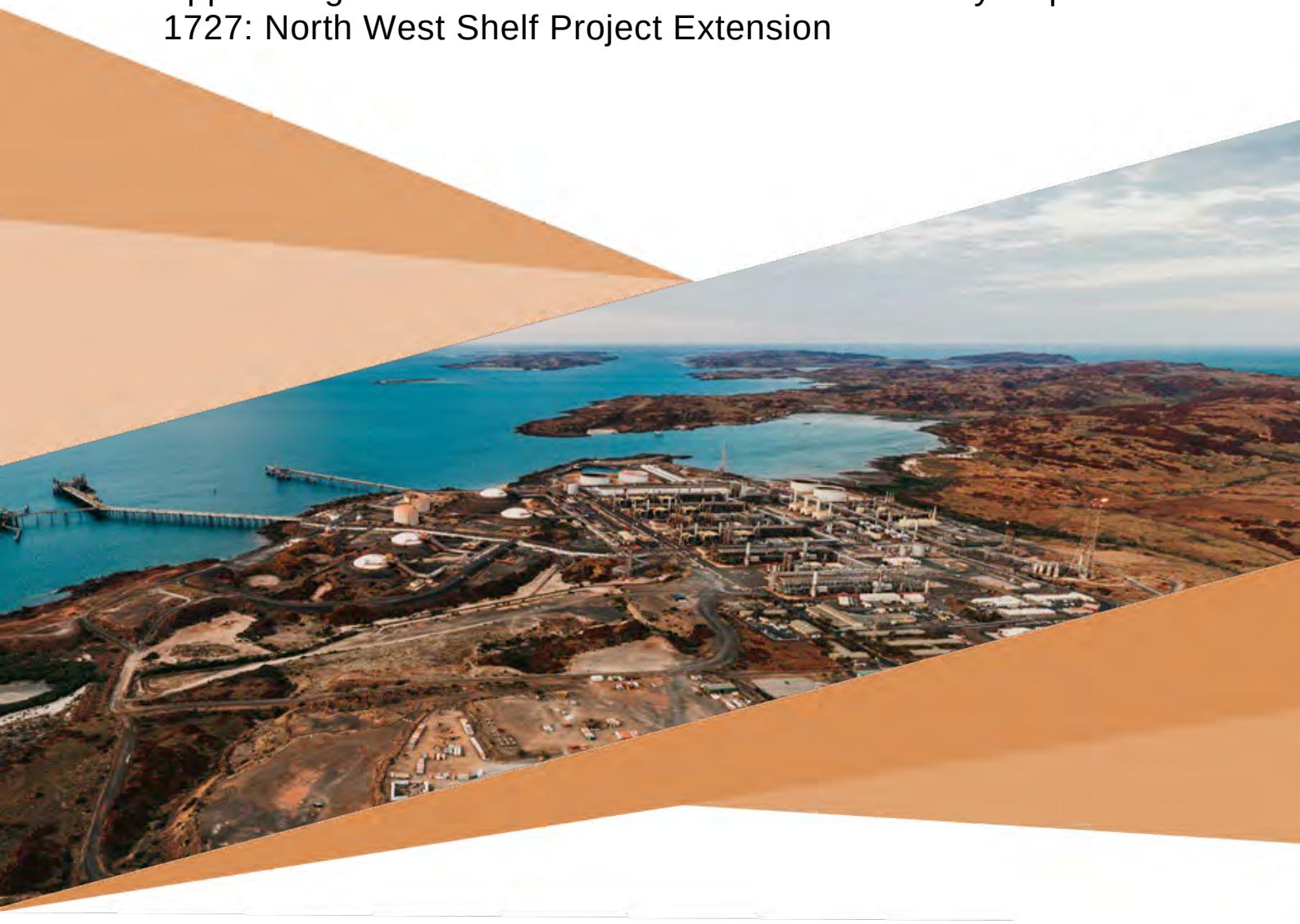
Ministerial **Appeals Committee**

Environmental Protection Act 1986

Appeals Committee's Report to the Minister for Environment

Appeals against Environmental Protection Authority Report 1727: North West Shelf Project Extension



Appellants	See Appendix 1
Proponent	Woodside Energy Limited
Authority	Environmental Protection Authority
Appeal No.	24 of 2022
Date	September 2024

Office of the Appeals Convenor

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Appeals Committee

Mark Webb (Chair)

This report

Cover image: Karratha Gas Plant (Woodside Energy Ltd)

Please contact us if you need the report in a different format.

Acknowledgement of Country

The Office of the Appeals Convenor acknowledges the traditional custodians throughout Western Australia and their continuing connection to the land, waters and community.

We pay our respects to all members of Aboriginal communities and their cultures, and to Elders past and present.

Contents

1 Executive summary

1.1 Decision under appeal

Woodside Energy Ltd's (the Proponent) North West Shelf (NWS) Project Extension Proposal (the Proposal) is for the continued future operation of the NWS Project to enable the long-term processing of third-party gas, fluids and North West Shelf Joint Venture (NWSJV) field resources through the existing NWS Project facilities, known as the Karratha Gas Plant (KGP), until 2070.

The KGP is located on the Burrup Peninsula in the Pilbara region of Western Australia, approximately 10 kilometres (km) north-east of Dampier and 18 km north-west of Karratha (Figure 1).

The existing NWS Project produces up to 18.5 million tonnes per annum (Mt per year) of liquefied natural gas (LNG) at the KGP and this production capacity remains unchanged for the extended life of the KGP (EPA 2022). The processing aspect of the Proposal allows for:

- potential changes to feed gas composition
- potential changes to composition of environmental discharge and emissions
- potential construction of additional operational equipment to accommodate potential changes to feed gas composition or management of environmental discharge and emissions.

The ongoing operation of the KGP up to 2070 includes:

- ongoing use of the existing facilities to process third party gas and fluids and NWSJV field resources
- continued inspection, maintenance, repair and improvement programs
- continued maintenance dredging associated with jetties and berthing pockets
- replacement of equipment, plant and machinery as required
- continued emissions and discharges to the environment (the proponent will continue to assess emissions reduction opportunities that could result in a staged decrease in emissions over time
- continued monitoring and management of environmental impacts.

The Proposal was referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act) in November 2018. The EPA set the assessment level at 'Environmental Review – Public Environmental Review' (EPA 2018). The EPA identified three key environmental factors during its assessment: air quality (including greenhouse gas (GHG) emissions), social surroundings, and marine environmental quality.

The EPA's findings were published in Report 1727 on 30 June 2022 with the EPA recommending that implementation of the proposal with conditions, would be consistent with the EPA's objectives for the key environmental factors. It is against this report that appeals have been lodged.

Further background for the Proposal and matters considered through the appeal process are provided in Section 2.

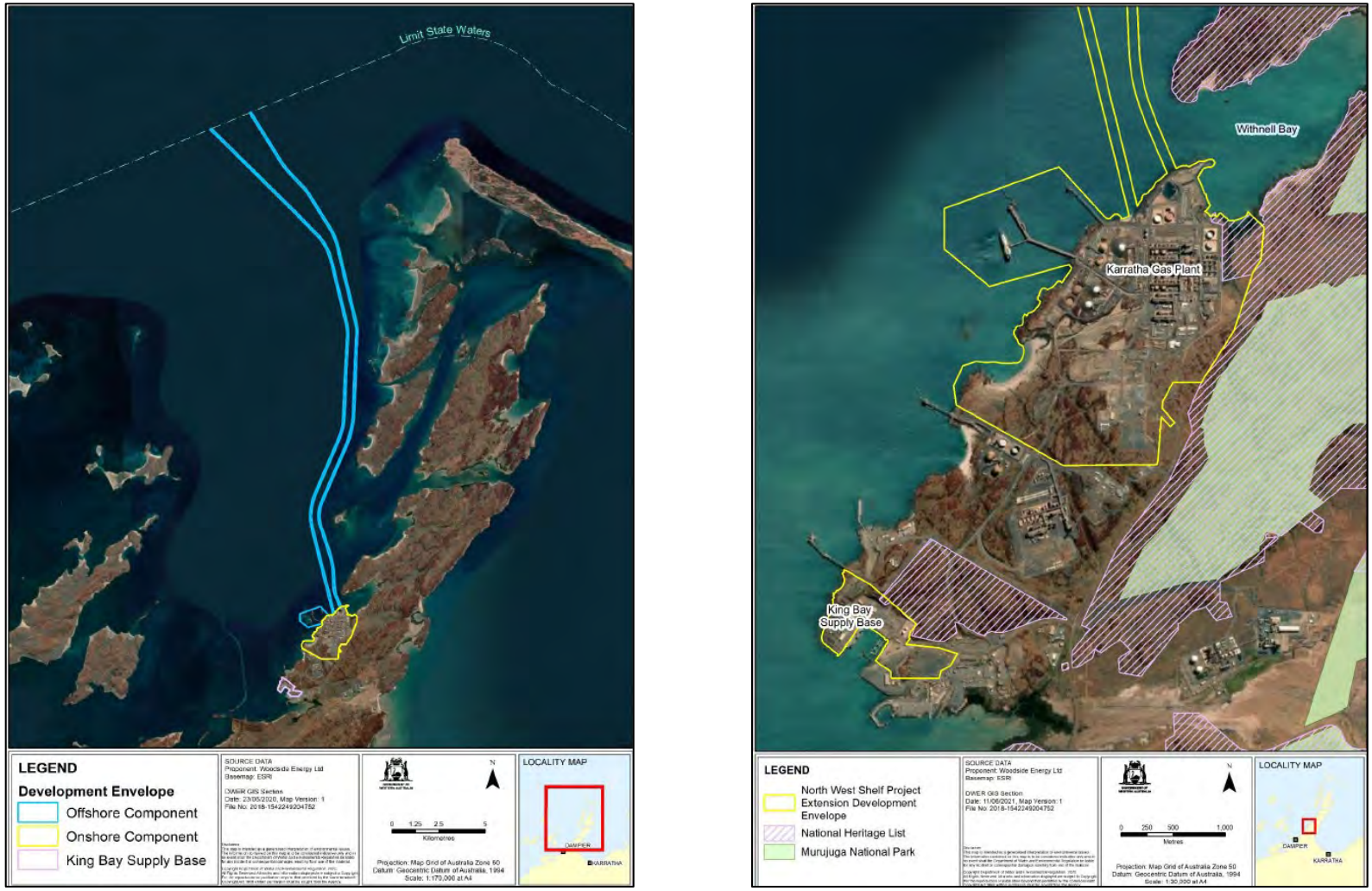

Figure 1 Proposal development envelope (EPA 2022)

1.2 Grounds of appeal and appellant concerns

A total of 727 valid appeals were received. Names of the appellants are listed in Appendix 1. Appeals included:

- 123 appeals based on pro forma grounds prepared by the Conservation Council of Western Australia (CCWA), Environmental Defenders Office (EDO), Greenpeace, Doctors for the Environment, and a further five unidentified sources
- 189 appeals based on proforma grounds with a degree of variation
- 88 appeals based on proforma grounds with supplementary bespoke grounds
- 327 appeals based on bespoke grounds.

Most appeals sought for the Proposal to either be rejected, or to be remitted to the EPA for re-assessment.

Concerns raised by the appeals include the significant quantity of GHG Emissions (GHGe) and the implications of this for global climate change, the threat of air emissions to Murujuga rock art and human health, impacts on marine environmental quality, and Aboriginal cultural heritage values.

Appellant's concerns are summarised in Table 1.

Table 1: Grounds of appeal

Ground	Key concerns submitted by appellants (summarised)
Greenhouse gas emissions	• adequacy of consideration of the latest climate science, including use of a carbon budget • impacts to the environment (including MNES, heritage areas, flora, fauna and social/economic interests like agriculture) not adequately assessed • relevant policy and international commitments to address climate change not adequately addressed • failure to consider the impacts on human health and wellbeing • adequacy of emission estimates for methane and measurement of fugitive emissions • 'scope 3' emissions not assessed • doesn't meaningfully address climate change, including relying on inflated baseline emissions • failure to apply the mitigation hierarchy and rely too much on offsets • are inadequate with respect to monitoring and transparency • do not reflect the EP Act objects and principles.
Air quality (human health and Murujuga rock art)	• outdated or inadequate science and standards applied in the assessment • inadequate conditions to manage risks • incorrect application of the precautionary principle • inadequate conditions for monitoring and transparency • inadequate mitigation or reduction of emissions.
Social surroundings (Aboriginal culture and heritage)	• inadequate assessment of cultural heritage impacts • inadequate understanding of cultural values affected • inadequate consideration of national and world heritage values.
Marine environment (values including fauna)	• inadequate assessment of wastewater discharge • inadequate assessment of dredging and shipping impacts • inadequate conditions to manage impacts.

Other concerns including cumulative impacts from industry on Murujuga and consideration of climate change impacts are briefly discussed in Section 9.

1.3 Conclusions

Based on responding to the concerns of appellants, the key issue for determination is whether the EPA's assessment was adequate, appropriate and justified based on the information, policy and guidance available at the time of the assessment, or any new information made available through the appeal investigation. If defects or shortcomings are identified, the consideration for the Committee is whether any of these defects or shortcomings are so significant that remittal to the EPA is required for further assessment or reassessment, or whether deficiencies can be remedied through varying the EPA's recommended conditions.

Typically, appellants argued that the EPA erred in Report 1727 in the following ways:

- the EPA failed to consider a matter that is within the constraints of the EP Act, or it considered a matter beyond those constraints
- its assessment was inconsistent with its policy framework
- the information and data used were flawed and that, had the EPA used alternative information and data, a different conclusion would have been arrived at
- the expert advice the EPA relied upon was flawed and should have relied upon alternative advice, and, if it did, a different conclusion would have been arrived at
- it is unclear how the EPA arrived at a particular conclusion about an assessment of a particular factor
- the EPA did not give proper attention to the EP Act objects and principles.

The Committee's consideration of the appeal grounds is discussed in the relevant sections of the report. The Committee considers that the majority of the appeals grounds be dismissed but that some should be upheld and reflected with changed or additional conditions. These recommendations are provided below.

1.4 Recommendation to the Minister

The Committee recommends that the appeal is allowed to the extent that the Minister varies the conditions recommended by the EPA as follows:

2 – Greenhouse gas emissions

- net GHG emissions limits and reporting requirements are amended to reflect financial year periods as opposed to calendar year
- net GHG emissions limits have been reduced following additional information provided by the Proponent
- a net GHG emissions limit is set for the period 1 July 2025 to 30 June 2030
- in addition to emissions intensity of the facility, emissions intensity of each LNG train be considered
- the Proponent be required to consider options to reduce scope 3 emissions in accordance with the EPA's 2023 EFG-GHGe
- requirements with respect to the revised GHG EMP be strengthened, in line with the 2023 EFG-GHGe and template, specifically with respect to adopting best practice, offsets integrity, and the requirement for an independent expert review
- the Proponent be required to address methane emissions in its revised GHG EMP.

3 – Air quality

- NOx emissions from the Proposal are reduced to 3,065 tpa by 31 December 2030 following additional information provided by the Proponent
- the AQMP will include an air emission reduction trajectory for the life of the Proposal commencing in 2025
- stack emission limits of 49ppmv [100mg/m^3] at reference O_2 (15% for gas turbines) are applied for each of the five LNG processing trains from 31 December 2030 resulting in further emission reductions
- requirements for continuous monitoring of stack emissions in each LNG processing train to be in place by 31 December 2030 or sooner, and monitoring results to be included in annual reports which are made publicly available by the Proponent
- requirements for the AQMP to be strengthened, specifically with respect to adopting best practice measures and the requirement for an independent expert review
- provisions requiring the Proponent to make all subsequent, approved versions of the AQMP and any reporting specific to the air quality conditions, publicly available.

The Committee's recommended conditions are provided at Appendix 2. Minor and consequential variations to conditions have also been suggested to improve clarity and consistency within the recommend conditions.

