Oil & Gas Climate Initiative Reporting Framework

Final version – October 2023

1 Introduction

As part of its mission and declarations, OGCI has committed to provide and communicate adequate quantitative and qualitative information about the progress its member companies are making against OGCI public commitments and declarations.

The credibility of messages brought forward by OGCI in its reporting rely largely on members' capacity to illustrate their actions with data that is reported and aggregated according to shared guidance and processes.

The *OGCI Reporting Framework* provides OGCI members with guidance on the key indicators to be reported yearly. Appendices include additional guidance on specific GHG emissions reporting topics.

This framework documents a common approach in terms of boundary and definition, relying on the basis that OGCI companies already use the most reliable publicly available guidance for the oil and gas sector. These include, but are not limited to, guidance and methodologies developed by CDP, IPCC, GRI, GHG Protocol, UN, World Bank, WBCSD, CCAC, IPIECA, IOGP and API.

2 General principles of reporting

The OGCI data reporting process consists of the collection of individual OGCI member company information and aggregation of this set of data into key indicators relevant for tracking OGCI performance and progress against the public commitments made by OGCI. The indicators selected by OGCI companies are aggregated in order to reflect specific OGCI figures to be published externally. OGCI members provide data that conforms to the following:

- **Transparency**: the assumptions and methodologies used for reporting should be clearly explained to facilitate replication and assessment of the reporting by the individual member companies. Records should be kept adequately in order to guarantee traceability of data during an external review.
- **Consistency internally within each company**: the reporting of an indicator should be internally consistent in all its elements with reporting of other years. Reporting is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate activities / source for each indicator.
- **Relevance in defining appropriate boundaries** for the organization's reporting: the boundaries for companies' reporting should be carefully set in order to appropriately reflect all relevant activities.
- **Completeness in terms of coverage** of all significant activities: for an indicator considered relevant by a company and within the chosen scope, all significant activities / sources of emission should be accounted for. For some indicators, there could be a need to define a materiality threshold which applies to a site, a branch or the company. The choice of boundaries (organizational, operational) and environmental indicators should be representative of the company's activities and the sensitivity of the environments in which it operates.
- **Accuracy of the estimation**: Accuracy is a relative measure of the exactness of activities or sources. Estimates should be accurate in the sense that they are systematically neither over nor under the true value for the indicator, as far as can be judged, and that uncertainties are reduced as far as practicable.

3 Reporting process

3.1 EY data consolidation and review process

Since 2016, OGCI has been working with EY & Associés (EY), as an independent 3rd party, to collect and check data consistency, and guarantee the confidentiality of member companies' data. In 2019, we developed together with EY an innovative process, applicable to both listed and state-owned national oil companies, to aggregate information about the level of third-party assurance that member companies apply individually into OGCI data reporting. Most OGCI member companies already ensure that data reported to the OGCI are independently verified. Our process confirms that OGCI data, as well as information about third-party data assurance are consolidated, reviewed and challenged in order to increase the reliability of the aggregate data we publish. In 2020, we worked with EY to develop a verification process for a selection of our aggregate data. EY's statement for this year covers nine of OGCI's 12 members, as of October 2023.

The approach is summarized below.

3.2 Timeline

OGCI aims to publish the chosen indicators on its website in October in accordance with the following milestones:

- The Reporting Framework is reviewed on a yearly basis between January and February.
- The collection of data for the preceding year is performed through the independent 3rd party between March and May of current year.
- The consolidation of individual member company data and the calculation of OGCI indicators are performed between May and June.

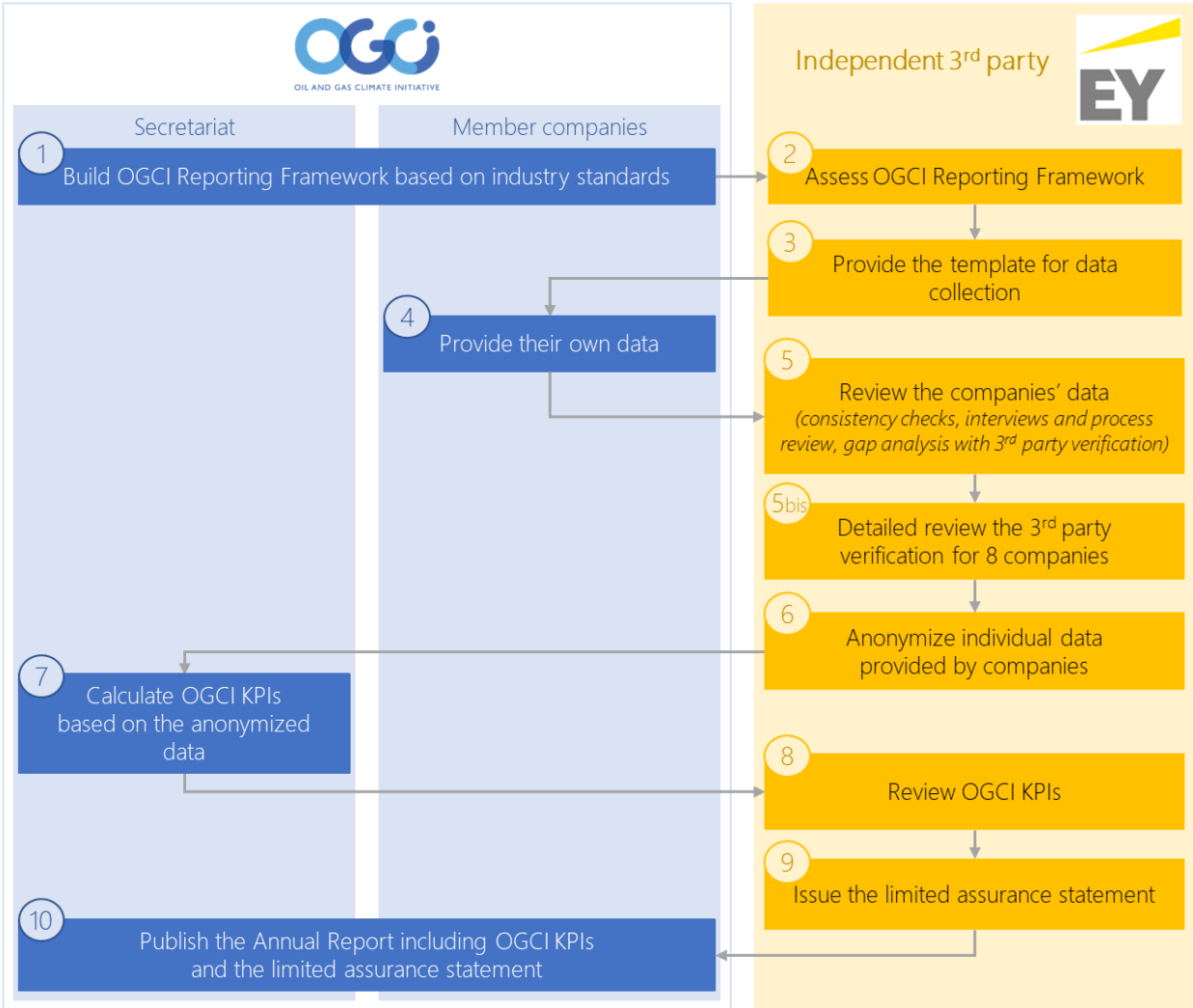

Figure 1: Data consolidation and review process – Source: OGCI

4 Definitions

Site

A site means any property, plant, building, structure, stationary source, stationary equipment or grouping of stationary equipment or stationary sources located on one or more contiguous or adjacent properties, in actual physical contact or separated solely by a public roadway or other public right-of way, and under common operational control. For offshore activities, a site could regroup several platforms as soon as there is an operational, technical or economic logic to do so.

Operated domain

Data is collected from each reporting unit about assets operated by the reporting company, including those assets partly owned by other companies (i.e. an operated joint-venture). Conversely this approach excludes data from assets which are partly owned by the reporting unit but operated by another company (i.e. a non-operated joint venture). The operational control approach is thus generally defined to collect and consolidate all data or information from assets which meet either of the following criteria:

- The asset is operated by the company, whether for itself; or under a contractual obligation to other owners or participants in the asset (for example, in a joint venture or other such commercial arrangement).

