



MRV and GHG Neutral LNG Framework



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Cargo Statement

This Framework is openly available as a reference for use by participants across the LNG value chain.

The preparation and publication of GHG intensity data and/or Cargo Statements based fully or partially on this Framework is the full responsibility of the Reporter. Neither GIIGNL nor any member companies or other contributors to the Framework assume responsibility for any consequences or damages resulting directly or indirectly from its use in the preparation or use of reports and Statements.

The information contained in the Framework is provided in good faith and every reasonable effort has been made to make sure that it is correct and up to date. However, GIIGNL, its member companies and the contributors to the Framework do not warrant accuracy and completeness of information. Any person or organization relying on any of the information contained in this Framework or making any use of the information and contained herein, shall do so at its own risk.

Users of this Framework are advised to reference any relevant claim regulations that are applicable to an LNG cargo that is assigned a declaration category under this Framework and to ensure that relevant requirements, including transparency, are fulfilled.

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Preface

ABOUT GIIGNL

The International Group of Liquefied Natural Gas Importers ('GIIGNL') is a non-profit organisation whose objective is to establish cooperation between LNG importers, to provide a global overview of the state-of-the-art technologies and general economics of the Liquefied Natural Gas (LNG) industry and to promote the development of activities related to LNG: purchasing, importing, processing, transportation, handling, re-gasification and its various uses. The Group constitutes a forum for exchange of information and experience among its 86 members from 27 countries to enhance safety, reliability and efficiency of LNG import activities and the operation of LNG import terminals in particular.

GIIGNL has a worldwide focus and its membership is composed of nearly all companies in the world active in the import and regasification of LNG.

BACKGROUND TO THE DEVELOPMENT OF THIS FRAMEWORK

In June 2020, GIIGNL published a report entitled 'LNG Carbon offsetting: fleeting trend or sustainable practice?'¹ which reviewed the developments, challenges and opportunities regarding 'carbon neutral' LNG. In September 2020, GIIGNL held two webinars entitled 'Carbon neutral LNG and its potential for LNG buyers' as well as 'Understanding Carbon Offsets', attracting wide interest in the topic within the industry.

In light of these developments, the General Delegate of GIIGNL in December 2020 contacted several GIIGNL Executive Committee members to gauge their interest for the association to work on common principles for the monitoring, reporting and verification (MRV) of greenhouse gas (GHG) emissions associated with LNG imports as well as on a common terminology for carbon neutral LNG.

In January 2021, the GIIGNL Bureau Members (the President and Regional Vice Presidents) officially expressed their support for developing a Framework, highlighting the need for the LNG industry to clarify the terminology and to develop a framework of practices related to the quantification, verification and offsetting of GHG emissions associated with

LNG imports. A Steering Committee consisting of seven Executive Committee Members (Cheniere, CNOOC, Engie, Jera, Shell, Tokyo Gas, TotalEnergies) and Pavilion Energy was created. The Steering Committee produced a scope and roadmap for the project and requested that the General Delegate and the Chairs of the Commercial and Technical Study Group convene a Technical Task Force to address the important issue of GHG monitoring, reporting and verification (MRV) in a transparent and ambitious manner, delivered in reference to existing frameworks and initiatives, providing clear and harmonised guidance to the industry and participants across the value chain. The resulting Framework is both an ambition as well as a path for action today.

In November 2021, the outputs of the Task Force, the Framework and associated Cargo Statement were presented to the General Assembly of GIIGNL.

The Framework has been designed to promote a consistent definition of 'GHG Neutral' LNG as well as disclosure of verified emissions based on sound GHG accounting criteria and definitions. Given the nature of LNG, the Framework recognises in particular the importance of quantifying and reporting emissions of methane, a potent greenhouse gas, in addition to carbon dioxide.

[1]GIIGNL (2020) LNG Carbon Offsetting: fleeting trend or sustainable practice?

WHO SHOULD USE THE FRAMEWORK

The GIIGNL MRV and GHG Neutral Framework ('Framework') is designed to promote a consistent approach for entities responsible for reporting the greenhouse gas ('GHG') footprint of an LNG cargo ('Cargo'), and/or seeking to make a claim related to GHG emission reductions, offsetting or neutrality associated with the Cargo. In order to maximise the contribution of primary data associated with the actual emissions from all life cycle stages of the LNG value chain, the Framework is designed for use by both the ultimate entity making a claim associated with the LNG cargo and also an individual life cycle stage owner that may be asked to issue a statement of GHG intensity for use within the GHG footprint calculation.

ACKNOWLEDGEMENTS

GIIGNL has developed this Framework with the support of consultants from Environmental Resources Management Ltd. (ERM) and warmly thanks all those that have contributed to its development and review. In particular, we would like to thank the 73 GIIGNL member companies that completed an in-depth survey and the technical Task Force representatives that met regularly to discuss and review the content and approach taken.

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Introduction

GIIGNL has developed this Framework in recognition that long-term decarbonisation is core to the international ambition to secure global net zero GHG emissions by mid-century and keep a 1.5 degree Celsius temperature rise above pre-industrial levels within reach. Natural gas, at least in the near to medium term, is playing a key role in replacing coal and supporting the transition towards low carbon energy sources. GIIGNL recognises the importance of reducing GHG emissions associated with all stages of the LNG life

cycle and of promoting mitigation or remedial actions, including the compensation of emissions with offsets to support the global net zero ambition.

A key component of achieving this aim is to promote transparent, consistent and reliable GHG accounting and disclosure based, as far as possible, on the actual GHG emissions associated with production, transportation and use of the Cargo.

PURPOSE

The Framework is designed to:

- Provide a common source of best practice principles in the monitoring, reporting, reduction, offsetting and verification of GHG emissions associated with a delivered cargo of LNG
- Promote the commitment to, and disclosure of, verified emissions based on consistent GHG accounting criteria and definitions from all relevant stages included in the reporting boundary, thereby facilitating the calculation of a cargo GHG Footprint that genuinely reflects its climate impact
- Promote a consistent approach to declarations related to emission reduction actions and GHG offsets that are associated with an LNG cargo
- Position emission reduction action as the primary focus of a claim of 'neutrality', with the use of offsets to compensate for residual emissions that cannot be reduced
- Promote full accounting for methane emissions as well as carbon dioxide and other applicable GHGs

All declarations made under the Framework are intended to be based on a GHG Footprint that aligns as closely as possible to the emission sources associated with a specific cargo, drawing from as much primary data as possible within the footprint boundary.

The Framework is intended to guide a Reporter and to form the basis of a verified Cargo Statement developed using established standards for GHG footprint accounting and neutrality. GIIGNL does not administer a certification process that can be applied to traded cargoes, although the methodological principles in the Framework may be used in applying for certification from an independent entity if applicable.

Note that the terms 'GHG neutral' and 'GHG offset' are used to describe declarations made in alignment with the Framework rather than 'carbon neutral' and 'carbon offset' in order to emphasise the importance of methane and promote accuracy of language in describing GHG emissions.

ALIGNMENT WITH ESTABLISHED STANDARDS

The Framework is designed to support, and not replace, established standards and methodologies that govern GHG emissions calculations, GHG footprint determination, GHG offsetting, and GHG (or carbon) neutral declarations.

The following schematic illustrates how current standards and methodologies are integrated to support the quantification of a GHG footprint and a ‘GHG Neutral’ claim. This overall structure has guided the development of the Framework.

Examples of relevant reference standards have been set out in Appendix B to this Framework. A brief overview is provided below.

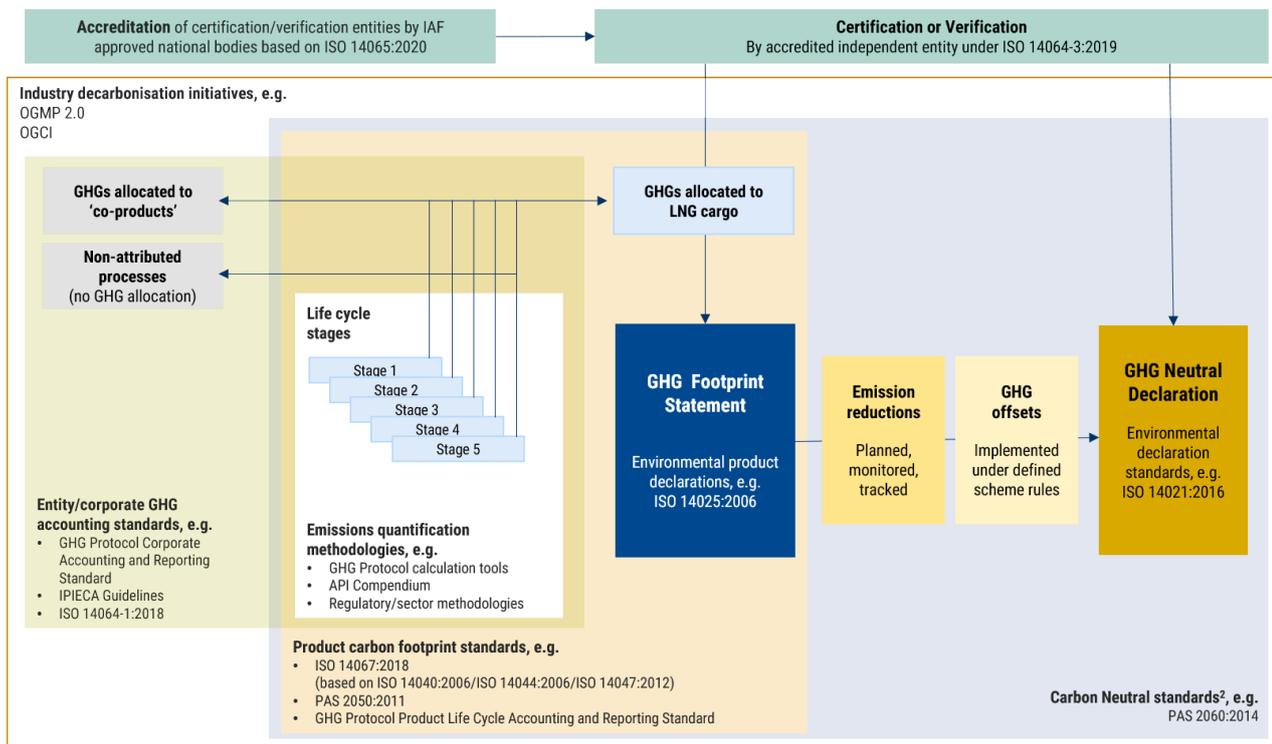


Figure 1: Standards and Methodologies that Underpin a 'GHG Neutral' Claim

[2] A new international standard for determining carbon neutrality, ISO/WD 14068 Greenhouse Gas Management and Related Activities – Carbon Neutrality, is under development by the International Organization for Standardization (ISO). This is expected to be published in 2023.

GHG EMISSIONS CALCULATION METHODOLOGIES AND ENTITY LEVEL REPORTING

Based on responses to the survey of GIIGNL membership, primary GHG data at entity level are extensively calculated and reported across all stages of the LNG value chain as part of corporate or asset level GHG inventories. The primary references that frame the approach calculating GHG inventories at entity level are the GHG Protocol Corporate Standard and ISO 14064-1:2018. For the oil and gas sector, detailed GHG emissions methodologies for each operational stage are provided in the API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, 2009. The API Compendium provides detailed methodology guidance for calculating GHG emissions from sources specific to the oil and gas sector. It is structured by source type, covering combustion, process/venting, fugitive and indirect sources of emission. API has also developed specific guidance for LNG operations in order to enable consistent and comprehensive internationally-accepted methodologies to estimate GHG emissions from the liquefied natural gas (LNG) operations segment.³

There are also many national or regional regulations that govern reporting of GHG emissions from entities involved in the LNG life cycle stages. Where these regulations reflect the calculation approaches set out in the GHG Protocol and API guidance, they will provide a useful basis for gathering data. However, many such regulations adopt boundaries and calculation approaches (e.g. emission factors or global warming potentials (GWPs)) that will not provide a complete data set in line with this Framework. For example, the EU emission trading system (EU ETS) only requires reporting of CO₂ from stationary combustion sources. Additional calculations may therefore be required to supplement data reported into a regulatory programme.