The final decision on whether or not the proposal may be implemented, and the conditions which apply to any such implementation, is a matter for the Minister for Environment and key decision-making authorities to consider under section 45(3) of the *Environmental Protection Act 1986* (EP Act).

The Committee notes the uncertainty about the impact of industrial emissions on rock art, and that the Murujuga Rock Art Strategy (MRAS) is expected to provide interim EQCs in its 2024 report, in accordance with key milestones (DWER 2023b). However, should the interim EQCs not be provided as expected and any impact of industrial emissions on rock art remains unclear, the Committee suggests it remains open to the Minister to remit the Proposal to the EPA to ensure its objective for protection of the rock art is achieved.

2 Context

2.1 Environmental impact assessment process

Part IV of the EP Act allows the EPA to consider environmental impacts of significant proposals. Significant proposals are those that could '*have a significant effect on the environment*' (section 37(1)). Where the EPA determines that a proposal could have a significant effect on the environment, it may decide to formally assess that proposal (section 38G.(1)(a)).

Woodside, as the Proponent, referred the Proposal to the EPA on 14 November 2018. The EPA determined the level of assessment on 4 December 2018 at which point the assessment commenced. A summary of the assessment stages for the Proposal is provided in Table 2.

The EPA determines the form, content, timing and procedure of any environmental review of a proposal being assessed (section 40(3)). The EPA has a policy framework for considering environmental matters in Environmental Impact Assessment (EIA) with its 'Statement of environmental principles, factors, objectives and aims of EIA' being the primary policy document[1] (EPA (2023e). The framework indicates the environmental factors it considers when assessing proposals, with specific guidelines prepared to describe how each factor is considered through EIA.

It is important to note that the EIA policy framework has changed throughout the course of assessment of this Proposal. The manner in which EIA is undertaken is pertinent to the form and content of the documentation which reflect the guidance in place at the time.

Table 2: Main stages of assessment of NWS Extension Project Proposal

Date	Stage	Comment
14 November 2018	Referral	
21 – 27 November 2018	Public comment on referral	133 submissions, all seeking a public environmental review level of assessment.
4 December 2018	Level of Assessment set (published 10 December 2018)	Public Environmental Review with two week public review period on the Environmental Scoping Document (ESD) and a six week public review period on the Environmental Review Document (ERD).
6 – 20 June 2019	ESD released for public comment	Describes the preliminary key environmental factors and required work the Proponent must undertake to prepare its ERD for public review.
29 August 2019	ESD finalised	Key Environmental Factors identified as being Air Quality, Social Surroundings (Heritage) and Marine Environmental Quality.
18 December 2019 – 12 February 2020	Public comment on ERD	19,869 submissions received, including 19,789 submissions based on five pro forma texts.

[1] The EPA used the 2016 version for the assessment, the current version of this document was revised in 2023.

Date	Stage	Comment
30 June 2022	EPA Report and recommendations published	Appeals closed on 21 July 2022.

The Proponent also referred the Proposal to the then Department of Environment and Energy (DoEE) on 22 November 2018, which determined the Proposal to be a controlled action under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The relevant Matters of National Environmental Significance (MNES) identified for the Proposal were National Heritage (EPBC Act section 15B and 15C) namely the Dampier Archipelago (including Burrup Peninsula). Assessment of the Proposal has been undertaken by the EPA as an accredited assessment, which is documented as chapter 4 – Matters of national environmental significance – in Report 1727.

As described in section 44(2) of the EP Act, the key outcome of an EPA assessment is a report that sets out:

a. what the EPA considers to be the key environmental factors identified in the course of the assessment; and
b. the EPA's recommendations as to whether or not the Proposal may be implemented and, if it recommends that implementation be allowed, the conditions and procedures, if any, to which implementation should be subject to achieve the EPA objectives.

Section 100(1)(d) of the EP Act allows any person to lodge and appeal against the content of, or any recommendation in, an EPA assessment report.

Where an appeal is lodged against an EPA assessment report, the Appeals Convenor or an appointed Appeals Committee, is required to report to the Minister and must have regard to the submissions made as part of any appeals.

2.2 Appeals process carried out by the Committee

The EPA released Report 1727 under section 44(3) of the EP Act on 30 June 2022. The appeals period closed on 21 July 2022 with 727 valid appeals received. The Appeals Convenor (AC) commenced investigation of appeals but had not completed the process before their resignation took effect in December 2023. The subsequently appointed AC recused themselves from hearing the appeal because of their previous role with the Department of Water and Environmental Regulation (DWER).

In certain circumstances the Minister can appoint an Appeals Committee to consider appeals and provide advice directly to the Minister. On 18 March and 28 March 2024 respectively, Minister Whitby appointed Mark Webb PSM and Professor Simon McKirdy as Co-Chairs of an Appeals Committee to investigate the appeals against the EPA assessment of the Proposal. On 20 May 2024 Professor McKirdy was removed from the committee by the Minister due to public concern over his previous professional connections with a NWSJV partner. The Minister requested Mark Webb continue as the Appeals Committee, with administrative support provided by the Office of the Appeals Convenor (OAC).

Appellants argued the EPA's assessment was flawed and was not consistent with the EPA's assessment framework, requirements of the EP Act and policy settings and lodged numerous grounds of appeal for consideration.

For an appointed Appeals Committee to consider an appeal ground in detail and not recommend that it be dismissed, the appellant must provide an argument or evidence of that

error, rather than state that the EPA was in error. Such arguments and evidence can then be considered by the Committee on its merits before making a recommendation to the Minister.

Appeal ground matters that are complex and involve re-assessment of a factor are likely to require remittal to the EPA.

The Committee was provided with all formal documentation provided in the appeals, including the EPA's response to appeals requested by the former AC under section 106 of the EP Act (hereafter the s106 Report), the Proponent responses to appeals, appellant responses to the s106 Report and supplementary written submissions provided to the OAC.

The Committee undertook consultation as required by section 109(1)(a) of the EP Act, including with all appellants. This involved email updates to all appellants, as well as meetings with individual and non-government organisation appellants to discuss their appeals further and where necessary, clarify the Committee's understanding of appeal grounds. All appellants were provided the opportunity to discuss their appeals and provide supplementary information throughout the Committee's considerations.

Consistent with the EP Act the Committee consulted other such persons as it considered necessary, including with representatives of the Proponent, officers of DWER and the Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW), Curtin University, and other specialists with expertise in rock art, atmospheric chemistry, risk assessment and management. Discussions were also held with the Chair of the EPA; however, this consultation was limited due to the Chair leaving the role in April 2024. In addition, it is not the Committee's role to undertake a re-assessment of the proposal, or elements of the proposal, but to consider the appeals on their merits.

A number of appellants also raised points of law; however, these cannot be determined by the Committee. Where these appeals include environmental aspects applicable in the appeals context, these aspects have been considered on their merits. Similarly, some appellants also raised concerns with earlier stages of the EIA process for this proposal and they are not addressed in this report if they are not related to the content of Report 1727.

The number of appeals against Report 1727 was unprecedented, involving a significant number of appellants who have provided substantial information throughout the process. In addition, the Committee notes the six-year duration of the assessment and appeals process, during which time there has been significant policy and legislative changes at the international, national and State level. This is particularly the case for GHGe and climate change. To illustrate the Proposal within its temporal policy context, a timeline is provided in Figure 2.

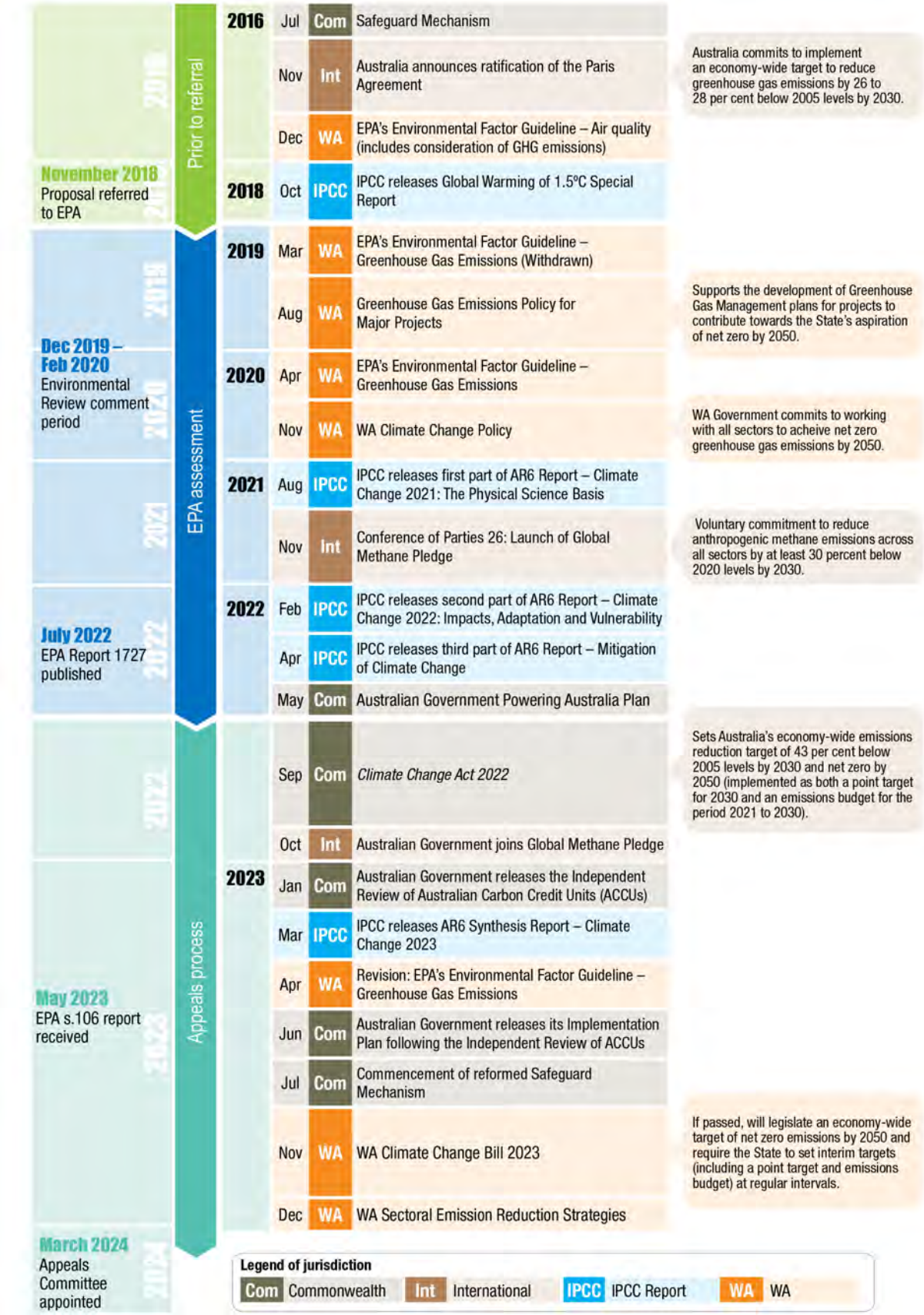

Figure 2 Timeline of climate change and GHGe policy evolution during assessment and appeals process

Where possible and applicable the Committee has given consideration to these changes to provide contemporised discussions of matters raised in appeal.

The options available to the Minister in deciding the appeals in accordance with the EP Act are:

1. Dismiss the appeals (section 101(1)(a))
2. Allow the appeals by remitting the proposal to the EPA for further assessment or reassessment (section 101(1)(d)(i))
3. Allow the appeals by varying the EPA's recommendations by changing the implementation conditions (section 101(1)(d)(ii)).

This report is prepared for the consideration of the Minister for the Environment under section 109(3) of the EP Act. The Minister's decision under section 101(1) is final and without appeal. In accordance with the EP Act, the proponent has a final right of appeal in respect to implementation conditions applied to the proposal. The Minister does not, on appeal, have authority to decide whether the proposal should not be implemented. This, along with broader socio-economic issues could be considered during consultation with other relevant DMA Ministers as part of the decision-making process under section 45 of the EP Act.

The Committee's considerations, report and recommendations have been undertaken in this context.

2.3 Issues for determination

The primary issue for determination in appeals is in effect whether the EPA's assessment was appropriate and justified based on the information available at the time of the assessment and aligned with its guiding documents and legislation. Where applicable, new information made available through the appeal process has been considered.

The environmental concerns raised by appeals are:

- GHGe and global climate change and impact
- impacts of air emissions on human health and Murujuga rock art
- impacts on Aboriginal cultural heritage
- impacts on marine environmental quality.

2.4 Structure of this report

This report reflects the structure of Report 1727, which is consistent with the EPA assessment framework of environmental factors, cumulative impact and holistic assessment. For significant concerns that do not relate to environmental matters relevant to the Proposal or its assessment, these are discussed separately as Other matters in Section 9.

At the commencement of the Proposal's assessment process, GHGe was a component of the air quality environmental factor, but in 2020 became a stand-alone factor and is addressed as such in this report. Noting the overlap between GHGe and air emissions, for the purpose of this report, oxides of nitrogen (NOx) are considered primarily in relation to air quality and its potential impact on rock art, rather than its individual contribution as a GHG.

There is also substantial overlap between the air quality and social surroundings factors, reflecting the potential impacts on the culturally significant Murujuga rock art. While the separation is artificial, where impacts result from air emissions, they are discussed with reference to the Air quality environmental factor. Other cultural and heritage impacts are discussed in the Social surroundings environmental factor.

3 Greenhouse gas emissions

3.1 Introduction

GHGe is a key environmental factor for the Proposal. The EPA objective for GHGe at the time of assessment was to reduce net GHGe to minimise the risk of environmental harm associated with climate change. The EPA assessed scope 1 and 2 GHGe in accordance with its 2020 Environmental Factor Guideline for GHGe (EFG-GHGe) applicable at the time of assessment. Recognising that its policy framework had developed since the time of assessment, and in accordance with its 2023 EFG-GHGe, the EPA subsequently also addressed scope 3 GHGe and considered whether residual emissions from the Proposal were consistent with the principles of the EP Act and the EPA factor objective for GHGe. In doing this, the EPA considered whether conditions could reduce any potential inconsistency of the Proposal with the principles of the EP Act and the EPA factor objective.

Most appellants raised appeal grounds with respect to the estimated GHGe resulting from the Proposal. The key appeal grounds relating to GHGe are summarised below and are discussed in detail in the sections.

Appellants contended that the estimated maximum total GHGe from the Proposal (see Section 3.2 below) will be significant, even with the proposed mitigation measures, and will be inconsistent with current climate science, Australia's obligations under the Paris Agreement[2] and the current policy and legislative framework.

Many appellants argued that the proposed mitigation measures to reduce the GHGe directly emanating from the Proposal (scope 1 emissions) are insufficient, and that the vast amount of those emissions from the third-party consumption of LNG, LPG, domgas and condensate (scope 3 emissions) have not been addressed.

A number of appellants expressed the view that the EPA did not assess the impacts of the GHGe from the Proposal on environmental values, including impacts from fugitive methane emissions and impacts on MNES. Appellants also contended that other impacts had not been assessed such as those on human health, traditional owners and agricultural production.

Some appellants argued that the 'mitigation hierarchy' and best practice had not been applied, and the Proponent was relying too heavily on offsetting instead of avoiding or reducing GHGe.

Many appellants argued for the Proposal not to proceed. Others argued for GHGe to be net zero from commencement of the Proposal. Alternatively, many appellants proposed that, if the Proposal was to proceed, mitigation measures should be strengthened to limit GHGe as much as possible.

The key appeal grounds with respect to GHGe are discussed in detail in the following sections.

[2] The Paris Agreement is an international treaty adopted in 2015 under the United Nations Framework Convention on Climate Change (UNFCCC). Its primary goal is to limit global warming to well below two degrees Celsius above pre-industrial levels, with efforts to keep the increase to 1.5 degrees Celsius. It establishes a framework for global climate action, requiring all participating countries to set and report on their own climate targets, known as nationally determined contributions, and to strengthen these efforts over time. The Agreement also focuses on enhancing climate resilience, providing financial and technical support to developing countries, and promoting sustainable development.