- The asset is operated by a joint venture (or equivalent commercial arrangement), in respect of which the company has the ability to determine management and board-level decisions of the joint venture.

Specific case of rotating management: A site is in "rotating management" when the operator is alternated over periods of time with a predefined order. These sites are not included in the operated domain.

Equity share domain

The perimeter called "equity share domain" includes all assets in which the company has a financial interest with rights over all or part of the production (or storage capacity or transport capacity), whether they are part of the operated domain or are operated by third parties, in rotating management or by shared control. The financial interests without operational responsibility and without rights to all or part of the production should not result in equity share accounting of the company's environmental footprint.

Upstream activities

Upstream activities comprise all operations from exploration to production and gas processing (up to the first point of sale), including LNG liquefaction plants if located before the first point of sale.

Downstream activities

Compared to upstream activities, downstream activities cover all the remaining segments of oil and gas production (after the first point of sale), including transportation, distribution, storage, oil refining, chemical and marketing.

Activity data

Activity data means the data on the amount of fuels or materials consumed or produced by a process, the total count of a specific piece of emitting equipment (e.g., pneumatic controllers), the tally of a particular operational activity that occurred (e.g., equipment blowdowns), etc. that are determined to be relevant for the calculation-based monitoring methodology, expressed in appropriate unit, during a given period. For example, the annual activity data for fuel combustion sources are the total amounts of fuel burned during the year considered.

Point of sale

The point of sale (POS) is defined as the place/device of transfer of ownership of the product to the downstream player, which may be a third party or a downstream business unit within the same company.

Categories of GHG emissions

The GHG emissions can be classified, accordingly with the definitions used by IPIECA[1], as follow:

- **Direct GHG emissions:** Emissions from sources at a facility owned (partly or wholly) and/or operated by the company, such as emissions from combustion in boilers or furnaces (Scope 1 emissions).
- **Indirect GHG emissions from imported energy:** GHG emissions that occur at the point of energy generation (owned or operated by a third party) for electricity, heat or steam imported (i.e. purchased) for use on site by the reporting entity. These are also called Scope 2 emissions.
- **Other indirect emissions:** all indirect emissions (also called Scope 3 emissions) other than those from imported energy. Examples of Scope 3 emissions include those associated with the extraction and production of purchased materials, transport of purchased fuels, and from use of a company's products and services.

Global Warming Potentials (GWPs)

The Global Warming Potential (GWP) measures the abilities of different greenhouse gases to trap heat in the atmosphere. The GWP of GHGs that are commonly emitted by the energy sector projects is provided in Appendix B. As there are several individual gases covered under some of the categories, all of those have not been provided. For further details, please refer to values provided by Intergovernmental Panel on Climate Change (IPCC)[2].

Calculation factors

Calculation factors concern net calorific value, emission factor, oxidation factor, conversion factor and design parameter.

- **Net calorific value**: Net calorific value (NCV) means the specific amount of energy released as heat when a fuel or material undergoes complete combustion with oxygen under standard conditions less the heat of vaporisation of any water formed. The NCV is also known as the lower heating value (LHV).
- **Emission factor**: Emission factor is a coefficient that relates the activity data to the amount of chemical compound which is the source of later emissions. Emission factors are often based on sample data, averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions.

[1] *IPIECA/API/IOGP Oil and gas industry guidance on voluntary sustainability reporting, 2015*
[2] *http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14*

- **Oxidation factor**: Oxidation factor means the ratio of carbon oxidised to CO_2 as a consequence of combustion to the total carbon contained in the fuel, expressed as a fraction, considering CO emitted to the atmosphere as the molar equivalent amount of CO_2. To simplify the approach, it can be considered an oxidation factor equal to 1 in all calculation of CO2 emissions; however, for estimating methane emissions from incomplete combustion (e.g. flaring), the oxidation factor needs to be assumed lower than 1 (value selected according with the source and/or regulatory requirements).

Design parameter

Design parameter is the information provided by the manufacturer of the device (instrument, pump, generator, etc.) providing ratio or efficiency allowing to estimate an indicator.

Uncertainty

Uncertainty means a parameter, associated with the result of the determination of a quantity, that characterises the dispersion of the values that could reasonably be attributed to the particular quantity, including the effects of systematic as well as of random factors, expressed in per cent, and describes a confidence interval around the mean value comprising 95 % of inferred values.

5 Reporting perimeter and consolidation rules

Companies should report according to a current perimeter basis, as described below.

Divestment and acquisition

In the case of an entity sold during the reporting year, the indicators of the entity should be reported until the date of sale. The entity will be removed from the perimeter the following year.

In the case of an entity purchased during the reporting year, the indicators of the entity should be reported from the date of acquisition until the end of the reporting year (that is to say, to the extent that the new entity is able to respond).

Closure and start-up of an entity

In the case of a closure of an entity during the reporting year, the perimeter is not changed for the current year, and the indicators of the entity should be reported until the date of closure. The entity will be removed from the perimeter the following year.

In the case of a start-up during the year N of a newly constructed entity, the entity should be added to the perimeter from the date of opening of the entity until the end of the reporting year.

Operated / non-operated assets

When a site is operated by the Company, whatever its share in the facility is, 100% of the indicator should be reported.

The company may choose to also report each of the indicators for non-operated site(s). For these non-operated sites, company will use the equity share approach.

The Equity share approach is based on asset ownership (or share of financial benefits). The approach is generally applied by consolidating data from all assets owned, or partly owned, by the reporting company in proportion to its percentage share of equity in (or benefits from) the assets. In contrast to the operational approach, this means data is consolidated from assets partially owned, but not operated by, the reporting company, as well as from operated assets that are wholly or partially owned—thus, irrespective of who the operator is, data is consolidated but only in proportion to the reporting company's ownership of each asset. The equity share approach is therefore aligned closely with financial reporting and is intended to provide a more complete picture of potential responsibilities.

More detail is provided on this approach in the companion IPIECA/API/IOGP document *Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions*, which also provides information on an alternative but similar approach known as the Financial Control Approach.

In case of modification of shares or operational control during the reporting year:

- in case of change in the operational control, the Divestment/Acquisitions rules should apply,
- in case of change in shares, the reporting should consider applicable share before and after the date of change for the reporting.

6 Overview of OGCI indicators

Indicators are collected on a yearly basis and refer mainly to the following general categories:

- Generic data, to assess OGCI global footprint
- Activity data related to hydrocarbon production levels and gas share in production portfolio of each company
- GHG figures: data related to emission levels, including specific breakdown for selected categories, like flaring and methane emissions
- Low carbon investment: information related to companies´ money spent on low-carbon projects, acquisitions of companies working on low-carbon solutions and R&D focusing on low carbon technologies.

This section provides the list of indicators to be reported and published within the yearly OGCI reporting process. The following sections detail the definition of each indicator. Indicators in blue are calculated. In parallel, OGCI member companies are working on other internal indicators to track their progress.

The boundary (business segment) and the approach (operational vs equity) for data collection is defined for each indicator in the Section 7.

In the definition of the key indicators to be reported, OGCI recognizes that most of them may already be reported by member companies within external frameworks or communication process, according to international recognized methodologies for the O&G sector. In order to ensure the consistency and comparability of figures published by single companies, OGCI supports the use of such external references, as specified for each indicator (see detailed list), providing that the coherence and comparability between OGCI companies is ensured.

