# Pluto Greenhouse Gas Abatement Program

June 2025

Rev 4

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# TERMS AND DEFINITIONS

| Abbreviations | Definition |
|---|---|
| ACCU | Australian Carbon Credit Unit |
| ANREU | Australian National Registry of Emissions Units |
| CERT | Corporate Emissions Reduction Transparency |
| CER | Clean Energy Regulator |
| $CH_4$ | methane |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2$-e | carbon dioxide equivalent |
| COP26 | United Nations Climate Change Conference of the Parties in 2021 |
| DISER | Australian Government Department of Industry, Science, Energy and Resources (former name until 30 June 2022) |
| DISR | Australian Government Department of Industry, Science and Resources (current name from 1 July 2022) |
| DWER | Government of Western Australia Department of Water and Environmental Regulation |
| EPA | Government of Western Australia Environmental Protection Authority |
| EP Act | [Western Australia] *Environmental Protection Act 1986* |
| ERD | Environmental Review Document |
| ERF | Emissions Reduction Fund |
| FEED | front-end engineering design |
| FID | final investment decision |
| GGAP | Pluto Greenhouse Gas Abatement Program (this document) |
| GHG | greenhouse gas |
| GHGMP | greenhouse gas management plan |
| MAC | Murujuga Aboriginal Corporation |
| MJ | megajoule |
| MS | Ministerial Statement |
| Mt | million tonnes |
| Mt $CO_2$-e | million tonnes of carbon dioxide equivalent |
| Mtpa | million tonnes per annum |
| MW | megawatt |
| $N_2O$ | dinitrogen monoxide |
| NDC | Nationally Determined Contribution |
| NGA | National Greenhouse Accounts |
| NGER | National Greenhouse And Energy Reporting |
| RFSU | ready for start-up |
| SGM | Safeguard Mechanism |
| SMR | steam methane reforming |
| t $CO_2$-e | tonnes of carbon dioxide equivalent |

| Abbreviations | Definition |
|---|---|
| TJ | terajoules |
| tpa | tonnes per annum |
| tpd | tonnes per day |
| VCS | Verified Carbon Standard |
| VCU | Verified Carbon Units |
| VER | Verified Emissions Reductions |
| WA | Western Australia |

| Term | Definition |
|---|---|
| Authorised Offsets | Offsets as defined in Table 3 "Abbreviations and Definitions" of Ministerial Statement 1208 by the Minister for Environment; Climate Action.<br>*Units representing GHG Emissions issued under one of the following schemes and cancelled or retired in accordance with any rules applicable at the relevant time governing the cancellation or retiring of units of that kind:*<br>*a) Australian Carbon Credit Units issued under the Carbon Credits (Carbon Farming Initiative) Act 2011 (Cth);*<br>*b) Verified Emission Reductions issued under the Gold Standard program;*<br>*c) Verified Carbon Units issued under the Verified Carbon Standard program; or*<br>d) *other offset units that the Minister has notified the proponent in writing meet integrity principles and are based on clear, enforceable and accountable methods.* |
| $CO_2$-e | $CO_2$ equivalent. The universal unit of measurement to indicate the global warming potential of each of the seven greenhouse gases, expressed in terms of the global warming potential of one unit of carbon dioxide for 100 years. It is used to evaluate releasing (or avoiding releasing) any greenhouse gas against a common basis.[1] |
| Condensate | Hydrocarbons that are gaseous in a reservoir but that condense to form liquids as they rise to the surface |
| Emissions | Refers to emission of greenhouse gases unless otherwise stated. |
| Emissions Intensity | The calculated ratio of GHG emissions per unit of production. |
| Environmental Commissioning | The activities undertaken after construction to verify that the equipment does not create adverse impacts and performs to the required specifications. Consistent with Department of Water and Environmental Regulation Works Approval W6332/2019/1 held by Woodside Burrup Pty Ltd for Pluto LNG (Pluto Train 2). |
| EPA Guideline | Refers to the EPA Environmental Factor: GHG Guideline as published in November 2024. |
| EPA Instructions | How to prepare *Environmental Protection Act 1986* Part IV Environmental Management Plans - Instructions. (EPA, 2021) |
| Global Warming Potential | Global Warming Potentials as defined by National Greenhouse Account Factors.<br>Carbon dioxide ($CO_2$) - 1<br>Methane ($CH_4$) - 28<br>Nitrous oxide ($N_2O$) - 265 |

[1] *IFRS Foundation, 2021. "Climate Related Disclosures Prototype", Appendix A. https://www.ifrs.org/content/dam/ifrs/groups/trwg/trwg-climate-related-disclosures-prototype.pdf The IFRS published a further consultation document subsequent to the 2021 prototype. As it did not contain an updated definition of Paris-Aligned scenarios, Woodside has retained use of the previous edition. Definition as per the Australian Clean Energy Regulator https://www.cleanenergyregulator.gov.au/Infohub/Markets/cert-report/cert-report-2023/cert-2023-glossary.*

| Term | Definition |
|---|---|
| Greenhouse gas | The seven greenhouse gases listed in the Kyoto Protocol are: carbon dioxide ($CO_2$); methane ($CH_4$); nitrous oxide ($N_20$); hydrofluorocarbons (HFCs); nitrogen trifluoride ($NF_3$); perfluorocarbons (PFCs); and sulphur hexafluoride ($SF_6$).[1] |
| Mitigation hierarchy | The order of priority of abatement options: *avoid, reduce, offset*. |
| Nationally Determined Contribution | A Nationally Determined Contribution (NDC) is a voluntary climate action plan submitted by a country to the United Nations Framework Convention on Climate Change (UNFCCC), outlining the country's proposed actions and targets to reduce greenhouse gas emissions and support adaptation to climate change. It is a key element of the Paris Agreement, and each country is expected to regularly update and enhance their NDCs over time. |
| Net Zero emissions | Net zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period. Where multiple greenhouse gases are involved, the quantification of net zero emissions depends on the climate metric chosen to compare emissions of different gases (such as global warming potential, global temperature change potential, and others, as well as the chosen time horizon).[2] |
| Offset | In respect to an entity's greenhouse gas emissions within its scope, achieving an equivalent amount of emission reductions or removals outside the boundary or value chain of that entity. |
| Offset integrity principles/ standards | Offset integrity standards are criteria that ensure that offsets represent real emissions reductions. Criteria include additionality and being measurable and verifiable. |
| Operational Control | As defined by Section 11, or Section 55 of the NGER Act 2007. Section 55 outlines that the regulator may declare a corporation etc. has operational control, see NGER Act Section 55 (1)(a). |
| Participant | A participating entity on the Pluto LNG Facility that is not the Responsible Emitter (such as a Joint Venture partner) *(*from *National Greenhouse and Energy Reporting Act 2007).* |
| Pluto LNG Facility | Pluto LNG Facility as defined under Federal NGER Act Section 9: this includes Pluto offshore extraction facilities, offshore Pluto-A Platform, subsea transmission systems, onshore Pluto LNG Plant, and supporting materials facility/laboratory. |
| Pluto LNG Plant | The facilities and infrastructure located at, or to be developed within, the Pluto LNG Park which are used for processing feedstock gas and for the production, storage, handling and loading of LNG and other products, and includes storage facilities and loading Facilities as defined in MS757/MS1208. |
| Pluto LNG Park | The facilities located on the land the subject of the leases with registration numbers K435291, K435292 and K545946 on the Burrup Peninsula, Western Australia. |
| Proponent | Woodside Energy Limited is the Proponent for the Proposal as per Ministerial Statement MS1208. Woodside Burrup Pty Ltd is an Australian Subsidiary of Woodside Energy Ltd, and is operator of the various facilities and activities comprising the Proposal for and on behalf of the owners of each respective facility. |
| Proposal GHG Emissions | GHG Emissions (as defined in MS1208) released to the atmosphere as a direct result of an activity or series of activities that comprise/s or form/s part of the proposal.<br>GHG Emissions (as defined in MS 1208) are taken to align with Scope 1 emissions as defined in the EPA GHG Factor Guideline.<br>Emissions calculations align with methodologies presented in the Federal National Greenhouse and Energy Reporting Act 2007 (Cth) and its subsidiary legislation. |

[2] IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 541-562. https://doi.org/10.1017/9781009157940.008

| Term | Definition |
|---|---|
| Reservoir emissions | Proposal GHG emissions that were separated (from the natural gas) in an acid gas removal unit and released unused and unprocessed. |
| Responsible Emitter | The NGER Act defines the 'responsible emitter' as the person with 'operational control' of a safeguard facility. Woodside Burrup Pty Ltd is the Responsible Emitter of the Pluto LNG Facility. |
| Safeguard Mechanism | The Safeguard Mechanism (referred to 'SGM' or 'SGM' scheme as the context requires) is the Australian Government's policy for reducing emissions at Australia's largest industrial facilities. It sets legislated limits—known as baselines—on the greenhouse gas emissions of these facilities. These emissions limits will decline, predictably and gradually. |
| Scope 1 GHG emissions | Scope 1 GHG emissions are those released to the atmosphere as a direct result of an activity, or a series of activities, at a facility[3]. Woodside estimates greenhouse gas emissions, energy values and global warming potentials in accordance with the relevant reporting regulations in the jurisdiction where the emissions occur (e.g. Australian National Greenhouse and Energy Reporting (NGER)). |
| Scope 2 GHG emissions | Scope 2 GHG emissions for a facility represent the emissions that were released outside a facility boundary to produce electricity that was imported into the facility and used[3]. Woodside estimates greenhouse gas emissions, energy values and global warming potentials in accordance with the relevant reporting regulations in the jurisdiction where the emissions occur (e.g. Australian National Greenhouse and Energy Reporting (NGER)). |
| Scope 3 GHG emissions | Other indirect GHG emissions. Scope 3 is a reporting category that allows for the treatment of all other indirect emissions. Scope 3 GHG emissions are emissions associated with the activities of the Responsible Emitter, but occur from sources not owned or controlled by the Responsible Emitter. Some examples of Scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.[4] Scope 3 emissions have been developed aligned with the definitions of the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard[5]; Category 9 "Downstream Transport and Distribution" and Category 11 - "Use of Sold Product", and supported by NGERs factors and other secondary emission factor databases. |

[3] https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline – GHG Emissions - November 2024.pdf Emissions and energy types | Clean Energy Regulator, 2025. https://cer.gov.au/schemes/national-greenhouse-and-energy-reporting-scheme/about-emissions-and-energy-data/emissions-and-energy-types

[4] *World Resources Institute and World Business Council for Sustainable Development, 2004. "GHG Protocol: a corporate accounting and reporting standard" https://www.wbcsd.org/Programs/Climate-and-Energy/Climate/Resources/A-corporate-reporting-and-accounting-standard-revised-edition*

[5] Corporate Value Chain (Scope 3) Standard | GHG Protocol

# 1. EXECUTIVE SUMMARY

| | |
|---|---|
| **Title of Proposal** | Pluto Liquefied Natural Gas (LNG) Development |
| **Proponent name** | As defined in the TERMS AND DEFINITIONS. |
| **Ministerial Statement number** | Ministerial Statement 757 (as amended by Ministerial Statements 850 and 1208). MS1208 Condition 12 "Greenhouse Gas Abatement" |
| **Proposal description and scope** | Proposal is described as per Ministerial Statement 757 including amendment via Attachment 5: The construction of facilities for the development of the gas fields and the processing and export of the gas at a liquefied natural gas plant to be constructed on the Burrup Peninsula.<br>The Proposal is further documented in Schedule 1 of Ministerial Statement 757 |
| **Purpose of this GGAP** | This GGAP is submitted in compliance with MS 1208 Condition 12.<br>The Greenhouse Gas Emissions Policy for Major Projects (August 2019) required major new projects or expansions of existing operations to set interim and long-term emissions reduction targets in alignment with the Western Australian Government's goal to achieve net zero emissions by 2050. Pluto LNG Plant's MS 1208 Conditions were set to align with this policy.<br>The GGAP was developed recognising the 2023 EPA Factor Guideline and GHG Template, and 2021 Instructions. This GGAP also incorporates updated recent State Policy and 2024 EPA Factor Guideline, aligning with the Federal Government SGM which was published after MS1208.The State Government released its updated "Greenhouse Gas Emissions Policy for Major Projects" on 15 October 2024. The updated policy responds to reforms to the Federal SGM which establishes a nationally consistent approach to reducing GHG emissions. The updated policy supports the Federal Government's commitments to achieving net zero emissions while avoiding unnecessary duplication. The policy notes that where proposals with significant GHG emissions are adequately dealt with by other regulatory measures such as the SGM, those emissions should not be regulated by the State. The EPA Environmental Factor Guideline for GHG (November, 2024) also outlines that the EPA no longer requires a GHG environmental management plan. In accordance with the updated policy, the State Government will initiate a review of existing MSs. Woodside understands a review of MS 1208 is likely to be progressed during 2025 to reflect the updated position. Until the review process is completed, MS 1208 remains in force and this GGAP revision is submitted in compliance with MS 1208, in particular, Conditions 12-3 to 12-5. |
| **Estimate of Net GHG Emissions** | <u>SGM and basis for this GGAP's estimated five-year net emissions envelope</u><br>This GGAP covers a five-year period from 1 January 2025 to 31 December 2029 and illustrates the implementation of the SGM scheme for the Pluto LNG Facility. The SGM subjects the Pluto LNG Facility to a production adjusted SGM baseline. During this five-year period net emissions under the SGM scheme are estimated to not exceed an envelope of 11.12 Mt $CO_2$-e. This projected five-year envelope illustrates net GHG emissions under the SGM scheme being lower than limits set out in MS 1208 Condition 12-1(2), and with net emissions currently on track to meet Condition 12-1(1) for 2021-end 2025 period as outlined in Compliance Reporting.<br>Indicative trajectory and forecasts for periods beyond 1 January 2030 provide further basis to confirm that Pluto LNG Facility's net emissions under the SGM scheme are estimated to achieve Net GHG Emissions reductions beyond those required by MS1208 limits.<br>Therefore, this GGAP aims to demonstrate that the Pluto LNG Facility's compliance with the SGM scheme, particularly the SGM baseline as set and indicated, satisfies MS 1208 Condition 12-3 (1)-(2). |
| **Key components in the GGAP** | Best practice mitigation measures that have been implemented, or may/could be implemented to avoid, reduce, and/or offset Scope 1 emissions are set out in Section 3.3. |
| **GGAP reviews and reporting** | The GGAP will be revised so that it is consistent with adaptive management and continuous improvement. Review and revision of this GGAP will be undertaken if there is a significant change to the proposal. Reporting will occur in accordance with regulatory requirements including; NGERs, SGM scheme, and MS757/MS1208. |

# 2. INTRODUCTION

Approvals for the Pluto LNG Development were granted by the Federal and WA governments. The WA government's approval of the Proposal (referred to as the "Pluto LNG Plant") was granted by the WA Minister for Environment by way of MS No. 757 (as-amended by MS No. 850 and MS No. 1208 and other amendments summarised in MS 757 Attachment 1 to 5). The Federal government's approval which included the Proposal as well as additional scope, was granted by the Department of Environment and Water Resources (now known as the Department of Climate Change, Energy, the Environment and Water) by way of Approval Decision EPBC 2006/2968.

