CO_2	CH_4
Regulatory	Ban on routine flaring since 1971.	x	x
	Carbon taxation since 1991 (includes both flared and cold vented gas)	x	x
	EU ETS regulation	x	
Technology	Hydropower electricity at selected offshore installations and onshore gas processing plants	x	
	Welded subsea pipelines		x
	Extensive leak detection and repair programs		x
	CCS at Sleipner and HLNG	x	
	Energy optimization and energy management in design and operation.	x	x
Natural factors	Short distance to main markets reduces amount of compressor stations needed for pipeline transportation	x	x
	Reservoir properties, hydrocarbon type, pressure, basin maturity and scale benefits	x	x
	Low temperature renders liquefaction step in upstream LNG less energy intensive	x	

Conclusions

Equinor gas produced in Norway, including LNG from Hammerfest, has lower GHG and methane intensities from production to distribution. Ban on routine flaring and carbon taxation are key drivers to low GHG and methane intensities. The GHG intensity of Equinor's Norwegian gas will be reduced further in the future as stated in the company's climate ambitions.

The results calculated by Equinor have been verified by an independent third party. In addition, values based on external sources and comparisons to other value streams have also been verified. The independent assurance statement is listed in appendix 2.

The results may be used to demonstrate the GHG intensity to customers and as basis for blue hydrogen life cycle analysis.

Terms and abbreviations

Carbon dioxide (CO_2) emissions: CO_2 released to the atmosphere because of our processes and activities, including CO_2 emissions from energy generation, heat production, flaring (including well testing/well work-over), and remaining emissions from carbon capture and treatment plants.

CNG: compressed natural gas, a mix of piped gas and regasified LNG.

EU ETS: European Union Emissions Trading System.

Greenhouse gases (GHG): The relevant GHGs are CO_2 and CH_4 . In addition, nmVOC is included as an indirect GHG. This contrasts with the company's sustainability report where nmVOC is assessed to be non-material for Equinor. Equinor uses a global warming potential of 25, aligned with current practice of the Norwegian authorities.

GHG intensity: GHG emissions allocated to energy content of marketed gas divided by marketed gas, presented as g CO_2e/MJ.

HLNG Upstream: Activities related to subsea offshore production (Snøhvit field), pipeline transport to onshore facility (Melkøya plant at Hammerfest) with production, processing and liquefaction. The order of the different steps differs from LNG production elsewhere

Location-based emission factor: calculation method reflects the average emissions intensity of grids (using mostly grid-average emission factor data) based on IEA (physical), expressed as kg CO_2/kWh.

LNG Transport: Includes activities related to LNG carriers.

LNG Downstream as CNG: Includes activities related to regasification, transmission, storage and distribution, excludes emissions from fuel dispensing/bunkering.

LNG Downstream as LNG: Includes activities related to storage and distribution, excludes emissions from fuel dispensing/bunkering.

Market-based emission factor: calculation method based on RE-DISS, reflects emissions from electricity that companies have purposefully chosen (or their lack of choice). It derives emission factors from contracts between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims.

Methane (CH_4) emissions: CH_4 released to the atmosphere including emissions from energy generation and heat production at own plants, flaring (including well testing/well work-over), cold venting, diffuse emissions, and the storage and offloading of crude oil.

Methane intensity: Methane emission allocated to energy content of marketed gas divided by marketed gas, presented in %.

Non-methane volatile organic compounds (nmVOC) emissions: nmVOC released to the atmosphere from power generation and heat production, flaring (including well testing/well work-over), process, cold venting and fugitives.

Piped gas Upstream: Activities related to exploration, field development and production and pipeline transport to onshore facility.

Piped gas Midstream: Activities related to gas processing plants, riser platforms and gas terminals in Europe.

Piped gas Downstream: Activities related to transmission, storage and distribution, excludes emissions from fuel dispensing.

References

[1] Norwegian Petroleum Directorate, "Historical production on the NCS," [Online]. Available: *https://www. norskpetroleum.no/en/facts/historical-production/. [Accessed 29 06 2021].*

[2] Norwegian Petroleum Directorate, Resource accounts for the Norwegian shelf - [Online]. Available: *https://www.norskpetroleum.no/en/petroleum-resources/resource-accounts/ [Accessed 16.11.2021].*

[3] NOROG, Klima- og miljørapport 2021. [Online]. Available: *https://klimamiljorapport.norskoljeoggass.no/klima-og-milj%C3%B8rapport-2021 [Accessed 29 06 2021]. [4] Norwegian Environment Agency, "Retningslinjer for rapportering fra petroleumsvirksomhet til havs", 2020.*

[5] Norwegian Environment Agency "Veileder til egenkontroll rapportering" 2018.