Theme	Code	Name of the published indicator
Activity data	**PROD.11**	Operated oil and gas production
	PROD.12	Operated gas production
	PROD.1	Gas as a share of operated production
	PROD.21	Oil and gas production – equity
	PROD.22	Total of gas production – equity
	PROD.3	Total of hydrocarbon production not operated by another OGCI member company– equity
GHG emissions	**GHG.1**	Total operated GHG emissions Scope 1
	GHG.1E	Total equity GHG emissions Scope 1
	GHG.11	*Operated GHG emissions Scope 1 - Upstream*
	GHG.2	Total operated GHG emissions Scope 2
	GHG.2E	Total equity GHG emissions Scope 2
	GHG.21	Operated GHG emissions Scope 2 – Upstream
	GHG.41	GHG emissions of exported electricity, steam, heat and cooling – Upstream
	CAR	Upstream carbon intensity
Methane	**MET.1**	Total operated CH_4 emissions
	MET.1E	Total equity CH_4 emissions
	MET.11	Operated CH_4 emissions – Upstream
	MET.11E	Equity CH_4 emissions – Up
	MET	Upstream methane intensity
Flaring	**FLA.1**	Natural gas flared – Upstream
	FLA.11	Routine gas flared – Upstream
	FLA.2	Flaring GHG emissions – Upstream
	FLA	Upstream Flaring Intensity
Investments	**INV.2**	Total spent in low carbon projects
	INV.3	Acquisition/Equity of low carbon activities
	INV.41	Total R&D spent during the reporting year
	INV.42	R&D spent on low carbon technologies during the reporting year
	INV.4	Share of R&D budget spent on low carbon technologies

Table 1: List of published OGCI indicators

7 Detailed description of OGCI indicators

7.1 Activity data

PROD.11	Operated oil and gas production
Definition and boundary	Each company provides its own operated hydrocarbon production at first point of sale along the reporting year. The production should include both liquid and gas products.
Methodology	**PROD.11** = Production distributed to the market (sold or for free)
Unit	Companies can report in their internal reporting units (toe, boe, boe/d, etc) and specify the unit in the dedicated field. The aggregated OGCI indicator is reported in [boe/day] (See Appendix B – Calculation and conversion factors).
External references	IOGP definition

PROD.12	Operated gas production
Definition and Boundary	Each company provides its own operated hydrocarbon production at first point of sale along the reporting year. The production should include unconventional gas.
Methodology	**PROD.12** = Production distributed to the market (sold or for free)
Unit	Companies can report in their internal reporting units (scf, sm3, etc) and specify the unit in the dedicated field.
External references	Same as PROD.11.

PROD.1	Gas as a share of operated production
Definition and Boundary	This KPI is calculated at the OGCI consolidated level based on A.1.1 and A.1.2. Definitions and boundaries are the ones applied for A.1.1 and A.1.2. (i.e. at point of sale, including unconventional gas).
Methodology	**PROD.1 = PROD.12 / PROD.11** Gas as a share of total operated production = Total operated gas production / Total operated hydrocarbon production
Unit	[%]
External references	NA

Note: The same three indicators as PROD.11 is also reported in the equity share domain and covered by the following indicator: PROD.21. The boundary "equity share domain" is defined above in the section "Definitions".

7.2 GHG Emissions

GHG.1	Total operated GHG emissions Scope 1
Definition and Boundary	Each company provides its own operated GHG emissions Scope 1 along the reporting year. These GHG emissions should cover all companies' relevant operated activities, such as upstream, downstream and other activities (e.g. power generation non associated with upstream nor downstream activities). These emissions should include at least CO_2 and CH_4. If available, N_2O and other gases can be included.
Methodology	Companies can use the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (e.g. Annual Report, Sustainability Report, etc.), assuming however that the figure is based upon the operational approach. Companies not able to report specific data on GHG emissions can refer to the specific topic guidance (See Appendix C – Methodologies and guidance for estimating GHG emissions). Companies should ensure that GHG.1 = GHG.11 + GHG.12 + GHG 13 Appendix B provides the Global Warming Potential of CH4 and N2O to use.
Unit	Companies should report in tonnes of CO_2 equivalent [tCO_{2eq}] (See Appendix B – Calculation and conversion factors).
External references	• IPIECA O&G industry guidance on voluntary sustainability reporting 2015: indicator E1 • IPIECA Climate Change Reporting Framework 2015: Topic 9

GHG.11	Total operated GHG emissions Scope 1 - Upstream
Definition and Boundary	This indicator covers operated GHG emissions Scope 1 of Upstream activities (Section "Definitions"). These emissions should include at least CO_2 and CH_4. If available, N_2O and other gases can be included.
Methodology	Same as GHG.1
Unit	Same as GHG.1
External references	Same as GHG.1

GHG.12	Total operated GHG emissions Scope 1 - Downstream
Definition and Boundary	This indicator covers operated GHG emissions Scope 1 of Downstream activities (Section "Definitions"). These emissions should include at least CO_2 and CH_4. If available, N_2O and other gases can be included.
Methodology	Same as GHG.1
Unit	Same as GHG.1
External references	Same as GHG.1

GHG.13	Total operated GHG emissions Scope 1 – Other (if applicable)
Definition and Boundary	This indicator covers operated GHG emissions Scope 1 of Other activities. Other activities comprise all the activities that do not fall into the upstream or the downstream definition (e.g. power generation). These emissions should include at least CO_2 and CH_4. If available, N_2O and other gases can be included.
Methodology	Same as GHG.1
Unit	Same as GHG.1
External references	NA

GHG.2	Total operated GHG emissions Scope 2
Definition and Boundary	Each company provides its own operated GHG emissions from imported electricity, steam, heat and cooling along the reporting year. These GHG emissions should cover all companies' relevant operated activities, such as upstream, downstream and other activities. When a company exports / sells electricity to external third party and if related data is available (to be reported into GHG.41), emissions related to this export can be deducted through the KPI GHG.41.
Methodology	Companies can use the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (e.g. Annual Report, Sustainability Report, etc.), assuming however that the figure is provided with the operational approach. Companies should ensure that GHG.2 = GHG.21 + GHG.22 + GHG 23-GHG.41
Unit	Companies should report in tonnes of CO_2 equivalent [tCO_{2eq}] (See Appendix B – Calculation and conversion factors).
External references	World Resource Institute – GHG Protocol, Scope 2 Guidance

GHG.21	Total operated GHG emissions Scope 2 – Upstream
Definition and Boundary	Each company provides its own operated GHG emissions from imported electricity, steam, heat and cooling consumed along the reporting year. These GHG emissions should cover all companies' relevant operated upstream activities.
Methodology	Same as GHG.2
Unit	Same as GHG.2

External references	Same as GHG.2

GHG.22	**Total operated GHG emissions Scope 2 - Downstream**
Definition and Boundary	Each company provides its own operated GHG emissions from imported electricity, steam, heat and cooling consumed along the reporting year. These GHG emissions should cover all companies' relevant operated downstream activities.
Methodology	Same as GHG.2
Unit	Same as GHG.2
External references	Same as GHG.2

GHG.23	**Total operated GHG emissions Scope 2 – Other (if applicable)**
Definition and Boundary	This indicator covers operated GHG emissions Scope 1 of other activities (Section "Definitions"). Other activities comprise all the activities that do not fall into the upstream or the downstream definition.
Methodology	Same as GHG.2
Unit	Same as GHG.2
External references	Same as GHG.2

<u>Note:</u> The same two indicators as GHG.1, and GHG.2 are also reported in the equity share domain and covered by the following indicators: GHG.1E, and GHG.2E. The boundary "equity share domain" is defined above in the section "Definitions".

GHG.41	**GHG emissions of exported electricity, steam, heat and cooling - Upstream**
Definition and Boundary	When a company exports / sells electricity, steam, heat or cooling to external parties and if related data is available, emissions related to this export can be reported here. Each company provides its own GHG emissions from these exported electricity, steam, heat and cooling along the reporting year. This indicator covers operated GHG emissions of exported electricity, steam, heat or cooling within the Upstream activities (Section "Definitions").
Methodology	Companies can use the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (e.g. Annual Report, Sustainability Report, etc.), assuming however that the figure is based upon the operational approach.
Unit	Companies should report in tonnes of CO_2 equivalent [tCO_{2eq}] (See Appendix B – Calculation and conversion factors).
External references	• IPIECA O&G industry guidance on voluntary sustainability reporting 2015: indicator E1 • IPIECA Climate Change Reporting Framework 2015: Topic 9

CAR	**Carbon intensity – Upstream**
Definition and Boundary	This indicator is calculated at the OGCI consolidated level.
Methodology	(See Section 8 p.14)
Unit	[KgCO2e/boe]
External references	NA

7.2 Methane emissions

MET.1	**Total operated CH_4 emissions – all sectors**
Definition and Boundary	Each company provides its own operated CH_4 emissions along the reporting year.