The Proposal has approval to process gas from gas fields to produce up to 12 Mtpa of LNG. In accordance with this approval (and without limiting the gas fields from which gas may be processed) the Pluto LNG Plant currently or proposes to process gas from the Pluto Development area and Greater Scarborough Development via a two-train LNG facility with a total production capacity of 11 Mtpa loadable-capacity (and without limiting the amount of LNG that may be produced). The first LNG and condensate produced and exported from the Proposal was during 2012, with domestic gas (domgas) production commencing in 2018. Further facilities, namely Pluto Train 2, are currently under construction. Environmental commissioning of Pluto Train 2 is proposed to commence in 2025, with production targeted to commence via Pluto Train 2 in H2 2026. The Pluto LNG Plant is a two-train LNG facility with a total production capacity of 11 Mtpa loadable-capacity and will or currently processes gas from the Pluto Development Area and Greater Scarborough Development.

## 2.1 Background

This revision of Pluto GGAP replaces Revision 3a of the Pluto GGAP dated June 2021. This revision incorporates the revised conditions set out in MS 1208, Condition 12, published 15 August 2023. Since publication on 15 August 2023 of MS 1208, the State Government released its updated "Greenhouse Gas Emissions Policy for Major Projects" on 15 October 2024. The updated policy responds to reforms to the SGM which establishes a nationally consistent approach to reducing GHG emissions. The updated policy notes the duplicative nature of state and commonwealth conditions for GHG emissions, applying an unnecessary administrative burden without delivering any additional environmental benefit. The policy therefore notes where proposals are adequately dealt with by other regulatory measures such as the SGM, those emissions should not be regulated by the State, meaning the State government will no longer apply conditions to reduce net GHG emissions. In accordance with the updated policy, the State Government will initiate a review of existing Ministerial Statements. Woodside understands a review of MS 1208 is likely to be progressed during 2025. Until the review process is completed, MS 1208 remains in force and this GGAP revision is submitted so that it complies with MS 1208 and in particular, Conditions 12-3 to 12-5. The EPA Guideline aligns with the SGM and thereby reduces the potential for regulatory duplication and reporting requirements[6]. The EPA Guideline also outlines that the EPA no longer requires a GHG environmental management plan.

The best practice design of the Pluto LNG Plant was subject to regulator and independent peer reviews in 2007, 2011 and 2019. These reviews occurred prior to the construction phases of the LNG trains in accordance with EP Act approval processes and consistent with MS 757 and the GGAP current at the relevant times. This GGAP focuses on operations of the Pluto LNG Plant as a two-train LNG facility and potential emission mitigation measures in the operations phase.

For clarity, the extent emissions are regulated by MS 1208 are limited to the scope of the Proposal, for example, limited to the WA State jurisdiction; while the extent of emissions regulated by NGERs

[6]Guideline – GHG Emissions - November 2024.pdf

include the scope of the Proposal, as well as other facilities within the Federal jurisdiction (beyond the jurisdiction of Western Australia) that comprise the Pluto LNG Facility as defined by the NGERs Act, such as the offshore Pluto-A Platform located in Commonwealth waters. As there is a difference between the emissions categories for the Pluto LNG Facility (NGERs 'facility') and the Pluto LNG Plant (MS 1208/EP Act 'Proposal'), the Pluto LNG Facility (NGERs 'facility') reporting information has been utilised to provide information fit for the purpose of assessment of this GGAP. This approach has been taken by applying the EPA Guideline in the context of this is GGAP. Therefore, the NGERs facility and emissions categories will be utilised throughout this GGAP to support language alignment between the MS 1208 and NGERs.[7]

The Pluto LNG Facility's Scope 1 emissions are regulated in accordance with the NGER Act by the SGM, a Federal Government mechanism for reducing emissions at industrial facilities. The SGM sets limits, known as baselines, on the GHG emissions of certain industrial facilities. These baselines decline, predictably and gradually, on a trajectory consistent with achieving Australia's emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. The SGM decline-rate is 4.9% each financial year until FY 2030 after which the default decline rate is proposed to be 3.285% per year. Further detail on the SGM is provided in Section 3.5.

Under the NGER Act, as Woodside Burrup Pty Ltd has Operational Control of the Pluto LNG Facility it is the Responsible Emitter (NGER/SGM Facility: "Pluto LNG", Responsible Emitter: number 20120237416). The Pluto LNG Facility has various owners (referred to as "participants"). Participants may acquit the Pluto LNG Facility emissions liability in accordance with commercial arrangements and underpinned by compliance requirements, alternatively the Responsible Emitter may act to acquit on behalf of participants. Regardless of which model of acquittal is utilised, the Responsible Emitter is ultimately responsible for the Pluto LNG Facility's compliance.

In relations to emissions management and compliance:

- Woodside Burrup Pty Ltd as the Responsible Emitter for the Pluto LNG Facility (under NGER) for emissions management and compliance has been proactive in its offset surrenders and public disclosures in accordance with NGERs; and
- Woodside Energy Ltd as the Proponent for the Pluto LNG Plant (under the relevant MS) has been proactive in its offset surrenders and public disclosures in accordance the relevant MSs as outlined in Appendix B.
- Additionally, Woodside in its corporate capacity has published Corporate Targets and has been proactive in its offset surrenders and public disclosures in accordance with these targets (Rev 3a).

### 2.1.1 Condition Requirements

Relevant MS 757 Condition 12 (as replaced by MS 1208) requirements are outlined below[8]:

**Table 2-1: MS 757 Condition 12 Requirements**

| Condition | Requirement | Section addressed in this Plan |
|---|---|---|
| 12-1 | The proponent must take measures to ensure that the **Net GHG Emissions** do not exceed:<br>(1) 7,350,000 tonnes of $CO_{2-e}$ for the period between 1 January 2021 and 31 December 2025 or such higher amount (not exceeding an additional 500,000 | **Section 3.2** |

[7] EPA Guideline, page 3, under the heading "What are greenhouse gases and the different scopes?"

[8] Table 2-1 does not include all MS 1208 conditions, only those relevant to the contents of the GGAP.

| Condition | Requirement | Section addressed in this Plan |
|---|---|---|
| | tonnes [reservoir][9] $CO_2$-e) that the CEO considers is otherwise accounted for and regulated under a condition of an implementation agreement (if any) applying to the Karratha Gas Plant;<br>(2) 13,560,000 tonnes of CO2-e for the period between 1 January 2026 and 31 December 2029;<br>(3) 14,350,000 tonnes of CO2-e for the period between 1 January 2030 and 31 December 2034;<br>(4) 13,325,000 tonnes of CO2-e for the period between 1 January 2035 and 31 December 2039; and<br>(5) 5,728,767 tonnes of CO2-e for the period between 1 January 2040 and 30 April 2042. | |
| 12-3 | Prior to 31 December 2024, or such greater time approved in writing by the **CEO**, the proponent must revise in consultation with the **Murujuga Key Stakeholders**, and submit to the **CEO** a revision of the **Rev 3a GHG Abatement Program** that: | **This GGAP**<br>DWER approved extension to 30 April 2025 noting s46 inquiry underway: Letter received 18 December 2024 |
| 12-3 (1) | is consistent with the achievement of the **Net GHG Emissions** limits in condition 12-1 (or the achievement of **Net GHG Emissions** reductions beyond those required by those limits); | **Section 3.2** |
| 12-3 (2) | specifies the estimated **Proposal GHG Emissions, Reservoir Emissions, Non-Reservoir Emissions, Total Emissions Intensity, Reservoir Emissions Intensity, Non-Reservoir Emissions Intensity** for the life of the proposal; | **Section 3.2** |
| 12-3 (3) | include a comparison of the estimated **Proposal GHG Emissions, Reservoir Emissions, Non-Reservoir Emissions, Total Emissions Intensity, Reservoir Emissions Intensity and Non-Reservoir Emissions Intensity** for the life of the proposal against other comparable facilities; | **Section 3.2** |
| 12-3 (4) | identifies and describes any measures that the Proponent will implement to avoid, reduce and/or offset (including offsets developed in consultation with **Murujuga Key Stakeholders) Proposal GHG Emissions, Reservoir Emissions** and/or **Non Reservoir Emissions** and/or reduce the **Reservoir Emissions Intensity, Non-Reservoir Emissions Intensity and/or Total Emissions Intensity** of the proposal; and | **Section 3.3**<br>**Section 3.7** |
| 12-3 (5) | provides for the future review of the program to:<br>(a) assess the effectiveness of measures referred to in condition 12-3(4); and<br>(b) identify and describe options for future measures that the proponent may or could implement to avoid, reduce and/or offset **Proposal GHG Emissions, Reservoir Emissions** and/or **Non-Reservoir Emissions** and/or reduce the **Reservoir Emissions Intensity, Non-Reservoir Emissions Intensity and/or Total Emissions Intensity** of the proposal. | **Section 4** |
| 12-4 | The proponent shall submit with the revised **GHG Abatement Program** required by condition 12-3, the dates and estimated **Net GHG Emissions** for the **Environmental Commissioning** of the **Pluto LNG Train 2**. | **This plan** |

[9] Clarification added aligning with original condition intent per DWER EPA Services (OEPA) and the State Office of the Appeals Convenor (OAC) engagements 2023.

# 3. GGAP COMPONENTS

## 3.1 GHG Emissions estimates

Scope 1 Emissions figure and Baseline Net Emissions Number(s) for the Pluto LNG Facility satisfies the analogous Conditions of MS 1208 related to Net GHG Emissions and Proposal GHG Emissions (including Reservoir Emissions and Non-Reservoir Emissions that total to the Proposal GHG Emissions Figure). For clarity, the NGER Act figures include minor emissions in addition to that of the Pluto LNG Plant (e.g. from the PLA offshore platform)[10], therefore the actual Pluto LNG Plant figures are expected to be less than the NGER Act figures stated in this GGAP. This provides a fit for purpose approach to illustrating the Pluto LNG Plant's emissions.

MS 1208 has no Conditions analogous to the NGER Act requirement to report Scope 2 Emissions or to the reporting of Scope 3 Emissions.

This GGAP applies to Scope 1 Emissions from activities associated with the Pluto LNG Facility operations. Estimates for Scope 2 Emissions and Scope 3 emissions associated with the Pluto LNG Facility are included for information purposes only and do not apply to conditions of MS 1208.

The production design capacities of the Pluto LNG Plant are:

- LNG – up to approximately 11 Mtpa
- Condensate – up to approximately 0.5 Mtpa
- Domestic gas – up to approximately 250 TJ/day

Components of the Pluto LNG Plant that contribute to the Pluto LNG Facility emissions include:

- Liquefaction gas turbines
- Power generation gas turbines
- Acid gas removal units (AGRUs)
- Nitrogen rejection units (NRUs)
- Thermal oxidisers
- Flaring
- Other fuel sources such as diesel for transport and machinery
- Fugitive emissions

A description of the Pluto LNG Plant's process, power requirements and storage and ancillary technologies is set out in previous revisions of the GGAP (see GGAP Revision 2, dated 2011 and Revision 3a dated June 2021).

Scope 2 emissions from electricity import in the context of the scope of the Pluto LNG Plant and Facility under the Proposal and NGER Act are negligible and currently limited to local grid import for offsite laboratory power and buildings.

Future offshore facilities associated with the gas fields that provide gas to the Proposal, such as the Scarborough offshore floating production unit are beyond the scope of the Pluto LNG Plant per the Proposal and the Pluto LNG Facility regulated by the NGER Act. Therefore, any GHG emissions from such facilities are beyond the scope of this GGAP and Pluto LNG Facility.

[10] From 2025 to 2036, non-Proposal emissions (such as emissions from Pluto Alpha offshore platform) included in Pluto LNG Facility NGER scope represents 0.4% of total Safeguard Facility emissions, and 0% thereafter

In this GGAP, Scope 1 emissions estimates are developed in line with methods of reporting and baselining set out in the NGER Measurement Determination 2008 and NGER (Safeguard Mechanism) Rule 2015.

Emissions estimates associated with the Pluto LNG Facility that have been included in this GGAP for information purposes only have been developed for:

Scope 2: in line with the same methods of reporting adopted for the Scope 1 emissions estimates.

Scope 3: focussing on exported product from the Pluto LNG Plant are developed aligned with the definitions of the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard[11]; Category 9 “Downstream Transport and Distribution” and Category 11 - “Use of Sold Product” and supported by NGERs factors and other secondary emission factor databases.

### 3.1.1 GGAP Emissions Envelope: Introduction

GHG emission estimates presented in this GGAP are based upon functions of the following key data inputs and assumptions (which may also be estimates):

- Stream characteristics and compositions
- Stream volumetric, molar and mass flow rates
- Heat & mass balance, and process simulations
- Equipment design, norms, and empirical (measured & as-reported) datasets
- Potential production profiles for the life of the Pluto LNG Facility
- Fuel consumption profile for the life of the Pluto LNG Facility
- Plant production, activities and efficiency scenarios are used to derive GHG emissions estimates aligned with emissions reporting and baselining methods

Section 3.2 presents an expected GHG emissions envelope. This is an upper-estimate for possible Pluto LNG Facility Covered and net emissions under the SGM scheme for the 5-year period of this GGAP revision. It also provides an indicative trajectory for Pluto LNG Facility estimated to end of field life for the Pluto Development area and Greater Scarborough Development (noting the Proposal is not limited to these fields and if other gas fields are proposed the life of the Proposal may be extended and updated estimates will be provided). Estimates are based on potential positive production outcomes and illustrate the associated SGM baseline indicating possible net emissions under NGERs.

Further, actual GHG emissions over the life of the Proposal will be subject to reservoir performance, facility reliability, up-time and frequency of maintenance (such as shutdown periods for turn-around activities), ambient conditions, and project start-up activities and timing. Other factors which can vary actual Covered and net emissions under the SGM scheme include variations in market demand, abatement technology maturity, technical and commercial feasibility, commercial arrangements, regulatory & JV approvals, third party activities, possible other resource owners and variations of end product use.

The 2025-end 2029 GHG emissions envelope proposed in this GGAP provides a basis to confirm that Pluto LNG Facility net emissions under the SGM scheme are anticipated to be consistent with the achievement of the Net GHG Emissions limits in Condition 12-1 in MS 1208, and are anticipated to deliver net emissions reductions this decade.