3.2 Estimated greenhouse gas emissions

In Report 1727 the EPA identified GHGe as a significant factor in the assessment of the Proposal. Although not explicitly stated in Report 1727, according to the Proponent's ERD, estimates of maximum GHGe from the Proposal, without mitigation measures, would add up to total GHGe (scope 1, 2 and 3) of nearly 4.4 billion tonnes of CO_2-e over the 50-year lifetime of the Proposal (WEL 2019).

As stated in Report 1727 (2022), the Proponent estimated the maximum total GHGe for the Proposal based on a maximum volume of LNG production of 18.5 Mt per year, which includes the production of LPG, domgas and condensate. As the Proponent is seeking an extension of the current project, estimated GHGe were based on a maximum volume, as per the existing approval for the North West Shelf Project (Ministerial Statements 536).

The Committee notes that, because several years have passed since the EPA's assessment, the lifetime of the Proposal, if it were to proceed from 2025, will be 45 years to 2070 as opposed to 50 years when the Proposal was assessed. Although the estimated annual maximum scope 1 and scope 3 GHGe remain the same, the Proposal's estimated total lifetime GHGe to 2070 can now be calculated over 45 rather than 50 years. However, to remain consistent with the estimated maximum GHGe quoted in Report 1727 and appeals, the Committee will refer to the estimated total scope 1 and scope 3 GHGe over the original 50-year life of the Proposal.

3.2.1 Scope 1 emissions

The EPA's 2020 EFG-GHGe, in place at the time of assessment, describes scope 1 GHGe as '*those released to the atmosphere as a direct result of an activity, or a series of activities at a facility level'* (2020b:7).

The Proponent estimated that, without mitigation measures and at maximum volume of production, scope 1 emissions will be up to 7.7 Mt CO_2-e per year, or up to 385 Mt of CO_2-e over the 50-year life of the Proposal[3] (WEL 2021d). On this basis, Report 1727 stated that the estimated annual scope 1 emissions constituted 8.3 per cent of WA's total annual scope 1 GHGe, which were 91.85 Mt of CO_2-e based on 2019 GHGe data used at the time of assessment. Based on the most recent, 2022 GHGe data, this amount now constitutes 9.3 per cent of WA's total annual scope 1 emissions of 82.5 Mt CO_2-e (DCCEEW 2022b).

Report 1727 primarily focused on mitigating the Proposal's scope 1 emissions, consistent with the Proponent's assertion that scope 2 emissions are negligible (see below), and in accordance with the 2020 EFG-GHGe applicable at the time of assessment, which did not require scope 3 emissions to be addressed.

The Committee notes that the EPA recommended both interim and long-term GHGe reduction targets over the life of the Proposal, including a provision for the Proponent to avoid, reduce, and/or offset the total quantity of reservoir emissions from the time the Ministerial Statement was to be issued.

Report 1727 identified the reservoir emissions component as the reservoir carbon dioxide due to acid gas removal (removal and venting of carbon dioxide from the gas stream during gas processing) estimated to produce approximately 1.64 Mt per year of CO_2-e (21.4 per cent of estimated scope 1 emissions). The Committee notes that the Proponent in its greenhouse gas

[3] The total estimated scope 1 GHGe over a 45- year life of the Proposal will be 346.5 Mt CO_2-e.

management plan[4] (GHGMP) (2021d) only proposed to avoid, reduce or offset the equivalent of 100 per cent of estimated reservoir CO_2 emissions from 2030 onwards.

In Report 1727, the EPA indicated that, through avoiding, reducing and/or offsetting emissions, the Proponent would reduce lifetime (based on 50 years at the time of assessment) scope 1 emissions from 385 Mt of CO_2-e to 138.85 Mt of CO_2-e, a net reduction of 246.15 Mt of CO_2-e.

In line with its 2020 EFG-GHGe, the EPA required the Proponent to reach net zero scope 1 GHGe by 2050, based on five-yearly emissions limits, which reduce over time. This could be achieved by avoiding, reducing, and offsetting GHGe, in accordance with the mitigation hierarchy.

3.2.2 Scope 2 emissions

Scope 2 GHGe from the Proposal are *'the emissions from the consumption of an energy product'* (EPA 2020b).

The Proponent indicated that the scope 2 GHGe from the Proposal will be minimal (0.002 Mt CO_2-e per year), as most of the power and energy requirements and their resulting GHGe will be generated on-site. In Report 1727, the EPA stated that:

> Noting that scope 2 emissions are negligible, the Extension Proposal's GHG emissions assessed in this report hereinafter relate to scope 1 GHG emissions of up to 7.7Mtpa of CO_2e.

3.2.3 Scope 3 emissions

The largest quantity of emissions from the Proposal are scope 3 GHGe, which the EFG-GHGe (2020b:2) describes as:

> …indirect GHG emissions other than scope 2 emissions that are generated in the wider community. Scope 3 emissions occur as a consequence of the activity of a facility, but from sources not owned or controlled by that facility's business.

The Proponent estimated that, at maximum volume of production, the scope 3 GHGe from the Proposal will be approximately 80.19 Mt CO_2-e per year. The Committee notes this is nearly as much as WA's annual total scope 1 GHGe. In its ERD (WEL 2019), the Proponent estimated the total maximum scope 3 GHGe to be 4009.31 Mt of CO_2-e, or over 4 billion tonnes maximum scope 3 GHGe of CO_2-e over the 50-year lifetime of the proposal.[5]

The Committee notes that scope 3 GHGe make up approximately 90 per cent of the Proposal's total estimated GHGe and scope 1 GHGe are approximately 10 per cent.

Scope 3 GHGe are further addressed in Section 3.4 below.

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[4] The Proponent developed the North West Shelf Project Extension Greenhouse Gas Management Plan, Revision 7, G2000RF1401194400 (GHGMP) (WEL 2021d) which was used to inform the EPA's assessment of GHG emissions.

The Committee notes that the EPA's 2020 EFG-GHGe refers to a management plan for GHGe as a Greenhouse Gas Management Plan (GHGMP) but that the EPA's 2023 EFG-GHGe renamed the document a Greenhouse Gas Environmental Management Plan (GHG EMP). When referencing the Proponent's management plan for GHGe as submitted as part of the referral documents to the EPA, the Committee Report will refer to it as the GHGMP (WEL 2021d). When referring to future revisions and general requirements of a management plan for GHGe, the document will be referred to as the GHG EMP.

[5] The total estimated scope 3 emissions over a 45-year life of the Proposal will be 3.6 billion tonnes of CO_2-e.

3.3 Climate science and policy

Many appellants contended that the Proposal is inconsistent with climate science, Australia's obligations under the Paris Agreement, and national and State emissions reduction targets which set out to reduce GHGe to limit global warming to well below 2°C and pursue efforts to limit it to 1.5°C.

Appellants argued that allowing the estimated total GHGe from the Proposal is inconsistent with efforts to remain within a carbon budget needed to limit global warming. The Intergovernmental Panel on Climate Change (IPCC) in its 6th Assessment Report (2021a) provided estimates of global carbon budgets associated with various pathways to limit global warming to 1.5°C, 1.7°C and 2°C. Appellants pointed out that the Australian Government's *Climate Change Act 2022* sets a GHGe reduction target of 43 per cent below 2005 levels by 2030 and a net zero emissions target by 2050. Based on this target, the Australian Government has set an economy-wide carbon budget of 4,381 Mt CO_2-e for Australia for the period 2021-2030.

The Committee notes that, although the IPCC's global carbon budgets relate to cumulative scope 1, 2 and 3 GHGe, the Australian Government's target pertains to emissions arising within Australian borders only. The Committee also notes that the Australian Government's carbon budget was set after the assessment of the Proposal, and has not been translated into carbon budgets for the States. The Committee notes that WA does not currently have a carbon budget for the State.

The Committee also notes that the Climate Change Bill 2023 currently before the WA Parliament sets the State's GHGe reduction target of net zero emissions by 2050 in legislation. The legislation, if passed, will create requirements for the responsible Minister to set interim emissions reduction targets for the State for the years 2035, 2040, 2045, with corresponding declining five-yearly emissions budgets leading up to 2050. As outlined in the explanatory paper accompanying the Bill (DWER 2023a):

> Interim targets must be set as soon as practicable after the national targets are set by the Australian Government under Article 4.9 of the Paris Agreement. These national targets (known as 'nationally determined contributions') are set on a five-yearly cycle, with the next to be set in 2025.

In line with the Australian targets, the Climate Change Bill considers only those emissions emanating within the State, in other words scope 1 and relevant scope 2 GHGe.

The EDO on behalf of CCWA, pointed out that the total lifetime GHGe of the Proposal, even with measures to reduce scope 1 emissions, would be almost 4.4 billion tonnes of GHGe added to the atmosphere, arguing that *all* GHGe contribute to climate change, regardless of their origin. The EDO further pointed out (EDO 2023:20) that:

> …the addition to the atmosphere of emissions from the Proposal will add to the risk of environmental harm associated with climate change, and is in direct opposition to the objective of the 2021 Guideline and 2023 Guideline. Report 1727 and 106 Report do not contain any evidence or otherwise explain why additional emissions can be considered environmentally acceptable in the context of this objective. The EPA has given no evidence to support its unreasonable finding that the Proposal is consistent with the objective to reduce emissions. This is unsurprising, as no such credible evidence is available to support the environmental acceptability of increasing greenhouse gas emissions.

Several appellants contended that, in order to limit global warming to 1.5°C, there should be no new investments in oil, gas and coal projects, in line with recommendations in the International Energy Agency's (IEA) Net Zero by 2050 Report (IEA 2021).

Some appellants opposed the Proponent's assertion in its ERD (WEL 2019:17) that:

> While the Proposal will contribute directly to a slight increase in global greenhouse gas emissions, natural gas has the potential to contribute significantly to the reduction in global greenhouse gas emissions by displacing higher carbon intensive power generation (e.g. coal-gas energy switch). As such, the Proposal may result in a net reduction in global emissions.

Appellants argued that displacing coal with gas works the same way as offsetting – emitting GHGe does not reduce GHGe. Appellants further argued that the extent of displacement must be compared with current and future pathways where the use of coal is being increasingly constrained.

Greenpeace Australia (2022) pointed out that:

> …the Proponent has stated that the extension is required to allow "existing gas resources to be developed without the need for constructing new processing facilities" and to provide the "ability to develop future gas reserves using existing NWS Project infrastructure". The first step in the mitigation hierarchy is to avoid the impact. The EPA has not given proper consideration to whether the Proponent has satisfactorily attempted to avoid the Proposal, and its resulting impacts, altogether. For instance, consideration should be given to how else the existing gas resources could be processed and how else future energy needs could be met given the world's urgent need to reduce emissions.

In its s106 Report the EPA acknowledged:

> …the preference of the appellants for no new investments in oil, gas, and coal projects in WA. However, the EPA's statutory role is to assess the proposal against the EPA's objectives, and not to pre-determine the outcome of particular types of proposal. The EPA cannot therefore give effect to the preference for no new oil, gas and coal projects in its report and recommendations.

The EPA in its s106 Report also stated (2023c:9) that:

> Whilst the Minister for Environment can consider the broader social and economic consequences of requiring alternative energy sources such as green energy to be used, the EPA is constrained to only consider the proposal that is referred to it for assessment.

In Report 1727, the EPA stated (2022:16) that:

> To provide a consistent framework for this case-by-case assessment, the EPA usually considers a proposal's annual and total (life of proposal) contributions to GHG emissions, and the proponent's contribution and trajectory towards the goal of net zero by 2050, having regard to the United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement, the Intergovernmental Panel on Climate Change's (IPCC) 1.5 report (IPCC 2021b) and other policy instruments which seek achievement of net zero emissions by 2050 to reduce the risk of global temperature increase of more than 1.5 degrees.

In its s106 Report, the EPA stated (2023c:11) that the EPA:

> …assessed the Proposal against the previous Commonwealth Government's targets to reduce domestic GHG emissions by 26% to 28% by 2030 (compared to 2005 emissions) under the Paris Agreement. The EPA also undertook its assessment in the context of the WA GHG Policy and the Western Australian Climate Policy (Government of Western Australia 2020). These State policies outline an aspiration for net zero by 2050, but do not mandate a trajectory or targets.

The Committee acknowledges that the broad legislative and policy framework for addressing GHGe as part of the assessment of a proposal has evolved since the EPA assessed the Proposal, both at State and Australian Government level, as outlined in Figure 2.

As pointed out by the EPA in its s106 Report (2023c:11):

> …the Commonwealth government's legislated commitment to reduce domestic GHG emissions by 43% by 2030 (compared to 2005 emissions) was submitted to the UNFCCC in June 2022 – this was after the EPA concluded its assessment, which is why the newer target was not considered. The EPA notes that the Commonwealth Government's 43% by 2030 emissions reduction target was legislated through the Climate Change Act 2022 which

> commenced on the 14 September 2022, and that this is an economy wide reduction, rather than specific to individual facilities/proposals.

The Committee acknowledges that, in the context of the EPA's assessment framework, the EPA focused on the environmental impacts of a proposal within the narrower policy framework that applies to the assessment of individual proposals, without considering the broader economic and social aspects. However, the Committee notes that, before making a decision on the Proposal, the Minister for Environment must consult with other relevant DMA Ministers as part of the decision-making process under section 45 of the EP Act.

The Committee finds that the EPA assessed the Proposal in accordance with its 2020 EFG-GHGe (2020b:1), which focuses primarily on scope 1 emissions and states that the EPA's objective is:

> To reduce greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change. In accordance with the guidance, the EPA required the Proponent to 'avoid, reduce and offset' emissions.

In requiring the Proponent to reduce scope 1 GHGe to net zero by 2050, the Committee finds that the assessment undertaken was consistent with international and national commitments to reach net zero emissions by 2050. The Committee considers that the EPA's assessment of the Proposal was also in line with the State's Greenhouse Gas Emissions Policy for Major Projects (2019) and the Western Australian Climate Policy subsequently released in 2022, which sets an aspirational target of net zero emissions by 2050.

The required scope 1 GHGe limits outlined in condition 2-3 are in accordance with the requirements for proponents to demonstrate '*their contribution towards the aspiration of net zero emissions by 2050*', based on five-yearly reduction targets in accordance with the 2020 EFG-GHGe.

Although the above pertains primarily to scope 1 GHGe, the Committee recognises that *all* GHGe contribute to global climate change, including scope 3 GHGe. The Committee acknowledges that, as pointed out by many appellants, measures to mitigate scope 1 GHGe address only approximately 10 per cent of the Proposal's total GHGe. The largest proportion of the Proposal's maximum total GHGe consists of over four billion tonnes of scope 3 GHGe over the lifetime of the Proposal.

The Committee finds that the EPA considered the climate science and broader policy implications for GHGe reductions at a State, national and international level within its relevant assessment framework. For this reason, the Committee recommends that this appeal ground is dismissed.

The EPA's subsequent consideration of scope 3 emissions, in line with the 2023 guidance, is outlined in Section 3.4 below.

3.4 Scope 3 emissions

A majority of appellants contended that the EPA should consider the full scope of GHGe in its assessment, including scope 3 emissions. Appellants suggested that the EPA should recommend conditions for scope 3 emissions. A number of appellants suggested that the EPA should apply limits on production to reduce scope 3 emissions.

Many appellants raised concerns about the impacts of scope 3 emissions on the environment. A number of appellants disagreed that scope 3 emissions are beyond the control of the Proponent.

Report 1727 outlined estimated maximum scope 3 GHGe at approximately 80.19 Mt per year of CO_2-e. The Proponent's ERD estimated maximum scope 3 emissions over the 50-year life of the project as 4009.31 Mt of CO_2-e (~4 billion tonnes CO_2-e).