	These emissions should cover CH_4 emissions coming from operational perimeter, (not only upstream but also other activities, including refineries, transport, pipelines, storage, etc.) and in particular CH_4 emissions from flaring.
Methodology	Companies can use the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (e.g. Annual Report, Sustainability Report, etc.), assuming however that the figure is based upon the operational approach. Companies not able to report specific data on methane emissions can refer to the specific topic guidance (See Appendix C – Methodologies and guidance for estimating GHG emissions).
Unit	Tonnes of CH_4 [t CH_4].
External references	NA

MET.11	Total operated CH_4 emissions – Upstream
Definition and Boundary	Each company provides its own operated CH_4 emissions coming from upstream activities along the reporting year. These emissions should cover CH_4 emissions coming from all operational upstream activities up to the first point of sale, including LNG liquefaction plants. Methane emissions from exploration are assumed to be not material (see annex B – methodological note for methane target).
Methodology	Same as MET.1.
Unit	Same as MET.1.
External references	CCAC-OMGP guidance

Note: The same two indicators as MET.1, and MET.11 are also reported in the equity share domain and covered by the following indicators: MET.1E, and MET.11E. The boundary “equity share domain” is defined above in the section “Definitions”.

MET	Upstream methane intensity
Definition and Boundary	This indicator is calculated at the OGCI consolidated level.
Methodology	(See Section 9 p.17)
Unit	NA
External references	NA

7.3 Flaring

FLA.1	Total gas flared – Upstream
Definition and Boundary	Each company provides its volume of gas directed to operational flare systems, wherein the gas is consumed through combustion. This indicator covers only the flaring from operated upstream activities.
Methodology	Companies can use the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (eSS.g. Annual Report, Sustainability Report, etc.), assuming however that the figure is based upon the operational approach. Companies should ensure that FLA.1 = FLA.11 + FLA.12
Unit	Companies can report in their internal reporting units (e.g. $MMSm^3$, Bscf) and specify the unit in the dedicated field. The aggregated OGCI indicator is reported in Mm^3 (See Appendix B – Calculation and conversion factors).
External references	• IPIECA O&G Industry Guidance on Voluntary Sustainability Reporting: indicator E4 • IPIECA Climate Change Reporting Framework: Topic 9 • Global Gas Flaring Reduction Partnership – Gas flaring definitions 2016

FLA.11	Total routine gas flared – Upstream
Definition and Boundary	Each company provides the volume of routine gas directed to operational flare systems, wherein the gas is consumed through combustion. Routine flaring of gas at oil production facilities is flaring during normal oil production operations in the absence of sufficient facilities or amenable geology to re-inject the produced gas, utilize it on-site, or dispatch it to a market. This indicator covers only the flaring from operated upstream activities.
Methodology	Same as FLA.1.
Unit	Same as FLA.1.
External references	Global Gas Flaring Reduction Partnership – Gas flaring definitions 2016

FLA.12	Total safety and non-routine gas flared – Upstream
Definition and Boundary	This indicator covers only the flaring from operated upstream activities. Safety and non-routine gas flared is the gas flared that is not routine gas flared.
Methodology	Same as FLA.1.
Unit	Same as FLA.1.
External references	Same as FLA.11

FLA.2	Flaring GHG emissions – Upstream
Definition and Boundary	Each company provides the GHG emissions associated with combustion of gas sent to flare systems (both routine, non-routine and safety flared gas). These emissions should cover at least CO2 and CH4 (assuming that combustion efficiency lower than 100%). This indicator covers only the flaring from operated upstream activities, i.e. the same perimeter than FLA.1.
Methodology	Companies can use the same methodology approach used for their public reporting of GHG emissions in other relevant documentation (e.g. Annual Report, Sustainability Report, etc.), assuming however that the figure is based upon the operational approach. If companies don't know a specific combustion efficiency, they can refer to standard values as described in the topic guidance. In case of specific regulatory requirements, related to the value of the combustion efficiency to be used, companies can use it in order to maintain consistency with data provided through regulatory frameworks.
Unit	Companies should report in tonnes of CO_2 equivalent [tCO_{2eq}] (See Appendix B – Calculation and conversion factors).
External references	IPIECA O&G Industry Guidance on Voluntary Sustainability Reporting: indicator E4.

FLA	Upstream flaring intensity
Definition and Boundary	This indicator is calculated at the OGCI consolidated level and covers only the flaring from operated upstream activities.
Methodology	Upstream flaring intensity = (Total gas flared – Upstream) / (Total operated hydrocarbon production) **FLA = FLA.1 / [PROD.11 x 365 / 7.333]**
Unit	The calculated OGCI indicator is reported in $Mm^3/Mtoe$ (See Appendix B – Calculation and conversion factors).
External references	NA

7.4 Low Carbon Investments

INV.2	Total spent in low carbon projects

Definition and Boundary	This indicator covers CAPEX spent in the year of reporting for the following: • Renewables energies (electricity & heat) (wind, solar, hydro, geothermal, marine) • Electricity & heat storage • CCUS projects. When CCS is included into a new facility, the company will estimate the share of the amount that is dedicated to CCS. This excludes investments in CCUS through OGCI CI. • Projects that aim to increase energy efficiency as primary purpose • Biofuels projects • Blue or Green Hydrogen projects • Sustainable mobility • Natural Climate solutions projects. Purchase of carbon credits are excluded This indicator also covers the OPEX spent in the year of reporting for the following: • OPEX spent during the year for Power Purchase Agreements from Renewable energies • OPEX of CCUS projects when available CAPEX and OPEX of natural gas projects are excluded from this perimeter. CAPEX of natural gas projects is captured in the indicator INV.1. This indicator does not account for acquisitions (intended as mergers or acquisitions of companies and/or start-up operating on low carbon projects/activities). Acquisitions are captured in INV.3. Money spent on programs and/or partnerships with universities and other organisations are excluded.
Methodology	Companies should consider only the CAPEX spent during the year and not the total CAPEX of a project.
Unit	Millions of USD [MM USD].
External references	NA

INV.21	**Total spent in renewable energy projects**
Definition and Boundary	This indicator covers CAPEX spent in the year of reporting for the renewable energies (electricity & heat) (wind, solar, hydro, geothermal, marine), electricity & heat storage. This indicator also covers the OPEX spent in the year of reporting for OPEX spent during the year for Power Purchase Agreements from Renewable energies. This indicator does not account for acquisitions (intended as mergers or acquisitions of companies and/or start-up operating on low carbon projects/activities). Acquisitions are captured in the indicator INV.3. Money spent on programs and/or partnerships with universities and other organisations are excluded.
Methodology	Same as INV.2
Unit	Same as INV.2
External references	Same as INV.2

INV.22	**Total spent in CCUS projects**
Definition and Boundary	This indicator covers CAPEX spent in the year of reporting for the CCUS projects (excluding investments in CCUS through OGCI CI.). When CCS is included into a new facility, the company will estimate the share of the amount that is dedicated to CCS. This indicator also covers the OPEX spent in the year of reporting for OPEX spent during the year for OPEX of CCUS projects when available. This indicator does not account for acquisitions (intended as mergers or acquisitions of companies and/or start-up operating on low carbon projects/activities). Acquisitions are captured in the indicator INV.3. Money spent on programs and/or partnerships with universities and other organisations are excluded.
Methodology	Same as INV.2
Unit	Same as INV.2
External references	Same as INV.2

Note: The similar indicators INV.2, INV.21 and INV.22 are asked for acquisitions or equity related investments (INV.3, INV.31 and INV.32).

INV.41	Total R&D spent during the reporting year
Definition and Boundary	Total R&D spent during the reporting year.
Methodology	Report investment spent during the reporting year in R&D including money spent on programs and university partnership.
Unit	Millions of USD [MM USD].
External references	Adapted from Equinor internal definition named "Low carbon R&D".