[11] Corporate Value Chain (Scope 3) Standard | GHG Protocol

### 3.1.1 Pluto Train 2 Environmental Commissioning Introduction

Environmental Commissioning of Pluto Train 2 has been approved under Works Approval W6332/2019/1 which includes both “commissioning” and “environmental commissioning” activities. Commissioning is the process of initial operation and testing to verify that equipment and systems are installed correctly and functional. Environmental commissioning of Pluto Train 2 will occur upon the introduction of first gas and will continue until validation of actual environmental performance against predicted design performance associated with seasonal atmospheric conditions and operational modes. Refer to Section 3.1.5 of this GGAP for further details.

### 3.1.2 Pluto-KGP Interconnector Introduction

GHG emissions associated with the processing of gas at Karratha Gas Plant (KGP) from the Pluto-KGP Interconnector (Interconnector) are managed under the KGP environmental approvals and regulations (such as NGERs, SGM and State MS(s)). Interconnector reservoir $CO_2$ emissions are subject to offset condition MS 1208 12-1(1) as a near-term Pluto condition, with offset progress summarised in Appendix B. Final reconciliation will be completed at the end of the 2021-2025 five-year period.

In December 2024, MS 1233 was published in relation to the North West Shelf (NWS) Project Extension Proposal, allowing for the ongoing operation of the NWS Project and processing of third-party gas and fluids and NWS Joint Venture field resources through the NWS project facilities until 2070. The NWS Project Extension Proposal is subject to conditions 2-1 to 2-5 of MS 1233, relating to the management of GHG emissions applicable in the context of MS 1208 condition 12-1 (1). The NWS Project is awaiting Federal Environmental approval for ongoing operations.

### 3.1.3 Historical GHG Emission Profile (One-train Operations)

The relative contribution of these sources and total GHG emissions based on operational data, by financial year is shown in Figure 3-1 NGERs Pluto LNG Facility recent Scope 1 and 2 GHG emissions (Mt $CO_2$-e) (FY). During stable operation, the most significant contributor to GHG emissions is the combustion of fuel gas to power compressors used in the refrigerant circuit for LNG liquefaction and supporting gas recycle systems. GHG emissions from the various sources vary according to plant status and production rate. This is reflected in setting SGM production adjusted (intensity) baselines for the Pluto LNG Facility, where for the period between FY2024 and end-FY2029 the baseline is partially influenced by production-variable emissions intensities derived from 5 years of historical operational data (FY18-FY22). At a minimum, offsetting of historical reservoir $CO_2$ emissions has been undertaken through this period (recent historical reservoir CO2 emissions are shown in light-blue).

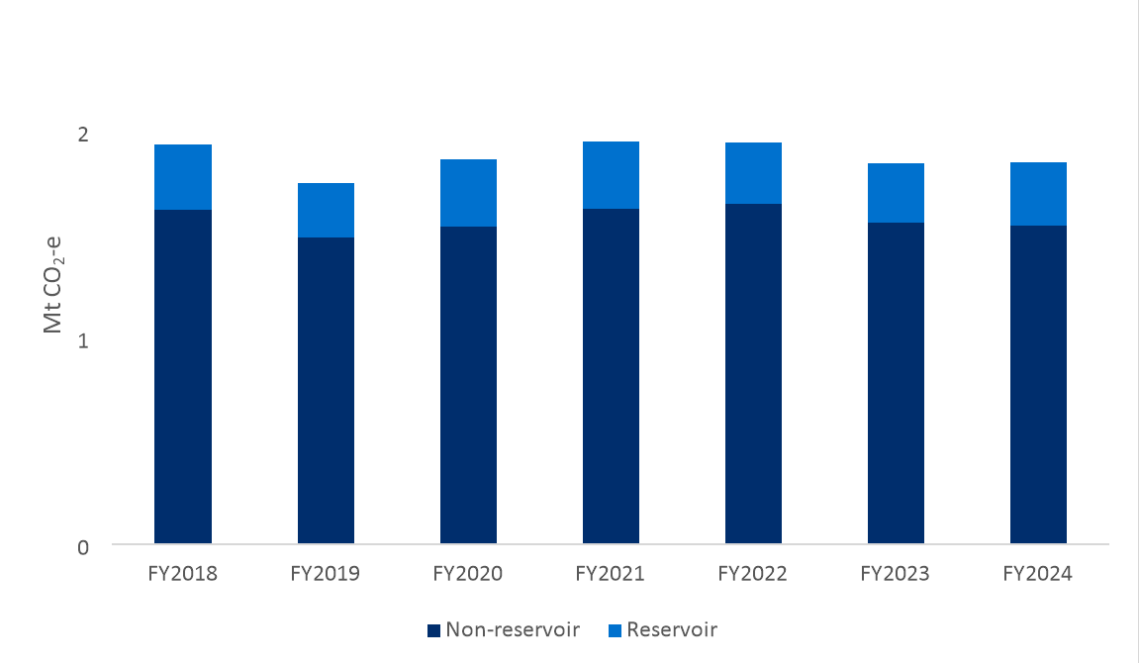


**Figure 3-1 NGERs Pluto LNG Facility recent Scope 1 and 2 GHG emissions (Mt $CO_2$-e)**

### 3.1.4 Estimated Proposal GHG Emissions (Two-train Operations)

Estimated GHG emissions for the Pluto LNG Facility are summarised below. The basis for this estimate is two LNG trains in operation with an upper estimated LNG production capacity of approximately 11 Mtpa.

**Table 3-1: Current Estimated Proposal GHG emissions[12]**

| | Scope 1 (Covered Emissions) | | Scope 2 | Total |
|---|---|---|---|---|
| **Base:** | **Non-Reservoir Emissions (Mt $CO_2$-e)** | **Reservoir Emissions (Mt $CO_2$-e)** | **Electricity (Mt $CO_2$-e)** | **Proposal GHG Emissions (Mt $CO_2$-e)** |
| **Annual (estimated peak)** | 3 | 0.3 | **0** | **3.3** |
| **Total for the life of the Proposal (estimated)** | 75 | 3 | **0** | **78** |

The Pluto LNG Facility electrical power system is optimised to support maximum energy efficiency and sparing across the facility. Due to several variables that influence the emissions intensity of LNG production, net emission intensities will vary across the life of the Pluto LNG Facility primarily due to cyclical turnaround (shutdown) maintenance periods, and process utilisation changes depending on availability of unprocessed natural gas supply from offshore reservoirs and upstream facilities.

[12] Based on upper-estimated potential production and associated emissions, subject to reservoir outcomes, other resource owners, emission reduction initiatives.

Further information of common assumptions, uncertainties and limitations applicable in developing emissions estimates for this GGAP are included in Appendix A.

**Table 3-2: Current estimated Proposal GHG Emission Intensity (Scope 1 and 2)[13],[14]**

| Period | Estimated range of emissions intensity ($tCO_2$-e/t LNG annual period averages) | |
|---|---|---|
| | Non-Reservoir | Reservoir |
| 2025 – 2030 | 0.31 - 0.33 | 0.03 – 0.04 |
| Post-2030 | 0.28 - 0.35 | 0.004 – 0.006 |

### 3.1.5 Pluto Train 2 Environmental Commissioning

Environmental Commissioning has been approved under the works approval (W6332/2019/1) which includes both "commissioning" (24 months including initial Gas Turbine Generator start-up 6 months prior to commissioning of the Pluto Train 2 following introduction of feed gas) and "environmental commissioning" (12 months).

Environmental Commissioning and start-up phase will include the introduction of feed gas and other process fluids required to bring the various plant systems into an operational state.

Performance testing will confirm infrastructure meets manufacturer specified emission levels and design emission rates. During start-up, which is a non-routine event, plant throughput can vary from 15% to 50% as the system achieves the required performance specifications. Flaring of gas will occur during this period whilst the upstream gas supply from the trunkline reaches the required composition and until the system has achieved required technical specification and cooled sufficiently to produce LNG. Whilst engineering estimates are provided, due to the uncertainty in the above activities a range has been provided.

The estimated Covered GHG emissions associated with Pluto Train 2 commissioning activities (i.e. achieving feed gas specification, power generation, and equipment testing) range from 0.5 – 0.7 Mt $CO_2$-e. These activities are expected to occur throughout 2025 and 2026, anticipated to commence from July 2025, although the exact timing of commissioning activities continues to develop and is subject to change. Covered GHG emissions associated with early ramp-up and testing occurring for the following approximately 12 month period (post initial start-up) are estimated as 1.6 Mt $CO_2$-e and have already been considered in this document as Pluto LNG Plant Proposal GHG emissions (as provided for by MS 1208 Condition 12-1) and will be subject to NGER reporting for the Pluto LNG Facility and application of the Safeguard Mechanism. Net GHG emissions are calculated for the entire Pluto LNG Facility, inclusive of Pluto Train 2 commissioning activities.

## 3.2 Measures to Avoid, Reduce and/or Offset GHG Emissions

### 3.2.1 Scope 1 Emissions

Table 3-3 shows the estimated projected Scope 1 emissions of the Pluto LNG Facility operations on a 5-yearly basis. The Pluto LNG Facility's SGM baseline emissions number requires net emissions to be kept at or below the baseline. If net emissions are above a facility's baseline, excess emissions need to be managed. As production throughput varies year to year dependent on several factors and specific plans and as marketing arrangements are commercially sensitive, the SGM production

[13] Excludes any emission reduction opportunities (abatement/offsets) executed during the period

[14] Intensity metric is based on LNG intensity, excludes condensate and domgas

adjusted baseline supports a consistent approach to regulation that will be reported on annually for the preceding financial year.

The Pluto LNG Facility's Net Emissions number is subject to adjustments following emissions management compliance with the SGM scheme requirements. Net Emissions will be managed via a hierarchy of controls, including but not limited to:

- Market demand for product / variable up-time and production rates
- Technical abatement opportunities maturity and feasibility (decarbonisation opportunities)
- Reservoir decline
- Commercial arrangements
- Regulatory & JV approvals
- Offsets

**Table 3-3 5-yearly estimated Scope 1 emission estimates and required reductions under the SGM[15]**

| Period | Pluto LNG Facility Total Gross Emissions Estimate (Mt $CO_2$-e) | Net GHG Emissions Estimate under the SGM (Mt $CO_2$-e) | | Required GHG Emissions Reduction under the SGM (Mt $CO_2$-e) |
|---|---|---|---|---|
| **Calendar years** | **Scope 1** | **Scope 1** | **Scope 2** | **Emissions Reduction** |
| **2025 – 2029 (GGAP envelope)** | 15.13 | 11.12 | 0 | 4.01 |
| **2030 – 2034 (indicative)** | 16.71 | 9.70 | 0 | 7.01 |
| **2035 – 2039 (indicative)** | 14.79 | 6.09 | 0 | 8.70 |
| **2040 - 2044 (indicative)** | 13.64 | 3.21 | 0 | 10.43 |
| **2045 – 2049 (indicative)** | 13.2 | 1.14 | 0 | 12.06 |
| **2050 and beyond (indicative)** | 4.67 | 0.00 | 0 | 4.67 |

Figure 3-2 provides a graphical representation of the set and indicative SGM baseline, which it is estimated that the Net GHG emissions under the SGM scheme will be equal to or below (as

[15] From 2025 to 2036, non-Proposal emissions (such as emissions from Pluto Alpha offshore platform) included in Pluto LNG Facility NGER scope represents 0.4% of total Safeguard Facility emissions, and 0% thereafter

represented Figure 3-2). MS 1208 Condition 12-1 net limits represented as annualised-averages relative to this trajectory are illustrated in Section 3.5 Figure 3-5.

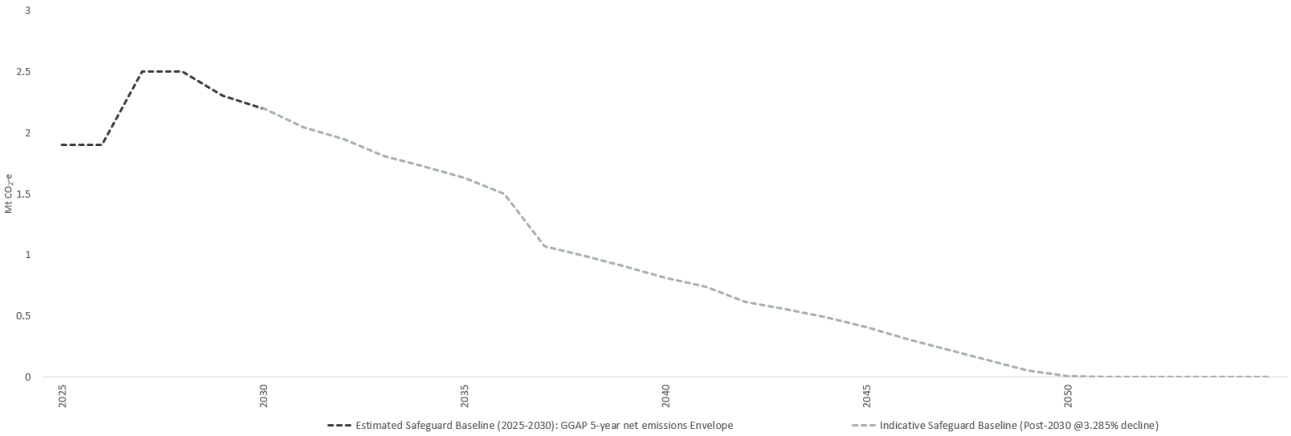


**Figure 3-2 Estimated net Scope 1 GHG emissions trajectory under the SGM**

### 3.2.2 Scope 3 GHG Emissions

Downstream Scope 3 GHG emissions associated with the Pluto LNG Facility are primarily a result of third-party use of sold product processed at the Pluto LNG Plant. The products from the plant are LNG and condensate which are utilised for a range of different end uses internationally, as well as domestic gas for Western Australia potentially used for power generation, heavy industry and production of ammonia such as for agricultural fertilisers.

The Pluto LNG Plant will process gas from the Greater Scarborough Development. The Scarborough reservoir contains less than 0.1% carbon dioxide and combined with processing design efficiencies at the FPU (offshore) and at Pluto Train 2 (onshore), the project is expected to be one of the lowest carbon intensity sources of LNG delivered into north Asian markets.

Woodside aims to support both Western Australia's domestic market and international markets by providing energy products that support energy security and energy transition with lower GHG emissions through a range of energy products and lower-carbon services.

For the purposes of this revision of the GGAP, it is assumed that end products associated with the Pluto LNG Facility are combusted, with upper production estimates based on potential positive production outcomes as described in Section 3.1. This provides an estimate of Scope 3 GHG emissions associated with the exported products from the Pluto LNG Facility, and does not consider potential net reduction by way of voluntary and regulatory abatement or offsetting of emissions applicable to particular consumers.