In its s106 Report, the EPA advised (2023c:15) that:

> This estimate was based on the Proponent's calculations and the third-party use of LNG, liquefied petroleum gas, condensate, domgas products and transport of LNG to customers.

The EPA acknowledged in its s106 Report (2023c:15) that:

> Scope 3 emissions have the same potential to impact on WA environment as scope 1 emissions. The scope 3 emissions associated with the proposal are therefore a substantial contribution to cumulative emissions arising from proposals in WA. The EPA also concluded that it did not consider it reasonable to impose conditions on Scope 3 GHG emissions as those emissions would be beyond the reasonable control of the Proponent.

The Committee agrees with the EPA that the quantity of scope 3 emissions associated with the Proposal is substantial. The Committee notes that the Proposal was assessed against the EPA's 2020 EFG-GHGe, which did not provide for assessment of scope 3 GHGe.

The Committee notes that under the current framework and consistent with the EPA's 2023 EFG-GHGe, the EPA does not recommend condition limits on scope 3 emissions. The 2023 revised EFG-GHGe requires proponents to provide credible estimates of scope 1, 2 and 3 GHGe and consider options to reduce scope 3 emissions.The EFG-GHGe has also been revised for Proponents to include, in their GHG EMP (2023a:7):

> A summary of where scope 3 emissions will be emitted (domestic or international) and whether they are or are reasonably likely to be subject to similar emissions reduction regulation as scope 1 or 2 emissions.

Further guidance on information requirements for scope 3 emissions, including reference to the GHG Protocol Corporate Value Chain (scope 3) Accounting and Reporting Standard (GHG Protocol Team 2013) to assist proponents to identify potential sources of scope 3 emissions (both upstream and downstream), is outlined in the EPAs 2023 GHG EMP template which was developed to support transparency and consistency of these management plans.

The Committee considers that whilst the Proposal was assessed against the 2020 EFG-GHGe and the EPA's assessment is reasonable against that guidance, it is important that individual proposals be made consistent with contemporary policy with respect to climate change.

Therefore, the Committee recommends that the appeal be partially upheld to the extent that condition 2-5 be amended to require the Proponent to consider reasonable means to mitigate scope 3 emissions in GHG EMP reviews consistent with the 2023 EFG-GHGe. Additional information relating to scope 3 emissions, consistent with the EPA's 2023 guidance and GHG EMP templates, should be included in the revised GHG EMP and in the summary plan, as required by proposed conditions 2-5(7) and 2-8(2).

The Committee notes that, before making a decision, the Minister for Environment must consult with other relevant DMA Ministers as part of the decision-making process under section 45 of the EP Act.

3.4.1 Longevity of the proposal

A number of appellants questioned the longevity of the Proposal, extending to 2070, which is 20 years past the internationally recognised net zero future by 2050. Although scope 1 GHG would be net zero by 2050, it is estimated that the Proposal would continue to be responsible for up to 80.19 Mt of scope 3 GHGe per year for another 20 years beyond 2050.

The EPA in its section 106 Report (2023c:13):

> … acknowledges that the Proposal's life extending beyond 2050 may be inconsistent with a global low-carbon environment'. The EPA therefore…. considers it appropriate to expand recommended condition 2 to require the Proponent to report to the WA Minister for Environment no later than 2045, demonstrating whether the Proposal can remain consistent with a global low-carbon environment beyond 2050.

A number of appellants subsequently argued that 2045 is too late to review the ongoing merits of the Proposal and make decisions about ongoing operations potentially resulting in significant scope 3 GHGe beyond 2050.

The Committee considers that providing a report by 2045 may not provide adequate time to make decisions and enact measures consistent with a net zero target for 2050 and beyond.

The Committee therefore recommends that this appeal is upheld to the extent that a condition be added that requires the Proponent to undertake a review, as recommended by the EPA, in 2040, with an update to be provided in 2045.

3.5 Impacts on environmental values

Many appellants argued that the EPA only focused on mitigating scope 1 GHGe estimated to be generated by the Proposal and did not adequately assess the impacts of all emissions from the Proposal on environmental values.

They argued that the EPA did not assess how the total GHGe from the Proposal (scope 1, 2 and 3) would contribute to cumulative and state-wide climate change impacts, including but not limited to, a drying climate, coral bleaching, sea level rise, and increased bushfire hazard and subsequent impacts on MNES including but not limited to, blue whales, green turtles and the Ningaloo and Shark Bay World Heritage Areas.

The traditional owners and custodians of Murujuga (Burrup Peninsula) expressed deep concern about the impacts of climate change on the health of the communities and the Elders. In their appeal submission (Alec & Cooper 2022), they stated that:

> Our communities are already suffering the impacts of climate change. Our communities and our Elders, who hold and maintain critical cultural information and knowledge, are particularly vulnerable to these impacts. Our sacred sites, waterholes, bush foods and bush medicine are impacted, and our ability to spend time on country and undertake cultural business is being affected.

They further stated that:

> … plants and animals such as turtles and whales and the health and vitality of wild populations are also significant elements of the cultural heritage, and therefore essential to the health and wellbeing of Aboriginal people.

The EPA in Report 1727 advises (2022:15) that '*the specific environmental impacts of the Extension Proposal's GHG emissions are not known with certainty*', in other words the contribution to global warming from GHGe from the Proposal and subsequent impacts on specific environmental values.

However, a small number of appellants informed the Committee that methodologies do exist to attribute local or regional environmental impacts from a changing climate to the GHGe emanating from a specific project.

In its s106 Report, the EPA (2023c:15):

> … considers that it is not possible to draw a direct link between the Proposal's (or any single proposal's) emissions and a specific environmental impact. However, there is acknowledgment of the cumulative impacts that arise from development proposals, and that a warming climate would impact the WA environment.

The EPA further stated (2023c:9) that:

> The EPA's consideration of the GHG Guideline and the recommended emissions reductions over the life of the project that arose from this consideration demonstrates that the impact of cumulative emissions on WA's environment was acknowledged and considered by the EPA.

In its 2020 EFG-GHGe, the EPA accepts the '*established link between GHG emissions and the risk of climate change, and the broad acknowledgement that the warming climate will impact the Western Australian environment*.' The EPA further recognises that '*Cumulative GHGe from a range of sources may have an impact on WA's environment'* (2020b:2).

Notwithstanding, the EPA states that it will continue to assess proposals on a case-by-case basis in accordance with its current assessment framework.

Recognising the link between GHGe and climate change, and subsequent impacts on WA, the EPA therefore focuses its assessment on reducing the quantity of GHGe of a proposal rather than determining the impacts of an individual proposal's GHGe on environmental values in WA.

New methodologies to attribute climate change to a specific proposal are being developed, but the Committee understands such methodologies are not yet widely tested or accepted. In the absence of any accepted methodologies that form part of the EPA assessment process, assessing a proposal within an agreed carbon budget could be a suitable alternative. The Committee notes that WA does not have an agreed carbon budget, but that the Climate Change Bill before State Parliament sets requirements for the relevant Minister to introduce five-yearly emissions reduction targets and associated carbon budgets for WA (see Section 3.3).

The Committee notes that the EPA's current assessment framework does not allow for the consideration of the cumulative impacts of GHGe from multiple projects and that, in addition to the absence of a carbon budget for the State, the EPA continues to assess each proposal on a case-by-case basis. The Committee also acknowledges the EPA's limitations within the EPA's assessment framework with respect to recommending conditions on scope 3 GHGe, as outlined in Section 3.4.

The Committee notes appellants' concerns about the impacts of climate change on WA, but recognises that it is not within the scope of the EPA's EIA framework to assess the impacts of global climate change on WA from an individual proposal.

The EPA required the Proponent to apply the mitigation hierarchy so that GHGe from the proposal are avoided or reduced, and residual emissions are offset, and achieve net zero scope 1 GHGe by 2050, consistent with the 2020 EFG-GHGe, climate science and State, national and international commitments to reduce GHGe at the time of assessment. For these reasons, the Committee recommends that this appeal ground be dismissed.

3.6 Methane emissions

Many appellants raised concerns about the potency of methane, its accounting and lack of assessment in the Report 1727. Concerns were raised throughout the appeal process, including in meetings with appellants.

3.6.1 Global Warming Potential

The CCWA argued (2022:5) that:

> The EPA's assessment relies on a global warming potential (GWP) for methane of 28 which is not scientifically sound because it is outdated, relies on a time horizon that is inappropriate in the context of the NWS Extension's lifespan and impacts, and does not accurately reflect the warming impacts of methane.

Report 1727 stated (2022:12):

> GWPs are values that allow direct comparison of the impact of different gases in the atmosphere by comparing how much energy one tonne of a gas will absorb compared to one tonne of carbon dioxide (Australian Government Clean Energy Regulator 2021).

The EPA stated in s106 Report that (2023c:15):

> The Proposal was assessed using a GWP of 28 based on a 100-year time scale which is consistent with the Commonwealth Department of Climate Change, Energy, the Environment and Water (formerly the Department of Industry, Science, Energy and Resources) National Greenhouse Accounts Factors – Australian National Greenhouse Account 2021 (DISER 2021).

The Committee confirms this value aligns with the National Greenhouse and Energy Reporting (NGER) Regulations 2008 (1 July 2020) GWPs, which was referenced in Report 1727.

The EPA stated that the use of a GWP of 28 for methane remains consistent with updated guidance following amendments to the NGER scheme legislation to facilitate the Commonwealth Safeguard Mechanism (SGM)[6] reforms which commenced on 1 July 2023 (Commonwealth of Australia 2023).

The Committee acknowledges that Australia is a signatory to the Paris Agreement, which is made under the UNFCCC. The UNFCCC discusses methods for climate change transparency and reporting, including common metrics used to quantify the contributions to climate change of emissions of different substances. The Committee notes that at the Conference of Parties (COP26) in Glasgow in November 2021, parties clarified that (UNFCCC 2022):

> The 100-year time-horizon GWP values…. shall be those listed in table 8.A.1 of the Fifth Assessment Report of the IPCC, excluding the value for fossil methane.

The 100-year time-horizon value for methane listed in table 8.A.1 of AR5 is 28 (IPCC 2013). The EPA also stated (2023c:15) that it understands that:

> … over time the GWP for methane may change, and that the Proponent would need to consider this in future updates to the GHGMP as set out in condition 2-11.

The Committee concludes that the EPA, in its assessment of the Proposal, used a GWP for methane consistent with national and international methods. The Committee therefore recommends that this appeal ground is dismissed.

3.6.2 Fugitive methane emissions

A number of appellants raised concerns about the accuracy of estimated fugitive methane emissions compared with actual emissions emitted due to leakages.

Appellants raised the importance of measuring fugitive methane emissions and the use of emerging technology to improve monitoring/measurement. Appellants suggested that the EPA

[6]The Australian Commonwealth Safeguard Mechanism is a regulatory framework designed to limit greenhouse gas emissions from large industrial facilities. Established under the *National Greenhouse and Energy Reporting Act 2007*, it sets baselines for emissions and requires facilities that exceed these baselines to offset their emissions through the purchase of carbon credits or other approved measures.

should have regard to guidance from the IEA which identifies the oil and gas industry as a major source of global methane leakages.

Many appellants suggested that fugitive methane emissions should be subject to independent monitoring and reporting. Some appellants suggested the EPA should have its own equipment and measurement capabilities. Appellants suggested that the EPA require a percentage reduction of methane emissions by 2030 and a robust methane measurement system.

The Committee notes that the EPA did not address these appeal grounds in its s106 Report.

Based on information within Report 1727 and the Proponent's GHGMP (2021d) the key sources of methane emissions from the Proposal are from venting carried over in CO_2 vent stream gas during acid gas removal estimated to produce 0.1Mtpa of CO_2-e and fugitive emissions (primarily methane) estimated to be less than 0.007Mtpa of CO_2-e, originating from multiple, small emission points/sources (flanges, valves, and process safety vents). The Proponent's GHGMP advises that emissions calculations, as well as monitoring and reporting, are undertaken in accordance with the Commonwealth NGER Act (2021d).

In its response to appeals, the Proponent advised (WEL 2022:7) that:

> Methane emissions are approximately 4% of total operated emissions (CO_2-equivalent basis). Reducing methane emissions supports the goal of reducing (net) emissions.

The Committee understands that fugitive methane emissions are a proportion of scope 1 emissions resulting from the operation of the Proposal.

The Proponent's GHGMP outlines strategies to avoid, reduce and offset scope 1 emissions over the life of the Proposal, including management of fugitive emissions (primarily methane) by adhering to the Methane Guiding Principles (MGP) developed by the Climate and Clean Air Coalition. These principles aim to reduce methane emissions from the oil and gas value chain (WEL 2021d).

Additionally, the Proponent advised in its response to appeals (WEL 2022:7) that it has:

> … signed the 'Aiming for Zero Methane Emissions Initiative', led by the Oil and Gas Climate Initiative, and 'is committed to striving to reach near-zero methane emissions' from its operated assets by 2030.

The Committee notes that the Proponent has signed up to the MGP and Aiming for Zero Methane Emissions Initiative and has committed to implementing a defined action plan and prioritising the above three activities in the near term.

The Committee also notes that the Global Methane Pledge was launched in 2021 to reduce global anthropogenic methane emissions across all sectors by at least 30% below 2020 levels by 2030 to help meet the goal of the Paris Agreement (CCAC 2021). The Committee notes that Australia became a signatory to the Global Methane Pledge in October 2022 and that subsequent reforms to the SGM will support emissions reductions of methane emissions from industrial and resource facilities (DCCEEW 2022a). The Committee further notes that, following a review of the NGER legislation (December 2023), reporting methods for fugitive methane emissions have been updated to improve the accuracy of reported emissions. The Committee understands that the Proposal[7] will be subject to these requirements.

The Committee acknowledges concerns from appellants and recommends this appeal be partially upheld to the extent that emissions reductions, best practice and reporting requirements in condition 3 will apply to fugitive emissions, and mitigation measures to reduce

[7] Recognising that the activities covered by the Proposal are not exactly the same as the facility covered by the SGM.

fugitive methane emissions, as outlined in the Proponent's 'defined action plan', be incorporated into the revised GHG EMP to improve transparency.

3.7 Mitigation hierarchy

Report 1727 defines the mitigation hierarchy as (2022:iii):

> … a sequence of proposed actions to reduce adverse environmental impacts and emissions. The sequence commences with avoidance, then moves to minimisation/reduction/rehabilitation, and offsets are considered as the last step in the hierarchy.

Appellants argued that neither the EPA nor the Proponent appeared to have addressed options to entirely avoid the GHGe estimated to be emitted by the Proposal by investigating the need for extending the life of the KGP in the context of a transition from the reliance on fossil fuels to renewables for future energy needs. This is addressed in Section 3.3 above.

Appellants contended that the Proponent did not apply the mitigation hierarchy in its Proposal, and planned to rely too heavily on the use of carbon offsets for GHGe mitigation. Appellants indicated that carbon offsets should only be used as a last resort.

Many appellants indicated that the Proponent had not identified all potential abatement opportunities. The ACCR, in its appeal (2022:33), stated that:

> The Proponent's continuous improvement process is not capable of delivering meaningful emission reductions. If it was, the list would be more exhaustive and include material improvements.

Some appellants argued that the Proponent had not demonstrated that best practice measures would be implemented that would deliver continuous improvement. Appellants' concerns with respect to best practice is further addressed in Section 3.8.

The EPA in its s106 report advised (2023c:19) that:

> The EPA considers that, in accordance with the mitigation hierarchy, offsetting of GHG emissions (carbon offsets) should be considered as a last resort. Carbon offsets should be limited to residual GHG emissions that cannot be avoided (such as reservoir sources) or to account for emissions that exceed emission reduction targets.

The EPA concluded that the Proponent considered the mitigation hierarchy by providing a GHGMP outlining the Proposal's GHGe trajectory to achieve net-zero emissions by 2050 (WEL 2021d). The Committee acknowledges that Report 1727 recommended condition 2-1 and condition 2-2 requiring the Proponent to avoid, reduce and/or offset reservoir CO_2 emissions, released to the atmosphere, through the amount of non-reservoir emissions that have been avoided and/or reduced through a certified improvement or through Authorised offsets from commencement rather than from 2030 as originally proposed in the Proponent's GHGMP.