INV.42	R&D spent on low carbon technologies during the reporting year
Definition and Boundary	Total R&D spent during the reporting year cover the following activities: • Renewables activities (wind, solar, hydro, storage) • CCUS • Energy efficiency when the main purpose • Biofuels • Blue or green hydrogen • Sustainable mobility • Natural Climate solutions. **Gas related activities are excluded from this definition**
Methodology	Same as INV.31
Unit	Same as INV.31
External references	Same as INV.31

INV.421	R&D spent on renewable energy technologies during the reporting year
Definition and Boundary	Total R&D spent during the reporting year cover renewables activities (wind, solar, hydro and storage). **Gas related activities are excluded from this definition**
Methodology	Same as INV.31
Unit	Same as INV.31
External references	Same as INV.31

INV.422	R&D spent on CCUS technologies during the reporting year
Definition and Boundary	Total R&D spent during the reporting year cover CCUS R&D. **Gas related activities are excluded from this definition**
Methodology	Same as INV.31
Unit	Same as INV.31
External references	Same as INV.31

INV.4	Share of R&D budget spent on low carbon technology
Definition and Boundary	This indicator is calculated based on INV.31. (Total R&D spent during the reporting year) and INV.32 (R&D spent on low carbon technologies).
Methodology	**INV.4=INV.42/INV.41**
Unit	Percentage [%]
External references	NA

8 Focus on the OGCI carbon intensity indicator

8.1 Upstream carbon intensity concept

The OGCI upstream carbon intensity baseline and target apply to the upstream, operated gas and oil sector.

The target, introduced in July 2020, is to reduce the collective average carbon intensity of member companies' aggregated upstream oil and gas operations.

The intensity baseline is calculated as a ratio between scope 1 (direct) + scope 2 (from electricity and steam imports) greenhouse gas emissions (CO_2+CH_4) (expressed in kg CO_{2eq}) and oil and gas production figures (expressed in boe) for the same upstream sector. A situation in 2025 will be calculated, and the delta between 2025 and 2017 will be the reduction target. The baseline and target represent the collective carbon intensities for OGCI as a whole.

$$Intensity\ OGCI = \left(\frac{\sum_{\substack{all\ OGCI \\ companies}} CO2\ emissions\ +\ 25\ *\ CH4\ emissions}{\sum_{\substack{all\ OGCI \\ companies}} oil\ +\ gas\ production\ at\ point\ of\ sale} \right)$$

Figure 2: Quantification of OGCI upstream carbon intensity

8.2 Scope of activities covered by the baseline and target

The intensity figure covers upstream operations where OGCI member companies have operational control and for which each company has specific reporting routines and nomenclatures. It includes all CO_2 and CH_4 emissions from operated upstream assets producing oil and/or gas: 100% of emissions at the asset level are included and are not divided based on equity or entitlement shares. All sources of emissions are considered, including emissions linked to *force majeure* events or sabotage.

Assets where an OGCI company has an equity interest, but does not function as operator, are outside of the boundary for inclusion and no emissions nor production associated with these "partner-operated" assets are included in the baseline and target, in alignment with our global definition of "operated domain" in the OGCI Reporting Framework.

Within the context of the scope for the establishment of the intensity baseline and target, upstream activities comprise all operations from exploration to production and gas processing (up to the first point of sale[3]), excluding gas liquefaction processes such as LNG operations and gas-to-liquids. More specifically, upstream is defined in line with the concept referenced in the IEA's Outlook[4] as including the production of oil and gas, as well as the gathering and processing of natural gas. In the case of tolling agreements, if the natural gas processed remains under the ownership of the toller, the quantity of natural gas processed by the member company should not be accounted in the quantity of marketed natural gas; the associated methane emissions should be accounted as under the operational control of the member company.

As explained above, gas liquefaction processes are not included in OGCI's "upstream" scope concept. Refining, shipping, transmission and distribution activities, considered as "downstream" activities, are also excluded from the OGCI "upstream" scope.

If and where applicable, Scope 1 emissions (CO_2 and CH_4) will be corrected for any export of excess electricity and/or steam production. CO_2 and/or CH_4 reinjected in the production well (for EOR purposes) are considered as not being emitted and are therefore not accounted for in the emission figures. For Scope 2, emissions are estimated based on national or contract-specific emission factors. Methane emissions will be reported in kg CO_{2eq} by using the methane Global Warming Potential of 25 over 100 years (IPCC AR4).

An intensity calculation, as opposed to an absolute calculation, has been chosen as it remains relevant even if there are changes to the OGCI asset make-up. Specifically, due to the nature of the upstream oil and gas business, it should be expected that some of the assets (and corresponding greenhouse gas emissions and hydrocarbon production) within the boundaries for inclusion for the 2017 baseline, will not be relevant in the time horizon of 2025. This may, for example be due to decommissioning or divestment in the 2018-2025 period. Similarly, new assets may enter the scope for the target over the

[3] *The point of sale (POS) is defined as the place/device of transfer of ownership of the product to the downstream player, which may be a third party or a downstream business unit within the same company. In the case where the LNG plant is located beside the production plant and where all the assets are operated by the same business unit, the point of sale will be defined as the input of the LNG plant and all the side-emissions will be accounted to the upstream boundary except those emitted in the LNG plant.*

[4] *International Energy Agency, World Energy Outlook 2017: "For simplicity, the oil and gas sectors are divided into upstream and downstream segments and then further into the subsectors of production, gathering and processing, refining, transmission and distribution. The production subsector includes all onshore and offshore oil and gas facilities from either conventional or unconventional reservoirs. Liquefaction of natural gas, transportation either by pipeline or as liquefied natural gas (LNG) and regasification are included in downstream processes in our methane emissions estimation"*

same period, as a result of start-ups and/or acquisitions. At the same time, the make-up of the OGCI may also change: some additional companies may join the initiative while others may leave.

The utilization of an intensity-based calculation, rather than an absolute, helps to mitigate the possibility that variations in OGCI members' asset portfolios and/or amongst the OGCI membership will have a material impact on the ability of OGCI, collectively, to reach the 2025 target. Nonetheless, these changes could lead to material increases or reductions in the collective upstream carbon intensity for OGCI. To monitor this, carbon intensity will be calculated and tracked annually towards the 2025 target year, based upon the assets included within the scope in the given year.

Finally, an intensity-based calculation allows OGCI to positively influence the carbon performance of industry at large, as the carbon intensity metric allows for easy benchmarking by others.

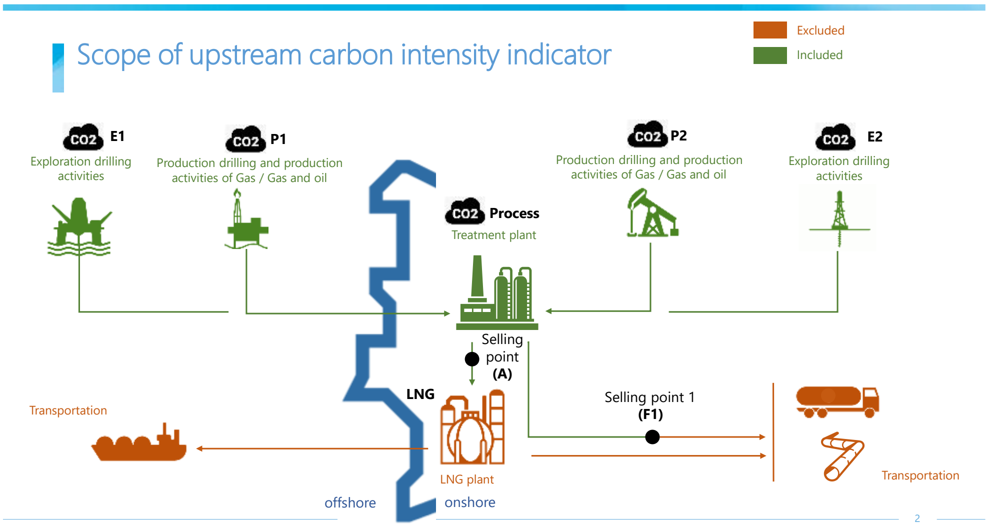

Figure 3: Boundaries of the carbon intensity target (illustration)

8.3 Methodology for establishing the baseline intensity

To support the establishment the OGCI upstream carbon intensity baseline in 2017 and target for 2025, emissions and oil and gas volumes for 2017 were collected for each company and a 2017 baseline was established for each company, as well as for OGCI collectively.