The Proponent will report on LNG produced for export from the Pluto LNG Plant as part of the annual reporting process in compliance with Condition 12-10(5) of MS 1208 (refer to Section 5).

**Table 3-4: 5-yearly estimated Scope 3 GHG emissions trajectory (peak)**

| Period | Estimates of Scope 3 Emissions associated with exported products (Mt $CO_2$-e) |
|---|---|
| **2025 – 2029** | 153 |
| **2030 – 2034 (indicative)** | 191 |
| **2035 – 2039 (indicative)** | 175 |
| **2040 – 2044 (indicative)** | 163 |
| **2045 – 2049 (indicative)** | 144 |
| **2050 and beyond (indicative)** | 52 |

Scope 3 GHG emissions associated with the Pluto LNG Plant arising from third party consumption of exported products are often managed and mitigated through relevant domestic and international emissions control frameworks. In that regard, many target markets for domestic gas and LNG have ratified the Paris Agreement. As such, target markets may have agreed: (a) to several global targets, including to keeping “global average temperature to well below 2°C above pre-industrial levels”, and (b) to set national targets relating to their own emissions. Greater use of natural gas (both as a lower carbon fossil fuel, and as dispatchable power source to partner with renewables) is likely to be an important option. The IEA’s Sustainable Development Scenario, which is aligned with a “well below 2°C” goal, includes significant additional gas supply. Further, as identified above, while the Proponent and the Responsible Emitter are not in a position to control emissions associated with third party consumption of exported gas, Woodside is committed to support a range of initiatives associated with the transition to a low carbon economy.

## 3.3 Mitigation measures

Prior to constructing the Pluto LNG Plant, the design of both Pluto Train 1 and Pluto Train 2 were subject to regulator and independent peer reviews as part of previous environmental approval processes.

The initial design and demonstration of best practice relating to GHG emission design for Pluto Train 1 was approved by the Western Australian Department of Environment and Conservation (as it was then known) (on advice of the EPA) in 2007, and Pluto GGAP Revision 2 accepted for operations in 2012.

For Pluto Train 2, the EPA commissioned an independent best practice peer review of the design of Pluto Train 2. The best practice peer review was accepted by the EPA via Pluto GGAP Revision 3 in 2020.

The best practice design of the Pluto LNG Plant infrastructure and operational improvements built into design (described in the submissions referred to above) are anticipated to have resulted in avoiding and/or reducing cumulative emissions of approximately 1 Mt $CO_2$-e per annum for Pluto Train 1, and approximately 0.58 Mt $CO_2$-e per annum for Pluto Train 2. The WA Minister for the Environment, Climate Action accepted Revision 3a of the Pluto GGAP on advice from the EPA in August 2021.

This revision of the GGAP focuses on forward-looking emission mitigation measures suitable for an operational two train LNG facility.

### 3.3.1 Consideration of mitigation measures

Pluto LNG Plant plans to achieve its net emissions baselines and limits in three ways:

- Avoiding GHG emissions through design
- Reducing GHG emissions through operations
- Offsetting GHG emissions as required

Avoiding and reducing GHG emissions is a priority[16].

The mitigation measures identified Table 3-5 below for the Pluto LNG Plant are classified as:

- Implemented: The measure has or will be implemented.
- Not Implemented: The measure/opportunity was assessed and deemed not feasible based on decision making criteria, including but not limited to commercial, technical and safety considerations.
- May/could be implemented: Measure/opportunity that may or could be implemented subject to assessment on decision making criteria[16] however a decision has not yet been made. It is anticipated that an update will be provided in future revisions of the GGAP.

Revision 3a of this GGAP detailed a range of emission reduction measures that have been implemented throughout initial design and since operations commenced in 2012.

Whilst several GHG emission reduction measures are presented below, some measures may target the same GHG emissions and not all measures will be progressed. Each measure is assessed based on the criteria set out in this GGAP. As such, the potential for GHG emission reductions should not be considered to be cumulative.

[16] Implementation is subject to technology maturity, technical and commercial feasibility, commercial arrangements, regulatory & JV approvals and third party activities (which may or may not proceed).

**Table 3-5: Pluto LNG Plant GHG mitigation measures that have been or may/could be implemented**

| Measures No. | GHG mitigation measure | Mitigation hierarchy: Avoid or reduce | Implemented, not implemented, or may/could be implemented | Description |
|---|---|---|---|---|
| 1 | Renewable power import:<br>*Grid connection enabling import of renewable power* | Reduce | Implemented: Modifications have been installed.<br><br>Future considerations: Renewable energy supply is subject to third party transmission infrastructure | The Pluto LNG Plant has been modified to receive power from the proposed Woodside Solar project, displacing existing onsite electrical power generation. The modifications are substantially completed and are ready for grid connection.<br>It will enable the import of up to 50 MW of solar power subject to FID, commercial arrangements, regulatory & JV approvals and third-party activities (which may or may not proceed). |
| 2 | Reliability improvement in extreme heat events (flaring reduction) | Reduce | Implemented: Modifications and procedures have been implemented. | Mitigation measures to address extreme ambient temperature impacts on equipment reliability, for example installation of shading and evaporative misting sprays. These and other reliability improvements successfully avoided flaring due to significant extreme heat related reliability events in 2023. |
| 3 | Methane destruction efficiencies | Reduce | Implemented: Optimisations to continue. | Improvement in the operating conditions of the Regenerative Thermal Oxidizer (RTO) to improve methane destruction efficiency. Work is now ongoing to update the operating parameters to achieve the optimal temperature and deliver the GHG emissions reduction potential. |
| 4 | Energy storage system: *renewable power firming* | Reduce | May/could be implemented | Integration of traditional (battery-based) and non-traditional energy storage system options are being investigated to provide firming for renewable power import (refer to item 1). |
| 5 | Electric motor assist:<br>*LNG compressor helper motors maximising use of lower carbon power* | Reduce | May/could be implemented | Increased electric motor assist for the LNG refrigerant compressors is being investigated as an energy efficiency measure to reduce requirement for gas turbine power and supplant by renewables via renewable energy import. |
| 6 | *Carbon Capture and Storage (CCS) via Pluto reservoir after end of field life, or CCS delivered by others (such as Angel CCS opportunity).* | Reduce | May/could be implemented | CCS is a mature technology which represents a proven solution to abate large-scale industrial emissions. However CCS is not presently available in the region. A large-scale multi-user CCS hub could offer the potential to assist Australian and international customers to decarbonise. Development of lower carbon service systems to capture and store $CO_2$ can bring about other decarbonisation |

| Measures No. | GHG mitigation measure | Mitigation hierarchy: Avoid or reduce | Implemented, not implemented, or may/could be implemented | Description |
|---|---|---|---|---|
| | | | | opportunities for Pluto LNG Plant (refer below 7, 8, 9) and across the region. |
| 7 | Hydrogen blending into turbine fuel:<br>*Gas reforming with CCS (No.7)* | Reduce | May/could be implemented | Hydrogen blending can reduce the quantity of natural gas required as fuel, thereby reducing combustion related emissions. Plant modifications to facilitate blending of hydrogen and lower carbon hydrogen generation facilities are being investigated. |
| 8 | Post combustion carbon capture:<br>*Capture and treatment of $CO_2$ from gas turbine exhaust for export to CCS (No.7) gathering system* | Reduce | May/could be implemented | Installation of post combustion carbon capture to the LNG refrigerant turbines and the power generation turbines is being investigated. |
| 9 | Lower carbon power generation:<br>*Oxyfuel thermal power generation, connected to CCS (No.7) gathering system* | Reduce | May/could be implemented | Replacement of existing open cycle gas turbine power generation with closed loop oxyfuel power generation which provides a high purity $CO_2$ exhaust stream for sequestration is being investigated. |
| 10 | Carbon Capture and Utilisation (CCU):<br>*Turning $CO_2$ into saleable products* | Reduce | May/could be implemented | Woodside is investigating several Carbon Capture and Utilisation (CCU) technologies that could be feasible at Pluto LNG Plant. A CCU facility leveraging the AGRU $CO_2$ stream as feedstock is being investigated. |
| 11 | Nitrogen Recycle Compression Sparing | Reduce | Not implemented | The use of a spare compressor was considered to improve reliability of the Train 1 nitrogen recycle system, reducing flaring in case of compressor upset conditions. This measure was not implemented because it was found that the additional fuel use from the spare compressor would result in similar or greater emissions compared to flaring during upset conditions[17]. In addition, the measure presented high levels of complexity and associated costs. |

[17] The flared gas stream would have a high inerts (nitrogen) content – refer to Opportunity 11

Additional opportunities to improve Scope 1 emissions estimation techniques and influence Scope 3 emissions are detailed in Table 3-6 below:

**Table 3-6 Other GHG mitigation opportunities (emissions estimation and Scope 3)**

| Measures No. | GHG mitigation opportunity | Mitigation hierarchy: Avoid or reduce | Implemented, not implemented, or may/could be implemented | Description |
|---|---|---|---|---|
| 12 | Flare metering and monitoring improvements | Reduce reported emissions | Implemented: In progress | Pluto LNG Facility currently reports flared emissions under NGERs Method 1. Pluto LNG Facility's gas composition and flare sources have high inerts content, estimated over annualised periods in the order of 45% by mass of total gas flared. Pluto is progressing with installing a new sampling system to enable NGERs Method 2 or pursue Method 2B GHG emissions reporting which together are anticipated to reduce reported GHG emissions through improved measurement and estimation techniques. |
| 13 | Scope 3 GHG emissions: Expectations for contractors | Reduce Scope 3 Emissions | Implemented | Woodside has engaged suppliers, via existing forums and encourages them to bring forward emissions reduction opportunities. Woodside include climate expectations in their contracting and procurement templates. This encourages suppliers and contractors to manage their GHG emissions. |

Further to the information presented in Table 3-5 and Table 3-6, Table 3-7 provides a summary of mitigation measures and opportunities as applicable to MS1208 Condition 12-3(4) parameters.

**Table 3-7 Summary of Mitigation Measures and Opportunities as Applicable to MS1208 Condition 12-3(4) Parameters.**

| Measures No. | GHG mitigation Measure/Opportunity | Mitigation hierarchy: Avoid or reduce | Proposal Emissoins | Reservoir Emissions | Non Reservoir Emissions | Reservoir Emissions Intensity | Non-Reservoir Emissions Intensity | Total Emissions Intensity |
|---|---|---|---|---|---|---|---|---|
| 1 | Renewable power import:<br>*Grid connection enabling import of renewable power* | Reduce | X | | X | | X | X |
| 2 | Reliability improvement in extreme heat events (flaring reduction) | Reduce | X | | X | | X | X |
| 3 | Methane destruction efficiencies | Reduce | X | | X | | X | X |
| 4 | Energy storage system: *renewable power firming* | Reduce | X | | X | | X | X |
| 5 | Electric motor assist:<br>*LNG compressor helper motors maximising use of lower carbon power* | Reduce | X | | X | | X | X |
| 6 | *Carbon Capture and Storage (CCS) via Pluto reservoir after end of field life, or CCS delivered by others (such as Angel CCS opportunity).* | Reduce | X | X | X | X | X | X |
| 7 | Hydrogen blending into turbine fuel: *Gas reforming with CCS (No.7)* | Reduce | X | | X | | X | X |
| 8 | Post combustion carbon capture: *Capture and treatment of $CO_2$ from gas turbine exhaust for export to CCS (No.7) gathering system* | Reduce | X | | X | | X | X |
| 9 | Lower carbon power generation: *Oxyfuel thermal power generation, connected to CCS (No.7) gathering system* | Reduce | X | | X | | X | X |
| 10 | Carbon Capture and Utilisation (CCU): *Turning $CO_2$ into saleable products* | Reduce | X | X | X | X | X | X |
| 11 | Nitrogen Recycle Compression Sparing – Not Implemented | Reduce | X | | X | | X | X |
| 12 | Flare metering and monitoring improvements | Reduce reported emissions | X | | X | | X | X |
| 13 | Scope 3 GHG emissions: Expectations for contractors | Reduce Scope 3 Emissions | | | | | | |

## 3.4 Benchmarking

Comparable benchmarking of an LNG processing plant is difficult to undertake due to the proprietary nature of data relating to plant performance and the difference in GHG efficiency that occurs due to local and site-specific factors.

With these limitations in mind, Section 5.2 of the Pluto GGAP Revision 3a sets out benchmarking against LNG facilities both nationally and internationally. The benchmarking was subject to an independent peer review. The Pluto LNG Facility's GHG emissions intensity is projected to be approximately 0.35 t $CO_2$-e/t LNG in 2025, as indicated in Figure 3-4. Following the commissioning of Pluto Train 2, the combined Pluto LNG Facility intensity in steady-state operations is estimated to be 0.33 t $CO_2$-e/t LNG, prior to implementing any potential emission reduction measures. The benchmarking performance of the Pluto LNG Facility is favourably positioned relative to the average GHG emissions intensity of LNG facilities with similar technology, geographic constraints, and climatic conditions.

GHG emissions intensity can be influenced by a range of internal (technology) and external (environmental / policy) factors in design or operational phases, including:

- Relative proportions of gases (including CO2) in reservoirs
- Ambient temperature at the location of the facility
- Major technology decisions, such as the use of air or water cooling which may be governed by factors other than GHG intensity
- Potential of integration with other facilities (i.e. the integration of utilities across Pluto Trains 1 and 2)
- Capacity for external power generation, including the use of renewable sources

Previous benchmarking of GHG intensity with other comparable projects has been presented in Section 5.2 of the Pluto GGAP Revision 3a, and replicated in Figure 3-3 of this GGAP. Although every effort was made to provide a comprehensive and accurate comparison of LNG plants located within Australia and internationally, it does not include all LNG plants worldwide. The GHG emission intensities shown in Figure 3-3 are based on GHG emissions and the published LNG (or total product) production capacity of the plant. Figure 3-3 includes emissions related to onshore processing plants only and excludes upstream emissions.

The benchmarking shown in Figure 3-3 indicates that the performance of the Pluto LNG Facility is well positioned in relation to the LNG industry’s average GHG intensity, especially when the effect of reservoir $CO_2$ offsets is considered.