[6] Norwegian Oil and Gas Association, "Retningslinje 044 Vedlegg B, Håndbok for kvantifisering av direkte metan- og NMVOC-utslipp, rev 19" 2021.

[7] Foulds, A., Allen, G., Shaw, J. T., Bateson, P., Barker, P. A., Huang, L., Pitt, J. R., Lee, J. D., Wilde, S. E., Dominutti, P., Purvis, R. M., Lowry, D., France, J. L., Fisher, R. E., Fiehn, A., Pühl, M., Bauguitte, S. J. B., Conley, S. A., Smith, M. L., Lachlan-Cope, T., Pisso, I., and Schwietzke, S.: Quantification and assessment of methane emissions from offshore oil and gas facilities on the Norwegian Continental Shelf, Atmos. Chem. Phys. Discuss. [preprint], *https://doi.org/10.5194/acp-2021-872, in review, 2021.*

[8] NVE, «Hvor kommer strømmen fra?» [Online] Available: *https://www.nve.no/energi/energisystem/kraftproduksjon/hvor-kommer-strommen-fra/ [Accessed 16.11.2021]*

[9] NVE, «Varedeklarasjon for strømleverandører» [Online] Available: *https://www.nve.no/energi/virkemidler/opprinnelsesgarantier-og-varedeklarasjon-for-stromleverandorer/varedeklarasjon-for-stromleverandorer/ [Accessed 16.11.2021]*

[10] DBI Gas- und Umwelttechnik GmbH, "Carbon Footprint of Natural Gas 1.1," Leipzig, Germany, 2021. Online: *https://www.dbi-gut.de/files/PDFs/Dokumente/61_Gasnetze/61_CFNG1.1_Report_ENG.pdf [Accessed 16.11.2021].*

[11] thinkstep for Natural & Bio Gas vehicle Assosiation (NGVA) Europe, "Greenhouse Gas Intensity of Natural Gas," thinkstep AG, 2017. *https://www.ngva.eu/medias/greenhouse-gas-intensity-from-natural-gas-study-published/*

[12] Sphera, "2nd Life Cycle GHG Emission Study on the Use of LNG as Marine Fuel," Sphera Solutions GmbH, 2021. *https://sphera.com/research/2nd-life-cycle-ghg-emission-study-on-the-use-of-lng-as-marine-fuel/*

[13] Borda, E.S., Korre, A., Nie, Z., Durucan, S., Comparative assessment of life cycle GHG emissions from European natural gas supply chains, Imperial College London in 14th International Conference on Greenhouse Gas Control Technologies, GHGT-14 21st -25th October 2018, Melbourne, Australia *https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3366138*

[14] Rystad Energy for the Norwegian Oil and Gas Association, "CO_2 emissions from gas imports to Europe & role of gas in decarbonizing power," 2021

[15] Equinor Våre klimaambisjoner - klimanøytral innen 2050 - equinor.com [Online] Available: *https://www.equinor.com/no/sustainability/climate.html [Accessed 16.11.2021]*

Appendix 1

Overview of the CNG product systems used in comparisons with Equinor's Norwegian piped gas.

Baseline year used	Central Europe (DBI 2021)	EU total (NGVA 2017)		EU North (NGVA 2017)		Germany (DBI 2021)
	2018	2015		2015		2018
	Pipeline	Pipeline (90%)	LNG (10%)	Pipeline (86%)	LNG (14%)	Pipeline
Producing countries	Russia Belarus Ukraine Norway UK	Russia Norway The Netherlands Germany Poland UK Algeria Angola Nigeria Russia Trinidad and Tobago USA	Algeria Angola Nigeria Russia Trinidad and Tobago USA	Denmark The Netherlands Norway Russia UK	Nigeria Qatar	Germany The Netherlands Norway Russia Germany
Receiving countries	Belgium Germany Estonia Latvia Lithuania Luxembourg The Netherlands Austria Poland Slovakia Czech Republic Hungary	Denmark Ireland Finland Sweden The United Kingdom Belgium Czech Republic Estonia Germany Hungary Latvia Lithuania Luxembourg	The Netherlands Poland Slovakia Bulgaria Croatia Cyprus Greece Italy Malta Romania Slovenia France Portugal Spain	Denmark Ireland Finland Sweden The United Kingdom		