The Committee notes that mitigation measures to achieve the emissions reduction trajectory set out in the Proponent's GHGMP (2021d) appear to be primarily based on reducing production, retiring LNG trains and using offsets to mitigate residual emissions, rather than incorporating avoidance and mitigation measures through best practice considerations to minimise emissions intensity and maximise energy efficiency.

The Committee recommends that the appeal ground be partially upheld to the extent that there is a requirement to develop, within 12 months, a revised GHG EMP in line with contemporary guidance and GHG EMP template, which requires the adoption of best practice measures to avoid or reduce scope 1 GHGe.

The Committee notes that following the revision of the GHG EMP, the Proponent may consider tangible emissions reduction measures and rely less on the use of carbon offsets to meet its

emissions reduction targets. Consideration of appellant concerns specific to best practice measures are discussed further in Section 3.8.

3.8 Best practice

Relating to the concerns outlined in Section 3.7 that the Proponent did not adequately apply the mitigation hierarchy, appellants argued that the Proponent had not sufficiently demonstrated the adoption of best practice design, technology, and management appropriate to mitigate GHG emissions as required by the EPA's 2020 EFG-GHGe.

Appellants pointed out that the KGP has been operational for nearly 40 years and the Proponent had not demonstrated that the current operations can be considered best practice.

Appellants argued that mitigation measures proposed by the Proponent in its GHGMP (2021d) appear to result in only a total scope 1 GHGe reduction of 68 Kt of CO_2-e per year. Some appellants raised that publicly available information appears to indicate that the Proponent currently intends to meet its GHGe reduction commitments primarily by reducing production or retiring one of the LNG trains.

Information provided by the Proponent shows that there is a significant difference between the efficiency and GHG intensity of the older and the newer LNG trains. According to the Proponent's information, the newer LNG trains (four and five) are considerably more efficient with respect to GHGe per tonne of LNG production than the older trains (one to three). The Committee also understands that older infrastructure is likely to be less efficient with respect to avoiding fugitive methane emissions.

Appellants contended that, by accepting the parameters of the current facility and the limited mitigation measures proposed by the Proponent, the EPA relinquished the opportunity to require a much steeper emissions reduction trajectory to net zero by 2050 and allowed the Proponent to overly rely on offsetting residual emissions.

Some appellants argued that conditions should be imposed to require that GHGe be net zero from commencement of the Proposal, in other words a requirement for net zero lifetime GHGe. A number of appellants argued in favour of the electrification of the Proposal.

The Proponent, in its response to appeals, stated (WEL 2022:14) that the:

> Proposal scope is for an extension in duration of operation rather than construction of new infrastructure (i.e. LNG Trains). The use of established infrastructure means that wholesale reductions in emissions are difficult to achieve, other than when major equipment is due for an end-of-life refurbishment. At these opportunities, Woodside will benchmark best practice performance and implement these where practicable, accounting for the unique circumstances of the facility.

In its s106 report, the EPA stated (2023c:9) that:

> The GHGMP explains the emission reduction trajectory and the mitigation measures to be used consistent with the application of the mitigation hierarchy. The GHGMP will be reviewed every 5 years to include additional measures ensuring innovation and improvements in best practice technology are considered.

The EPA also stated (2023c:19) that:

> In alignment with the WA GHG Policy and EPA's GHG Guideline, the Proponent's GHGMP sets out the key provisions to avoid, reduce, and/or offsets GHG emissions until it achieves net zero by 2050. Avoidance and reduction measures set out in the GHGMP include incorporation of best practice design considerations into future equipment upgrades and continuous improvement opportunities such as improving energy efficiency, reducing fuel use and intensity, and minimising flaring. The EPA considered the proponent's avoidance measures and found them reasonable for the assessment.

The EPA further stated (2023c:10) that:

> … after considering the appeals, the EPA is of the view that a GHG best practice review could be reasonably required within 12 months. Consistent with the EPA's newly released GHG Factor Guideline (released April 2023) this could require benchmarking against other similar facilities and further evidence of the steps that might be taken to reduce emissions, including the adoption of new technologies or to bring forward 'end-of-life' replacement technology. The review process should also consider the role of GHG policy and regulations in reducing emissions.

The Committee recognises that the KGP is an existing facility with less efficient, older technologies, and that the EPA guidance at the time of assessment did not require an independent review of estimated emissions, best practice, proposed mitigation measures, or offsets integrity (see Section 3.11).

However, the Committee recognises that the EPA's preferred approach is to set an environmental outcome and allow the Proponent to assess what technologies to use to meet that outcome. Consideration of specific technologies will be made in the context of best practice considerations, as set out in the GHG EMP, which is required to be revised within 12 months and subsequently reviewed every five years, in accordance with condition 2.

The Committee acknowledges that the Proponent can achieve GHGe reduction requirements by lowering production volume or retiring LNG trains. However, the Committee also notes that the EPA's 2020 EFG-GHGe requires (2020b:7):

> … continuous improvement to reduce emissions over the project life through consideration of measures to improve performance or setting targets for emissions intensity improvement over time'.

The EPA's 2023 guidance requires (2023a:7):

> … a demonstrated commitment to continuous improvement to ensure emissions reductions over the life of the project. This should include a consideration of measures to improve performance or setting targets for emissions intensity improvement over time.

The Committee notes that the emissions limits in condition 2-3 are upper limits and that actual emissions may be lower due to variations in production volume, the replacement of old technologies and the implementation of best practice measures. The Committee acknowledges that five-yearly reviews of the GHG EMP and the consideration, and especially implementation, of best practice will allow for continuous improvement and lower emissions.

The Committee supports a best practice review within 12 months, as proposed by the EPA in its s106 report. Such a review should be undertaken in accordance with the EPA's contemporary template for a GHG EMP, which requires the Proponent to consider best practice measures and provides guidance on the methodology for conducting a best practice review.

Condition 2-12 requires the Proponent to provide a clear statement as to whether the requirements of conditions 2-1 and 2-3 have been met or are likely to be met, including a description of any reasons why not. Furthermore, the EPA's 2023 EFG-GHGe requires the GHG EMP be subject to an independent expert review to demonstrate how best practice measures have been adopted, which would take into account any constraints from existing operations.

The Committee recommends that this appeal ground is upheld to the extent that conditions are amended that will require the Proponent to develop a revised GHG EMP within 12 months, based on the 2023 EFG-GHGe and template. The Committee also recommends that conditions with respect to GHGe intensity are amended to allow for greater transparency

around GHG emissions intensity of the older trains one to three compared to the newer trains four and five.

3.9 Net scope 1 emissions limits

Many appellants noted that the annual estimated scope 1 GHGe from the Proposal appear to be overestimated and that emissions limits set out in the conditions, particularly for the initial period, would not lead to meaningful reductions.

Appellants pointed out that, based on the Proponent's website and reporting to the Clean Energy Regulator, annual scope 1 GHGe over the past few years have been lower than the maximum approved 7.7Mt of CO_2-e per year outlined in the Proposal. Appellants, therefore, argued that the maximum five-yearly net GHGe as part of the emissions reduction trajectory to net zero by 2050 can be lower than those proposed by in Report 1727. Several appellants have suggested that the Proposal's estimated GHGe for the Proposal should be independently verified, as required by the EPA's 2023 EFG-GHGe.

The EPA in its s106 Report stated (2023c:16) that:

> … it is constrained to only consider the proposal that is referred to it for assessment. For this proposal, the referral includes the ability for the Proponent to process third-party gas at the Karratha Gas Plant over 50 years (2020 – 2070) with a maximum LNG production capacity at 18.5 Mt per year. This means that the EPA was required to consider the maximum extent of the Proposal in relation to potential impacts to the environment, including generation of GHG emissions.
>
> The EPA agrees with appellants that this might cause the estimated amount of GHGe produced over the life of the Proposal to be overstated against actual emissions and if compared to historical emissions. If there is an overstatement, this means there has been a lower level of emissions than anticipated and therefore a reduction in impacts.
>
> The EPA does not consider this to be a cause for reassessment as (i) in the immediate term it means that there have been fewer emissions and (ii) in the medium to long-term GHG emissions reductions targets for the Proposal place hard limits on net emissions. The Proponent would be required to resubmit a revised GHGMP every 5 years which includes estimated Proposal GHG emissions (condition 2-11). If there are substantial changes in the Proposal's GHG emissions, or changes to the production capacity over the life of the Proposal, then the Minister for Environment can also request the EPA to inquire into and report on amending the conditions under section 46 of the EP Act.

The EPA also argued that it is important to note that there is a difference between the baseline used for the EPA's assessment, which is based on approved maximum capacity, and the emissions reported by the Proponent to the Clean Energy Regulator, which are based on actual GHGe emitted.

The Proponent, in information provided during the appeal process, recognised that scope 1 GHGe have not, to date, approached 7.7 Mt per year. The Proponent indicated (WEL 2023:5) that:

> For the next revision of the GHGMP, Woodside would propose adjusting the current emissions reduction baseline from 7.7 Mt to the past 5-year operating baseline of 6.17 Mt. The associated emissions reduction commitments would also appropriately be revised for this new baseline.

The Proponent (WEL 2024b:10):

> … confirms that the onshore emissions used to calculate the 6.17Mtpa CO_2-e baseline are consistent with those used with applications submitted to the Clean Energy Regulator in 2024 as part of SGM compliance activities and notes that these numbers have been subject to external audit as part of these requirements.

The Proponent provided five-yearly operating emissions baselines for the entire emissions reduction trajectory to net zero GHGe by 2050, as represented in Figure 3 (WEL 2024b).

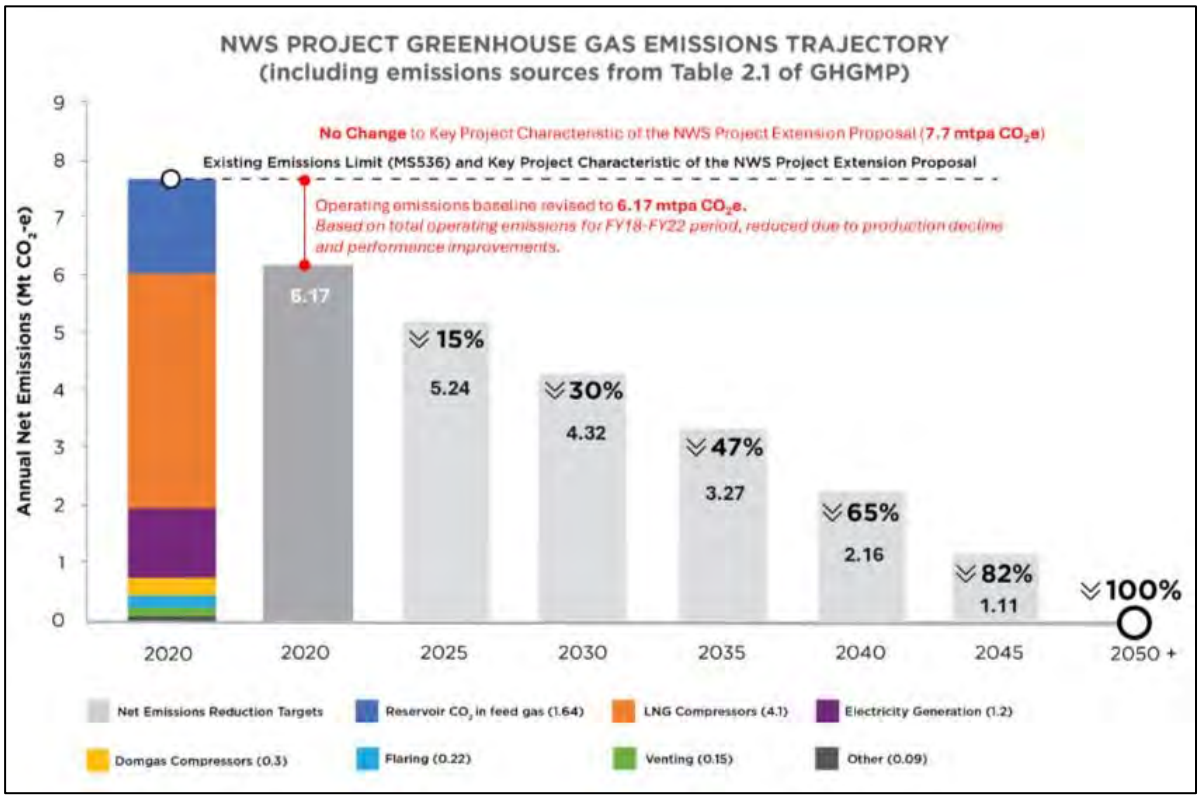

Figure 3 Revised operating emissions baselines and GHGe reduction trajectory (WEL 2024b)

The Committee acknowledges that the EPA's assessment was based on information provided by the Proponent and that guidance available at the time of assessment did not require independent verification of the Proposal's estimated emissions. The Committee also recognises that there is a difference between the parameters of the EPA's assessment and the requirements of the SGM (see Section 3.10).

The Committee notes that the Proposal is an extension of the current approval for the KGP, which is based on an annual LNG production capacity of 18.5 Mt per year and allows for maximum scope 1 GHGe of 7.7 Mt of CO_2-e per year.

The Committee notes that the Proponent, without changing the Proposal, has provided operating emissions baselines for the GHGe reduction trajectory to net zero by 2050, which are reflected in the revised condition 2-3. The revised reduction trajectory would reduce the estimated maximum scope 1 GHGe over the 50-year lifetime of the Proposal from 138.85 Mt of CO_2-e to 111.35 Mt of CO_2-e.

The Committee, therefore, recommends that this appeal ground be upheld to the extent that the GHGe limits in condition 2-3 are amended to reflect the operating emissions baseline provided by the Proponent.

The Committee considers that whilst the Proposal was assessed against the 2020 GHG-GHGe and the EPA assessment is reasonable against that guidance, it is important that individual proposals be made consistent with contemporary policy with respect to the important issue of climate change. The Committee therefore recommends that the revised GHG EMP is prepared in accordance with the EPA's contemporary guidance and template, and that independent

verification should determine if the baseline at commencement and the corresponding emissions reduction trajectory can be further adjusted.

3.9.1 Net scope 1 emissions limits to 2030

A number of appellants argued in favour of setting net scope 1 GHGe limits for the period to 2030. They contended that opportunities to reduce GHGe emissions should be implemented now rather than be postponed until 2030.

Whereas the EPA required the Proponent to avoid, reduce and/or offset reservoir emissions for the period to 2030, appellants noted that the Proponent, in its GHGMP (2021d) proposed interim scope 1 GHGe reduction targets for the period to 2025 and the period to 2030, which do not appear to be reflected in the recommended conditions. As stated in Report 1727 (2022:13) the interim GHGe reduction targets presented to in the GHGMP are to:

- maintain scope 1 emissions below 6.55 million tonnes per year by 2025. This is 15% lower than the existing project emissions baseline
- maintain scope 1 emissions below 5.39 million tonnes per year by 2030. This is 30% lower than the existing project baseline.

The Committee also notes that the Proponent, in its GHGMP (2021d) proposed scope 1 GHGe reduction targets for the period to 2025 and the period to 2030 and concurs with appellants that opportunities for GHGe reductions should be implemented now rather than be postponed until 2030. Considering the time that has passed since the Proposal was first submitted to the EPA, the Committee recommends that specific GHGe limits for the period to 2025 are no longer appropriate.

The Committee recommends that this appeal ground is upheld to the extent that specific GHGe reduction targets for the period from 2025 to 2030 are included in condition 2-3.

3.9.2 Possible changes in scope 1 greenhouse gas emissions composition

A number of appellants argued that the EPA had not sufficiently addressed potential changes in feed gas composition from third party gas, which could lead to possible changes in the composition of GHGe.