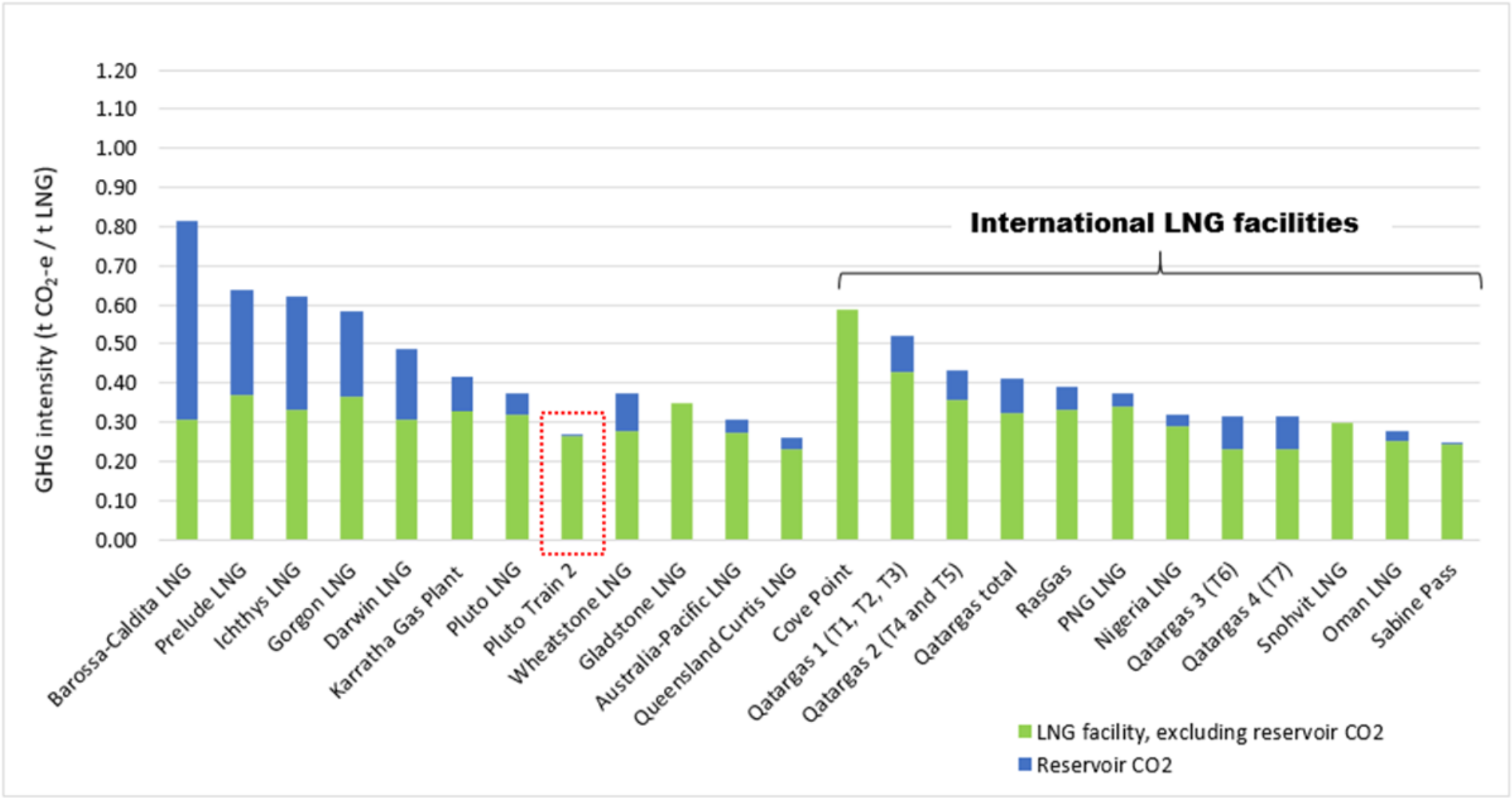


**Figure 3-3 Comparison of Pluto LNG Facility GHG emissions against other comparable projects, replicated from Section 5.2 of the Pluto GGAP Revision 3a.**

The most recent benchmarking has been undertaken as part of the SGM reforms, which has set a range of best practice 'production variables' for the production of LNG, condensate and electricity generation.

The process of defining the production variables and default GHG emissions intensity values was undertaken in accordance with the SGM Framework[18] for developing default production variables and GHG emissions intensity values (the Framework document). It involved stakeholder consultation and independent technical expert review.

The production variables relevant to the Pluto LNG Facility are:

- Liquefied natural gas (from unprocessed natural gas)
- Processed natural gas (processing only) (GJ)
- Stabilised crude oil or condensate (stabilisation only) (GJ)
- Reservoir $CO_2$ (from existing fields)
- Electricity Generation
- Extracted oil and gas (hydrocarbon)

Associated emissions intensity values for the Pluto LNG Facility and Default Industry Average for each relevant production variable are provided in Table 3-8 below. The emission intensity inputs to the SGM baseline calculation for these production variables will transition from being facility specific to industry average by 2030. Further, since July 2023 an annual decline rate is applied to facility baselines. This means the Pluto LNG Facility will be held to lower net emissions intensities year-on-year. The industry average emissions-intensity values are determined by analysis conducted by the Department of Climate Change, Energy, the Environment and Water[18,19,20].

**Table 3-8 Comparison of Site-Specific and Default Industry Average Production Variable Emissions Intensity Values**

| | Liquefied natural gas (from unprocessed natural gas) (tCO2e/GJ) | Processed natural gas (processing only) (tCO2e/GJ) | Stabilised crude oil or condensate (stabilisation only) (tCO2e/GJ) | Reservoir carbon dioxide (tCO2e/t) | Electricity generation (tCO2e/MWh) | Extracted oil and gas hydrocarbon (tCO2e/GJ) |
|---|---|---|---|---|---|---|
| **Pluto LNG Facility-Specific (as determined through NGER, subject to change per SGM Rule)[19]** | 0.00424 | 0.0003213 | 0.000353 | 1 | 0.7804 | 0.00001202 |
| **Default Industry Average (as determined through NGER)[19, 20]** | 0.00414 | 0.00159 | 0.00121 | 0.928 | 0.539 | 0.000376 |

DCEEW has published best practice SGM emissions intensity values, applicable to new facilities only, presented in Table 3-9. These are defined by DCEEW as "*best practice (benchmarks): are set at international best practice, adapted for an Australia context, and apply to new facilities*"[20]. As the Pluto LNG is not a new facility, Table 3-9 does not apply and has been provided for information only.

[18] Framework for developing production variables and default emissions-intensity values 2023 - DCCEEW

[19] Emissions-intensity determinations presented in Table 3-8 and Table 3-9 apply from the 2023-24 financial year and will be updated annually. For further information refer to Emissions-intensity determination data | Clean Energy Regulator.

[20] Safeguard Mechanism: Prescribed production variables and default emissions intensities 2024 - DCCEEW

**Table 3-9 Best Practice Production Variable Emissions Intensity Values, Applicable to New Facilities[19,20.]**

| | Liquefied natural gas (from unprocessed natural gas) (tCO2e/GJ) | Processed natural gas (processing only) (tCO2e/GJ) | Stabilised crude oil or condensate (stabilisation only) (tCO2e/GJ) | Reservoir carbon dioxide (tCO2e/t) | Electricity generation (tCO2e/MWh) | Extracted oil and gas hydrocarbon (tCO2e/GJ) |
|---|---|---|---|---|---|---|
| **New Facilities Best Practice Benchmark** | 0.000876 | 0.000243 | 0.00032 | 0.02 | 0.236 | 0.000036 |

Under the SGM, the current estimated net GHG emissions intensity for the Pluto LNG Facility's LNG production is presented in Figure 3-4.

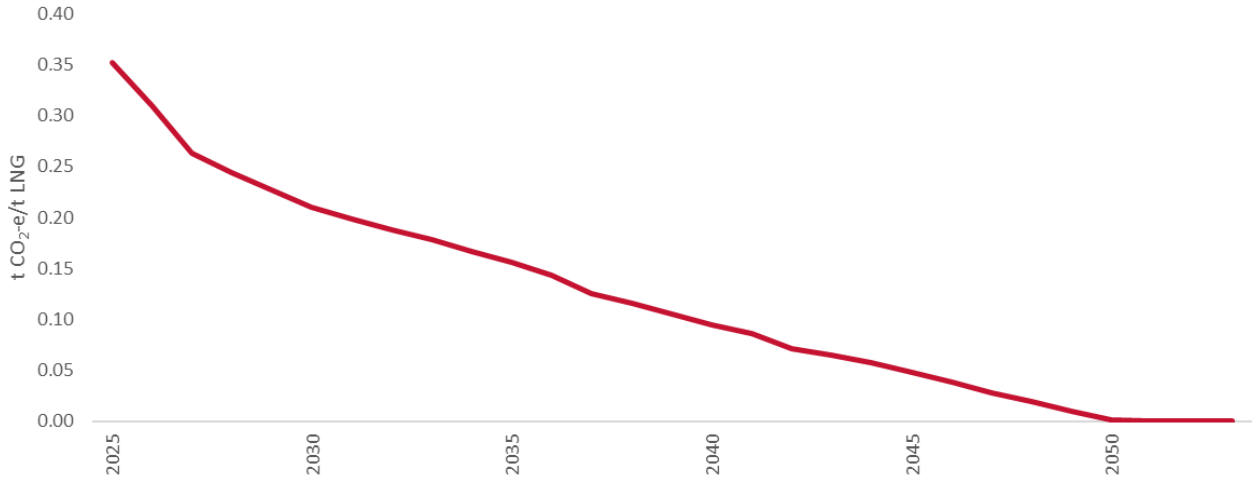


**Figure 3-4 Estimated Pluto LNG Facility Net LNG Emissions Intensity (t $CO_2$-e/tLNG)**

GHG emissions intensity for the Pluto LNG Facility, without the inclusion of emission reduction opportunities (mitigation/offsets) executed during relevant periods, is included in Section 3.1.4 Table 3-2.

## 3.5 Other Statutory processes

The Proposal's operations are subject to several legislative frameworks specific to GHG emissions. These are summarised in Table 3-10.

**Table 3-10: State and Federal GHG emission related legislation**

| Government Authority | Legislation / Policy | Description |
|---|---|---|
| Federal | *Climate Change Act 2022* | The Act sets out Australia's GHG emissions reduction targets in a manner consistent with the Paris Agreement, and Australia's Nationally Determined Contribution. |
| Federal<br>Clean Energy Regulator | *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule* | The Federal SGM[21] requires Australia's highest GHG emitting facilities (more than 100,000 t $CO_2$-e per year) to reduce or limit their emissions in line with Australia's emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050. Direct GHG emissions from the Pluto LNG Facility, as well as indirect GHG emissions associated with the transportation and end use of gas within Australian safeguard facilities are subject to the SGM, and net GHG emissions from these sources must be kept below a specified limit or baseline.<br>Safeguard Facilities that exceed their baseline must manage their excess GHG emissions, such as by surrendering acceptable quality offsets suitably classified as Australian Carbon Credit Units (ACCUs) or SGM Credits (SMCs) which is the other eligible compliance unit. Each are representative of one tonne of $CO_{2\text{-}e}$ per credit, so that net emissions under the scheme are brought in line with the baseline. So that sufficient credits are available and that there is a means to comply, safeguard facilities that exceed their baseline are able to buy Government-held ACCUs from the Clean Energy Regulator via the Cost Containment Measure implemented as part of recent reforms.<br>SGM obligations for the Pluto LNG Facility as defined under SGM will be met by direct GHG emissions abatement as first preference. Options to manage residual net GHG emissions in excess of baseline include surrendering ACCUs or SMCs, applying to become a trade-exposed baseline-adjusted facility, applying to borrow baseline from the following year or applying for a multi-year monitoring period. Surrendered offsets may be generated from Woodside's registered carbon offset projects, purchased from the carbon offset market, received from the Government in the form of an SMC, or purchased from the Government through the Cost-Containment Mechanism.<br>Woodside is supporting customers at a corporate level to manage indirect GHG emissions associated with customer use of gas, including production from the Pluto LNG Plant.<br>As detailed above, Pluto LNG Facility is subject to the production adjusted SGM declining baselines. |
| Federal<br>Clean Energy Regulator | *National Greenhouse and Energy Reporting Act 2007 (NGER Act)* | Those responsible for facilities emitting GHG are required to report on the amount of GHGs on an annual basis. The objectives of the NGER scheme are to:<br>• Inform government policy and the Australian public<br>• Help meet Australia's international reporting obligations<br>• Assist Federal, state, and territory government programs and activities<br>• Avoid duplicating reporting requirements in the states and territories.<br>The methods and criteria for calculating GHG emissions are described in the NGER (Measurement) Determination 2008 (DoEE, 2008). GHG emissions associated with the Proposal will be reported in line with NGER scheme requirements. |

[21] Further information about the SGM and SGM Baselines can be found at the Clean Energy Regulator website: https://cer.gov.au/schemes/safeguard-mechanism and https://cer.gov.au/schemes/safeguard-mechanism/safeguard-baselines

| | | |
|---|---|---|
| State<br>Government of Western Australia | Western Australian Climate Policy | The Policy determines actions taken by the West Australian Government to enhance climate resilience and support the low-carbon transition. One policy of relevance to this revision of the GGAP is the Government of Western Australia's Greenhouse Gas Emissions Policy for Major Projects (revisions August 2019, and October 2024). |
| State<br>Government of Western Australia | Greenhouse Gas Emissions Policy for Major Projects | The Greenhouse Gas Emissions Policy for Major Projects (August 2019) required major new projects or expansions of existing operations to set interim and long-term emissions reduction targets in alignment with the Western Australian Government's goal to achieve net zero emissions by 2050. Pluto LNG Plant's MS 1208 Conditions were set to align with this policy.<br>The Western Australian Government updated the Policy in October 2024. The updated policy replaces the 2019 policy. The updated policy responds to reforms to the Federal SGM scheme which establishes a nationally consistent approach to reducing greenhouse gas emissions. The updated policy supports the Federal Government's commitments to achieving net zero emissions while avoiding unnecessary duplication. The policy therefore notes that certain proposals in WA will be regulated under the Federal SGM and that the State Government will no longer apply conditions to reduce net GHG emissions. The EPA Environmental Factor Guideline for GHG (November, 2024) also outlines that the EPA no longer requires a GHG environmental management plan. In accordance with the updated policy, the State Government will initiate a review of existing Ministerial Statements. Woodside understands a review of MS 1208 is likely to be progressed during 2025. Until the review process is completed, MS 1208 remains in force and this GGAP revision is submitted so that it complies with MS 1208 and in particular, Conditions 12-3 to 12-5. |

The Pluto LNG Facility is subject to production adjusted SGM declining baselines, in addition to MS 1208 Condition 12-1 net GHG Emissions requirements. To avoid regulatory duplication, the State Government has initiated a review of existing requirements for Proposals that may be adequately regulated by the SGM, and therefore do not require further State regulation. From 2026, it is estimated that the SGM will result in the lowest net GHG emissions trajectory for Pluto LNG of the processes outlined in Table 3-10.