Appendix 2

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To Equinor ASA

Independent accountant's assurance report

We have undertaken a limited assurance engagement by Equinor ASA on a selection of disclosures reported in the "Greenhouse gas and methane intensities along Equinor's Norwegian gas value chain" (hereafter "The Report"). The Report is based on data from the period 01.01.2020-31.12.2020 for Upstream and Midstream piped gas and 01.01.2019-31.12.2019 for Upstream LNG. The selected disclosures are:

- Greenhouse gas (hereafter GHG) and methane intensity per segment of Equinor piped gas to Europe value chain in 2020 for upstream (GHG intensity and methane) and midstream (GHG intensity and methane), as shown in figure 4 on page 5 of The Report.
- GHG and methane intensity per segment of Equinor's LNG value chain in 2019 for upstream (GHG intensity and methane), as shown in figure 9 on page 8 of The Report.

Other than as described in the preceding paragraphs, which sets out the scope of our engagement, we did not perform assurance procedures on the remaining information included in The Report, and accordingly, we do not express a conclusion on this information.

Criteria applied by Equinor

In preparing The Report, Equinor applied the definitions for Scope 1 and 2, set by the Greenhouse Gas Corporate Standard (the "Criteria"). The Criteria can be accessed at ghgprotocol.org and are available to the public. Such Criteria were specifically designed for companies and other organizations preparing a corporate-level GHG emissions inventory. As a result, the subject matter information may not be suitable for another purpose. We consider these reporting criteria to be relevant and appropriate to review The Report.

Equinor's responsibilities

Equinor's management is responsible for selecting the Criteria, and for presenting The Report in accordance with that Criteria, in all material respects. This responsibility includes establishing and maintaining internal controls, maintaining adequate records and making estimates that are relevant to the preparation of the GHG statement, such that it is free from material misstatement, whether due to fraud or error.

EY's responsibilities

Our responsibility is to express a conclusion on the presentation of The Report based on the evidence we have obtained.

Our engagement was conducted in accordance with the *ISAE 3000: Assurance Engagements Other than Audits or Reviews of Historical Financial Information*. This standard requires that we plan and perform our engagement to obtain limited assurance about whether, in all material respects, The Report is presented in accordance with the Criteria, and to issue a report. The nature, timing, and extent of the procedures selected depend on our judgment, including an assessment of the risk of material misstatement, whether due to fraud or error.

We believe that the evidence obtained is sufficient and appropriate to provide a basis for our limited assurance conclusion.

Our Independence and Quality Control

We have maintained our independence and confirm that we have met the requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants. EY also applies *International Standard on Quality Control 1, Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance and Related Services Engagements*, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Description of procedures performed

Procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Our procedures were designed to obtain a limited level of assurance on which to base our conclusion and do not provide all the evidence that would be required to provide a reasonable level of assurance.

Although we considered the effectiveness of management's internal controls when determining the nature and extent of our procedures, our assurance engagement was not designed to provide assurance on internal controls. Our procedures did not include testing controls or performing procedures relating to checking aggregation or calculation of data within IT systems.

The Green House Gas quantification process is subject to scientific uncertainty, which arises because of incomplete scientific knowledge about the measurement of GHGs. Additionally, quantification of GHG's is subject to estimation (or measurement) uncertainty resulting from the measurement and calculation processes used to quantify emissions within the bounds of existing scientific knowledge.

The engagement consists of making enquiries, primarily of persons responsible for preparing the GHG reporting and related information and applying analytical and other relevant procedures.

Our procedures included:

- Interviewing those in charge of GHG reporting at Equinor and conducting process walkthroughs to develop an understanding of the process for the preparation of The Report
- Obtaining and reviewing evidence on a sample basis to support the material GHG emissions data for Scope 1 and 2 used in The Report, based on the GHG Corporate Standard against source data and other information prepared of those in charge of preparing The Report
- Obtaining the calculations of intensities and rates to support the data used in The Report, including the description of these results
- Controlling correct use of GHG intensity for piped gas for 2020 for the NCS from the external sources described in The Report
- Controlling correct use of European and Norwegian intensity values from the external sources, as described and referenced in The Report

We believe that our procedures provide us with an adequate basis for our conclusion. We also performed such other procedures as we considered necessary in the circumstances.

Conclusion

Based on our procedures and the evidence obtained, we are not aware of any material modifications that should be made to the selection of disclosures in The Report, within our scope, in order for The Report to be in accordance with the Criteria

Stavanger, 19 November 2021
ERNST & YOUNG AS

The assurance report is signed electronically

Tor Inge Skjellevik
State Authorised Public Accountant