Industry specific frameworks, guidance and protocols also inform the reporting of GHG emissions from corporate entities. For example, the IPIECA Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, 2011 provides develops the GHG Protocol Corporate Standard specifically for the Petroleum Industry and the Oil and Gas Methane Partnership (OGMP) 2.0 Framework, 2020 is a UN Environment Programme (UNEP) led initiative that sets out a reporting framework for methane emissions in the oil and gas sector. The Sea Cargo Charter has been adopted to promote reporting of CO₂ within the shipping sector.

Reporters under this Framework may also participate in independent company level reporting initiatives such as Natural Gas Sustainability Initiative (NGSI), Methane Intelligence Standard for Methane Emissions Performance (MIQ) and ONE Future or Project Canary.

This first publication of the Framework is based on quantification of a GHG footprint based on fossil sources of gas. If non-fossil sources such as biomethane/renewable natural gas (RNG) or synthetic methane are a component of the delivered cargo, equivalent principles will apply based on quantification methodologies that are aligned with the source and processes involved in its production, taking appropriate account of CH₄ and N₂O emissions, as well as removals accounting if applicable.

GHG FOOTPRINT DETERMINATION

Product accounting standards are applicable to the quantification of the GHG footprint of a product such as an LNG cargo. These standards set out the approach to assessing the emissions associated with all life cycle stages of the product, including how to apportion entity level emissions between the product and other co-products produced by the entity from processes attributable to the product.

There are three standards in use for developing the carbon footprint of products:

- ISO 14067:2018 – Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification
- Greenhouse Gas Protocol – Product Life Cycle Accounting and Reporting Standard (GHG Protocol Product Standard), 2011
- PAS 2050:2011 – Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

These standards are closely aligned in terms of methods and approaches. PAS 2050 became closely aligned with the GHG Protocol Product Standard when it was revised in 2011, and these then informed the development of ISO 14067, published in 2018. The GHG Protocol Product Standard, in particular, provides many clear, illustrative examples of the steps for quantifying a product footprint.

[3] ISO TC67/SC9-LNG Installations and Equipment. International Organisations for Standardization (ISO) is developing a new standard on a methodology to calculate GHG emissions at LNG plant for Scope 1 & 2. This new standard ISO/NP 6338 is expected to be published in 2023.

Because they are designed to apply to almost any conceivable product, it is not feasible for the standards product carbon footprint standards to be completely prescriptive regarding the approach taken for a specific product such as LNG. Instead, the practitioner is given some discretion in how to carry out the assessment, for example in terms of the scope of the study, whether capital goods are included or excluded, and how to allocate burdens among co-products. As a result of these different choices, it can be challenging to compare the results of carbon footprint assessments carried out by different practitioners, even where the same standard has been applied.

Accordingly, the accounting approach described in this Framework aims to complement these established standards by providing additional criteria and guidance for assessing and reporting GHG emissions associated with the specific case of an LNG cargo. Carbon footprint assessments that are carried out in alignment with this Framework will have a consistent approach and be more comparable as a result.

Carbon footprinting standards refer to life cycle assessment (LCA) standards ISO 14040:2006, ISO 14044:2006, ISO 14047:2012 and ISO 14072:2014. A further in-depth technical resource may be found in the Life Cycle Data System (ILCD) Handbook (2011).

Reference may also be made to industry LCA studies such as

- Roman-White et al, 2021, LNG Supply Chains: A Supplier-Specific Life-Cycle Assessment for Improved Emission Accounting
- Tagliaferri et al, 2017, Liquefied Natural Gas for the UK: a Life Cycle Assessment

CARBON NEUTRAL STANDARD

The most widely accepted standard for carbon neutrality currently available is PAS 2060:2014. PAS 2060 sets out a standardised approach to quantify, reduce and offset GHG emissions on a specified entity, product or activity and make a claim of carbon neutrality. PAS 2060 is designed for carbon neutral claims made for entities, products or services⁴.

There are independent 'carbon neutral' certification schemes available which provide their own frameworks for shaping the certification criteria for carbon neutrality. In general, these schemes adopt the principles and approach of PAS 2060 and the above carbon footprint standards. This Framework

has adopted PAS 2060 as the reference standard for a claim of 'GHG Neutral LNG'. It is expected that GHG footprints developed on the basis of the Framework will be eligible for submission to independent carbon neutral certification schemes, but in order to achieve consistent application of an established standard, a claim of GHG Neutral in alignment with the Framework is dependent on verification of conformance with the principles and criteria set out in PAS 2060.

VERIFICATION STANDARDS

The international standard ISO 14064-3:2019 specifies principles and requirements for verifying and validating GHG assertions, including organisation, project and product GHG statements. Verification entities are accredited to perform the verification against defined standards by a national accreditation body that is a member of the International Accreditation Forum (IAF) under ISO 14065:2020.

STANDARDS FOR ENVIRONMENTAL DECLARATIONS AND CLAIMS

Reference may be made to standards issued by the International Organisation for Standardisation that govern disclosures and claims relating to the environmental credentials of a product. These include

- ISO 14020:2000, which establishes the principles for environmental declarations
- ISO 14021:2016, which addresses self-declared environmental claims, and
- ISO 14025:2006; which is relevant to 'environmental product declarations' resulting from a life cycle assessment of a product, including a carbon footprint

VERIFICATION STANDARD

The international standard ISO 14064-3:2019 specifies principles and requirements for verifying and validating GHG assertions, including organisation, project and product GHG statements. Verification entities are accredited to perform the verification against defined standards by a national accreditation body that is a member of the International Accreditation Forum (IAF) under ISO 14065:2020.

[4] A new international standard for determining carbon neutrality, ISO/WD 14068 Greenhouse Gas Management and Related Activities – Carbon Neutrality, is under development by the International Organization for Standardization (ISO). This is expected to be published in 2023.

DECLARATION PATHWAYS

A key objective of this Framework is to promote the quantification and reporting of actual GHG data associated with the full value chain of an LNG cargo. Recognising the various levels of readiness and commercial expectations of potential Reporters, the Framework supports a hierarchy of 'Declaration Pathways' that reflect the requirements of the relevant standards set out above. In particular, as illustrated in Figure 2.

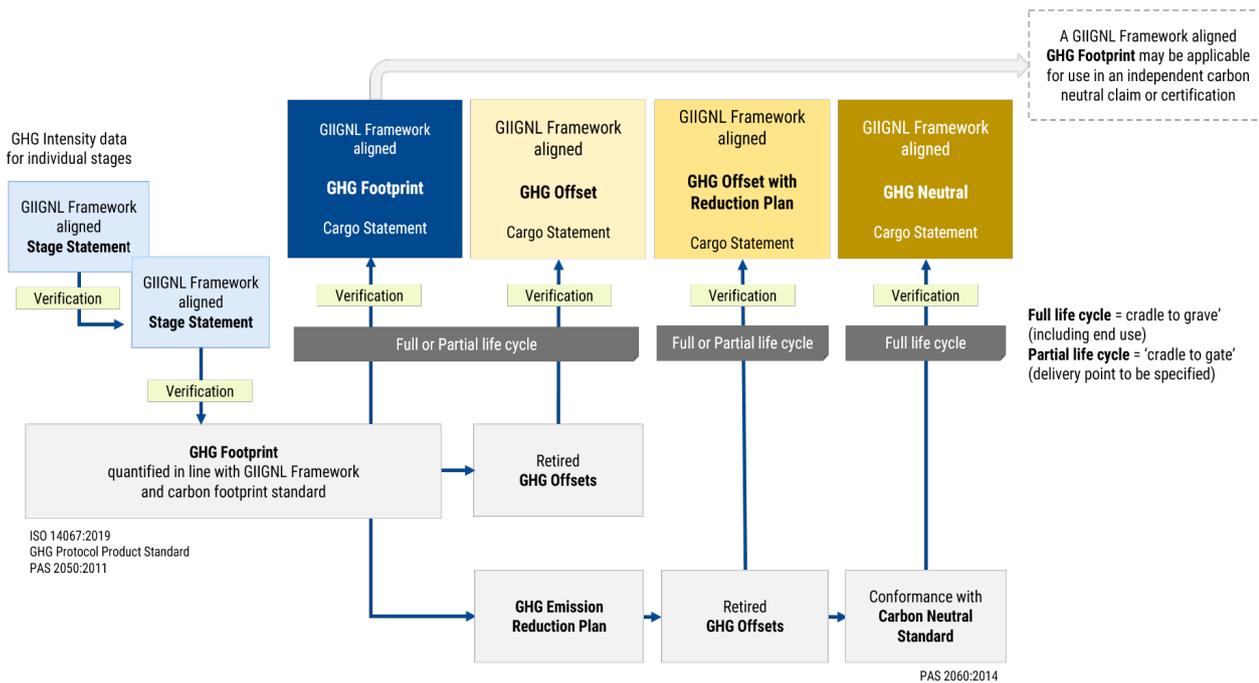


Figure 2: Declarations Provided for Under the Framework

There are FIVE available Declaration Pathways:

A **'Stage Statement'** (relating to a stage or subset of stages in the life cycle that are used in the calculation of a Cargo GHG Footprint):

- **'GIIGNL Framework Aligned Stage Statement'** ('Stage Statement'): a verified statement of GHG intensity and emissions associated with a specified amount of gas or LNG exported from defined life cycle stage(s) within the LNG value chain, calculated in accordance with a defined GHG footprint standard (e.g. ISO 14067:2018) and the criteria set out in this Framework

A GHG footprint for a product is built from the GHG emissions associated with each stage included in the life cycle boundary. Provision has therefore been made for operators of stages within the LNG life cycle to issue a verified 'Stage Statement' that can be used in the calculation of the Cargo GHG Footprint, thereby increasing the contribution of primary, stage-specific data. Stage Statements from 3rd parties are not a required component of the Framework. Over time, it is expected that use of Stage Statements will increase, enhancing both accuracy and comparability of the GHG Footprint.

A **'Cargo Statement'** (relating to a delivered LNG Cargo):

- **'GIIGNL Framework Aligned LNG Cargo GHG Footprint'** ('GHG Footprint'): a verified full ('cradle to grave') or partial ('cradle to gate') life cycle GHG footprint calculated in accordance with a defined GHG footprint standard (e.g. ISO 14067:2018) and the criteria set out in this Framework
- **'GIIGNL Framework Aligned GHG Offset LNG Cargo'** ('GHG Offset'): a verified full or partial life cycle GHG footprint that has been offset with carbon credits that meet the criteria set out in the Framework
- **'GIIGNL Framework Aligned GHG Offset LNG Cargo with Reduction Plan'** ('GHG Offset with Reduction Plan'): a verified full or partial life cycle GHG footprint that embodies an emission reduction plan and has been offset with carbon credits that meet the criteria set out in the Framework
- **'GIIGNL Framework Aligned GHG Neutral LNG Cargo'** ('GHG Neutral'): a verified full life cycle GHG footprint that embodies an emission reduction plan and commitment to long-term decarbonisation, has been offset with carbon credits that meet the criteria set out in the Framework and is verified to conform to an internationally accepted carbon neutral standard (PAS 2060:2014 or equivalent)

It is very important to GIIGNL that claims associated with the GHG status of LNG cargoes are consistent, transparent and founded on established standards. The decision has therefore been taken that a claim of 'GHG Neutral' in alignment with this Framework should represent a high bar of achievement that includes a commitment to long term decarbonisation and alignment with an internationally accepted standard for carbon neutrality as currently provided by PAS 2060:2014 or equivalent⁵.

An assessment of the life cycle GHG emissions for LNG by stage⁶, estimated that end use (power generation) emissions account for approximately 70% of the full life cycle GHG footprint for LNG. Whilst acknowledging that there are other uses of the gas such as feedstock to petrochemical processes, end use is a very significant component of life cycle emissions and, in line with the requirements of PAS 2060, a declaration of GHG Neutral under his framework is also reserved for full life cycle GHG footprints.

A declaration of a GHG Neutral LNG Cargo under this Framework represents a verified full life cycle GHG Footprint across the entire cargo value chain including end use, supported by a long-term decarbonisation commitment, an emission reduction plan and fully netted with offsets that meet best practice principles

It is acknowledged that the term 'carbon neutral' is used under various independent certification schemes and claims, which may apply different definitions and life cycle boundaries. If a Reporter also participates in an external carbon neutral initiative, there must be full transparency on the components of the respective claims and the Declaration Pathway associated with the definitions set out in this Framework.