For simplicity, Figure 3-5 illustrates an estimated linear Net GHG Emissions trajectory for Pluto LNG Facility as currently approved, based purely on a base Net GHG emission year and the forecast SGM decline rate. The SGM bulletin (May 2024) outlines an indicative decline rate of 3.285% per annum from 1 July 2030, as is reflected in the indicative SGM Baseline, noting that decline rates for this period will be revised by 1 July 2027[22]. These rates are subject to review and may be adjusted in five-year blocks to align with Australia's future emissions reduction targets. From 2026 onwards, it is expected the Pluto LNG Facility's compliance with the SGM as set and indicated will inherently demonstrate Net GHG Emissions in compliance with the Conditions of the Proposal's MS(s).

[22] safeguard-mechanism-reforms-factsheet-2023.pdf (dcceew.gov.au)

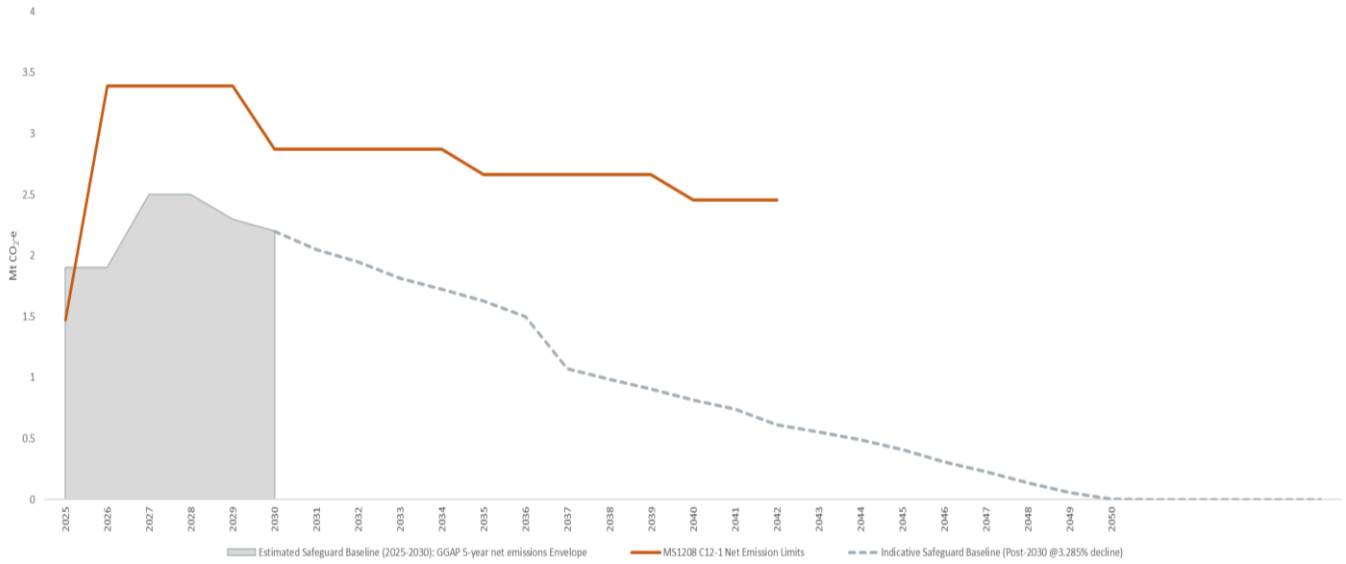


**Figure 3-5 Baseline and trajectory of net GHG emissions under SGM and MS1208 C12-1[23]**

[23] From 2025 to 2036, non-Proposal emissions (such as emissions from Pluto Alpha offshore platform) included in Pluto LNG Facility NGER scope represents 0.4% of total Safeguard Facility emissions, and 0% thereafter

## 3.6 Consistency with other (non-statutory) GHG reduction instruments

### 3.6.1 Climate strategy

Woodside's corporate climate strategy is integrated throughout our company strategy: our aspiration to thrive through the energy transition with a low-cost, lower-carbon, profitable, resilient and diversified portfolio[24].

In the 2023 Climate Transition Action Plan and 2023 Progress Report (CTAP)[25] (Woodside, 2024), Woodside outlined its climate strategy to achieve its energy transition objective of becoming a low-cost, lower-carbon energy provider, specifically:

- reducing our net equity Scope 1 and 2 GHG emissions,
- investing in products and services for the energy transition.

Reducing our net equity Scope 1 and 2 greenhouse gas emissions is supported by three levers: avoiding emissions in design, reducing emissions in operations, and offsetting the remainder with carbon credits.

Investing in products and services is also supported by three levers: assessing investments for their resilience to the energy transition; diversifying our products and services; and supporting our customers and suppliers to reduce their emissions.

These levers are supported by our work to promote global measurement and reporting – including our own publication of transparent disclosures. Each element of our strategy is supported by the 2023 CTAP. An update to key elements of the 2023 CTAP and progress made during 2024 against targets is set out in the 2024 Climate Update[26] (Woodside, 2025).

Woodside has already implemented a range of GHG management measures to align with its climate strategy aim to reduce GHG emissions globally, including:

- setting near- and medium-term corporate targets to reduce its net equity Scope 1 and Scope 2 greenhouse gas emissions by 15% in 2025 and 30% in 2030[27]. As of end-2024, Woodside had achieved 14% greenhouse gas emissions reductions below the starting base.
- Corporate investment target[28] of US$5 billion in new energy products and lower-carbon services by 2030. As of end-2024, there has been US$2.5 billion cumulative total spend on new energy products and lower-carbon services[29].
- Emissions abatement target to take FID on new energy products and lower-carbon services by 2030, with total abatement capacity of 5 Mtpa $CO_2$-e[30].

[24] For Woodside, a lower-carbon portfolio is one from which the net equity Scope 1 and 2 greenhouse gas emissions, which includes the use of offsets, are being reduced towards targets, and into which new energy products and lower-carbon services are planned to be introduced as a complement to existing and new investments in oil and gas. Our Climate Policy sets out the principles that we believe will assist us achieve this aim.

[25] climate-transition-action-plan-and-2023-progress-report.pdf (woodside.com)

[26] climate-update-2024.pdf (woodside.com)

[27] Targets and aspiration are for net equity Scope 1 and 2 greenhouse gas emissions relative to a starting base of 6.32 Mt CO2 -e which is representative of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and which may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with a final investment decision prior to 2021. Net equity emissions include the utilisation of carbon credits as offsets

[28] Scope 3 targets are subject to commercial arrangements, commercial feasibility, regulatory and Joint Venture approvals, and third party activities (which may or may not proceed). Individual investment decisions are subject to Woodside's investment targets. Not guidance. Potentially includes both organic and inorganic investment.

[29] Includes pre-RFSU spend on new energy products and lower carbon services that can help our customers decarbonise by using these products and services. It is not used to fund reductions of Woodside's net equity Scope 1 and 2 emissions which are managed separately through asset decarbonisation plans.

[30] Includes binding and non-binding opportunities in the portfolio, subject to commercial arrangements, commercial feasibility, regulatory and Joint Venture approvals, and third-party activities (which may or may not proceed). Individual investment decisions are subject to Woodside's investment targets. Not guidance.

The Climate Transition Action Plan and 2023 Progress Report also described the vision for Pluto net zero[31], conceptually exploring future potential abatement options, including measures further detailed in Section 3.3.1.

## 3.7 Offsets

The Pluto LNG Facility utilises certified carbon credits which meet the regulatory requirements to offset Scope 1 GHG emissions during a specified period after design out and operate out measures have been adopted. The Pluto LNG Facility utilises offsets to meet these regulatory requirements, while asset and technology decarbonisation opportunities are matured and viable measures implemented. Carbon offset can be sourced through carbon market purchases, purchased from the Federal Government through the Cost-Containment Measure, through issuance of SMCs from the Clean Energy Regulator (CER), or through development of carbon origination projects. The Pluto LNG Facility has and will continue to use a combination of these sources.

Woodside uses accredited offsets from Australian and international standards, as encompassed in the term 'Authorised Offsets', set out in recent relevant Ministerial Statements. SMCs under SGM are also required to meet applicable regulatory requirements.

### 3.7.1 Summary of offset usage

Offsets will be utilised for compliance with regulatory net emission requirements. During the operational life, the Pluto LNG Facility anticipates that carbon offsets may be surrendered for more than 30% of the expected SGM Baseline. Reporting will be completed in accordance with SGM Rule.

### 3.7.2 Type and location of offsets

Woodside maintains a diversified portfolio on a corporate level to reduce its exposure to any single country, geo-political, method, developer or standard body risk that may impact supply, and to subsequently manage asset regulatory obligations as well as voluntary demand (i.e corporate targets). This includes domestic and international units across a diverse range of abatement activities which can be summarised under either avoidance/ reduction or removal activities. Woodside has participated in both the Australian compliance market and the voluntary market for carbon credits. Woodside holds carbon credits from the following carbon credit programs:

- The ACCU Scheme, which is established and governed by the Clean Energy Regulator (CER). The CER issues ACCUs and administers their trade on the Australian National Registry of Emissions Units (ANREU).
- Verified Carbon Standard (VCS), under which Verified Carbon Units (VCUs) are issued, is established and governed by the non-government organisation Verra.
- Gold Standard, under which Verified Emissions Reductions (VERs) are issued, is established and governed by the non-government organisation Gold Standard.

Woodside at a corporate level has both an Australian and International carbon origination team that aims to identify, assess and develop carbon abatement projects in Australia and Internationally.

Offsets were discussed as part of consultation with Murujuga Aboriginal Corporation (MAC) in accordance with MS 1208 Condition 12-3(4). Refer to Section 6 for a summary of key topics covered throughout the consultation process.

### 3.7.3 Offset integrity, assurance and reporting

In order to be accredited under the standards set out in Section 3.7.2, units adhere to criteria and specific principles.

[31] Woodside, 2024. Climate Transition Action Plan and 2023 Progress Report. Refer to Slides 24 and 25 including footnotes.

Woodside has a process to assess both GHG abatement integrity and broader environment, social and governance (ESG) integrity. Woodside monitors the evolution of integrity assessment frameworks and standards developed by independent organisations when formulating our approach. Our approach is informed by current and emerging external frameworks such as the Integrity Council for the Voluntary Carbon Market (ICVCM)'s Core Carbon Principles[32], the Investor Group on Climate Change's (IGCC)'s guidance[33], and the Oxford Principles for Net Zero Aligned Offsetting[34].

### 3.7.4 Offset availability

Woodside has a long-term integrated strategy across new energy, decarbonisation and offsets in order to meet both regulatory and corporate emissions reduction targets. As such its strategy to support sufficient emissions management, inclusive of decarbonisation and offsetting, spans across short, medium and long term (2050+) periods.

### 3.7.5 Reporting and evidence of surrender

Consolidated Reporting of GHG performance including net GHG emissions will be undertaken 5-yearly in accordance with MS 1208 Condition 12-11. This report will include (amongst other information as required) details of the type, quantity, identification or serial number and date of retirement or cancellation of any Authorised Offsets retired or cancelled for the purposes of complying with Condition 12-1, and the 5-year net emissions envelope detailed in this revision of the GGAP.

Woodside published details on its surrendered units via its Climate Transition Action Plan and 2023 Progress Report. The Climate Transition Action Plan and 2023 Progress Report was structured to align with the Task Force on Climate-related Financial Disclosures (TCFD) framework. A summary of offset projects and retired units specific to the Pluto LNG Facility is set out in Appendix B and has also formed part of Annual Compliance Reporting (ACR) under MS757 for the Pluto LNG Facility[35].

The 2024 Annual Compliance Report[29] outlines the current Pluto LNG Plant tracking of performance for the five year period (2021-end 2025) as summarised in the table below, and is on track to achieve compliance with MS1208 Condition 12-1(1):

**Table 3-11 Pluto LNG Plant GHG emissions in relation to MS1208 Condition 12-1(1)**

| Description | Volume |
|---|---|
| Proposal GHG emissions between 1 January 2021 and 31 December 2024 | 7.49 MtCO2-e |
| Applicable Authorised Offsets (See Appendix B) | 2.12 M units |
| Net GHG Emissions between 1 January 2021 and 31 December 2024 | 5.37 MtCO2-e |
| Remaining allowable net GHG emissions to 31 December 2025 (against 7.35Mt limit) | 1.98 MtCO2-e |

## 3.8 Operation beyond 2050

Pluto LNG Plant is anticipated to be operating beyond 2050, subject to obtaining relevant approvals, with net zero GHG emissions in accordance with SGM requirements as set out in Section 3.1 and Section 3.2.

[32] ICVCM, 2023. "The Core Carbon Principles", https://icvcm.org/the-core-carbonprinciples/.

[33] IGCC, 2022. "Corporate Climate Transition Plans: A guide to investor expectations", https://igcc.org.au/wp-content/uploads/2022/03/IGCC-corporate-transition-planinvestor-expectations.pdf.

[34] University of Oxford, 2020. "The Oxford Principles for Net Zero Aligned Carbon Offsetting", https://www.smithschool.ox.ac.uk/sites/default/files/2022-01/OxfordOffsetting-Principles-2020.pdf.

[35] Pluto LNG Environmental Compliance Reporting - Woodside Energy. https://www.woodside.com/what-we-do/operations/pluto-lng/pluto-lng-environmental-compliance-reporting

# 4. ADAPTIVE MANAGEMENT, CONTINUOUS IMPROVEMENT AND REVIEW

The Proponent has an adaptive management approach that embeds a continuous cycle of monitoring, evaluating and implementing change (where appropriate), while maintaining ongoing reporting so that relevant future improvement opportunities, not yet identified, will be able to be captured and actioned.

The Proponent will review the existing or identify new potential GHG mitigation measures through a five yearly review process. The potential GHG mitigation measures presented in this revision of the GGAP will be reviewed, evaluated, implemented or updated to reflect the reason for non-adoption or future consideration, considering:

- changes to the uncertainties or assumptions, as noted in Section 3.1 and Appendix A
- evaluation of routine GHG emissions monitoring data
- new and relevant data and information gained as a result of implementing this revision of the GGAP, or from external sources
- effectiveness of internal processes and procedures to reduce and manage GHG emissions
- changes in markets and technology, including a detailed technology review
- other changes in regional infrastructure and energy resources
- monitoring and management actions.

## 4.1 Greenhouse Gas Abatement Program revision

The Proponent will undertake a technical review and evaluation of the actions outlined in this GGAP every five years (adaptive management review) so that there is a consideration of whether actions are adequately addressing the relevant key risks and meeting the objectives of current and future State and Federal legislation and policy. This revision of the GGAP may also be revised by the Proponent prior to the five-year interval as or if the Proponent considers appropriate.

Since operations commenced in 2012, the Pluto LNG Facility has engaged in continuous improvement activities from the best practice design reviews (Section 3.3) and benchmarking (Section 3.4) completed for each of the LNG trains through to emission reduction measures in operations. This has been and will continue to be supported through revisions of the GGAP.