8.4 Restatement of the baseline and reporting changes

If new companies join or leave the OGCI, the baseline may need to be re-estimated and revised as a result of these changes. However, the target itself will not be restated as new member companies will be expected to endorse the existing target. When individual companies' emission quantification methodologies are updated (e.g. because of new regulatory emission factors, improvement of reporting processes, etc.), the emissions quantified using these updated methodologies shall also be used in connection with the OGCI intensity target tracking. Significant changes in the reported upstream carbon intensity performance linked to the update of reporting methodologies for one or multiple companies will be commented on in the annual OGCI report.

8.5 Assessment of data quality and accuracy

In order to conduct the work in compliance with the antitrust law, an independent third party is in charge of collecting, reviewing and anonymizing the data for aggregation. More specifically, the independent third party carried out the following tasks

- Assessment of the appropriate implementation of the OGCI Reporting Framework to the company data, including the subsequent Methodological note for OGCI upstream carbon intensity target
- Analysis and investigation of indicators value change in the years 2015, 2016 and 2018 (insofar as available) compared to the baseline year 2017
- Calculation of consistency ratios to identify potential outliers
- Reconciliation between indicators reported to the OGCI and indicators verified by a third-party.
- Anonymization of companies' individual indicators

These aspects are addressed through bilateral interviews between the independent third party and the member companies of OGCI.

The independent third party also carries out the following work of the OGCI consolidation process related to the correct consolidation and reporting of the KPIs and intensity indicators:

- Consistency check of the conversion factors and formulas used to calculate those indicators with the OGCI Reporting Framework

8.6 Data limitations

The specific limitations applicable to methane and identified in the "Methodological note for OGCI methane intensity target and ambition" apply to the upstream carbon intensity, as methane is considered as a component of the upstream carbon intensity.

All OGCI companies have internal routines for the gathering, quantification and reporting of emissions data, though the data coverage and granularity may vary from company to company. The OGCI member companies have, for the purpose of setting the baseline and target, agreed on the scope and boundaries for which the data shall apply. As part of this process, the OGCI companies have had to evaluate their own operations to determine if any gaps in data coverage and quality exist and then take steps to include all relevant sources and figures in the data supplied to the OGCI as part of the upstream carbon intensity, baseline and target establishment work. Similarly, companies have had to evaluate the applicability of quantification methods utilized for their own operations and update their methodologies as required.

For the OGCI to collectively increase confidence in the data used as the basis for the establishment of an upstream carbon intensity baseline and target, all companies participated in follow-up interviews with the independent third party in charge of collecting, verifying and anonymizing the data for aggregation.

8.7 Estimation of the industry intensity

Estimates based on IEA and IPCC data lead to a carbon intensity average for the industry of approximately 49 kgCO2e/boe for oil and 58 kgCO2e/boe for gas (excluding LNG). The average industry carbon intensity has been estimated for a similar perimeter as the one used by OGCI, based on global energy-related carbon dioxide emissions and total primary energy demand, using data from the International Energy Agency's World Energy Outlook 2018 (tables 1.2, 1.5, page 486 and page 489), as well as the Representative Concentration Pathway Database RCP2.6 from the Intergovernmental Panel on Climate Change (IPCC). It considers a Global Warming Potential of methane over a 100-year time horizon.

This estimation, based on top-down assessments, is comparable with other scientific papers, such as "Global carbon intensity of crude oil production" published by Stanford in August 2018 (https://science.sciencemag.org/content/361/6405/851).

Details of the methodology used by OGCI to calculate the carbon intensities of approximately 49 kgCO2e/boe for oil and 58 kgCO2e/boe for gas are as presented in the following table.

ESTIMATION OF OIL&GAS SECTOR SCOPE 1+2 INTENSITIES				
2017	**OIL**	**GAS**	**Unit**	**Comment/source**
Total estimated CO2 emissions (production, processing and end use)	11,3	6,8	Gt CO2eq	IEA's 2018 World Energy Outlook (tables 1.5, p. 489)
Total CH4 emissions from sector (production, processing and end use)	0,9	1,1	Gt CO2eq	Representative Concentration Pathway Database RCP2.6 from the Intergovernmental Panel on Climate Change (IPCC) © RCP Database (Version 2.0.5) http://www.iiasa.ac.at/web-apps/tnt/RcpDb
Sub-total (CO2+CH4)	12,2	7,8	Gt CO2eq	These values, which include scopes 1, 2, and 3.
Scope 1+2 emissions (production and processes) (%)	20%	23%		IEA's 2018 World Energy Outlook p. 486 (oil) & p. 489 (gas): The 2018 WEO estimates that 20% of CO2e emissions from oil production, processing and end use and 25% of CO2e emissions from gas production, processing and end use are scope 1 and scope 2 (23% excluding LNG process).
Scope 1+2 emissions	2,4	1,8	Gt CO2eq	
Total primary energy demand	32 509	22 774	Mboe	International Energy Agency's World Energy Outlook WEO 2018 (tables 1.2, p. 486)

Scope 1+2 intensity (total)	75,0	78.7	kg CO2eq/boe	Scope 1+2 emissions / Total primary Energy Demand
% of upstream	65%	74%		Oil: IEA's 2018 World Energy Outlook p. 491: 35% is refining Gas: IEA's 2018 World Energy Outlook p. 491: 26% is pipeline, LNG and downstream methane
Scope 1+2 intensity upstream	**48,7**	**58,3**	**kg CO2eq/boe**	

9 Focus on the OGCI methane intensity indicator

9.1 Purpose

This methodological note is meant to describe the process and framework through which the OGCI methane emissions intensity target and ambition have been established. It covers the following aspects:

- The concept of the methane intensity target and ambition
- Scope of activities covered by the target and ambition
- Emissions sources included in the scope for the quantification of intensities
- Methodology for establishing the baseline, target and ambition intensities
- Data limitations

9.2 Methane intensity concept

The OGCI methane intensity target and ambition, announced in 2018, applies to the upstream, operated gas and oil sector. The target and ambition year is 2025. A baseline intensity was also established for 2017.

The intensity baseline, target and ambition are presented as percentage figures, which represent the volume of methane emissions for the upstream gas and oil sector as a percentage of the volume of the total gas marketed for the same upstream sector. The baseline, target and ambition represent the collective methane intensities for the OGCI as a whole.

$$Intensity\ OGCI = \left(\frac{\sum_{\substack{all\ OGCI \\ companies}} CH4\ emissions}{\sum_{\substack{all\ OGCI \\ companies}} marketed\ natural\ gas} \right) = \text{methane}_{[Sm^3]} / \text{gas}_{[Sm^3]}$$

Figure 4: Quantification of the OGCI upstream methane intensity

The intensity figure covers upstream operations where OGCI member companies have operational control and for which each company has specific reporting routines and nomenclatures. All methane emissions from operated upstream assets marketing oil and/or gas are included: 100% of methane emissions at the asset level are included and are not divided based on equity or entitlement shares. Assets where an OGCI company has an equity interest, but does not function as operator, are outside of the boundary for inclusion and no emissions nor production associated with these "partner-operated" assets are included in the current baseline, target or ambition intensities. Within the context of the scope for the establishment of the intensity baseline, target and ambition, "upstream" can be described broadly as "from wellhead to point of sale[5]". More specifically, upstream is defined in line with the concept referenced in the IEA's Outlook for Natural Gas[6] as including the production of oil and gas, as well as the gathering and processing of natural gas.