[5] For example, the international Organization for Standardization is working on a new carbon neutral standard, ISO/WD14068, expected to be published in 2023

[6] LNG and Coal Life Cycle Assessment of Greenhouse Gas Emissions, Prepared for the Center for Liquefied Natural Gas. PACE Global, 2015

ACCOUNTING PRINCIPLES

The following core principles for the life cycle GHG accounting of the LNG cargo are adopted for this Framework. These are adapted from established GHG accounting principles, for example as set out in the GHG Protocol Product Standard and ISO 14067:2018 Greenhouse gases – Carbon footprint of products – Requirements and guidelines for quantification.

| | |
|---------------------|--|
| Relevance | GHG emissions data and methods appropriate to the assessment of the GHG emissions arising from all stages applicable to the selected life cycle boundary of the GHG footprint are included |
| Completeness | All significant GHG emissions within the specified boundaries have been included. Any significant GHG emissions that have been excluded are disclosed and justified |
| Consistency | Assumptions, methods and data are applied in the same way across all relevant stages of the assessment to allow for meaningful comparisons of the reported footprint between different cargoes and over time |
| Accuracy | Quantification of the GHG footprint, within the specified boundaries, is accurate, verifiable, relevant and not misleading, and bias and uncertainties are reduced as far as is practical. Double counting of emissions is avoided |
| Transparency | All relevant issues are addressed and documented in an open, comprehensive and understandable manner. Any relevant assumptions are disclosed and data sources used are appropriately referenced. Any estimates are clearly explained and bias is avoided to ensure the cargo GHG footprint and associated declaration represent what they purport to represent |
| Coherence | Methodologies, standards and guidance documents that are already recognised internationally and adopted for product categories are applied, to enhance comparability between cargo GHG footprints |

Framework Structure

The process that forms the basis of the Framework is set out in Figure 3 below, which also illustrates the process steps relevant to each Declaration Pathway. The process is designed to establish a consistent accounting approach in alignment with established standards for quantification of product GHG Footprint and GHG Neutral declarations.

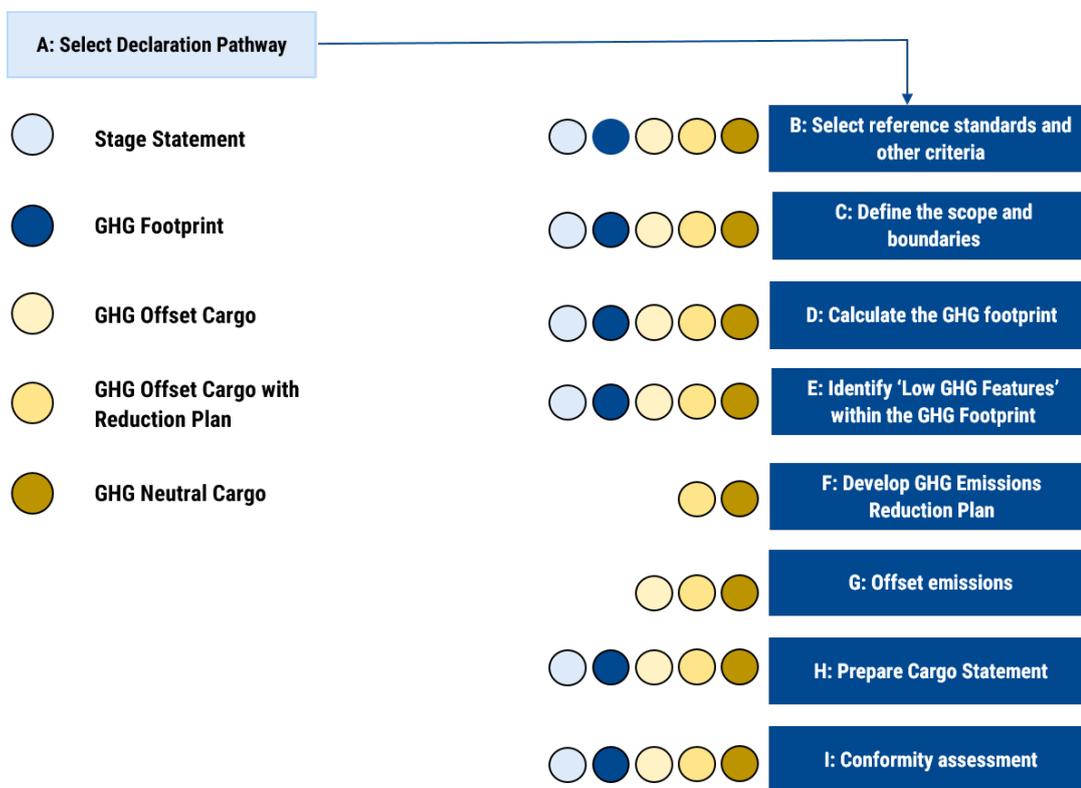


Figure 3: GIIGNL MRV and GHG Neutral Framework Process Steps



A: Select Declaration Pathway

The first step is to define the Declaration Pathway to be followed. This will inform the requirements that will need to be fulfilled for alignment with the Framework and associated standards.

In selecting a Declaration Pathway, the Reporter is committing to the calculation of a GHG footprint based on the best available data in line with the standards referenced in this Framework and adherence to the principles set out in this Framework for GHG emission reduction plans, offsetting and verification.

The Declaration Pathway chosen may take into consideration the needs of markets (such as the EU methane strategy/Carbon Border Adjustment Mechanism (CBAM)), customers or corporate objectives and may also take into account the resources that will need to be involved and availability of data and other information required for the declaration.

Reporters will need to develop a documented process that sets out the approach to achieving the selected Declaration Pathway. This will address:

- A detailed GHG Footprint Methodology (see Section D)
- GHG Emission Reduction Plan (if applicable), (see Section F)
- Offset Strategy (if applicable), (see Section G)
- Reporting requirements for the Cargo Statement or Stage Statement (see Section H).

For GHG Neutral Declarations based on PAS 2060, reference should be made for any additional information that may need to be included in the Qualifying Explanatory Statement (QES) required by that standard.

GIIGNL Framework Criteria – DECLARATION PATHWAY

- Define Declaration Pathway
- Prepare Documented process that explains how the Reporter will meet the requirements of this Framework and associated Standards and methodologies



B: Select Reference Standards and Other Criteria

This step identifies the reference standards for GHG quantification, GHG footprint determination and GHG neutrality (as applicable) that will be used as the basis for a GHG Footprint Declaration made under this Framework.

Reference should be made to Section 2 and Appendix B, which describe key reference standards for determination of the GHG footprint, as well as claims of GHG Offset, GHG Offset with Reduction Plan or GHG Neutral LNG.

The reporter should take account of corporate or customer preferences regarding the standards used in delivering the selected Declaration Pathway.

GIIGNL Framework Criteria – KEY REFERENCE STANDARDS

| | |
|--|--|
| <p>Standards and methodologies for GHG quantification</p> | <ul style="list-style-type: none"> • Entity specific GHG accounting standards and GHG quantification methodologies applicable to each stage. e.g. • ISO 14064-1:2018 • GHG Protocol Corporate Standard • API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, 2009 • IPIECA Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, 2011 • Sea Cargo Charter |
| <p>GHG footprint determination</p> | <ul style="list-style-type: none"> • ISO 14067:2018 • GHG Protocol Product life cycle Accounting and Reporting Standard • PAS 2050:2011 |
| <p>Standards for GHG neutrality</p> | <ul style="list-style-type: none"> • PAS 2060:2014⁷ |

[7] A new international standard for determining carbon neutrality, ISO/WD 14068 Greenhouse Gas Management and Related Activities – Carbon Neutrality, is under development by the International Organization for Standardization (ISO). This is expected to be published in 2023.



C: Define the Scope and Boundaries

The scope of reporting defines the product under assessment, sets out the GHGs to account for and defines the common unit of analysis.

The product under this Framework is a gas or LNG exported from a defined stage (Stage Statement) or delivered as an LNG Cargo (Cargo Statement). A template for the Cargo Statement is included with this Framework, which incorporates the reporting of a Stage Statement.

UNIT OF ANALYSIS

In order to ensure consistency in reporting, a common unit of analysis must be used. The functional energy-based unit of million Btu (mmBtu), on a higher heating value (HHV) basis, of product has been selected as the common unit of analysis for the allocation of GHG emissions to the product from each life-cycle stage included in the reporting boundary. The GHG intensity of LNG will therefore be expressed as metric tonnes of carbon dioxide equivalent (CO₂e) per million Btu (CO₂e/mmBtu) of product, or other equivalent intensity ratio of mass of emissions (as CO₂e) per unit of energy.

BASIS OF REPORTING

In line with the GHG Protocol and PAS 2060:2014, as well as industry emissions accounting methodologies, such as the API Compendium, the seven Kyoto Protocol GHGs⁶ (CO₂, CH₄, N₂O, SF₆, PFCs, HFCs, and NF₃) form the basis of calculation of CO₂e under this Framework. If any GHGs are excluded, these need to be justified and it will be the responsibility of a verifier to assess whether any omissions may result in a material misstatement. Given the nature of processes associated with the LNG life cycle, SF₆, PFCs, HFCs, NF₃ are likely to be deemed insignificant and reporting of CO₂, CH₄ and N₂O, are set as the minimum criteria under this Framework.

To calculate the CO₂e emissions, a Global Warming Potential (GWP) is used that reflects the global warming impacts of different GHGs in comparison with one unit of CO₂. The source of GWP values is the IPCC Assessment Report (AR), which is updated periodically. Best practice, adopted by this Framework, is to apply the most up-to-date GWP values based on a 100-year timeline. At the time of initial release of this Framework, the latest version is AR6⁸. Whilst it is

acknowledged that the IPCC AR also sets out a 20-year time line for GWPs, accounting under this Framework applies a 100-year timeline to be consistent with established GHG accounting approaches, including the GHG Protocol, industry guidance (e.g. IPIECA, API Compendium), national reporting regulations and carbon offset methodologies.

Based on the member survey conducted during development of this Framework, some operators may still apply AR4 GWPs in their entity GHG reporting. As the Framework asks for separate reporting of methane emissions, it is expected that the GWP will be updated to the latest and applied consistently across all life-cycle stages. Transparency on the GWP is therefore an essential component of the Cargo Statement and any use of superseded GWPs should be avoided if possible and justified to the verifier.

The Framework also recognises that the GWP of methane continues to be reviewed. Users of this methodology must incorporate any changes to GWPs at an appropriate time, particularly noting the distinction provided in IPCC AR6 between methane from fossil sources and methane from natural sources (classified as vegetation, soil, fire, lightning, volcanoes, and oceans).

Reporters should be aware that secondary default emission factors for CO₂e have embedded GWPs that may not be transparent. Where possible, separate emission factors for CO₂, CH₄ and N₂O should be applied. The GWPs applied should be identified, disclosed, and taken account of in assessment of data uncertainty.

Reporters should be mindful that reporting regimes in place within the LNG life cycle stages may operate with different scopes of GHG reporting. For example, under the EU Emissions Trading Scheme (EU ETS), only CO₂ from stationary combustion sources is included (methane, and N₂O are excluded) and the International Maritime Organisation (IMO)'s Energy Efficiency Design Index (EEDI) regulations currently covers only CO₂ emissions (methane has been identified for future phases). To align with this framework, additional calculations may therefore be required to extend existing GHG accounting to fully meet the boundary requirements of included gases and attributable processes.

A key priority is to include all relevant sources of methane loss, an area for which reporting may be incomplete (for example fugitive emissions across all stages and methane slip from shipping).