The Proponent, in its response to appeals, stated (WEL 2022:12) that the ERD prepared for the Proposal included:

> … consideration of circumstances that lead to changes to feed gas composition including... changes to the composition of environmental discharge and emissions, although annual volumes of key emissions and discharges are expected to be in line with current levels in all circumstances.

The Committee considers that the Proposal will be subject to scope 1 GHGe limits, as previously discussed, which are not dependent on the feed gas composition. The Committee therefore recommends that this appeal ground be dismissed.

3.10 Safeguard mechanism

Several appellants argued in favour of retaining State conditions on the Proposal, alongside the framework provided by the SGM.

In its preliminary views to the EPA's s106 Report, the ACCR contended that (2023:24):

> The EPA's recent recommendation to allow state conditions to be removed based on the SGM should not be implemented.

The ACCR argued that it would likely be an onerous and lengthy process to reinstate conditions in the event that Australian Government requirements would be removed.

The EPA in its s106 Report (2023c:18):

> … notes that since its assessment of the Proposal, changes have been made to the national policy settings for GHGe. The Proposal would be subject to reporting requirements to the Clean Energy Regulator to comply with the NGER Act and the SGM. The SGM provides a legislative framework to limit the amount of greenhouse gas emissions from large industrial facilities that produce more than 100,000 tonnes of scope 1 CO_2-e each year. The SGM is currently undergoing reform, including but not limited to:
>
> - adjusting baselines to remove 'headroom' (i.e., the gap between aggregate baselines and current emissions)
> - baselines decline by 4.9% each year between 2024 and 2030. Indicative decline rate of 3.285% beyond 2030 but this will be considered during SGM review in 2026-27.
>
> The EPA does not seek to duplicate the Commonwealth's process under the SGM, rather the EPA is of the opinion that the two mechanisms can complement each other to deliver good environmental outcomes.

To clarify that the EPA did not seek to duplicate the Australian Government's process under the SGM, the EPA in its s106 Report proposed to amend conditions 2-5 and 2-9 to (2023c:13):

> … enable review for consistency with the Safeguard Mechanism and whether the GHGMP should be required to be implemented during any period'. The EPA also stated, however, that 'the condition limits in condition 2-3 should remain irrespective of the GHGMP.

The Proponent has stated (WEL 2023:7) that:

> It would be Woodside's view that that the GHGMP could be updated to reflect the SGM and associated baseline and reductions as the driving GHG reduction mechanism once details are finalised. If, however, this is not the case, then existing GHG reductions proposed would remain relevant.

The Committee recognises that the Proposal[8] will be subject to requirements under the SGM and notes that the SGM has been reformed to reduce emissions from included industrial facilities to contribute to achieving Australia's climate targets of 43 per cent below 2005 levels by 2030 and net zero by 2050, set under the *Climate Change Act 2022* and consistent with Australia's current National Determined Contribution (NDC) under the Paris Agreement.

As explained by the EPA in its s106 Report, the Committee understands that the reformed SGM sets out to progressively reduce GHGe baselines to remove 'headroom'. The Committee notes that the reformed SGM retains the production-adjusted (intensity) baseline framework, which allows baselines to grow and fall with production. The Committee notes that baselines for existing facilities will be set using a hybrid approach weighted towards the use of facility-specific emission intensity values, transitioning to default (industry average) emissions intensity values by 2030. The Committee also understands that new gas fields supplying LNG facilities will be given a zero baseline allocation for reservoir CO_2 in new fields (DCCEEW 2024b).

The Committee notes the 2023 review of the WA environmental approval system and the recommendation that the EPA avoid unnecessary duplication with the SGM (Government of Western Australia 2023). However, until such time that changes are made to the policy settings within the EPA's assessment framework, the Committee agrees with the EPA that the State and Australian Government mechanisms can complement each other.

The Committee also concurs with the EPA and appellants that GHGe limits for the Proposal should be set irrespective of the fact that the Proposal is subject to the SGM. The Committee notes that requirements in the GHG EMP are considerably broader than provisions in the SGM, for example with respect to scope 3 emissions.

[8] Recognising that the activities covered by the Proposal are not exactly the same as the facility covered by the SGM.

The Committee, therefore, recommends that, if the Minister decides to include a condition aimed at avoiding duplication with other statutory processes, only relevant parts of the GHG EMP be 'switched off' if those matters are addressed through another statutory decision-making process.

3.11 Quality of carbon offsets

Many appellants considered carbon offsets to be ineffective and argued that they do not deliver meaningful emissions reductions. Appellants questioned the integrity of carbon offsets and whether GHGe would be legitimately offset. Appellants argued that the EPA should not allow offsetting as a legitimate mitigation strategy while there is no way of accounting for offsets in state or Australian Government climate targets. Appellants questioned the use of Australian Carbon Credit Units (ACCUs) being counted towards WA's net zero aspiration. Appellants recommended conditions to require offsets be based in Australia and monitored by an independent authority.

In its appeal document Greenpeace stated (2022) that:

> The EPA should recommend that the Proposal not be accepted due to unacceptable impacts given that offsets are an insufficient and unacceptable means of mitigating the significant impacts of the Proposal on global warming. In any case, further assessment by the EPA is required to determine the level of integrity of any offsets proposed in relation to the Proposal, including whether the offsets are additionally, verified, measurable, permanent and not of dubious integrity, and whether they would provide complete, effective and permanent mitigation of the totality of the Proposal's greenhouse gas impacts (including scope 1, 2 and 3 emissions).

The ACCR in its appeal document argued (2022:37) that the '*use of ACCUs from other states could not be counted towards WA's net zero aspiration without the ACCUs being double counted.*'

Appellants indicated that the EPA should have assessed the adequacy of proposed offsets given CO_2 emitted from the Proposal would be in the atmosphere for long periods of time.

Appellants raised that there is insufficient capacity for the world to meet its climate targets through 'biological offsets' and carbon offsets should only be reserved for genuinely hard to abate sectors. Appellants suggested that Australian sequestration cannot be relied on as an offset due to the lack of permanence.

The ACCR in its appeal document argues (2022:36) that:

> For a biological store of carbon to remain stable it needs to be part of a stable, mature environment. To a first approximation, this limits the quantity of carbon that can be sequestered on land to the amount of emissions that have been created by historic land clearing and forest degradation, which is equivalent to 40-70 ppm of atmospheric carbon dioxide. This also means that land based sequestration cannot mitigate the extraction and combustion of fossil fuels from geological storage and that there is insufficient capacity for the world to meet its climate targets through biological offsets. Estimates show that global land based carbon dioxide removal is capable of sequestering 103Gt of Carbon (equivalent to 378 $GtCO_2e$) between 2020 and 2100. This is less than a decade worth of current emissions, meaning that even with maximal use of offsets, the bulk of reductions to 2050 need to come from actual emissions reductions. Offsets are a scarce resource and need to be conserved for genuinely hard to abate sectors such as cement manufacturing.

In its s106 Report, the EPA stated (2023c:19-20) that:

> Whilst carbon offsets should only be relied on as a last resort within the mitigation hierarchy, where carbon offsets are utilised, they should meet offset integrity principles and be based on clear, enforceable, and accountable methods. The Proponent's GHGMP plan is to 'design

out', 'operate out' and offset emissions (3.1.3), in that priority, and this is generally consistent with this last resort approach.

The Proponent considered carbon offsets as part of the GHGMP, noting that use of offsets to ensure a trajectory (based on 5 yearly targets) towards net zero GHG emissions by 2050 would be implemented only where continuous improvement opportunities are not sufficient (Woodside 2021c).

The EPA did not assess individual proposed carbon offsets for the Proposal due to the evolving nature of offset opportunities, and the availability and effectiveness of mitigation, which are likely to change over the life of the Proposal. These details would be required to be updated in subsequent revisions of the GHGMP in accordance with conditions 2-5(4) and 2-5(5).

The Committee acknowledges the appellants' concerns regarding the quality of, and reliance on, carbon offsets. The Committee considers that the Proponent applied the mitigation hierarchy and considered measures to avoid or, reduce its direct (scope 1) emissions and offset residual emissions as outlined in its GHGMP (2021d), consistent with the EPA's 2020 EFG-GHGe.

The Committee notes that the Proponent, as outlined in its GHGMP, intended to purchase and surrender ACCUs for emissions above SGM emission baselines and other eligible offsets as defined in the Climate Active Carbon Neutral Standard for Organisations (Commonwealth of Australia 2020). The Proponent advised in its GHGMP that the surrender of any offsets required to ensure net emission targets are achieved will occur within 12 months of the end of the relevant year in which the offsets were required, and evidence of any retired offset units will be reported in their Annual Compliance Report and Emissions Performance Report (2021d).

In its response to appeals, the Proponent stated that the role of offsets in Woodside's projects are explained in the Woodside Climate Report 2021 (WEL 2021a). In that report, Woodside recognises that there are important conditions on the use of offsets (WEL 2022:17):

- The emissions reduction hierarchy should prioritise avoiding and reducing emissions before offsetting them
- Offsets must be scientifically verified and accurately accounted for using robust methodologies.

The Committee notes that the Proponent's GHGMP (2021d) provided limited detail on specific offsets proposed. The Committee notes that this information will be required in the revised GHGMP, which will be renamed GHG EMP, to be submitted in 12 months from the issue of a Ministerial Statement in accordance with condition 2-5. The Committee further considers that any authorised offsets that have been retired or cancelled to offset reservoir emissions or proposal GHGe will be reported in accordance with condition 2-11. The Committee, therefore, recommends that this appeal ground be dismissed.

3.11.1 Use of Australian Carbon Credit Units and other authorised offsets

The EPA in its s106 Report advised (2023c:20) that:

> In making its recommendations to the Minister for Environment, the EPA defined Authorised Offsets as 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:
>
> a) Australian Carbon Credit Units (ACCUs) issued under the Carbon Credits (Carbon Farming Initiative) Act 2011 (Cth)
>
> b) Verified Emission Reductions issued under the Gold Standard program
>
> c) Verified Carbon Units issued under the Verified Carbon Standard program
>
> d) Other offset units that the Minister for Environment has notified the proponent in writing meet integrity principles and are based on clear, enforceable and accountable methods.

> The EPA considers that the above definition of Authorised Offsets is appropriate for consideration of carbon offsets under WA and Commonwealth legislation. On this basis, the EPA has determined that the above offset types would provide permanent, measurable, verifiable, and an additional benefit.
>
> The Commonwealth released its Independent Review of Australian Carbon Credit Units (the Chubb Review) (Government of Australia 2022) on the 9 January 2023. The purpose of the Chubb Review was to examine the integrity and efficiency of ACCUs and the carbon crediting framework in Australia. The review concluded that the scheme is essentially sound, and recommended a number of changes to clarify governance, improve transparency, facilitate positive project outcomes and co-benefits, and enhance confidence in the integrity and effectiveness of the scheme.
>
> On this basis, the EPA considered ACCUs should be available as carbon offsets for the Proposal and considers that the use of carbon offsets should align with future Australian standards as stated in the definition of Authorised Offsets in EPA Report 1727.

The Committee acknowledges that as part of the 2026-27 review of the SGM scheme (DCCEEW 2024b:9), the:

> Climate Change Authority will advise the government on the extent to which on-site abatement is being driven by the reforms, and whether any additional incentives are required (such as a discount on ACCUs when used for more than a certain percentage of a baseline or any circumstances where limits on the use of ACCUs may be appropriate).

The Committee acknowledges that the EPA considers domestic offsets under the SGM (i.e. ACCUs) and voluntary offsets purchased to offset residual emissions. The Committee recognises that the Australian Government accepted all 16 recommendations of the Independent ACCUs Review in principle and published an Implementation Plan in June 2023. The Committee notes that offsets of high integrity can contribute to Australia's climate targets and the NDC under the Paris Agreement.

The Committee notes that the EPA's 2023 EFG-GHGe has been revised to require proponents to consider the integrity of proposed offsets, their practicability, availability and whether they generate additional co-benefits. Further guidance is provided in the GHG EMP template where proponents should describe the role of offsets in achieving emissions reduction targets, the type of offsets proposed, the certifying body of the offsets and where the offsets will be generated (i.e. state, domestic or international).

In accordance with the GHG EMP template, the Proponent is to provide a summary of offset integrity and assurance mechanisms, demonstrate consistency with relevant offset integrity principles and describe whether offsets are likely to be available at the time of surrender (EPA 2023d). In addition to the integrity standards set out in the Commonwealth *Carbon Credits (Carbon Farming Initiative) Act 2011,* the EPA also refers proponents to the principles in the Climate Active Carbon Neutral Standard for Organisations (Commonwealth of Australia 2020). In addition, proponents are expected to provide evidence of the surrender of any offsets to achieve their net emission reduction targets.

The EPA's 2023 guidance also now requires the GHG EMP to be subject to independent expert review of offsets integrity to provide confidence that offsets proposed will result in genuine and credible emission reductions.

The Committee recommends upholding these appeal grounds to the extent that a condition is added underlining the need for an independent expert review of the GHG EMP to identify whether offsets satisfy integrity principles and are likely to be reasonably practicable and available at the time of proposed future surrender, in accordance with the current template for a GHG EMP.

3.12 Reporting requirements

A number of appellants argued that reporting requirements applicable to the Proposal are inadequate to ensure transparency about matters including GHGe estimates and proposed measures to avoid, reduce and/or offset emissions.

The Committee recognises that the recommended conditions regarding reporting were formulated on the basis of the guidance available to the EPA at the time of assessment. The 2020 EFG-GHGe included minimum high-level requirements for what was called a GHGMP at the time, but there was no detailed guidance available.

The Committee also recognises that more detailed requirements are included in the EPA's 2023 EFG-GHGe and template for what is now called a GHG EMP, which describes in considerable detail how emissions estimates are to be provided, details of emissions reduction measures and the trajectory of emissions reductions. The GHG EMP template also sets out the requirement of best practice measures based on an international and Australian review, and a justification if best practice measures are not proposed. Furthermore, the EPA's 2023 EFG-GHGe requires an independent expert review to demonstrate how best practice measures have been adopted.

The GHG EMP template outlines that reporting is required against the commitments and interim targets identified in the emissions reduction trajectory. The recommended conditions require the Proponent to prepare an annual report specifying the quantity of emissions for the previous year and a consolidated report every five years, which are to be made publicly available. Condition 2-11(2) requires an audit and peer review of the consolidated report carried out by an independent person with suitable technical expertise. Furthermore, condition 2-12 requires the consolidated report to be accompanied by a separate summary report.

The Committee notes that the GHG EMP also requires reporting of scope 3 emissions and measures considered to mitigate those emissions, as outlined in Section 3.4. The Committee further notes that the 2023 template for a GHG EMP requires an independent expert to review whether proposed offsets satisfy integrity standards and principles (Section 3.11).

The Committee recognises that the Proposal will also be subject to reporting requirements under the NGER legislation, which are based on a financial year timeframe. The Committee recommends that, conditions are amended so that the timeframes for net GHGe limits are based on a financial year period (i.e. July to June) for easier comparison when reporting outcomes under both the SGM and the EP Act.

The Committee recommends that this appeal ground is upheld to the extent that the Proponent will be required to comply with stricter reporting requirements, including in relation to scope 3 emissions, in accordance with the current template for a GHG EMP.

3.13 Procedural issues

Many appellants contended that the EPA Report 1727 did not properly apply the precautionary principle and the principle of intergenerational equity, outlined in article 4A of the EP Act, particularly with respect to the threat of serious and irreversible harm due to climate change.

3.13.1 Precautionary principle

Section 4A of the EP Act describes the precautionary principle as follows:

> Where there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Appellants argued that, by recommending the Proposal to proceed, the EPA had not applied the precautionary principle and that the GHGe generated by the Proposal would directly contribute to global warming, threatening to cause serious and irreversible harm to the environment.

The EDO, on behalf of CCWA, stated in its response to the EPA's s106 Report (2023:65-67) that:

> … proper consideration, as required under the EP Act, would lead the EPA to conclude that the Proposal is inconsistent with the 4A Principles and should not be implemented.