# 5. REPORTING

## 5.1 NGERS

Monitoring, auditing and reporting of emissions from the Pluto LNG Facility is carried out in accordance with the requirements of the National Greenhouse and Energy Reporting Act 2007, or as otherwise required by law.

## 5.2 Ministerial Statement Compliance Reporting

The Proponent will report in accordance with Ministerial reporting conditions.

The information provided to demonstrate compliance with MS 1208 will be the Scope 1 GHG emissions reported under the NGER Act. NGER and SGM reporting follows financial-year periods. As such, GGAP reporting under MS 757/MS 1208 may include data from overlapping financial years, and/or provisional data subject to change for open financial-year report periods.

The Pluto LNG Facility Annual Compliance Reporting, the approved revision of the GGAP and supporting summary report will be made publicly available on Woodside's website woodside.com.

## 5.3 Management Actions

The following management action will be implemented as part of this revision of the GGAP.

**Table 5-1: Management Actions**

| Management Action | Management Target | Monitoring | Reporting |
|---|---|---|---|
| MA1: Maintain net emissions below regulated limits | Net GHG Emissions do not exceed:<br>(1) 7,350,000 tonnes of $CO_{2\text{-}e}$ for the period between 1 January 2021 and 31 December 2025 or such higher amount (not exceeding an additional 500,000 tonnes [reservoir] $CO_{2\text{-}e}$) that the CEO considers is otherwise accounted for and regulated under a condition of an implementation agreement (if any) applying to the Karratha Gas Plant;<br>(2) 13,560,000 tonnes of CO2-e for the period between 1 January 2026 and 31 December 2029;<br>(3) 14,350,000 tonnes of CO2-e for the period between 1 January 2030 and 31 December 2034;<br>(4) 13,325,000 tonnes of CO2-e for the period between 1 January 2035 and 31 December 2039; and<br>(5) 5,728,767 tonnes of CO2-e for the period between 1 January 2040 and 30 April 2042. | Annual emissions monitoring<br><br>Offsets purchased and surrendered (where applicable) | Annual Compliance Assessment Report (ACAR) as required under MS 1208<br><br>NGER Report<br><br>Five yearly progress report |

# 6. STAKEHOLDER CONSULTATION

The various revisions of the Pluto GGAP have been publicly available on Woodside's website since 2011 in accordance with MS 757.

## 6.1 Stakeholder consultation to date

Woodside has been a part of the regional north-west WA communities for more than 40 years and during this time it has promoted and encouraged stakeholder input and feedback. Consistent with the EPA's broader principles for environmental impact assessment (EPA, 2023), the Proponent has consulted with a broad range of stakeholders regarding GHG emissions from the Pluto LNG Plant operations.

Stakeholders consulted previously on the GGAP are listed in previous revisions of the GGAP (most recently Revision 3a dated June 2021).

In accordance with MS 1208 Condition 12-3(1)-(5), this revision of the GGAP has been prepared in consultation with MAC. Table 6-1 summarises consultation activities and key topics discussed.

**Table 6-1: Summary of Consultation**

| Date | Stakeholder | Consultation Type | Key Topics Discussed |
|---|---|---|---|
| 26 March 2024 | MAC Board and CEO | Initial Meeting | - Initial meeting, introduction and lookahead to areas on which Woodside was seeking to consult with MAC in future, including the Pluto GGAP |
| 22 July 2024 | MAC Board and CEO | Meeting | - Introduction to the Pluto GGAP<br>- Discussion on how MAC would like to be consulted, and potential areas of interest |
| 21 August 2024 | MAC Board and CEO | Meeting | - Scope of the Pluto GGAP, including GHG net emissions limits under MS 1208 (and intention to align with Federal SGM), emissions reduction trajectory and overview of levers to achieve this<br>- Introduction to upcoming Independent Expert Technical Review of the GGAP |
| 18 September 2024 | MAC Board and CEO | Meeting | - Further detail on GGAP contents<br>- Abatement opportunities including associated estimated emissions abatement, and carbon offsets<br>- Update on Independent Expert Technical Review |
| 23 October 2024 | MAC Board and CEO | Meeting | - Summary of Independent Expert Technical Review of the Pluto GGAP, including findings and recommendations<br>- Lookahead of further consultation opportunities with MAC<br>- Confirmed conclusion of consultation with MAC |

## 6.2 Consultation as part of s46 inquiry No.2299

In addition, as part of the EPA's Report 1734 s46 inquiry[36] 2023, a range of stakeholders were engaged directly for comment on the GGAP. These stakeholders included:

- Environmental Defenders Office
- Conservation Council of Western Australia
- Murujuga Aboriginal Corporation
- Australian Energy Producers
- The Chamber of Minerals and Energy of Western Australia.

During the s46 inquiry (No.2299), the EPA report advised that submissions were made by all stakeholders engaged, with several key issues raised regarding with the appropriateness of the

[36] EPA's, Pluto Liquified Natural Gas Development (Site B Option) Burrup Peninsula, Shire of Roebourne – s. 46 inquiry

Condition 12 of MS 757 (as it existed at that date), contemporary GHG conditions, the Pluto LNG Facility GGAP (Woodside 2021b), reservoir offset requirements and the management of cumulative GHG emissions.

This consultation formed the basis for the revised Condition 12 which this revision of the GGAP incorporates.

## 6.3 Ongoing consultation

It is anticipated that consultation with MAC and other stakeholders will occur on an ongoing basis. Where consultation takes place over the life of the Proposal, consultation outcomes that Woodside considers relevant will be incorporated into future versions of the GGAP, which is anticipated to be updated on a five yearly basis as set out in **Section 4.1**.

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# APPENDIX A: COMMON ASSUMPTIONS, UNCERTAINTIES AND LIMITATIONS

The following table outlines assumptions used in developing this document, and uncertainties that may impact the outcomes of the Project.

**Table A-1 Assumptions, uncertainties and limitations**

| Assumption | Explanation |
|---|---|
| GHG emissions discussed in this revision of the GGAP refer to the those defined by the NGER Act. [37] | Net GHG emissions are equal to an entity's gross GHG emissions reduced by the number of retired carbon credits. This GGAP specifically refers to the GHGs outlined in the *National Greenhouse and Energy Reporting Act*[38]*.*<br>Woodside has set its corporate Scope 1 and 2 GHG emissions reduction targets on a net equity basis, allowing for both direct GHG emissions reductions from its operations and/or projects and GHG emissions reduction achieved from the utilisation of carbon credits as offsets (including credits relating to avoidance, reduction and/or removal activities). |
| Scope boundaries defined by operational control. | The Pluto LNG Facilities boundaries of GHG emissions scopes have been defined using the operational control method in accordance with the NGER Act. Operational control is determined by whether a corporation has the authority to introduce and implement operating, health and safety or environmental policies over a facility. Based on NGERs guidance, Construction activities are not included as Scope 1 emissions estimates as it is carried out by a third-party, and is not applicable for the purposes of production products or services applicable to the Facility primary production process.<br>Unless otherwise specified all GHG and reduction forecasts are presented as full-operated Pluto LNG Facility emissions, not pro-rata adjusted such as for equity share. |
| Factors influencing LNG Plant Energy Intensity | Gas Composition<br>The proportion of $CO_2$, $N_2$ and other inert gases that naturally occur in the reservoir gases that supply the LNG facility. Feed gas composition has a potential impact on the efficiency of the liquification process. Inert gas contained in the feed gas stream (from the reservoir) must largely be removed prior to, or during, the liquefaction process. $CO_2$ and other inerts removed are usually vented to atmosphere. |
| | Ambient Temperature<br>The ambient temperature of the surrounding environment at the location of the LNG plant (lower temperatures enhance air cooling of LNG and turbine efficiency). The cooling efficiency of the refrigeration loop is improved when cooling takes place in areas of lower ambient temperatures as compared to warmer temperatures. Ambient temperatures also influence the efficiency of gas turbine operation (compressor efficiency is favoured by cooler temperatures). Therefore, cooler temperatures result in greater efficiency and less GHG emissions for the same power output compared to a gas turbine operating in a warmer climate. |
| | Process Integration<br>The level of integration with other gas processing facilities such as domestic supply, LPG extraction and condensate production. A larger site typically has a smoother electrical demand and allow greater flexibility for power generation plant. Integration with other facilities including domestic gas supply, LPG extraction and condensate production, also provides greater opportunity for waste heat utilisation thereby increasing overall energy efficiency of the facility. |

[37] The greenhouse gases listed in the NGER Act are carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons.

[38] Greenhouse gas emissions, energy values and global warming potentials are estimated in accordance with the relevant reporting regulations in the jurisdiction where the emissions occur.

| Assumption | Explanation |
|---|---|
| | Local Electricity Generation<br>The capacity for local electricity generation infrastructure to supply electrical power. This enables generation plant to be operated more efficiently as the grid can be used for sparing capacity and larger scale power generation has greater capacity for efficiency for the same price per megawatt output. For NGER reporting, GHG emissions from the consumption of grid power are included and reportable as Scope 2 GHG emissions, however the GHG emissions from the production of electricity for the grid is accounted for by the supplier (refer to National Greenhouse and Energy Reporting Guidelines). |
| Emission factor and methodologies | Emission estimates are aligned to 2023 National Greenhouse Account Factor Guideline and the National Greenhouse and Energy Reporting (Measurement) Determination.<br>Global Warming Potentials used are:<br>• Carbon Dioxide ($CO_2$) – 1<br>• Methane ($CH_4$)– 28<br>• Dinitrogen monoxide ($N_2O$) - 265<br>In the event global warming potentials are revised, GHG emissions estimates will be adjusted accordingly through subsequent revisions of the GGAP. |
| Life of Proposal | Ministerial Approval 757 (as amended by Ministerial Statements 850 and 1208) is valid until 30 April 2042, as is reflected in MS1208 Condition 12-1. Emissions estimates provided in the GGAP beyond 2042 are for information only and in accordance with the Environmental Factor Guideline (November, 2024), demonstrating achievement of net zero emissions no later than 2050. As described in Section 3.1.1, emissions estimates provided in the GGAP are an upper estimate and based on potential positive production outcomes. Operations of the Pluto LNG Facility beyond 2042 will be subject to further relevant approvals. |
| Project timing | Emission estimates and timings are based on current projects and activities at the Pluto LNG Plant, these are subject to change. Timings will be updated in future revisions. |
| Reservoir outcome. | Reservoir outcomes can vary significantly, emission estimates are based on selected reservoir assumptions for the purposes of estimating a potential GHG envelope.<br>Typical of most oil and gas activities, reservoir performance carries a wide uncertainty range, and production varies with market demand and downstream processing performance.<br>Emissions estimates presented in this revision of the GGAP are developed solely for the purpose of estimating a GHG envelope as a potential outcome associated with utilisation of the Pluto LNG Facility infrastructure for processing of offshore gas in accordance with MS approval (but does not limit the gas fields from which gas may be processed) from the Pluto Development area (Pluto, Xena, Pyxis) and Greater Scarborough Development (Scarborough, Thebe and Jupiter). These assumptions provide a basis for estimating an upper estimate of GHG envelope and associated net emissions under the SGM for the period 2025-2030, and indication of trajectory to net zero by 2050. These forward-looking statements are not intended to inform basis for commercial estimates or insights. |
| SGM Decline Rate | SGM default decline rates are applied in this revision of the GGAP consistent with Australian Government policy defined in Division 5. Section 32 of the NGER (Safeguard Mechanism) Rule 2015. |
| Pluto Train 2 Environmental commissioning | GHG Emissions for commissioning of Pluto Train 2 are based on detailed design engineering estimates and commissioning plan. |

# APPENDIX B: OFFSET PROJECTS AND UNITS

Applicable carbon liability on Pluto LNG Facility will be acquitted through the facility venturers' respective offset portfolios, inclusive of the Pluto Trees project (Woodside Pluto Carbon Offset Project – Stages 1 to 4) as outlined in the table below. Furthermore, Woodside as the Responsible Emitter, may act to acquit on behalf of a participant to ensure acquittal liabilities are managed by the compliance period deadline.

**Table B-1 Pluto Trees Projects (Registered Carbon Farming Offset Projects)**

| Offset Project Proponent | Project Name | Reference | Methodology |
|---|---|---|---|
| Woodside Burrup Pty. Ltd. | Woodside Pluto Carbon Offset Project - Stage 4 | ERF101451 | Reforestation and Afforestation - 1.2 |
| Woodside Burrup Pty. Ltd. | Woodside Pluto Carbon Offset Project - Stage 3 | EOP100818 | Reforestation and Afforestation - 1.2 |
| Woodside Burrup Pty. Ltd. | Woodside Pluto Carbon Offset Project - Stage 2 | EOP100654 | Reforestation and Afforestation - 1.2 |
| Woodside Burrup Pty. Ltd. | Woodside Pluto Carbon Offset Project - Stage 1 | EOP100203 | Reforestation and Afforestation - 1.2 |

The below table B-2 outlines retired eligible offset units retired against MS757, and as amended by MS1208, between the calendar year periods of 2021-end 2024 as outlined within the Pluto Annual Compliance Reports (ACR). It evidences that the liability requirements have been acquitted in full and proactively on an annual basis, ahead of the end of the 5-year monitoring period (1 January 2021 – 31 December 2025).

Previous year's ACRs and communication with DWER in August 2021 demonstrated compliance information applicable for the updated MS1208 Condition 12-14 covering the offset package for Pluto's reservoir CO2 emissions with retirement of offsets up to 31 December 2020.