[8] IPCC (2021) Sixth Assessment Report

GIIGNL Framework Criteria – BASIS OF REPORTING

| | |
|---------------------------------------|--|
| Focal Product | Gas or LNG exported from a defined stage (State Statement) or delivered as an LNG Cargo (Cargo Statement) |
| Common unit of analysis | mmBtu (or equivalent energy unit) on HHV basis |
| Greenhouse gases (GHG) | CO ₂ , CH ₄ , N ₂ O, SF ₆ , PFCs, HFC _s , NF ₃ (GHGs other than CO ₂ , CH ₄ and N ₂ O are likely to be insignificant for the LNG product) |
| Global Warming Potential (GWP) | The most up-to-date GWP values based on a 100-year timeline as set out in the latest IPCC Assessment Report The GWP applied must be transparently stated in the Cargo Statement |
| GHG intensity unit | tCO ₂ e/mmBtu (or equivalent mass:energy unit) |

BOUNDARIES

Emission Sources

Within the physical boundary chosen for reporting, all sources of GHG emissions must be included in the assessment for each stage. Specific sources will be identified and assessed for each relevant stage and sources will include, as relevant:

- Stationary combustion and flaring, including unburnt methane emissions from flares and methane slip from ships
- Mobile combustion, including product transport (LNG, BOG and liquid fuels) and applicable support services(land/marine/air)
- Venting
- Fugitive losses
- Emissions due to imported energy (electricity, steam, heat, cooling)

At entity level, the relevant sources may be categorised according to Scope 1 (direct emissions), Scope 2 (indirect emissions associated with imported energy) and Scope 3 (other indirect emissions) as set out in the GHG Protocol Corporate Standard and supporting

guidance for Scope 2 and Scope 3. Product accounting approaches, as set out in the GHG Protocol Product Standard or ISO14067:2018, do not apply the concept of scopes and focus on emissions that are attributable to the product across its full life cycle regardless of operator control. Life cycle emissions associated with purchased energy are separately treated as Scope 2 (associated with generation of the power) and Scope 3 (emissions associated with the upstream production and processing of fuels used to generate the power, and losses associated with distribution and transmission). Under the product GHG footprint standards, all these elements need to be taken into account.

GIIGNL Framework Criteria – EMISSION SOURCES

All sources of emission to be included, including:

- Stationary combustion and flaring, including unburnt methane emissions from flares and methane slip from ships
- Mobile combustion, including product transport (LNG, BOG and liquid fuels) and applicable support services (land/marine/air)
- Venting
- Fugitive losses
- Emissions associated with imported energy (electricity, steam, heat, cooling)

Life Cycle Stages

LNG is natural gas that has been converted to a liquid state through cooling, (this stage is called liquefaction, and results in a much lower volume for ease of transportation). The LNG is transported on specially designed tankers to other markets. During shipment, some LNG is continually evaporated back to a gas as “boil off gas” (BOG), which may be re-liquefied by re-liquefaction units on board or used to supplement or as an alternate to bunker fuel for the carriers. Once arrived at the receiving facility, the LNG is transferred to storage facilities until required for transport into the gas pipeline system, when it is regasified and distributed. Upstream of liquefaction, and downstream of regasification, the stages in the value chain of LNG are the same as that of natural gas.

Under this Framework there must be full transparency of the life-cycle stages included in the Cargo GHG Footprint. A full life cycle ‘cradle to grave’ approach means all attributable emissions associated with the LNG cargo from well head up to and including end use combustion or final processing of the natural gas.

However, some reporters may utilise the Framework to account for a partial life cycle that includes a reduced set of the life cycle stages. It is acknowledged that, for LNG, ‘cradle to gate’ has been defined as both well head to delivery flange and also well head to regasification. This Framework therefore does not make a definitive definition of ‘cradle to gate’, but requires full transparency of the stages included.

The Framework also makes provision for developing Stage Statements. These may cover only one, or a subset of stages within the life cycle and are used as inputs to the calculations by the Reporter undertaking the cargo GHG Footprint quantification.

A schematic overview of the LNG life cycle stages is shown in Figure 4.

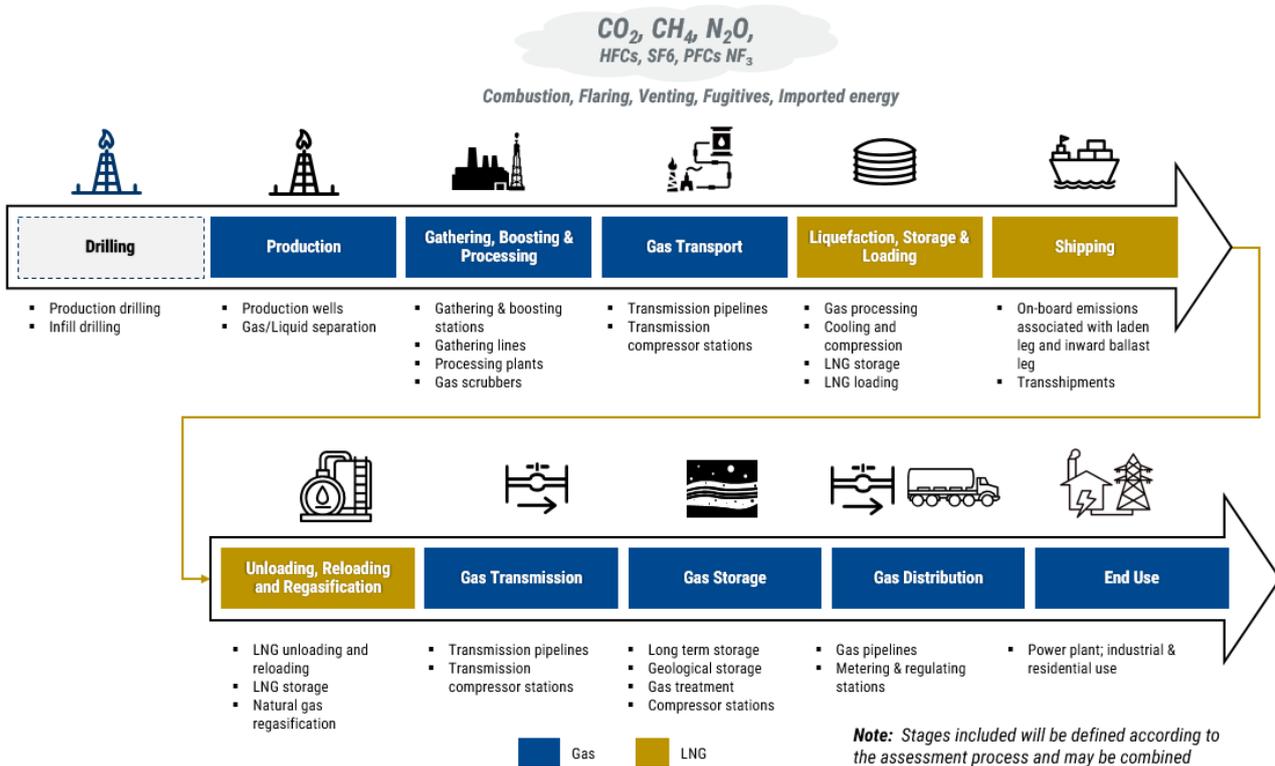


Figure 4: LNG Life Cycle Stages

Exclusions

The life-cycle standards require transparency and justification for any exclusions from the boundary of the GHG Footprint calculations. The following potentially attributable processes have been identified as exclusions from the boundary for the purpose of this Framework, although they may be added if considered significant. If included, these should be explicitly referenced in the Cargo Statement and not combined with production emissions. This is to facilitate like for like comparison between statements.

- **Construction activities and materials**
Emissions associated with construction, extension and dismantling activities, as well as capital goods such as steel, concrete for construction and maintenance
- **Production materials**
Raw material used in production operations such as amines used in acid gas removal, glycol used in dehydration, thermal heat transfer fluids, lube oil etc.
- **Exploration**
Due to the temporal nature of their emissions and complexity in accurate amortise to lifetime production, exploration drilling is not required to be included. Production drilling, including infill drilling, should be assessed for significance and if applicable transparently included
- **Commissioning and Decommissioning**
The timing and quantification of emissions associated with decommissioning will be difficult to attribute to the cargo with any degree of accuracy. First commissioning (construction stops at ready for gassing-up) and the last decommissioning (decommissioning stops at end of inerting) are attributable, but will typically make a small contribution over the lifetime operation of the equipment/installation. These should be assessed for significance and if applicable transparently included.

| GIIGNL Framework Criteria – PHYSICAL BOUNDARIES | |
|---|---|
| Full life cycle, 'cradle to grave' | All life-cycle stages from wellhead (including production and infill drilling) up to and including end use ('cradle to grave') |
| Partial life cycle, 'cradle to gate' | A 'cradle to gate' boundary under this Framework is defined as wellhead up to and including either the delivery flange at the unloading port, or regasification. The end-point must be explicitly and transparently defined |
| Partial life cycle, 'stage specific' | For Stage Statements, the included stage(s) assessed must be explicitly defined |

SHIPPING BOUNDARIES

The shipping stage presents particular GHG accounting challenges in relation to boundary setting and the shipping stage-specific voyage and reporting boundaries are laid out below.

Sources of relevant GHG emissions from shipping activities include:

- Fuel combustion of all fuels including LNG, Boil off Gas (BOG) or liquids
- Methane slip from incomplete fuel combustion
- On-board venting
- Fugitive emissions associated with flange and equipment leaks
- On board emissions associated with loading/unloading/reloading

Shore based emissions (both direct and from imported power) during loading, unloading and reloading are assumed to be included in the respective terminal emissions and not included in the shipping stage. The Reporter must ensure that all such emissions have been included within the overall GHG footprint boundary.

The shipping stage of the life cycle will include both the laden leg and one ballast leg, in line with emerging expectations such as IMO, Global Logistics Emissions Council (GLEC) Framework, and Sea Cargo Charter.

- **Laden leg** emissions should be calculated from the open Custody Transfer Measurement Statement (CTMS) at the load port up to and including the closing of the CTMS at the discharge port. Floating Storage and Regasification Units (FSRU) or other floating storage are also considered to be the discharge point for the purposes of this Framework. Alternative boundaries for the laden leg may be considered where shown to have no material influence on emissions estimates, e.g. flange connection / disconnection, pilot on-board at the load port to pilot off-board post-discharge.
- The shipping stage will include the **inward ballast leg**, which is defined for the purpose of this Framework as the full unladen previous journey from the last discharge port, dry dock or lay-up location. These boundaries also apply to cargo swaps and third-party cargo purchases.

Note that it is important to ensure that loading and unloading emissions are included in the footprint, and these will typically be accounted for within the emissions of the on-shore loading or unloading facility. Emissions from the ship during loading, re-loading or unloading should be included within the shipping emissions.

Transshipments

If the LNG has been subject to transshipment between its originating and destination port, then the laden leg should include the complete voyage from initial loading port to final discharge port, and also take account of emissions associated with the unloading and reloading associated with the transshipment service. This applies for ship-to-ship transshipments at sea, ship-jetty-ship and ship-storage-ship operations.

Ballast legs preceding each of the laden legs must also be included in reporting. In cases where transshipment facilities are an integrated part of LNG project value chain, with a long term transshipment agreement, and dedicated vessels are utilised by a project under a long term time charter, the shipping stage prior to trans-shipment may include the laden leg from the loading port and the return ballast voyage to the loading port, instead of the inward ballast leg of this vessel as part of GHG accounting, as well as an attributed share of the GHG emissions from the transshipment terminal itself.

For the laden leg and ballast legs upstream of the transshipment point, assumptions may need to be applied based on representative data.

Exclusions from Shipping Boundary

Exclusions from the shipping stage boundary include:

- Re-positioning that is unrelated to the LNG Cargo
- Emissions associated with carrier movements for the commercial purposes of the ship owner, e.g. stays in shipyards for the purpose of refit, dry dock or construction
- Search and Rescue

GIIGNL Framework Criteria – SHIPPING BOUNDARIES

Shipping specific boundary criteria

- Laden leg from liquefaction plant to unloading Terminal
- Inward ballast leg from point of mobilisation of the ship
- Interim transshipments and transfers included



D: Calculate the GHG Footprint

The GHG footprint standards ISO 14067:2018, GHG Protocol Product Life Cycle Accounting and Reporting Standard and PAS 2050:2011 all require that site-specific data are collected for individual processes where the organisation undertaking the assessment has financial or operational control. The purpose of making provision for Stage Statements under this Framework is to enable individual stage owners to follow a site-specific approach and therefore increase the availability of primary data within a Cargo GHG Footprint that is reported by another party.

A Reporter should aim to maximise the availability of site-specific data used in the GHG Footprint determination, both from operations under its control and through the use of Stage Statements from other operators as far as possible. It is recognised that the availability of Stage Statements may be limited during early adoption of this Framework.

GHG FOOTPRINT METHODOLOGY

A documented methodology, the 'GHG Footprint Methodology', must be developed by the Reporter that sets out the approach to determine the GHG Footprint in line with the criteria set out in this Framework and the applicable footprint standard. The description of calculations applied for emissions accounting and allocation must be sufficiently detailed to ensure consistency of calculations over time and to form the basis for verification.

Where appropriate, the GHG Footprint Methodology may cross reference to established facility level measurement, monitoring and reporting procedures that govern data collection and quality control. Where periodic rather than continuous data collection methods are used (e.g. gas composition analysis), then it must include the frequency of data collection and sampling. It will include sources of primary and secondary data and the approach to selecting and applying secondary data methods.