The EDO argued that the conditions recommended by the EPA:

> … are only minimisation measures; they do not respond to the threat of serious and irreversible environmental harm in a precautionary manner'. The EDO contended that 'proper application of the precautionary principle dictates that, given the threat of serious and irreversible harm, it cannot be acceptable to increase or maintain current level of greenhouse gas emissions.

The EDO further argued that:

> … a proper precautionary response to the threats of irreversible harm in respect of climate change…would be to recommend against implementation of the Proposal or, at a minimum, to impose conditions that greenhouse gas emissions … be reduced to zero for the life of the Proposal.

In Report 1727, the EPA considered that it had taken the precautionary principle into consideration by acknowledging that climate change as a result of cumulative GHGe has the potential to cause serious damage to WA's environment. Notwithstanding that the specific impacts of a single proposal's GHGe cannot be known with certainty, the EPA considered that it had recommended practicable conditions to reduce scope 1 emissions in order to minimise the risk of environmental harm associated with climate change.

The EPA stated (2022:114) that:

> The proponent has provided a GHG emissions reduction trajectory (based on five-year targets) towards net zero by 2050 consistent with the Paris Agreement and IPCC 1.5 report, a continuous improvement approach and has proposed the use of offsets for emissions reduction targets in accordance with the mitigation hierarchy.

In its s106 Report, the EPA stated (2023c:12) that:

> The EPA decided to adopt a precautionary approach in considering the Proposal and determined that significant reductions in emissions should be required on a regular basis. The EPA's position was that this should be a linear trajectory to 2050, at which point the Proposal should operate at net zero emissions. This was to ensure that reductions in emissions would not be delayed and are appropriately mitigated.

The existing EPA policy settings within the EIA framework focus on mitigating the scope 1 and scope 2 emissions of individual proposals subject to EPA assessment. The Committee acknowledges that the conditions requiring the Proponent to mitigate scope 1 emissions in a linear trajectory and reach net zero GHGe by 2050 are in line with international, national, and State policies to reach net zero by 2050, aimed to minimise the risk of environmental harm associated with climate change.

The Committee notes the key concerns of appellants relating to scope 3 emissions, which are outside of the current policy settings in the EPAs assessment framework. The Committee finds that the EPA recognised the uncertainty associated with the climate related impacts of the Proposal and the broader uncertainty with respect to climate change, and within the context of its policy framework, applied reasonable GHGe reduction measures in response to this uncertainty.

The Committee, therefore, finds the EPA assessed the Proposal appropriately and applied amended conditions in accordance with its precautionary principle, and recommends that this appeal ground be dismissed.

3.13.2 Principle of intergenerational equity

Section 4A of the EP Act describes the principle of intergenerational equity as follows:

> The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

A number of appellants argued that the EPA had not considered the intergenerational impacts of global warming to 1.5°C or above, such as impacts on human health and the health, diversity, and productivity of the environment. Appellants pointed out the likely social and economic costs of a changing climate, for example in the way of increased costs to the public health system, disaster relief and infrastructure. To address these costs, a number of appellants suggested that a carbon fund be established.

Some appellants argued that, despite recognising that the estimated maximum almost 4.4 billion tonnes of GHGe from the Proposal (scope 1, 2 and 3) will contribute to global warming, the EPA did not consider the public health risks associated with climate change which would worsen over time, impacting future generations on a global scale.

Doctors for the Environment Australia (DEA) stated (2022) that the:

> WA Climate Health Inquiry's Final Report published in December 2020, convened under Part 15 of the Public Health Act 2016 (WA), acknowledges the widespread and profound health threat posed by climate change. The Act recognises the environmental needs of future generations (Sustainability Principle) and that lack of scientific certainty should not be used as a reason to postpone measures to prevent or control a public health risk (Precautionary Principle). Policy decisions which increase our emissions fundamentally undermine public health policy seeking to protect the health of individuals and communities from climate change impacts.

DEA also stated that:

> … it is expected that many of the adaptive measures to minimise the health implications of climate change will sit outside the health sector, and require significant resources and change across government, industry, business, and communities. As every increment of further warming will result in increasing health impacts, and the need for greater adaptation measures to protect human health, then every increment of increase in greenhouse gas emissions represents a greater health burden.

DEA recommended that the current Environmental Factor Guideline (EFG): Human Health and other EFGs be revised to include climate change impacts and consideration be given to how GHGe link with other environmental factors pertaining to human health. DEA also recommended a Health Impact Assessment for all projects captured within the current guidelines.

The traditional owners and custodians of Murujuga (Burrup Peninsula) expressed deep concern about the impacts of climate change. In addition to impacts on water holes and other surface expressions that are cultural heritage sites, they stated that Aboriginal people are already vulnerable to the impacts of elevated temperatures in the region, such as increased mortality and reduced quality of life. They worried about the effects of climate change on the health of their Elders and the impact on the critical cultural knowledge that they hold. The traditional owners expressed concern that the impacts of the Proposal, in addition to those of other industrial developments on Murujuga, would interfere with their ability to continue to practice their traditions.

AgZero2030 indicated in information presented to the Committee how impacts of predicted climate change have been modelled for the agricultural sector in WA, generating a 'preliminary guide to the potential losses to WA wheat production'. Based on modelling of a specific climate change scenario, 'total lost production between 2023 and 2070 would be 53 million tonnes worth $21.21 billion' (AgZero2030 2024:3).

AgZero also submitted that the scope 3 emissions from the Extension Proposal were so significant that (AgZero2030 2022:10):

> … there could be important questions of a legal duty of care owed by the State Government, including the Minister for Environment. While the Full Federal Court in Sharma held that it was inconsistent with the Environmental Protection and Biodiversity Conservation Act 1999 (Cth) to hold that the Commonwealth Minister for the Environment had a duty of care to consider the impacts of the proposed GHGe on Australian children for climate change harm that may be suffered decades in the future, the key reasons for that finding do not apply to the WA Minister for the Environment and WA Government approving huge increases in GHGe, including scope 3 GHGe, where a class of plaintiffs is already suffering climate change harm and is readily ascertainable as a class of persons, such as WA farmers.

The EDO, on behalf of CCWA, stated (2023:67) that:

> Report 1727 does not consider or provide evidence of how the proposed measures … can ensure environmental health, diversity and productivity is maintained or enhanced for future generations. Stating that the principle has been applied, or the 'EPA's earlier assessments and recommendations (themselves insufficient) are consistent with it, do not make it so'. The EDO argues that 'any implementation of the Proposal is inconsistent with the principle of intergenerational equity.

In its Report 1727, the EPA stated (2022:117) that it:

> … has noted that GHG emissions pose a risk to future generations, however, also notes that the proponent has provided a trajectory to net zero emissions by 2050 consistent with the Paris Agreement and IPCC 1.5 report, and to use offsets should these targets not be met by continuous improvement'. The EPA further notes that it has recommended conditions to avoid, reduce and/or offset the total quantity of reservoir emissions and achieve net zero GHG emissions by 2050.

In its s106 Report, the EPA stated (2023c:9) that 'the net zero by 2050 target, combined with the mitigation measures proposed, are consistent with the principle of intergenerational equity.'

With reference to the WA *Public Health Act 2016*, the EPA in its s106 Report stated (2023c:12) that it '*has regard to government policy in situations where it considers this appropriate*.'

The Committee acknowledges that the conditions requiring the Proponent to mitigate scope 1 emissions in a linear trajectory and reach net zero GHGe by 2050 are in line with international, national, and State policies to reach net zero by 2050 to minimise the risk of environmental harm and impacts on future generations associated with climate change.

The Committee also notes that, in the context of the EPA's assessment framework, it is not within the EPA's remit to assess the intergenerational impacts on human health and the broader social and economic impacts of a changing climate in the context of a single proposal.

In Report 1727, the EPA noted (2022:120) it applied the principle of intergenerational equity with respect to GHGe by recommending condition 2:

> … which requires the proponent to avoid, reduce and/or offset the total quantity of reservoir emissions released to the atmosphere until 2029, achieve and report on specific emissions limits which will achieve net zero GHG emissions by 2050, implementation and review of the GHGMP in consultation with NYFL and MAC.

With regard to whether a duty of care may be owed, it is not for the Committee to determine points of law.

The Committee notes that the key concern of appellants relates to all GHGe, including scope 3 GHGe, which are the main source of emissions from the Proposal. The Committee finds that the EPA assessed the Proposal in accordance with the principle of intergenerational equity in the context of its assessment of the Proposal and with national and international agreements on climate change, and within the current policy settings of the EPA's assessment framework, and recommends that this appeal ground be dismissed.

The Committee notes that, before deciding on the Proposal, the Minister for Environment must consult with other relevant DMA Ministers as part of the decision-making process under section 45 of the EP Act, and that some of these socio-economic matters may be relevant to those discussions.

3.14 Recommendation

Taking into account the grounds of appeal discussed, the EPA's assessment and its response to appeals, the Committee finds that the EPA's assessment of GHGe impacts from the Proposal was consistent with the EP Act and policy framework for environmental matters in EIA assessment available at the time. In considering the appeals in the current policy settings, the Committee recommends some of the appeal grounds are upheld to the extent that conditions are amended to reflect the following:

- net GHG emissions limits and reporting requirements are amended to reflect financial year periods as opposed to calendar year
- net GHG emissions limits have been reduced following additional information provided by the Proponent
- a net GHG emissions limit is set for the period 1 July 2025 to 30 June 2030
- in addition to emissions intensity of the facility, emissions intensity of each LNG train be considered
- the Proponent be required to consider options to mitigate scope 3 emissions in accordance with the EPA's 2023 GHG-EFGe
- requirements with respect to the revised GHG EMP be strengthened, in line with the 2023 EFG-GHGe and template, specifically with respect to adopting best practice, offsets integrity, and the requirement for an independent expert review
- the Proponent be required to address methane emissions in its revised GHG EMP.

The Committee notes that the Minister can seek a review or inquiry into conditions under section 46 of the EP Act at any time. The Committee also notes that the CEO of DWER has the power to request a review of the GHG EMP at any time.

4 Air quality

4.1 Introduction

In its 2020 Environmental Factor Guideline for Air Quality, the EPA states (2020a:1) that its objective for the air quality factor is '*to maintain air quality and minimise emissions so that environmental values are protected*'.

The EPA '*recognises that maintaining good air quality and minimising emissions protects human health and amenity, as well as the broader environment*' (2020a:1). The EPA considers the impact to air quality together with other environmental factors to assess the impacts to an ecosystem's integrity. While air emissions may include greenhouses gases, GHGe are considered by the EPA under the *Greenhouse Gas Emissions* factor (EPA 2020a) and are discussed in Section 3 of this report.

The Proposal's potential impact to air quality is through the generation of emissions from infrastructure including gas turbine generators, furnaces/boilers, and flaring associated with the gas processing plant.

Many appellants raised concerns about the impacts of the predicted air emissions from the Proposal, primarily on human health and Murujuga rock art.

4.2 Air quality – human health

This section of the Committee report addresses appellants' concerns with respect to the impacts of the Proposal's predicted air emissions on human health. Appellants' concerns regarding the impacts of the Proposal's predicted air emissions on rock art are addressed in Section 4.3 below.

In addition to concerns regarding the impacts of hazardous pollutants on human health, many appellants expressed concern with respect to the estimated GHGe over the life of the Proposal. They contended that, despite the recognition that GHGe contribute to climate change, the EPA had not sufficiently addressed the impacts of climate change on human health. These concerns are addressed in Section 3 of the Committee report.

4.2.1 EPA assessment

The EPA stated (EPA 2022:23) that the:

> … Extension Proposal has the potential to impact air quality through the generation of air emissions from gas turbine generators, furnaces/boilers, and flaring associated with the gas processing plant. The predominant pollutants emitted from the Extension Proposal that relate to human health include oxides of nitrogen (NOx), unburnt VOCs (including benzene), sulfur dioxide (SO_2) and particulates (as PM_{10}). Generally, ozone is not directly emitted by the Extension Proposal but is formed as a result of anthropogenic sources via chemical reactions.

The cumulative impacts of the predicted air emissions from the Proposal and other industrial sources within the Murujuga airshed[9] were assessed at Dampier, Karratha, Hearson Cove and Deep Gorge (Ngajarli) against the National Environment Protection (Ambient Air Quality) Measure, which provides national monitoring standards for the protection of human health for

[9] The Murujuga airshed encompasses the entire Burrup Peninsula and includes the population centres of Dampier and Karratha and surrounding areas. Industrial facilities that currently release or have approval to release significant quantities of air emissions into the Murujuga airshed include the existing North West Shelf Project, Woodside Pluto LNG Plant, Yara Pilbara Fertilisers Pty Ltd Ammonia Plant, Yara Pilbara Nitrates Pty Ltd Technical Ammonium Nitrate Production Facility, Perdaman Urea Project, Pilbara Iron Yurralyi Maya Power Station, Santos Devil Creek Power Station, ATCO Karratha Power Station and EDL West Kimberley Power Plant (Maitland LNG Plant) (EPA 2022:22-23).

nitrogen dioxide (NO_2), SO_2, ozone (O_3) and particulates (PM_{10} and $PM_{2.5}$), and the National Environment Protection (Air Toxics) Measure, which provides national monitoring investigation levels for the protection of human health for benzene and other air toxics[10].

The EPA stated (2022:23-24) that:

> Particulate matter (PM_{10} and $PM_{2.5}$) was not modelled in the air quality impact assessment undertaken on behalf of the proponent as it was considered the Extension Proposal would have 'negligible' contribution of particulate matter when compared to 'smoke from bushfires and controlled burns, raised dust, and other industrial sources'.
>
> The DWER study (Ramboll 2022) predicted GLCs for PM_{10} and $PM_{2.5}$ particulates either reach or slightly exceed the relevant Air NEPM standards. The DWER study (Ramboll 2022) determined that background (non-industrial) dust sources were the main contributors (>85% of PM_{10} and >82% of $PM_{2.5}$) to these exceedances rather than industry. The vast majority of industrial emissions are associated with bulk commodity operations in the region.
>
> Given this, the issue of impacts to human health from particulate matter raised in public submissions is considered unlikely to make a material contribution to the dust levels on the Burrup Peninsula or significantly contribute to exceedances of NEPM standards. Therefore, this issue has not been considered further in this assessment.

In summarising its assessment of impacts to human health from the Proposal's predicted air emissions, the EPA stated (2022:33) that:

> Predicted GLCs at all sensitive receptors remain below applicable criteria for current and future proposed, and worst case 'FBSIA'[11] cumulative impact scenarios in the proponent's air quality impact assessment (Jacobs 2019a) and for scenario 3 in the DWER Study (Ramboll 2022). The impact of the Extension Proposal is likely to be consistent with the EPA's objective for air quality in relation to human health and amenity. The EPA recommends that the proponent implement an AQMP to include progressive reduction of air emissions.

The EPA further (2022:26):

> … notes that the existing North West Shelf Project is regulated by the Department of Water and Environmental Regulation (DWER) under Part V of the EP Act through licence L5491/1984/18. The DWER has advised that a review of the emissions and discharges authorised under the licence will be undertaken in accordance with DWER's Regulatory Framework. In addition, any future changes to air emission composition as a result of processing third party gas may also require the licence to be reviewed.

4.2.2 The appeals

Adequacy of assessment

Most appellants argued that the EPA in its assessment had failed to adequately consider the most recent science and standards in relation to air emissions, particularly with respect to hazardous pollutants. They contended that the EPA did not adequately assess the risks of hazardous pollutants on human health, and that the Proponent did not demonstrate that emissions would be minimised, or that any risks would be adequately managed.

Many appellants argued that the Proposal would generate Australia's largest source of carcinogenic benzene, toluene, ethylbenzene, and xylene (BTEX), and that the risk to human health was significant.