In addition, the choice has been made to include gas liquefaction within the OGCI's "upstream" scope concept. Refining, shipping, transmission and distribution activities, considered as "downstream" activities, are excluded from the OGCI "upstream" scope. Moreover, exploration drilling activities are considered outside of the boundary for inclusion (as this activity can be seen as separate from the value chain for marketed gas and oil), while production drilling and completions are considered within the boundary for inclusion.

[5] *The point of sale (POS) is defined as the place/device of transfer of ownership of the product to the downstream player*

[6] *International Energy Agency, World Energy Outlook 2017: "For simplicity, the oil and gas sectors are divided into upstream and downstream segments and then further into the subsectors of production, gathering and processing, refining, transmission and distribution. The production subsector includes all onshore and offshore oil and gas facilities from either conventional or unconventional reservoirs. Liquefaction of natural gas, transportation either by pipeline or as liquefied natural gas (LNG) and regasification are included in downstream processes in our methane emissions estimation"*

The figure below details the scope of assets covered by the methane intensity target:

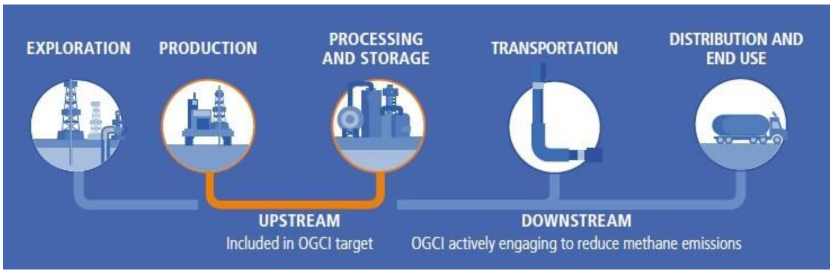

Figure 5: Boundaries of the methane intensity target (illustration)

In the case of gas liquefaction (e.g. LNG) and gas-to-liquids process (GTL), in particular, the boundaries for inclusion for the quantification of the OGCI upstream methane intensity may vary from company to company, operation to operation and even cargo to cargo, depending upon where the point of sale is located. For example, based upon the boundary description, if a company has operational control for a regasification facility, with point of sale being defined as where the gas from this facility enters the transportation network, then this regasification facility and its emissions fall within the boundary for inclusion, which again is more conservative than the "upstream" concept referenced in the IEA's Outlook for Natural Gas. In the case of tolling agreements, if the natural gas processed remains under the ownership of the toller, the quantity of natural gas processed by the member company should not be accounted in the quantity of marketed natural gas; the associated methane emissions should be accounted as under the operational control of the member company.

An intensity target and ambition, as opposed to an absolute target or ambition, has been chosen, as it remains relevant even if there are changes to the OGCI asset make-up. Specifically, due to the nature of the upstream oil and gas business, it should be expected that some of the assets (and corresponding methane emissions and hydrocarbon production) within the boundaries for inclusion for the 2017 baseline, will not be relevant in the target and ambition year of 2025. This may, for example be due to decommissioning or divestment in the 2018-2025 period. Similarly, new assets may enter the inclusion scope for the target and ambition over the same period, as a result of start-ups and/or acquisitions. At the same time the make-up of the OGCI may also change towards 2025, with the potential that some companies may join the initiative, while others may leave.

The utilization of an intensity-based target and ambition, rather than an absolute target and ambition, helps to mitigate the possibility that variations in OGCI members' asset portfolios and/or amongst the OGCI membership will have a material impact on the ability of OGCI, collectively, to reach the 2025 methane intensity target and ambition. Nonetheless, the possibility does exist that changes in OGCI members' portfolios and/or in OGCI membership, towards 2025, could lead to material increases or reductions in the collective, upstream methane intensity for OGCI. To monitor this, methane intensity will be calculated and tracked annually towards the 2025 target/ambition year, based upon the assets included within the inclusion scope in the given year.

In addition, an intensity-based target and ambition allows the OGCI to positively influence the methane performance of industry at large, as the methane intensity metric allows for easy benchmarking by others.

9.3 Emissions sources covered by the methane target

As the aim of the methane intensity baseline, target and ambition are to demonstrate the level of methane emissions from upstream gas and oil production, all sources within the upstream sector are covered by the baseline, target and ambition. This means that methane emissions from fugitives, venting and incomplete combustion, for example in flares and turbines, are all included. Following this approach, emissions linked to *force majeure* events or sabotage are also included.

The (non-comprehensive) list below details typical sources of emissions that are included in the scope of methane emissions reported:

Non-combustion related emissions

- Hydrocarbon storage tanks
- Compressor seals
- Pneumatic controls and pumps
- Liquids unloading and storage
- Fugitive leaks
- Loss of primary containment
- Gas dehydration
- Venting (e.g. casing head, gas separation)
- Well completion

Combustion-related emissions
- Flaring
- Stationary combustion sources, e.g. turbines

9.4 Establishing the target and ambition

To support the establishment the OGCI methane emissions intensity target and ambition for 2025, methane emissions and marketed gas volumes for 2017 were collected for each company and a 2017 baseline was established for each company, as well as for OGCI collectively. Using their company-specific baseline emission intensities, companies then indicated an ambitious methane intensity level for the year 2025, assuming that 2017 marketed gas production volumes would be similar to those of 2025. The OGCI members then defined an OGCI intensity target and ambition for 2025, taking into account the 2017 collective intensity baseline, as well as the ambitious emission intensity levels indicated by individual companies.

9.5 Upstream methane emissions reduction measures

OGCI member companies have submitted methane emission reduction measures that were identified as enabling these companies, collectively, to move the OGCI emissions intensity towards the identified target and ambition levels by 2025. To reduce the OGCI's collective methane emissions intensity, member companies will target key emissions sources through a variety of measures, as appropriate.

9.6 Data limitations

Company and/or regulatory recording and reporting requirements for methane vary between and within OGCI companies and operating jurisdictions.

All OGCI companies have internal routines for the gathering, quantification and reporting of methane emissions data, though the data coverage and granularity may vary from company to company. The OGCI member companies have, for the purpose of setting the baseline, target and ambition, agreed on the scope and boundaries for which the data shall apply. As part of this process, the OGCI companies have had to evaluate their own operations to determine if any gaps in data coverage and quality exist and then take steps to include all relevant sources and figures in the data supplied to the OGCI as part of the methane intensity, baseline, target and ambition establishment work. Similarly, companies have had to evaluate the applicability of methane quantification methods utilized for their own operations and update their methodologies as required.

For the OGCI to collectively increase confidence in the data used as the basis for the establishment of a methane emissions intensity baseline, target and ambition, all companies have provided an assessment of their own activities related to methane management and reporting (based upon the UN PRI Methane guide for investors). All companies also participated in follow-up interviews with an independent third party.

9.7 Restatement of the baseline and previous year's methane intensity

If new companies join or leave the OGCI, the baseline may need to be re-estimated and revised as a result of these changes. However, the target itself will not be restated as new member companies will be expected to endorse the existing target. When individual companies' methane emission quantification methodologies are updated (e.g. because of new regulatory emission factors, improvement of reporting processes, etc.), the emissions quantified using these updated methodologies shall also be used in connection with the OGCI intensity target tracking. Significant changes in the reported methane intensity performance linked to the update of reporting methodologies for one or multiple companies will be commented on in the annual OGCI report.

9.8 Assessment of data quality and accuracy

The review and assessment process provided by an independent third party as part of the methane intensity baseline, target and ambition establishment process is important to ensuring that there is a common understanding within the OGCI regarding the overall quality and coverage associated with the methane emissions data.

9.9 Co-Product Allocation

The OGCI CH4 intensity target has been designed to guide ambition at the Corporate level.

At asset level, depending on the profile of production (e.g. oil and wet gas), operators may elect to choose energy allocation, in order to more accurately allocate emissions associate with oil production.

To do so, OGCI member companies recommend the use of the energy allocation method to estimate CH4 performance of individual upstream assets / NG value chains, where a portion of total CH4 emissions is attributed to NG marketed production, based on the ratio of (1) energy equivalent of produced natural gas divided by (2) total energy equivalent from O&G marketed production on the same asset. For additional guidance, please refer to the NGSI CH4 Emission Intensity Protocol (2021) reporting framework.