The GHG Footprint Methodology will set out the approach to determining attributable processes and the allocation of GHG emissions to the product.

This methodology and associated procedures must be available to the verifier.

Quality Control

The means of conducting internal quality control over the GHG Footprint accounting process should be set out in the GHG Footprint Methodology and implemented before issuance of the Stage Statement or Cargo Statement.

Review of the GHG Footprint Methodology

It is recommended that the Reporter's GHG Footprint Methodology is reviewed at least every reporting cycle, and is kept up to date to reflect any relevant changes (e.g. attributable processes, methodological criteria or data sources such as updated GWP or increased availability of primary data).

GIIGNL Framework Criteria – GHG FOOTPRINT METHODOLOGY

- Document and implement a GHG Footprint Methodology
- Review the GHG Footprint Methodology annually

GHG Footprint Assessment

The following seven steps guide the development of a GHG Footprint using one of the three carbon footprint standards referenced under this Framework. The approach does not replace the standards, but provides context for using the standards for an LNG cargo.

Further elaboration on these steps is provided in Appendix C: GHG Footprint Quantification Guidance and Criteria.

| Step | Description and Key Criteria |
|---|--|
| Step 1: Select GHG footprint standard | <p>A GHG Footprint aligned with this Framework will be based on an established standard for product accounting. Three aligned standards are applicable: ISO 14067:2018, the GHG Protocol Product Standard and PAS 2050:2011.</p> <p>The standard selected by the Reporter must be referenced in the Cargo Statement.</p> |
| Step 2: Identify attributable processes within each life-cycle stage | <p>Within each life-cycle stage included in the boundary, identify processes that are totally or partially attributable (directly related) to the LNG production and use life cycle. This attribution supports the allocation of GHG emissions to LNG production and co-products in the calculation approach from those attributable processes. GHG emissions arising from non-attributable processes are excluded from allocation to the LNG production and use life cycle.</p> <p>A Process Map should be developed and included in the GHG Footprint Methodology, which clearly identifies all processes within the stage boundary and clearly indicates those that are attributable (fully or partially) or non-attributable to the LNG cargo.</p> |
| Step 3: Set time boundary for the GHG footprint assessment | <p>A defined time boundary must be established for data collection and calculation of the GHG footprint.</p> <p>For shipping, it is expected that this will be on an actual voyage basis.</p> <p>For other stages, 12 consecutive months is considered reasonable as this may be synchronised with annual reporting cycles and will smooth the impact of seasonal variation and abnormal events (e.g. shut downs, process instability). The 12 month period may be on a fixed or rolling basis and the GHG Footprint must be reviewed at least annually.</p> <p>Where a significant proportion of secondary data is being used, such as that drawn from public reporting databases and regulatory programmes, it is recognised that there may be a lag between reporting and data availability for use in calculations. The principle, however, remains the same in that the most recent data available should be used and the data reviewed and updated with a frequency not greater than every 12 months and the most recent data available must be applied.</p> |
| Step 4: Determine emission quantification and allocation methodologies | <p>Emission calculation methodologies will include all relevant GHG emissions determined within each stage included within the reporting boundary. Existing GHG reporting systems may need to be extended to ensure full coverage of gases and sources and to capture product and co-product flows.</p> <p>Emissions will be calculated based on established GHG quantification methodologies applicable to each stage.</p> <p>Where site-specific data are used, emissions will be allocated between the LNG and other co-products based on the processes that have been determined to be attributable to the LNG on the basis of energy content as the selected unit of analysis. Other bases of analysis may need to be employed for products that do not have energy content such as helium, with physical basis such as mass preferred over an economic or other basis of assessment.</p> |

| Step | Description and Key Criteria |
|---|--|
| <p>Step 5: Collect data for each stage</p> | <p>Data sources must be identified in the GHG Footprint Methodology, including the full chain of data from origination to final reporting, such as fuel gas meter, gas export meter, gas sample etc.</p> <p>A hierarchy of data preference is established as:</p> <ul style="list-style-type: none"> • Primary Direct: Direct primary data, such as metered flow measurements, gaseous fuel sampling, and product flow measurement. It is particularly important to source primary data for the most significant emission sources. • Primary Indirect: Indirect primary data, such as component counts and engineering assumptions, modelled gaseous fuel composition based on the specific process. Standardised component leakage rates, if modified based on primary direct gas compositions would also be primary indirect data. • Secondary Direct: Cargo-aligned secondary data, including process level default factors and those based on specific regional or basin level assumptions. Use of LCA models that allow input of primary data from the cargo life cycle (e.g. LCA models such as OPGEE) fall into this level. • Secondary Indirect: Secondary factors and LCA models that are not related to the characteristics of the specific stage owners across the defined cargo life cycle. This would include stage-based emission factors and LCA models that are unrelated to the characteristics and sources of the cargo. Whilst secondary factors may be a pragmatic approach to calculating emissions from minor sources, significant use of non-specific secondary data will not meet the requirements of the GHG footprint standards and the criteria defined for this Framework. Sources of default or fixed factors must be stated. <p>The expectation is that that the Reporter will be able to demonstrate why they are unable to meet a higher level if Primary Direct data are not used.</p> <p>The Reporter must disclose in the Cargo Statement the approximate proportion of primary data used in the calculation of the disclosed GHG intensity and absolute emission data. This requirement requests disclosure against four bands:</p> <ul style="list-style-type: none"> • 0-25% primary data • 25-50% primary data • 50-75% primary data • 75-100% primary data <p>A GHG Footprint built entirely from secondary data is not expected to conform to the requirements of ISO14067:2018 or to other GHG footprint standard, and therefore will not conform to this Framework.</p> <p>Data collection should be subject to internal quality assurance to ensure good quality data are used in the reported GHG Footprint.</p> <p>The quantification and allocation approach, including sources of data and justification for choices made, must be documented in the GHG Footprint Methodology and made available to the verifier.</p> |

| Step | Description and Key Criteria |
|---|--|
| <p>Step 6: Roll up data from each stage, taking account of allocation of emissions associated with co-products</p> | <p>Where there are multiple products produced in a stage or process, it is necessary to allocate GHG emissions as far as possible to the inputs to the product (LNG cargo or export gas from an individual stage) and co-products in order to calculate the GHG intensity (tCO₂e/mmBtu) to be used in the Cargo GHG Footprint calculations.</p> <p>An energy-based co-product allocation across the value chain has been established within this Framework as the preferred approach. Where energy allocation is not possible, the hierarchy of allocation approaches is energy>mass>economic value or other. Allocation to co-products should be performed at the most granular level possible in order to increase the accuracy of the allocation between products and co-products. Note that wastes are not considered to be co-products and there is no allocation related to self-consumption of gas as a fuel.</p> <p>It is also necessary with the allocation process to account for losses, or 'shrinkage', from one stage to the next occurring due to the use of gas as a fuel within some of the processes, losses due to flaring, venting and fugitives, or due to removal of co-products.</p> <p>Appendix C provides further description, as well as worked illustrative examples describing an 'absolute emissions' (or 'carry forward') approach and an 'emissions intensity' (or 'shrinkage factor') approach.</p> <p>To transfer emissions from each Stage to the next along the chain in order to compile the GHG Footprint, two key parameters are needed:</p> <ul style="list-style-type: none"> • The GHG intensity from the preceding stage • Quantity of gas passed from one stage to the next <p>These two values will enable the emissions to be 'rolled along' from one stage to the next and may require further manipulation by the reporter or by operators of specific life cycle stages, though the principles of the approaches remain valid.</p> |
| <p>Step 7: Quantify total emissions associated with the LNG Cargo and emissions intensity</p> | <p>The last step in the GHG Footprint quantification is to prepare the emissions data based on the GHG quantification, allocation and aggregation across all relevant stages, for presentation in the Cargo Statement.</p> <p>These data will include, at Cargo and/or Stage level as applicable:</p> <ul style="list-style-type: none"> • GHG intensity (CO₂e/mmBtu) • Methane intensity (tCH₄/mmBtu) • GHG emissions (tCO₂e) • Methane emissions (tCH₄) <p>Note that other mass:energy unit can be utilised, with energy on HHV basis.</p> <p>Ensure that all steps taken are documented in the GHG Footprint Methodology, with evidence retained to support verification.</p> |

PARTICULAR CONSIDERATIONS FOR GHG FOOTPRINT ASSESSMENT

Shipping Stage Data Considerations

The shipping contribution to the Cargo GHG Footprint is expected to be based on primary data. Where cargo swaps, in-charters and monitoring equipment failure require the use of secondary data, the Reporter will need to satisfy the verifier that the best available data were used. Where transshipments are made during the course of a voyage, these should be based on metered primary data where possible.

Methane and N₂O emissions may be based on the use of standard factors available from empirical studies, manufacturers and industry bodies⁹ where primary emission factors are not yet available. This is consistent with reporting of other stages, and it is expected that data quality will improve over time, and in line with industry expectations and regulation.

In the case of the inward ballast leg, it is recognised that primary data may not always be available, and the Framework has adopted similar principles to that of Sea Cargo Charter¹⁰ including:

- Using Automatic Identification System (AIS) data to determine the length of the ballast voyage and a known or class-based Energy Efficiency Operational Indicator (EEOI) value or other modelling approach
- Extrapolating from similar known ballast legs either for a specific carrier or based on similar class of carriers
- Using distance tables or voyage calculator based on the ballast speed and consumption

Methane

GIIGNL recognises the importance of methane emission quantification and reduction in the transition to a 'low-carbon' economy and is fully aligned with complete and transparent reporting of methane emissions. Methane emissions are required to be reported separately in the Cargo Statement. Similar to other aspects of the life cycle emissions, the Framework is not prescriptive in this area and is based on verifier assurance that methane is reported as fully and as accurately as practicable, in line with a general expectation that methodologies will continue to improve with time resulting in a greater use of direct primary data.

It is also recognised that there are a growing number of methodologies and approaches to measuring or

estimating methane emissions in the oil and gas supply chain, such as Project Canary/IES Trustwell, MIQ, OGMP 2.0 as well as other rapidly evolving remote sensing approaches. Reporters are expected to be aware of these approaches and to implement the most appropriate, and highest-quality approach for their operations, with particular attention to the needs of a verifier to support the verification.

The Framework encourages the use of primary data, which requires direct measurement or source-specific emissions calculations and includes the use of data originating from Leak Detection and Repair (LDAR) as an approach to fugitive emissions estimation. In this regard, the primary data for methane referenced by the Framework is consistent with OGMP 2.0 Level 4 and 5 methods for reporting methane emissions. An estimated methane emission based on e.g. a specific component count, and using API compendium leakage rates, modified for the specific gas composition is aligned with the primary indirect approach. Where specific leakage rates become available, this would be primary direct.

Accounting for Purchased Energy

Electricity or steam generated internally (within the footprint accounting boundary) and consumed by an attributable process will be accounted for based on the life cycle of the energy supply system (the extraction and processing of fuels used for energy generation), GHG emissions during generation of electricity (including transmission and distribution losses).

Electricity or steam purchased from a third party, and consumed by an attributable process will be accounted for on the basis of an emission factor directly associated with the supply if available, or in the case of electricity, on the most recent emission factor available for the grid from which the electricity is sourced. This again must also include emissions associated with transmission and distribution losses and the life cycle emissions of the energy supply system. Life cycle factors for fuels used in energy supply may be based on data sources such as the UK Government conversion factors for company reporting of GHG emissions.¹¹ The most recent factors available should be applied.

[9] Examples include The International Council on Clean Transportation Working Paper 2020-02, the API Compendium, AP-42, as relevant to each emission source

[10] <https://www.seacargocharter.org/>

[11] <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>

The GHG Protocol Scope 2 guidance sets out two approaches to reporting the emissions associated with generating electricity.

- A **market-based** method that quantifies purchased energy emissions based on GHG emissions emitted by the generators from which the reporter contractually purchases electricity bundled with instruments, or unbundled instruments on their own. It reflects a positive action to enter into a contract to source specific type of product. Examples include a direct Power Purchase Agreement (PPA) with the supplier or the cancellation of Energy Attribute Certificate (EAC) such as EU Guarantee of Origin (GO), US Renewable Energy Certificates (RECs) or international Renewable Energy Certificates (iRECs). Although a tradeable commodity, where EACs are used, these must have been issued within the same region as the energy supplied.
- A **location-based** method quantifies purchased energy emissions based on the GHG emissions associated with average energy generation emission factors for defined locations, including local, subnational, or national boundaries.