**Table B-2 Carbon Credits retired for the MS1208 net emissions limit period 1 January 2021 to 31 December 2025. Reported to end-March 2025**

| Quantity | Project ID | Project Name | Vintage | Serial Number | Retirement Date |
|---|---|---|---|---|---|
| **2021 Compliance Period, Retirement Period 2022**<br>*Retirements = 315,843 units* | | | | | |
| 72,261 | 1,477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243294703-243366963-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 3/02/2022 |
| 4,795 | 1,819 | 19.2 MWp Solar Power Project by HZL at Debari and Dariba, Rajasthan | 25/03/2017-31/12/2017 | 7385-391219330-391224124-VCU-034-APX-IN-1-1819-25032017-31122017-0 | 3/02/2022 |
| 22,697 | 1,819 | 19.2 MWp Solar Power Project by HZL at Debari and Dariba, Rajasthan | 01/01/2018-01/12/2018 | 7386-391224125-391246821-VCU-034-APX-IN-1-1819-01012018-01122018-0 | 3/02/2022 |

| | | | | | |
|---|---|---|---|---|---|
| 63,000 | 1,353 | Bundled Wind Power Project in Tamilnadu, India, co-ordinated by Tamilnadu Spinning Mills Association (TASMA-V2) | 01/01/2017-31/12/2017 | 9064-64731020-64794019-VCS-VCU-508-VER-IN-1-1353-01012017-31122017-0 | 3/02/2022 |
| 39,627 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9032-62499920-62539546-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 3/02/2022 |
| 3,055 | 1,819 | 19.2 MWp Solar Power Project by HZL at Debari and Dariba, Rajasthan | 01/01/2018-01/12/2018 | 7386-391246822-391249876-VCU-034-APX-IN-1-1819-01012018-01122018-0 | 8/02/2022 |
| 7,000 | 1,353 | Bundled Wind Power Project in Tamilnadu, India, co-ordinated by Tamilnadu Spinning Mills Association (TASMA-V2) | 01/01/2017-31/12/2017 | 9064-64794020-64801019-VCS-VCU-508-VER-IN-1-1353-01012017-31122017-0 | 8/02/2022 |
| 4,403 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9032-62539648-62544050-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 8/02/2022 |
| 8,029 | 1,477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243376210-243384238-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 8/02/2022 |
| 681 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2016 | GS1-1-CN-GS605-15-2016-20917-76-756 | 3/02/2022 |
| 40,698 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2017 | GS1-1-CN-GS605-15-2017-20918-5007-45704 | 3/02/2022 |
| 4,597 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2017 | GS1-1-CN-GS605-15-2017-20918-45705-50301 | 3/02/2022 |
| 139 | 5660 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 004 | 2018 | GS1-1-MM-GS5660-16-2018-6891-3-141 | 3/02/2022 |
| 823 | 5661 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 005 | 2018 | GS1-1-MM-GS5661-16-2018-6894-17-839 | 3/02/2022 |
| 2,690 | 5661 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 005 | 2018 | GS1-1-MM-GS5661-16-2018-18871-55-2744 | 3/02/2022 |
| 4,942 | 5662 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 006 | 2018 | GS1-1-MM-GS5662-16-2018-18969-101-5042 | 3/02/2022 |
| 45 | 6129 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 007 | 2018 | GS1-1-MM-GS6129-16-2018-7306-1-45 | 3/02/2022 |
| 3,919 | 6129 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 007 | 2018 | GS1-1-MM-GS6129-16-2018-19096-80-3998 | 3/02/2022 |
| 4,500 | 6129 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 007 | 2018 | GS1-1-MM-GS6129-16-2018-7306-46-4545 | 3/02/2022 |
| 127 | 6338 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 008 | 2018 | GS1-1-MM-GS6338-16-2018-19668-13-139 | 3/02/2022 |
| 7,998 | 6338 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 008 | 2018 | GS1-1-MM-GS6338-16-2018-18743-1-7998 | 3/02/2022 |

| | | | | | |
|---|---|---|---|---|---|
| 7,907 | 6599 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 009 | 2018 | GS1-1-MM-GS6599-16-2018-18814-1-7907 | 3/02/2022 |
| 6,535 | 6600 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 010 | 2018 | GS1-1-MM-GS6600-16-2018-18938-1-6535 | 3/02/2022 |
| 4,109 | 6861 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 011 | 2018 | GS1-1-MM-GS6861-16-2018-19366-1-4109 | 3/02/2022 |
| 1,266 | 7343 | GS1729 - Myanmar Stoves Campaign - Soneva in Myanmar - VPA No. 012 | 2018 | GS1-1-MM-GS7343-16-2018-19670-1-1266 | 3/02/2022 |
| **2022 Compliance Period, Retirement Period 2023**<br>*Retirements = 425,407 units* | | | | | |
| 24,724 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2017 | GS1-1-CN-GS605-15-2017-20918-116646-141438 | 22/02/2023 |
| 50,532 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2017 | GS1-1-CN-GS605-15-2017-20918-66114-116645 | 22/02/2023 |
| 2,807 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2017 | GS1-1-CN-GS605-15-2017-20918-53109-55915 | 22/02/2023 |
| 2,807 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2017 | GS1-1-CN-GS605-15-2017-20918-50302-53108 | 22/02/2023 |
| 71,999 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243574051-243646251-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 21/02/2023 |
| 33,335 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9146-70709817-70743245-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 21/02/2023 |
| 147,151 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243410550-243557700-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 21/02/2023 |
| 29,421 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9146-70672826-70702246-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 21/02/2023 |
| 38,711 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9032-62544051-62582761-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 21/02/2023 |
| 8,175 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243565876-243574050-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 21/02/2023 |
| 3,785 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9146-70706032-70709816-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 21/02/2023 |
| 8,175 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243557701-243565875-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 21/02/2023 |
| 3,785 | 786 | Hyundai Steel Waste Energy Cogeneration Project | 01/01/2017-30/06/2017 | 9146-70702247-70706031-VCS-VCU-260-VER-KR-1-786-01012017-30062017-0 | 21/02/2023 |
| **2023 Compliance Period, Retirement Period 2024**<br>*Retirements = 742,945 units* | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 1,509 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2018 | GS1-1-CN-GS605-15-2018-20919-106629-108137 | 13/02/2024 |
| 1,509 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2018 | GS1-1-CN-GS605-15-2018-20919-105120-106628 | 13/02/2024 |
| 27,157 | 605 | Antai Group Waste Gas Recovery for Power Generation Project (300303) | 2018 | GS1-1-CN-GS605-15-2018-20919-77963-105119 | 13/02/2024 |
| 225 | 4210 | WithOneSeed Timor Leste Community Forestry Program | 2018 | GS1-1-TL-GS4210-21-2018-19055-8572-8796 | 13/02/2024 |
| 225 | 4210 | WithOneSeed Timor Leste Community Forestry Program | 2018 | GS1-1-TL-GS4210-21-2018-19055-8347-8571 | 13/02/2024 |
| 4,050 | 4210 | WithOneSeed Timor Leste Community Forestry Program | 2018 | GS1-1-TL-GS4210-21-2018-19055-4297-8346 | 13/02/2024 |
| 514 | 1890 | Grid Connected Solar Energy Project | 01/01/2018-31/12/2018 | 7594-409684179-409684692-VCU-034-APX-IN-1-1890-01012018-31122018-0 | 14/02/2024 |
| 2,712 | 1890 | Grid Connected Solar Energy Project | 01/01/2019-31/03/2019 | 7913-439568156-439570867-VCU-034-APX-IN-1-1890-01012019-31032019-0 | 14/02/2024 |
| 781 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457212584-457213364-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 2,041 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457098819-457100859-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 1,616 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457058424-457060039-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 2,135 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2018-31/12/2018 | 8103-457025595-457027729-VCU-034-APX-CN-1-903-01012018-31122018-0 | 14/02/2024 |
| 894 | 1890 | Grid Connected Solar Energy Project | 01/04/2019-31/12/2019 | 8666-38197143-38198036-VCS-VCU-997-VER-IN-1-1890-01042019-31122019-0 | 14/02/2024 |
| 23,998 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-244270705-244294702-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 14/02/2024 |
| 514 | 1890 | Grid Connected Solar Energy Project | 01/01/2018-31/12/2018 | 7594-409683665-409684178-VCU-034-APX-IN-1-1890-01012018-31122018-0 | 14/02/2024 |
| 2,712 | 1890 | Grid Connected Solar Energy Project | 01/01/2019-31/03/2019 | 7913-439565444-439568155-VCU-034-APX-IN-1-1890-01012019-31032019-0 | 14/02/2024 |
| 781 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457211803-457212583-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 2,041 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457096778-457098818-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 1,616 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457056808-457058423-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |

| | | | | | |
|---|---|---|---|---|---|
| 2,135 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2018-31/12/2018 | 8103-457023460-457025594-VCU-034-APX-CN-1-903-01012018-31122018-0 | 14/02/2024 |
| 894 | 1890 | Grid Connected Solar Energy Project | 01/04/2019-31/12/2019 | 8666-38196249-38197142-VCS-VCU-997-VER-IN-1-1890-01042019-31122019-0 | 14/02/2024 |
| 23,998 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-244246707-244270704-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 14/02/2024 |
| 431,956 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2018-31/12/2018 | 10717-243814751-244246706-VCS-VCU-263-VER-ID-14-1477-01012018-31122018-1 | 14/02/2024 |
| 1 | 1890 | Grid Connected Solar Energy Project | 01/01/2018-31/12/2018 | 7594-409674413-409674413-VCU-034-APX-IN-1-1890-01012018-31122018-0 | 14/02/2024 |
| 9,251 | 1890 | Grid Connected Solar Energy Project | 01/01/2018-31/12/2018 | 7594-409674414-409683664-VCU-034-APX-IN-1-1890-01012018-31122018-0 | 14/02/2024 |
| 16,095 | 1890 | Grid Connected Solar Energy Project | 01/04/2019-31/12/2019 | 8666-38180154-38196248-VCS-VCU-997-VER-IN-1-1890-01042019-31122019-0 | 14/02/2024 |
| 48,814 | 1890 | Grid Connected Solar Energy Project | 01/01/2019-31/03/2019 | 7913-439516630-439565443-VCU-034-APX-IN-1-1890-01012019-31032019-0 | 14/02/2024 |
| 36,738 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457060040-457096777-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 29,078 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457027730-457056807-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 14,073 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457197730-457211802-VCU-034-APX-CN-1-903-01012019-31122019-0 | 14/02/2024 |
| 38,430 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2018-31/12/2018 | 8103-456985030-457023459-VCU-034-APX-CN-1-903-01012018-31122018-0 | 14/02/2024 |
| 7,226 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project 4 | 01/01/2019-31/12/2019 | 8104-457213365-457220590-VCU-034-APX-CN-1-903-01012019-31122019-0 | 19/03/2024 |
| 7,226 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project 4 | 01/01/2019-31/12/2019 | 8104-457220591-457227816-VCU-034-APX-CN-1-903-01012019-31122019-0 | 19/03/2024 |
| **2024 Compliance Period, Retirement Period 2025**<br>*Retirements = 633,852 units* | | | | | |
| 136,970 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2019-31/12/2019 | 12782-435086301-435223270-VCS-VCU-263-VER-ID-14-1477-01012019-31122019-1 | 13/12/2024 |
| 10,000 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2019-31/12/2019 | 11720-353760763-353770762-VCS-VCU-263-VER-ID-14-1477-01012019-31122019-1 | 13/12/2024 |
| 4,440 | 1745 | Bundled Solar Power Project by Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited | 01/01/2019-31/12/2019 | 8643-36545281-36549720-VCS-VCU-997-VER-IN-1-1745-01012019-31122019-0 | 13/12/2024 |

| | | | | | |
|---|---|---|---|---|---|
| 5,173 | 1890 | Grid Connected Solar Energy Project | 01/01/2020-20/07/2020 | 8665-37772849-37778021-VCS-VCU-997-VER-IN-1-1890-01012020-20072020-0 | 13/12/2024 |
| 62,541 | 1987 | Genneia Wind Projects in Argentina | 01/01/2019-31/12/2019 | 11453-331386924-331449464-VCS-VCU-1323-VER-AR-1-1987-01012019-31122019-1 | 13/12/2024 |
| 3,155 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457227817-457230971-VCU-034-APX-CN-1-903-01012019-31122019-0 | 13/12/2024 |
| 3,942 | 2588 | Taiba N'Diaye Wind Power | 01/01/2020-31/12/2020 | 12355-406483188-406487129-VCS-VCU-1531-VER-SN-1-2588-09122019-31122019-0 | 13/12/2024 |
| 79,438 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2019-31/12/2019 | 12730-431420737-431500174-VCS-VCU-263-VER-ID-14-1477-01012020-31122020-0 | 13/12/2024 |
| 103,030 | 1477 | Katingan Peatland Restoration and Conservation Project | 01/01/2019-31/12/2019 | 12782-435223271-435326300-VCS-VCU-263-VER-ID-14-1477-01012019-31122019-1 | 13/12/2024 |
| 5,512 | 1745 | Bundled Solar Power Project by Vector Green Sunshine Private Limited and Polepally Solar Parks Private Limited | 01/01/2019-31/12/2019 | 8643-36549721-36555232-VCS-VCU-997-VER-IN-1-1745-01012019-31122019-0 | 13/12/2024 |
| 6,421 | 1890 | Grid Connected Solar Energy Project | 01/01/2020-20/07/2020 | 8665-37778022-37784442-VCS-VCU-997-VER-IN-1-1890-01012020-20072020-0 | 13/12/2024 |
| 77,647 | 1987 | Genneia Wind Projects in Argentina | 01/01/2019-31/12/2019 | 11453-331449465-331527111-VCS-VCU-1323-VER-AR-1-1987-01012019-31122019-1 | 13/12/2024 |
| 3,917 | 903 | Hebei Guyuan County Dongxinying 199.5 MW Wind Power Project | 01/01/2019-31/12/2019 | 8104-457230972-457234888-VCU-034-APX-CN-1-903-01012019-31122019-0 | 13/12/2024 |
| 4,895 | 2588 | Taiba N'Diaye Wind Power | 09/12/2019-31/12/2019 | 12355-406487130-406492024-VCS-VCU-1531-VER-SN-1-2588-09122019-31122019-0 | 13/12/2024 |
| 11,206 | 1987 | Genneia Wind Projects in Argentina | 01/01/2019-31/12/2019 | 11453-331599692-331610897-VCS-VCU-1323-VER-AR-1-1987-01012019-31122019-1 | 18/02/2025 |
| 34,362 | 2588 | Taiba N'Diaye Wind Power | 01/01/2020-31/12/2020 | 12384-407499108-407533469-VCS-VCU-1531-VER-SN-1-2588-01012020-31122020-0 | 18/02/2025 |
| 10,988 | 1964 | Quang Minh Solar Power Project | 31/01/2019-31/12/2019 | 10743-245859707-245870694-VCS-VCU-842-VER-VN-1-1964-31012019-31122019-0 | 18/02/2025 |
| 13,913 | 1987 | Genneia Wind Projects in Argentina | 01/01/2019-31/12/2019 | 11453-331610898-331624810-VCS-VCU-1323-VER-AR-1-1987-01012019-31122019-1 | 18/02/2025 |
| 42,660 | 2588 | Taiba N'Diaye Wind Power | 01/01/2020-31/12/2020 | 12384-407533470-407576129-VCS-VCU-1531-VER-SN-1-2588-01012020-31122020-0 | 18/02/2025 |
| 13,642 | 1964 | Quang Minh Solar Power Project | 31/01/2019-31/12/2019 | 10743-245870695-245884336-VCS-VCU-842-VER-VN-1-1964-31012019-31122019-0 | 18/02/2025 |
| **Total Retired to date for Compliance Period Monitoring period 2021 - 2024 (retirements in 2022 – 2025)** | | | | ***2,118,046*** | |