Appendix A – Acronyms and abbreviations

API	American Petroleum Institute
CCAC	Climate and Clean Air Coalition
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
GHG	Greenhouse gas
GWP	Global Warming Potential
HHV	Higher Heating Value
IEA	International Energy Agency
IFC	International Finance Corporation
IOGP	International Oil & Gas Producers
IPCC	Intergovernmental Panel on Climate Change
IPIECA	International Petroleum Industry Environmental Conservation Association
kWh	Kilowatt-hour
LHV	Lower Heating Value
MWh	Megawatt-hour
ncm	Normal Cubic Meter
NCV	Net Calorific Value
OGCI	Oil and Gas Climate Initiative
scm	Standard Cubic Meter
tCO_2e	metric ton of carbon dioxide equivalent
TJ	Terajoules
WBCSD	World Business Council for Sustainable Development

Appendix B – Calculation and conversion factors

The list reported below provides the most relevant literature sources of calculation factors (unit conversion, standard parameters like GWP, HHV/LHV, etc) that OGCI uses in its reporting and that companies can use:

- American Petroleum Institute (API) - *The API Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry,* 2009
- Intergovernmental Panel on Climate Change (IPCC) - *IPCC Guidelines for National Greenhouse Gas Inventories*, 2006
- IPCC Fourth Assessment Report, Climate Change 2007 - *Global Warming Potentials*
- International Energy Agency (IEA): IEA Energy Statistics Division, CO2 emissions from fuel combustion (yearly updated)
- Climate and Clean Air coalition, Oil & Gas Methane Partnership, technical guidance for estimating methane emissions and mitigation options, 2015
- BP Statistical Review of World Energy 2019

The following table provide the main conversion factors that are used at OGI level to consolidate the companies' indicators:

Theme	Conversion factor	Source
Activity data	1 toe = 7.33 boe	BP Statistical Review of World Energy 2019 – Crude Oil
	1 cf = 0.028 m^3	BP Statistical Review of World Energy 2019 – Natural Gas
	1 cf = 0.000167 boe	BP Statistical Review of World Energy 2019 – Natural Gas
	1 m3 = 0.860 toe	BP Statistical Review of World Energy 2019 – Natural Gas
	1 m^3_{CH4} = 0.000714 t_{CH4}	Calculated (@ 0°Celsius 1 atm)
GHG Emissions	1 t CH_4 = 25 t CO_{2e}	GWP conversion factor, IPCC Fourth Assessment Report, Climate Change 2007
	1 t NO_2 = 298 t CO_{2e}	
Financial data	1 £ = 1.2494 USD	XE Converter website
	1 € = 1.1117 USD	XE Converter website
	1 BRL = 0.2099 USD	XE Converter website
	1 CNY = 0.142722 USD	XE Converter website

Appendix C – Methodologies and guidance for estimating GHG emissions

This Appendix contains reference material that can be useful for estimating GHG emissions. It does not represent the methods that each member company actually applies in estimating its GHG emissions for OGCI reporting purposes.

Materiality threshold

The company should seek completeness of reporting. Setting a materiality threshold is not recommended.

Methods of quantifying indicators

For topics tackled by the Initiative associated with quantitative indicators, several methods of quantification are possible. These methods can be divided into several categories. A degree of accuracy generally corresponds with each category. Three main categories are distinguished, and presented below by declining accuracy level:

- Methods based on **measurements**. This method is based on instrumentation allowing measuring a flow, consumption or a production of one or several parameters used in the reporting of the indicator. For instance, the greenhouse gases, the methods in which the emissions are calculated from the measurement of fuel multiplied by a specific emission factor are assimilated to this situation (e.g.: measured carbon content based on sampling).
- Methods based on **calculations** or using calculation factors (See Appendix B). For instance, for the greenhouse gases, emission factors can be used. The ones used could be national or, preferably, those of recognized international bodies (API, OGP, IPCC, etc.), used by the profession.
- Methods based on **estimates**: This method is based on design manufacturer information. For example, greenhouse gas emissions may be calculated for a diesel engine from the design and operating hours.

Whenever economically and technically possible, the most accurate available category of quantification should be preferred.

Uncertainty

By nature, the reporting, assessment and data collection are sources of uncertainty. The estimate of this uncertainty is an essential element in reporting. It does not challenge the validity of reporting data but matches them with a degree of reliability. It also helps to identify domains for possible improvement in the accuracy of reporting and guides methodological choices.

For all quantitative indicators, the Company should see to limit the uncertainty to 10% of the value, at both site and group level. 0 A simplified methodology to estimate the uncertainty is provided below, based on IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, June 15, 2001.

Calculation of uncertainty

The estimated uncertainty of emissions from individual sources is either a function of instrument characteristics, calibration and sampling frequency of direct measurements, or (more often) a combination of the uncertainties in the calculation factors for typical sources and the corresponding activity data.

Assuming a normal distribution of the data collected for a specific indicator, the figure below depicts the proportion of samples that would fall between 0, 1, 2, and 3 standard deviations above and below the actual value.

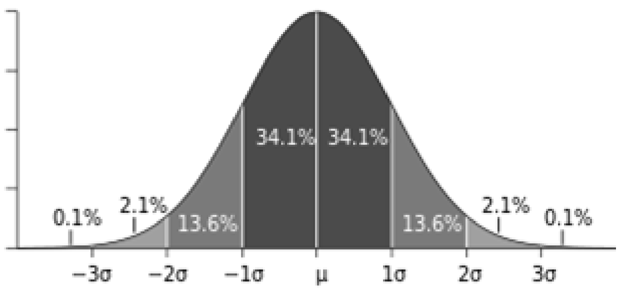

Figure 6: Unbiased normally distribution of value

where

- μ is the mean of data

- σ is the standard deviation of data

The analysis of the graphic show that 68.2% of the value are included in the confidence interval [μ-σ ; μ+σ] and that 95% of the value are included in the confidence interval [μ-2σ ; μ+2σ].

The uncertainty U is the standard deviation of the mean of a data set, is calculated from the following formula[7]:

$$U = \frac{2\sigma}{\sqrt{n}}$$

- where n is the number of measurements in the set.

As mentioned in the current guidance, the uncertainty should not exceed +/- 10% of the mean, i.e.:

$$\frac{U}{\mu} \leq 10\%$$

Combining uncertainties

The Company should take into account the cumulative effect of all components of the measurement system on the uncertainty of the annual activity data using the error propagation law which yields two convenient rules for combining uncorrelated uncertainties under addition and multiplication or respective conservative approximations if interdependent uncertainties occur:

Uncertainty of a sum

This type of calculation could be used, for instance for individual contributions to an annual value

- for uncorrelated uncertainties (data are independent)

$$U(total) = \frac{\sqrt{(U1\,.x1)^2 + (U2\,.x2)^2 + \cdots + (Un\,.xn)^2}}{x1 + x2 + \cdots + xn}$$

- for interdependent uncertainties

$$U(total) = \frac{(U1\,.x1) + (U2\,.x2) + \cdots + (Un\,.xn)}{x1 + x2 + \cdots + xn}$$

Where:

- U(total) is the uncertainty of the sum, expressed as a percentage;
- xi and Ui are the uncertain quantities and the percentage uncertainties associated with them, respectively.

Uncertainty of a product

Example given: different parameters used to convert a meter reading into mass flow data

- for uncorrelated uncertainties (data are independent)

$$U(total) = \sqrt{U1^2 + U2^2 + \cdots + Un^2}$$

- for interdependent uncertainties

$$U(total) = U1 + U2 + \cdots + Un$$

Where:

- U(total) is the uncertainty of the sum, expressed as a percentage;
- Ui are the percentage uncertainties associated with each of the quantities.

[7] *The sum of the data T set has a variance equal to the sum of the variance of each data, which lead to V(T) = nσ². The standard deviation is the square root of the variance. The standard deviation of the mean is as such √n.σ/n = σ/√n. It is multiplied by 2 to remain in the 95% confidence interval.*