Under this Framework a market-based approach would be considered 'Primary Direct data' because it has a specific link between the actual electricity consumed and the generation source. A location-based approach would be considered 'Primary Indirect' because it utilises actual electricity use, but references a grid average of multiple generation sources. A market-based approach is therefore preferred under this Framework and provides a means of demonstrating the benefits of emission reductions associated with contracts for renewable electricity or 'low carbon' energy.

Note that the GHG Protocol approach to market-based and location-based accounting is relevant to accounting for the generation of the energy, and does not include the additional emission associated with the extraction and processing of fuels, which will need to be added.

Reference should be made to guidance on treatment of contractual instruments, for example in ISO 14067:2018 and the GHG Protocol Scope 2 Guidance.

Accounting for CCUS and Removals

Removals include, for example, Direct Air Capture (DAC) or certain nature-based solutions. Carbon capture, utilisation and storage (CCUS) is not characterised as a removal since it prevents release of GHGs but does not remove them from the atmosphere. CCUS would include both carbon capture and permanent storage as well as carbon capture and usage of CO₂ for purposes such as enhanced oil or gas recovery (EOR/EGR), or other CO₂ usage. CCUS within the life cycle boundary will not be incorporated in the footprint as a negative emission (the footprint is based on net emissions), but may be reported separately as a 'low GHG feature' for the relevant Stage. Direct removal of GHGs from the atmosphere (for example via DAC) may be accounted for as 'project-based emission reduction' and verified in line with a relevant project accounting standard such as ISO 14064-2:2019 and/or methodologies associated with a recognised GHG offset programme.

When accounting for CCUS, permanence and capture efficiency must be taken into consideration. The CCUS process will be categorised as an attributable process if it stores GHGs that would otherwise have been emitted from an attributable process. All emissions associated with the CCUS activity, including energy and fugitive losses, must be allocated accordingly to the export gas and other relevant co-products. The portion of CO₂ captured, used or stored should be accounted individually, balanced within the overall GHG footprint calculation and confirmed during verification. Where CO₂ is utilised in enhanced oil recovery (EOR) any allocation must only be made on the basis of the permanently stored portion of the CO₂.

If a CCUS or emission removal initiative has been developed into an emission reduction project under an offset program, with credits sold to another party, then the removals associated with the sold credits must be added back into the GHG footprint of the LNG cargo. This is to avoid double counting of the offset. Such a project also cannot be declared as a 'low GHG feature' of the delivered LNG.

Any use of CCUS to reduce the GHG Footprint or direct GHG removal from the atmosphere for GHG offsetting must be fully transparent in the Cargo Statement.



E: Identify 'Low GHG Features' within the Cargo GHG Footprint

As a means to provide qualitative information that may help to distinguish between LNG Cargoes, and also provide transparent reference to emission reduction or avoidance initiatives already in place at the time of developing the Cargo GHG Footprint, Reporters are asked to describe any 'low GHG features' that are embodied within the footprint.

These features are considered passive advantages already associated with a supply source within the footprint boundary and differ from planned actions that would be implemented through a GHG Reduction Plan (see Section F). These features will be reported in the Cargo Statement.

Examples may include:

- CO₂ content of field gas
- Inclusion of biogas or other non-fossil source of gas
- Transport distances
- CCUS, e.g. at the upstream, LNG production or end use stage
- Low GHG emission power supply (with direct PPA or cancelled EACs) for imported energy
- Electric drive technology in the liquefaction plant (where there is corresponding power purchase agreement (PPA) for low carbon energy or cancellation of certified Energy Attribute Certificates (e.g., RECs)
- Waste heat recovery
- Flare and venting elimination
- Carrier design, chartering carriers with high RightShip GHG Rating¹²
- Alternative lower carbon fuels in shipping

Where a low GHG feature is included, the Reporter should describe the reference criteria used to classify the feature as 'low GHG'.

Indirect climate benefits, for example through displacing higher emission intensity fuels used to generate electricity and other energy supplies in the destination market are relevant to the industry as a whole, but are not considered features of a delivered LNG Cargo.

It is intended that sharing the low GHG features in the Cargo Statement will help facilitate the sharing of best practice and progress made to decarbonise the LNG sector.

GIIGNL Framework Criteria – LOW GHG FEATURES

- Low GHG features disclosed in the Cargo Statement
- Reference criteria must be provided

[12] <https://www.rightship.com/resources/news/the-origins-and-future-of-rightship-s-ghg-rating/>



F: Develop GHG Emission Reduction Plan

To support the deep commitment needed to fulfil a GHG Neutral claim under this Framework, and in line with PAS 2060, the Reporter must be able to demonstrate a GHG Emission Reduction Plan designed to achieve reductions in GHG emissions within the selected LNG cargo life cycle boundary.

Reducing emissions and taking active steps towards decarbonisation are fundamental to achievement of the Paris Agreement's aims. Offsetting is considered the last resort to compensate for emissions that cannot yet be avoided or reduced and GIIGNL has adopted this approach to underpin a declaration of GHG Neutral in alignment with this Framework. This approach is aligned with PAS 2060 and independent 'carbon neutral' certification initiatives. In particular, the Framework's use of reporting by stage of the value chain allows a Reporter to demonstrate a GHG Footprint reduction plan by segment of the value chain.

The reduction plan will include both a commitment to reducing GHG emissions and the identification of positive actions that will be taken to reduce or eliminate GHG emissions. These emission reductions must be within the boundary of the Cargo GHG Footprint – i.e., associated with at least one of the stages included in the footprint calculation.

The reduction plan may address how initiatives taken by stage owners across the life-cycle boundary are taken into account, but the responsibility for the GHG Emission Reduction Plan rests with Reporter.

COMMITMENT

For 'GHG Neutral' declarations, a Reporter is expected to make a commitment to long-term decarbonisation at an entity level and also to achieving and maintaining neutrality of the subject (a specific cargo or 'GHG Neutral product line'). Maintenance of neutrality of the subject of a GHG Neutral declaration is a requirement of PAS 2060.

For LNG cargoes that are declared as either 'GHG Neutral' or 'GHG Offset with Reduction Plan', the Reporter must commit to developing and implementing a GHG Emission Reduction Plan relevant to the life cycle boundary included in the Cargo Statement.

GHG EMISSION REDUCTION PLAN

The GHG Emission Reduction Plan is intended to deliver a long term, sustainable, trajectory of reduced emissions. The planned emission reductions must include positive actions that:

- Are relevant to the life cycle stages included in the GHG Footprint
- Consider methane as well as other GHG emissions, and
- Go beyond compliance with existing legislation or standard business practice

The plan may address opportunities such as:

- Improved monitoring and reporting to facilitate identification of emission reduction opportunities (particularly in respect to methane losses)

- Changes to operating procedures and logistics planning, including preventive maintenance
- Fuel switching and investment in renewable energy
- Major capital investment in emission avoidance or reduction technologies, including CCUS

It is not possible to list all the permutations of LNG contract types that may fall under this Framework, and the verifier will evaluate whether the reduction plan is both meaningful and relevant. PAS2060 provides criteria for reduction plans, which will guide the Reporter. Guidance on how GHG reductions may be addressed under example arrangements is offered below (other arrangements will be possible):

| Example Cargo Category | Indicative Criteria for Emission Reduction Plan |
|--|--|
| <p>Long term supply contract for repeat deliveries from common base port</p> | <p>Defined plan for operational and technological GHG reductions across the specific life cycle stages included in the footprint of delivered cargoes under the supply contract. This may involve working with operators within the supply chain to provide stage based GIIGNL Framework aligned footprint data, information on reduction actions etc.</p> <p>Emission reduction actions can focus on long term investment initiatives within the cargo life cycle boundary.</p> |
| <p>Company commitment to provide GHG Neutral LNG as defined product (source and destination variable)</p> | <p>A company may commit to GHG Neutral LNG across a range of its supply contracts. In addition to reduction opportunities associated with a specific cargo, the reduction plan would evaluate, identify and prioritise emission reduction opportunities across its portfolio with the aim to achieve the greatest, and quickest, and most sustainable route towards decarbonisation.</p> <p>An assessment of potential reduction actions may reflect a cost benefit analysis across multiple sources and destinations of the LNG. However, for a Cargo Statement, it will be necessary to demonstrate how the emission reduction initiatives are reflected in that particular cargo.</p> |
| <p>One-off cargoes</p> | <p>The plan should identify means to minimise the GHG emissions associated with the cargo, which may be a component of a wider plan developed by the Reporter, and a review of whether these objectives were met and a plan for optimisation of future cargoes.</p> <p>A plan for a one-off cargo will be shorter term, but could include operational opportunities such as slow steaming and route planning or carrier choice and reflect emission reduction plans associated with individual stages within the GHG Footprint.</p> |

The plan will provide, at minimum, a qualitative description of GHG emission-reduction measures to be put in place within the life cycle boundary of the LNG cargo, accompanied by an indication of timelines and goals to quantify reductions. The plan must include positive actions to reduce at least carbon dioxide and methane emissions. Externalities (e.g. displacement of coal in destination markets) may be referenced, but are not considered to be part of the GHG Emissions Reduction Plan.

The GHG Emission Reduction Plan is the responsibility of the Reporter. It is not a requirement of Stage Statements that may be used to support a GHG Neutral declaration, but a Reporter may wish to ask a Stage Reporter to provide a supporting plan if in agreement between both parties.

EMISSION REDUCTION TARGETS AND PERFORMANCE TRACKING

Under PAS 2060, reductions achieved after setting the baseline will need to be reported, and targets/goals may be set in line with the Reporter's objectives. It is therefore important that there is transparent and verifiable accounting of reductions achieved as a result of planned actions.

As GHG accounting within all stages of the life cycle matures, particularly in relation to more accurate capture of methane emissions, there may be adjustments in the quantification of the GHG Footprint over time that result from monitoring and accounting improvements rather than real changes in emission profile. These changes may result in an increase (e.g. from capturing additional methane sources or an increase in the IPCC GWP values) or decrease (e.g. moving from a conservative secondary emission factor to a site-specific factor based on measurements) in the calculated GHG intensity. Both situations reflect improvements in accounting, but do not reflect changes in actual emission. Therefore, baselines need to be regularly reviewed and updated where there has been any significant adjustment due to methodological reasons to ensure that reported reductions are real, and to avoid disincentivising improvements in accounting.

The GHG Emission Reduction Plan will set out:

- The approach to establishing a baseline for cargoes that will be declared as GHG Neutral or GHG Offset with Reduction Plan
- GHG reduction targets
- Planned means of achieving the targets
- Criteria for baseline adjustment

Setting a baseline for assessing emission reductions can be a challenge, but in the case of a product footprint will typically represent the first footprint calculation period. PAS 2060 allows for the first GHG Neutral claim to be based on the baseline footprint with planned reductions. Industry benchmarks make a useful initial indication of comparative impact between cargoes and may be used to inform the level of ambition in target setting. However, a GHG Emission Reduction Plan will need to deliver reductions based on actual data from within the life cycle stages included within the GHG Footprint.

KPIs relevant to the Reporter and the cargo life cycle(s) covered by the plan should therefore be established that will enable genuine accounting aligned with project-based accounting approaches (e.g., GHG Protocol Product Standard) for emission reduction initiatives that have been implemented.

For Reporters adopting the pathway to GHG Neutral and GHG Offset with Reductions declarations, the Offset Strategy (see Section G) may be incorporated in the GHG Reduction Plan.

Review of the GHG Emission Reduction Plan

The GHG Emission Reduction Plan should be reviewed at least every 12 months.

GIIGNL Framework Criteria – GHG EMISSION REDUCTION PLAN

- Articulate a commitment to long term emission reduction and decarbonisation
- Develop a GHG emission reduction plan that identifies opportunities and actions to reduce emissions at defined stages within the life cycle boundary. The plan must:
 - Consider methane as well as other GHG emissions
 - Go beyond complying with existing legislation or standard business practice
- Ensure GHG accounting and KPIs differentiate between monitoring and methodology changes and real reductions
- Track actions taken and estimate of emission reductions achieved
- Review plan at periodic intervals (each cargo for one off transactions, or at least every 12 months for multi-cargo commitments)



G: Offset Emissions

It is now widely accepted that the use of carbon offsets should be additional, and marginal, to emission elimination action, offering a way to compensate only for emissions that cannot be otherwise reduced. This Framework recognises that there is a demand, at least in the near term, to simply offset the calculated footprint of the cargo, leading to a declaration of GHG Offset LNG. Entities choosing this declaration category are very strongly encouraged to use this only as a step towards building long term commitment and plan to deliver real and permanent emission reduction.

Offsets largely originated from the Kyoto Protocol's flexible mechanisms, based on cap and trade (e.g. EU ETS) or baseline and additionality systems (e.g. Clean Development mechanism (CDM), Joint Implementation (JI)). The CDM initiated many of the rules and methodologies applied across the wide range of baseline and additionality voluntary carbon market initiatives now available. A change in direction of the international negotiations (that caused the unbalance between demand and supply of credits), together with concerns over the environmental credentials of some early project types, particularly large hydroelectric dams and some industrial HFC projects, led to stagnation in the offset market between 2013 and 2017. Demand is now increasing again with the focus mostly on removals and on nature-based solutions, led by voluntary demand to support net zero targets and carbon neutrality, as well as the re-emergence of compliance programs that utilise offsetting such as CORSIA.

GIIGNL has decided not to establish a positive or negative list of project types, vintage or offset standards that are accepted under this Framework. This decision reflects the diverse needs of members and the expected near-term evolution of both voluntary and compliance markets as a result of Article 6 of the Paris Agreements, as well as the work of the Taskforce on Scaling Voluntary Carbon Markets (TSVCM), and Voluntary Carbon Markets Integrity Initiative (VCMI). At some point, offsets from voluntary schemes will need to be incorporated into national accounting systems (national inventories) and Nationally Determined Contributions (NDCs).

The criteria set by this Framework are that reporters will:

- Establish a transparent **Offset Strategy** that sets out the criteria for selection of project type and standard used
- Select **verified offsets** from standards that follow the key principles set out below

- Demonstrate that the offsets are transparently **cancelled/retired in a third-party registry**
- **Disclose the offset projects** used in the Cargo Statement, including the number or proportion of offsets acquired from each project

OFFSET STRATEGY

Reporters making a declaration of GHG Offset or GHG Neutral LNG are expected to develop a coherent Offset Strategy that sets out the approach to selection and sourcing of carbon offsets that meet the principles of this Framework.

This strategy may take into consideration:

- Company objectives, including commitment to net zero or preference for additional co-benefits, such as social, biodiversity or wider sustainability issues
- How the offsets acquired will align with company strategy
- National or regional policies on offset use or supply that are relevant to LNG Cargo life cycle
- Developments in the structure of international negotiations relating to the operation of the carbon market through Article 6 of the Paris Agreement; including use of 'corresponding adjustments' to national GHG accounting to avoid double counting of the offset with national commitments
- Development in the voluntary market, including reference to the work of the Taskforce on Scaling Voluntary Carbon Markets (TSVCM), and Voluntary Carbon Markets Integrity Initiative (VCMI)
- Stakeholder expectations, including buyers or users of the LNG Cargo

It is recommended that explicit consideration is given in the Offset Strategy emission removal opportunities.

The strategy should be aligned with the planned use of the Framework to support cargo deliveries. Where there is intent for repeated, or long-term supply of GHG Offset or GHG Neutral LNG, the strategy should take this into account and be subject to regular review.

The Offset Strategy must be fully transparent and publicly available.

PRINCIPLES

The following principles are adopted within this Framework to govern the selection of offset projects used to support GHG Offset with Reduction plan or GHG Neutral declarations. The principles reflect established criteria used to govern the creation of carbon offsets and are informed by the International Carbon Reduction and Offset Alliance (ICROA), TSVM, and VCM.

The selected GHG offsets must be:

- **Real:** there will be evidence that the project actually removes or reduces emissions
- **Measurable:** the volume of emission reductions/removals can be quantified, using recognised measurement methods
- **Permanent:** the reduction/removals are permanent and adequate safeguards are in place to minimise the risk of reversal
- **Additional:** the emissions reductions are additional to what would have occurred if the project had not been carried out
- **Avoid leakage:** offset projects must assess and mitigate against potential increases in emissions elsewhere resulting from the implementation of an offset project
- **Independently verified:** a third-party verifier has verified the reductions/removals to a reasonable level of assurance
- **Unique:** No more than one carbon credit can be associated with one tonne of emissions reduction/removal and a mechanism to prevent double counting is present. Registered on a third-party registry

The use of offsets verified and certified under standards that embody these principles is expected to form a key component of the offset strategy.

REGISTRY RETIREMENT

Like any commodity, there is an established market for trading carbon credits. It is therefore required that the carbon offsets are transparently registered and permanently retired or cancelled in a recognised third-party registry. Common registries in use at the time of issuance of this Framework include, among others, those operated by the United Nations Framework Convention on Climate Change (UNFCCC) (e.g. CDM), VERRA (e.g. VCS), Gold Standard, the American Carbon Registry (ACR), the Joint Crediting Mechanism (JCM) and the Climate Action Reserve (CAR).

Retirement of the offsets used to support GHG Offset or GHG Neutral declaration will be confirmed as part of the Cargo Statement verification.

DISCLOSURE IN THE CARGO STATEMENT

Transparency is fundamental to the credibility of transactions declared to be aligned with this Framework. The Cargo Statement will include a statement of the offsets used, confirmation of cancellation and the number of carbon credits that each project contributes towards the total.

A statement that the offsets have been selected and retired in line with the Reporter's Offset Strategy will also be included and conformance with the strategy will be confirmed by the Cargo Statement verifier.

OFFSET PROJECTS WITHIN THE LNG CARGO LIFE CYCLE BOUNDARY

If a carbon offset project has been established within the boundary of the LNG cargo life cycle, the following guidance is provided on the GHG Footprint accounting:

- Credits from an offset project associated with an attributable process within the boundary of stages included in the Cargo GHG Footprint are not eligible to compensate for emissions associated with the delivered cargo if the reduced emissions are already accounted for in the GHG intensity from that stage (e.g. where emissions are diverted for permanent carbon capture). This is to avoid double counting of the reduction since the lower emissions will already be included in the footprint calculation.
- If credits from an emission reduction project that is associated with an attributable process within the Cargo GHG Footprint have been registered and sold to a 3rd party, the equivalent tonnes of emission must be added back into the footprint calculation. This is because the reduced emissions have been used to compensate for GHG emissions outside the boundary and is also designed to prevent double counting.'

This means that offsets used under the Framework must originate from a boundary that is completely separate from the Cargo GHG Footprint boundary – including the market for end use of the gas where a full life cycle is included.

GIIGNL Framework Criteria – GHG OFFSETS

- Establish a transparent Offset Strategy that sets out the criteria for selection of project type and standard used
- Select verified offsets from standards that follow the key principles set out in the Framework and the Offset Strategy
- Maintain evidence that the offsets are transparently retired on a third-party registry
- Disclose the offsets used in the Cargo Statement, including the number of offsets acquired from each project



H: Prepare Cargo Statement

It is the responsibility of the Reporter to produce the Statement related to a Cargo or individual Stage(s) of the LNG life cycle, and to ensure that it is independently verified. The Reporter may determine the timing of verification, for example to allow annual verification of all statements issued in the previous year. The status of verification must always be transparently disclosed

and the Statement will not be considered final until verified. Section I (Conformity Assessment) provides further details.

Within the Statement, the Reporter must indicate the selected Declaration Pathway. Table 1 sets out the reporting expectations of each Declaration Pathway.

| | Stage Statement | LNG Cargo Footprint | GHG Offset LNG Cargo | GHG Offset LNG Cargo with Reduction Plan | GHG Neutral LNG Cargo |
|--|-----------------|---------------------|----------------------|--|-----------------------|
| Details of Reporter and LNG Cargo | | | | | |
| Statement Date | x | x | x | x | x |
| Reporting Entity/Entities | x | x | x | x | x |
| Seller | - | x | x | x | x |
| Load Port | - | x | x | x | x |
| Loading Date | - | x | x | x | x |
| Discharge Port | - | x | x | x | x |
| Discharge Date | - | x | x | x | x |
| Cargo quantity discharged and units (energy, HHV) State units used | - | x | x | x | x |
| Ship (Name / IMO number) | - | x | x | x | x |
| Declaration | | | | | |
| Declaration Category | x | x | x | x | x |
| Confirmation of alignment with the GIIGNL Framework | x | x | x | x | x |
| Verification status of the Statement | x | x | x | x | x |
| Signed declaration | x | x | x | x | x |
| Life Cycle Boundary | | | | | |
| Life cycle stages included in the GHG Footprint | x | x | x | x | x |
| GHG Emission Statement | | | | | |
| HHV energy content of gas or LNG included in the Statement. | x | x | x | x | x |
| Total GHG Emissions (CO ₂ e, CH ₄) | x | x | x | x | x |
| CO ₂ e and CH ₄ intensity in units of mass per unit energy | x | x | x | x | x |
| GHGs included in the CO ₂ e value | x | x | x | x | x |
| GHG offset retirement (tonnes) | - | - | x | x | x |
| Greenhouse gases included in the total carbon dioxide equivalent (CO ₂ e) emissions | x | x | x | x | x |
| Standards Applied | | | | | |
| Standards applied for development of GHG Footprint and GHG Neutral status (as applicable) | x | x | x | x | x |

| | Stage Statement | LNG Cargo Footprint | GHG Offset LNG Cargo | GHG Offset LNG Cargo with Reduction Plan | GHG Neutral LNG Cargo |
|---|-----------------|---------------------|----------------------|--|-----------------------|
| Stage-based GHG Data (note stages can be aggregated as relevant to the Reporter) | | | | | |
| Exported energy content | X | X | X | X | X |
| Stage specific CO ₂ e emissions | X | X | X | X | X |
| Stage specific CO ₂ e intensity | X | X | X | X | X |
| Stage specific CH ₄ emissions | X | X | X | X | X |
| Stage specific CH ₄ intensity | X | X | X | X | X |
| Verification status of Stage specific data | X | X | X | X | X |
| Stage-based Calculation Approach | | | | | |
| Estimated percentage of emissions based on primary data | X | X | X | X | X |
| Overview of calculation methodology(ies) applied | X | X | X | X | X |
| Date range of the emissions calculations | X | X | X | X | X |
| GWP applied | X | X | X | X | X |
| Low GHG Emission Features | | | | | |
| 'Low GHG emission' features within the boundary of the reported GHG Footprint | X | X | X | X | X |
| GHG Emissions Reduction Plan (stages aggregated as appropriate) | | | | | |
| Long-term decarbonisation commitment | - | - | - | - | X |
| GHG Emission Reduction Plan | - | - | - | X | X |
| GHG Emission reduction performance* | - | - | - | X | X |
| GHG Offsets | | | | | |
| GHG Offset Statement (balance of emissions and offsets) | - | - | X | X | X |
| Details of offset projects used | - | - | X | X | X |
| GHG Offset Strategy overview | - | - | X | X | X |
| GHG Neutrality | | | | | |
| Confirmation of full life cycle GHG Footprint | - | - | - | - | X |
| Verified PAS 2060 ¹³ Qualifying Explanatory Statement (QES) or equivalent | - | - | - | - | X |
| Conformity Assessment of the Statement | | | | | |
| Date verification undertaken | X | X | X | X | X |
| Entity responsible for the verification | X | X | X | X | X |
| Scope and boundary of the assessment | X | X | X | X | X |
| Level of assurance applied | X | X | X | X | X |
| Reliance on verification by other parties (e.g. stage level data) | X | X | X | X | X |
| Attached Verification Opinion | X | X | X | X | X |

Table 1: Reporting Expectations of each Declaration Pathway

A representative layout for a Cargo Statement (which incorporates a Stage Statement) has been developed to facilitate reporting. This is not considered a required template and other formats may be used if equivalent reporting content is included.

[13] A new international standard for determining carbon neutrality, ISO/WD 14068 Greenhouse Gas Management and Related Activities – Carbon Neutrality, is under development by the International Organization for Standardization (ISO). This is expected to be published in 2023.

The final declaration when making specific claims under the Framework will consist of the Cargo Statement(s) and Verification Report(s) and, in the case of GHG Neutral declarations, a verified QES in accordance with PAS 2060 (or equivalent).

DISCLOSURES MADE PRIOR TO VERIFICATION

In the event that a Cargo Statement needs to be shared, or a public claim made of the Cargo Declaration status, prior to completion of verification and issuance of the Verification Opinion, the status as ‘pending verification’ must be transparent to any stakeholder that may be in receipt of the Statement or any claims made in association with the planned status of the cargo. The final verified Cargo Statement, updated as appropriate to reflect any subsequent data reconciliation or verification findings, and the Verification Opinion must be made available to relevant stakeholders.

CONFIDENTIALITY

Details of input data to the calculation or the GHG Footprint and the Reporter’s internal procedures for measurement and monitoring of the GHG emissions may be classified as confidential to external parties. However, the independent verifier contracted by the Reporter must have unrestricted access to relevant information sources and personnel as required to complete the verification process.



I: Conformity Assessment

In order to ensure the credibility of reporting under this Framework, Stage Statements and Cargo Statements must be subject to independent third-party verification. This verification may be on a cargo-by-cargo basis, or on a ‘batch’ basis where a number of Statements are verified, for example to align with a corporate assurance schedule.

The general approach to verification is shown in Figure 5 below.

The ‘linear’ approach to verification, shown in Figure 5, may be applicable for a one-off cargo. However, where there are frequent cargoes to be verified a more pragmatic staged approach may be appropriate. There are three key assessments that must be included in the overall verification process as shown below. The verifier may work with the Reporter to design the optimum approach and timeline to achieving verification. There is no defined regularity for verification under this Framework, other than a minimum annual verification of cargoes delivered/used within the Reporters selected temporal boundary.

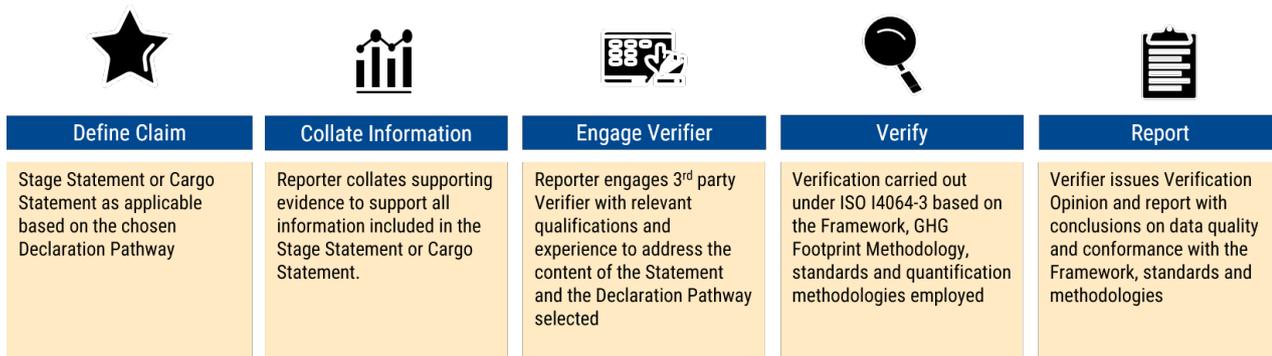


Figure 5: Approach to Verification

| Verification Step | Approach |
|---|--|
| a. Validation of the alignment of the GHG Footprint Methodology, GHG Reduction Plan and Offset Strategy (as applicable) with the applied standard and this Framework | To be undertaken before the first cargo, and reviewed annually to reflect any changes that would impact the GHG Footprint Methodology or other criteria (e.g. attributable processes, methodological criteria or data sources such as updated GWP or increased availability of primary data) |
| b. Verification of stage intensities and related information used in the GHG Footprint calculation | Methodology implementation and verification of Intensity data from stages with GHG intensity data should be verified on an annual basis, with the most recent verified period applied in the GHG Footprint calculations. This may be based on verified Stage Statements received from another party |
| c. Verification of the data and information associated with the delivered Cargo | <p>Verification of the final Statement, including details associated with a particular cargo must take place within 12 months of the delivery and may cover a batch of cargoes under one verification</p> <p>This verification would also include offset retirement, and for a GHG Neutral declaration, the verifier may also verify the PAS 2060 QES and conformance with the PAS 2060 standard</p> |

In this way, the verification may be undertaken based on the same cycle as a Reporter's GHG inventory verification as illustrated in the following example.

Example:

A Reporter delivers three cargoes in August, November and December 2022 that follow the GHG Offset declaration pathway. The steps may include:

- a. Q1 2022: Validation of the Carbon Footprint Methodology and Offset Strategy and verification of stage intensities based on 2021 data
- b. On delivery of each Cargo: Retirement of offsets and issuance of Cargo Statement with 'self-declared' GHG Offset Cargo Statement status based on partial verification
- c. Q1 2023:
 - Verification of 2022 Cargo Statements, including checking appropriate GHG Footprint calculation based on verified intensities, as well as additional information relating to the shipping stage, delivered LNG and offset retirement. Cargo Statements will be adjusted if applicable based on verification findings
 - Review of Carbon Footprint Methodology and Offset Strategy to confirm continued alignment and applicability
 - Verification of 2022 stage intensities for use in GHG Footprint calculations for cargoes delivered over the next period

VERIFICATION STANDARD

The standard to be applied for the verification of the Stage Statements or Cargo Statements under this Framework is ISO 14064-3:2019. This standard applies to verification of GHG assertions, and is relevant for both entities and products.

At stage level, the emissions may have been subject to compliance or corporate level verification or assurance. These will typically also be under ISO 14064-3, but may also be under the assurance standard ISAE 3410, which is designed specifically for entity level emissions. Assurance of an operator's corporate emissions may provide a level of confidence over the input data to the footprint calculation, but will not constitute verification of a product footprint prepared under one of the GHG footprint standards.

GHG ASSERTION

The assertion that is the subject of verification is the information set out in the Stage Statement or Cargo Statement, including quantitative emissions data and intensity data and supporting information related to Low GHG Features, the GHG Emission Reduction Plan and Offset Strategy as appropriate.

For a Reporter pursuing a GHG Neutral claim under PAS 2060, a 'Qualifying Explanatory Statement' (QES) as described in that standard will form a basis for verification together with the Cargo Statement supported by other outputs of this Framework (GHG Footprint Methodology, GHG Emission Reduction Plan and Offset Strategy).

VERIFIER QUALIFICATIONS

Verification entities accredited under ISO 14065:2020, or the latest versions of that standard, will have established procedures to control competence and delivery of GHG verification engagements based on ISO 14064-3:2019. To govern the integrity of Statements issued under this framework, it is expected that the Reporter will use a verifier that meets this accreditation requirement.

Accreditation dictates the governance procedures of the verification entity, including training and competence and audit team selection. The individual verification team must demonstrate skills and experience relevant to stages included in the Statement.

For the purpose of this Framework, the verification team must demonstrate, at minimum, the following competencies:

For all Declaration Pathways:

- GHG emissions quantification associated with all stages included within the footprint boundary (technical experts may be required for oil and gas processes, shipping data etc.)
- GHG verification skills under ISO 14064-3:2019
- Product life cycle accounting (for example accreditation to provide certification of product footprints under ISO 14067:2018)

For GHG Neutral declarations:

- Experience with verification of PAS 2060 declarations or equivalent

LEVELS OF ASSURANCE

The level of assurance is agreed with the verifier in advance, and will inform the planning of verification activities. Under ISO 14064-3:2019, the definitions of Limited and Reasonable assurance are:

- **Reasonable Assurance** where the nature and extent of the verification activities have been designed to provide a high but not absolute level of assurance on historical data and information. A reasonable assurance opinion is typically expressed in positive language ("we conclude that the Cargo Statement issued on [date] is a true and fair representation of the GHG Footprint and GHG Neutral declaration")
- **Limited assurance** where the nature and extent of the verification activities have been designed to provide a reduced level of assurance on historical data and information

A limited assurance opinion is typically expressed in negative language ("we conclude that nothing came to our attention that the Cargo Statement issued on [date] is not a true and fair representation of the GHG Footprint and GHG Neutral declaration").

The ambition of this Framework is to achieve a reasonable level of assurance. However, it is recognised that at least at early stages of adoption, this may not be feasible or cost effective and a limited level of assurance may be sought under this Framework. It is expected that the Reporter will have a plan to increase the level of assurance secured, particularly for Stage Statements which address only one stage of the life cycle.

The verification opinion provided on conclusion of the verification may be unmodified (“the Cargo Statement has been prepared in alignment with the Framework”) or modified (“the Cargo Statement has been prepared in alignment with the Framework except for non-material instances of non-alignment, or the Cargo Statement has not been prepared in alignment with the Framework”).

The verifier may also decide that there is not sufficient evidence to support verification, and the conclusion will be ‘unverified’.

RELIANCE ON VERIFIED STAGE STATEMENTS

It is the ambition of this Framework that, ultimately, all stage owners across the LNG value chain will develop the capacity to issue verified stage statements that will be used in the calculation of the GHG Footprint included in the final verified Cargo Statement.

Where Reporters are reliant on information from other life cycle stages, the verifier will need access to the organisation(s) that generated the data in order to review the complete dataset, unless they are able to rely on a verified Stage Statement in line with this Framework.

The verifier of the Cargo Statement will determine whether the applicable Stage Statement has been reported and verified in accordance with the Framework and will take the decision on the reliance that can be placed upon it.

VERIFICATION REPORT

The verifier will issue a verification opinion in line with the requirements set out in ISO 14064-3:2019. This will include:

- Identification of the Reporter
- Date of the Statement under verification
- The scope and boundary of the verification (including stages covered)
- The declaration category claimed
- The level of assurance (Reasonable or Limited)
- Details of LNG quantity and emissions verified, and GHG intensity,
- Where this relates to multiple cargoes, the number of cargoes delivered in the relevant date range and associated average emissions per cargo, and the delivery dates of each cargo must be included
- Confirmation that an Offset Strategy is in place and the retirement of offsets set out in the Cargo Statement is in line with the strategy
- Where GHG Neutral status is claimed, confirmation of the suitability of the Reduction Plan and details of GHG reductions made within the life cycle boundary
- Details of the verifier’s organisation and verification team, including personnel, roles, accreditation references, name of Technical Reviewer and Authoriser
- Verification comments and recommendations
- Verification opinion
- Cross-reference to supporting verification opinions, by unique reference

PREPARING FOR VERIFICATION

The verifier will conduct planned activities to assess the processes, procedures and calculation methods employed in preparing the Cargo Statement and both quantitative and qualitative content. The techniques used may include a review of documents, interviews with key personnel and site visits. It is the verifier’s decision on the methods to employ, and the extent to which a site visit is required. The verifier will want to see evidence of data sources, as well soft copies of spreadsheets or access to view databases and models used to source and manipulate the data.

It is the verifier’s decision whether to rely on evidence verified by another verifier, and they may decide that conduct additional verification steps to enable adoption of third-party verified Stage Statements within the GHG Footprint.

| GIIGNL Framework Criteria - VERIFICATION | |
|---|--|
| Entity performing verification | Independent, third party accredited for ISO 14064-3:2019 or equivalent |
| Standard applied | ISO 14064-3:2019 |
| Verification team competencies | GHG Verification Product life cycle accounting GHG emissions accounting associated with the oil and gas sector, including shipping |
| Physical Boundary (Partial life cycle, 'stage specific') | For stage statements, the included stage(s) must be clearly defined |
| Level of assurance | To be agreed with verifier and transparently disclosed Reasonable assurance preferred |
| Frequency | Verification to be undertaken as soon as practicable following delivery of the cargo, with a maximum delay of 12 months |

Governance

This Framework will be hosted on a website administered by GIIGNL and will be freely available to any interested organisation. This Framework is openly available as a reference for use by participants across the LNG value chain.

GIIGNL undertakes to review the framework on a periodic basis to reflect emerging practices and obligations for GHG accounting, offsetting and GHG neutrality claims. The Framework version and issuance date will be clearly referenced.

REGISTRATION OF THE VERIFIED CARGO STATEMENT WITH GIIGNL

GIIGNL intends to collect data reported under this Framework to establish a basis for improved understanding of the evolution of GHG intensity within the sector, with clearly defined boundaries of reporting. This will also support a database of emission reduction actions and low GHG features referenced in the Cargo Statements.

Any commercially sensitive or confidential information in the Cargo Statement may be redacted in the version shared with GIIGNL

Please share the verified Cargo Statement with GIIGNL Central Office: (**central-office@giignl.org**)



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