The ACCR stated (ACCR 2022:39) that:

[10] Toluene, xylenes, formaldehyde and benzo(a)pyrene as marker for polycyclic aromatic hydrocarbons (PAHs)

[11] Future Burrup Strategic Industrial Area air emissions scenario modelled with Karratha Gas Plant improvement opportunities (KIO) and without KIO in the Proponent's air quality impact assessment (Jacobs 2019a). KIO were described as 'feasible and significant NOx reductions as determined by Woodside engineering investigations.' (EPA 2022:28)

> KGP is Australia's largest source of carcinogenic BTEX emissions to air. By far. Since the National Pollutant Inventory (NPI) has been publishing data, the KGP has emitted over 49 million tonnes of benzene, toluene, ethylbenzene and xylene (BTEX) to air. These pollutants are carcinogens that can cause several types of cancer including leukemia and birth defects. KGP has emitted more BTEX than every other Australian facility combined.

In its s106 Report (2023c:5), the EPA advised that:

> Extensive air quality modelling was undertaken to inform the EPA's assessment, including a report commissioned by the DWER regarding cumulative emissions for the Murujuga airshed (Ramboll 2022). Air quality modelling was undertaken against the most recent and relevant standards and criteria including both the 2015 and 2021 National Environment Protection (Ambient Air Quality) Measure (NEPM).

The EPA further stated (2023c:5) that:

> The EPA's assessment considered air modelling under multiple scenarios, including current baseline, worst-case, and cumulative impacts within the Murujuga airshed, for all key air pollutants relevant for the Proposal and at three locations adjacent to the Proposal. The EPA found that even under worst-case scenarios, ground-level concentrations (GLCs) of key pollutants NOx, sulfur dioxide, and ozone would be well below the NEPM standards at sensitive receptors and within the vicinity of the Proposal (NEPM 2021). Further, emissions from the abovementioned key pollutants would be reduced from current baseline levels through the EPA's recommended conditions and optimisation of the Proposal.

Adequacy of conditions

In line with its requirement for continuous improvement, the EPA considered a number of additional measures '*to ensure that the proponent adopts practicable and efficient technologies to minimise air emissions'* (2022:33).

While measures specifically aimed at minimising impacts on rock art are discussed below, the Committee notes that the EPA in Table 5 of Report 1727 (2022:37-38) summarises its recommended conditions with respect to air quality regulation as follows:

- seek to adopt practicable and efficient technologies to minimise air emissions (including NOX, SOX and VOC [including BTEX])
- seek to maintain regional air quality in accordance with NEPM standards and DWER air quality standards by the minimisation of air emissions from the Extension Proposal
- seek to ensure air quality criteria for benzene are not exceeded by requiring the minimisation of air emissions from the Extension Proposal
- requirement to implement an AQMP which is reviewed every 5 years to ensure continuous improvement and reduction in emissions in consultation with MAC
- monitoring, contingency measures and reporting.

Requirement to submit the AQMP to Department of Agriculture, Water and the Environment (DAWE)[12] to support regulation under the EPBC Act.

The EPA also points out that air emissions are regulated through Part V of the EP Act.

Most appellants contended that the only mitigation measures proposed in the North West Shelf Project Extension Air Quality Management Plan (Revision 2, February 2021) (WEL 2021b) were reducing NOx emissions by 40 per cent and 'substantially' reducing VOC emissions by 31 December 2030. A number of appellants contended that the EPA provided no scientific justification for the proposed 40 per cent reduction in the NOx emissions or how this would effectively mitigate harm to the environment. Most appellants expressed specific concern about the impacts of NOx emissions on rock art. This is addressed in Section 4.3 below.

[12] Following a restructure of Commonwealth Government departments since the EPA's assessment of the Proposal, environmental matters are now considered by the Department of Climate Change, Energy, the Environment and Water (DCCEEW)

Most appellants contended that the Proponent did not consider all emission reduction options or demonstrate that the air emission impacts were as low as reasonably practicable (ALARP) such as upgrading the LNG processing plant infrastructure to reduce emissions.

The ACCR stated (ACCR 2022:34) that:

> There is no other evidence of material changes having been considered to reduce emissions from the dated, inefficient equipment. As mentioned above, the NWS Operator's processes require that environmental impacts are assessed and minimised to ALARP. If more detailed assessments of low emissions technology have not been provided to the EPA, the NWS Operator has either not followed its own processes, or is withholding information from the regulator and ministers.

The ACCR further stated (2022:41-42) that:

> The Pluto LNG facility installed Regenerative Thermal Oxidisers (RTOs) to destroy VOCs from its AGRU vent. This mature technology will have both a GHG benefit if applied to KGP, since it will destroy residual methane emissions, as well as removing the vast majority of carcinogenic emissions from the Burrup air shed.
>
> Not only has the Proposal not committed to, or the EPA Report not required this mature technology to be applied, there does not appear to have been any attempt to apply a hierarchy of controls. As shown above, KGP emitted 49% of Australia's BTEX to air. The vast majority of it would be destroyed with the installation of five RTOs at KGP. This would also be a genuine application of the hierarchy of controls that Woodside claims to have applied and the EPA is obliged to follow.

Many appellants also contended that the EPA failed to apply conditions that required transparent and regular air monitoring reporting of the key air pollutants considered by the EPA. These appellants contended that BTEX should be monitored to a higher standard with more frequent reporting due to the high risk to human health.

4.2.3 Appeal consideration

The Committee notes that the EPA's assessment considered current, future proposed and worst-case cumulative impact scenarios of the Proposal's predicted NOx, SO_2 emissions and O_3 at sensitive receptors within the Murujuga airshed. The Committee also notes that the EPA evaluated the predicted GLCs of these pollutants against the most recent relevant standards, including the 2015 and 2021 National Environment Protection (Ambient Air Quality) Measure (Air NEPM).

The Committee understands that predicted air emissions from the Proposal are expected to result in air quality to be within existing standards (i.e. cumulative). The Committee notes that the EPA, in line with its requirement for continuous improvement, recommends additional measures to minimise air emissions from the Proposal, including amending condition 3 to require the application and independent verification of best practice measures. The Committee also notes that the EPA recommends that the annual monitoring report provided to the CEO of DWER is made publicly available.

The Committee recognises that the KGP is an existing facility and acknowledges appellants' concerns around less efficient older technologies. The Committee notes that the EPA's preferred approach is to set an environmental outcome and allow the Proponent to assess technologies to meet that outcome. Consideration of specific technologies, such as those identified by appellants, will be made in the context of best practice considerations, as will be outlined in the revised AQMP to be prepared within 12 months of the issue date of the Ministerial Statement. The Proponent will further be required to review the AQMP at least every five years. The Committee expects that the requirements set out in the amended conditions proposed by the EPA in its s106 Report, as outlined below, will apply to the revised and future revisions of the AQMP.

Possible technological improvements would be captured by condition 3-5(5) which requires that the Proponent (2022):

> identifies and describes the practicable measures and technologies that the proponent has implemented or will implement to minimise all air emissions, including the adoption of advances in air pollution control technology and process management…

The Committee notes that the EPA proposes to update condition 3-5(6) (EPA 2023c:7) requiring that the:

> Identified air pollution abatement measures and the subsequent comparison against international industry best practice are verified through an independent review undertaken by a suitable technical expert.

The Committee notes that Report 1727 includes a requirement to reduce NOx and VOCs emissions at a minimum by 40 per cent by 2030, which is reflected in conditions 3-5(1)(e) and 3-5(1)(f) respectively. The Committee also notes that, since the assessment was undertaken, the Proponent has committed to further reducing NOx emissions. Based on an operating baseline of 7,662 tonnes per year, the Proponent has committed to reducing NOx emissions by, at a minimum, 60 per cent by 2030, to 3,065 tonnes per year. Issues surrounding NOx emissions are addressed in detail below.

The Committee considers that NOx emissions may be further reduced through lowering stack emissions limits and the application of best practice measures, independently verified through an expert review. This is further discussed in Section 4.3 below.

The Committee also notes that the EPA, in its s106 Report, recommends amending condition 3 to require the Proponent to make the AQMP and annual monitoring reports publicly available.

The Committee's recommendations with respect to the air quality environmental factor can be found in Section 4.4 at the end of the following section on air quality and Murujuga rock art.

4.3 Air quality - Murujuga rock art

A large number of appellants raised significant concerns about the potential impacts of air emissions from the Proposal on the Murujuga rock art when considered in isolation, and cumulatively with other existing industrial emission sources within the Murujuga airshed. Appellants contended that the predicted air emissions from the Proposal will adversely impact the Murujuga rock art beyond natural weathering processes. They contended that air emissions from the proposal would contribute to causing permanent and irreversible damage to the Murujuga rock art, and therefore, the rock art would not be retained for future generations. Appellants also raised concerns about the World Heritage nomination of Murujuga and the Proposal's potential impact on the listing.

Murujuga is the traditional Aboriginal name for the Dampier Archipelago and surrounds, which includes the Burrup Peninsula and Murujuga National Park. The Murujuga region is home to one of the largest, densest and most diverse collections of rock art, or petroglyphs, in the world (DBCA 2023). Murujuga has been listed on Australia's National Heritage List under the Dampier Archipelago by the Australian Government since 2007 (Commonwealth of Australia 2007).

In January 2020, the Murujuga Cultural Landscape was added to Australia's World Heritage Tentative List by the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Centre (Australian Government 2020). This nomination is to have Murujuga's unique cultural, spiritual and archaeological values internationally recognised at the highest level (DBCA 2023). The nomination for the Murujuga Cultural Landscape was submitted to the UNESCO World Heritage Centre in February 2023. Since then, the

nomination has been accepted and referred to the International Council on Monuments and Sites for evaluation, with a decision expected by the World Heritage Committee in 2025 (DCCEEW 2024a).

There has been a significant amount of research and environmental monitoring associated with the Murujuga rock art for over 20 years, with the purpose of determining whether anthropogenic air emissions are accelerating the natural weathering of the rock art and surrounding rock surface.

4.3.1 EPA assessment

The predominant pollutants emitted from the Proposal identified by the EPA that may impact the Murujuga petroglyphs (rock art) include NOx (consisting of nitrogen dioxide (NO_2) and nitric oxide (NO)), unburnt VOCs (including benzene), sulphur dioxide (SO_2) and particulates as PM_{10} (EPA 2022:23).

The Committee understands that ground level ozone is not directly emitted by the Proposal, but instead formed by the reaction of ultraviolet light (sunlight) on air containing NOx and hydrocarbons (e.g. VOCs) that react to form ozone directly at the source or further away. When ozone breaks down in the air, it contributes to the production of smog. NOx also contributes to the formation of acid rain.

The EPA (2022 :33):

> … advises that there are significant environmental values associated with rock art within Murujuga … The EPA considers there may be a threat of serious or irreversible damage to the rock art from industrial air emissions (in particular NOx and SOx from the Proposal) accelerating the natural weathering. Furthermore, the EPA acknowledges that there is contested science and a lack of consensus on the science about whether such emissions are adversely affecting rock art within Murujuga.

The EPA further stated (2022:33) that it:

> … is aware of numerous independent scientific studies and monitoring of potential cumulative impact of industrial air emissions on the rock art that have been undertaken since 2004. The conclusions of some of these studies and monitoring are contested as shown in the Senate Environmental and Communication References Committee Report on the Protection of Aboriginal rock art of the Burrup Peninsula (Commonwealth of Australia 2018), the Burrup Peninsula Aboriginal Petroglyphs: Colour Change & Spectral Mineralogy 2006-2016 (Duffy et al 2017) and the Summary of scientific studies and monitoring programs commissioned by the Burrup Rock Art Monitoring Management Committee and the Burrup Rock Art Technical Working Group.

The EPA also stated (2022:33-34) that:

> To address the contested and uncertain science, DWER is implementing the Murujuga Rock Art Strategy (MRAS) which was released by the State Government in February 2019. The purpose of the MRAS (DWER 2019) is to protect the rock art on Murujuga from the potential impacts of anthropogenic emissions and establish the framework for long-term monitoring and analysis of changes to the rock art to determine whether the rock art is subject to accelerated change.

The EPA further stated (2022:34) that the

> MRAS includes the Murujuga Rock Art Monitoring Program (MRAMP) which will monitor, evaluate and report on changes and trends in the integrity of the rock art, specifically to determine whether anthropogenic emissions are accelerating the natural weathering, alteration, or degradation of the rock art (DWER 2019)'. The EPA anticipated that the interim results of the MRAMP would be available in 2023 and that these results would 'facilitate the development of air quality standards. The air quality standards will include environmental objectives and environmental quality standards for the purpose of avoiding the cumulative risk of adverse impact of the rock art within the Murujuga Cultural Landscape.

The also EPA also stated (2022:35) that

> Given the lack of full scientific consensus about whether proposal specific, and cumulative industrial air emissions in the Murujuga airshed are adversely affecting rock art within Murujuga by accelerating the natural weathering of the rock art and noting there may be a threat of serious or irreversible harm if the Extension Proposal is implemented, the EPA has given particular consideration to the precautionary principle and the principle of intergenerational equity.

The EPA further stated (2022:35) that:

> consistent with the precautionary principle, the EPA has adopted an overall cautious approach and has carefully evaluated options to avoid serious or irreversible impact to the rock art, including whether air emission minimisation measures proposed by the proponent are sufficient to meet the EPA's objectives, whether there are additional practicable measures that can be recommended so that the Extension Proposal avoids degradation of the rock art, or whether it should recommend that the Extension Proposal not be implemented.

The EPA stated that after consideration of the precautionary principle and principle of intergenerational equity, it recommended that a cautious, preventative approach be taken, and the Proponent be required '*to ensure no air emissions from the Proposal have an adverse impact accelerating the weathering of the Murujuga rock art beyond natural rates'* (2022 :36). This is reflected in condition 3-1.

The air emissions minimisation measures considered by the EPA included a 40 per cent reduction of NOx and VOC emissions by 31 December 2030. The EPA further required (2022:36):

> The proponent to achieve compliance with any detailed air quality standards to ensure that there are no adverse impacts accelerating the weathering of rock art within Murujuga beyond natural rates. The EPA expects that this will include environmental quality objectives and environmental quality criteria derived from the results from the MRAMP.

The EPA concluded (2022:36) that:

> With proposal specific outcomes-based regulation, MRAMP derived environmental quality objectives and the environmental quality standards for cumulative impact regulation, and other recommended conditions, the Extension Proposal may be implemented in a way which is not likely to be inconsistent with the EPA's objectives.

4.3.2 The appeals

Adequacy of assessment

Many appellants contended that the EPA did not consider the impact of the Proposal on the World Heritage listing process of Murujuga. They contended that the EPA's recommendation is contrary to the WA Government's commitment to protect and preserve Murujuga and to promote the World Heritage listing. Many appellants believe that the industrial development on the Burrup will jeopardise consideration of the nomination by UNESCO.

In Report 1727 the EPA recognised the World Heritage nomination for the Murujuga Cultural Landscape and the diverse collection of rock art. In Report 1727, the EPA considered the cultural values of the Murujuga Cultural Landscape that are likely to be relevant during the World Heritage listing in its assessment within the air quality, social surroundings and holistic assessment.

Most appellants contended that the EPA in its assessment failed to adequately consider the existing peer-reviewed science on the impact of industrial emissions on the environmental and cultural values of Murujuga rock art. Many of these appellants cited and provided peer-reviewed scientific publications in support of their claims.

One appellant argued (Black 2022:3) that:

> the EPA recommendation failed to consider adequately existing scientific evidence showing the outer rock patina, essential for preservation of the petroglyphs, is being dissolved by nitric acid formed from nitrogen dioxide released primarily by the North West Shelf (NWS) operations.

Appellants contended that the EPA failed to demonstrate that it assessed the Proposal's predicted NO_2, SO_2, and benzene emissions and O_3 concentrations in a cumulative context with other existing and future emission sources with respect to the Murujuga rock art.

Many appellants expressed concern that the EPA had recommended that the Proposal be approved before the findings of the MRAMP were available.

FARA stated (2022:3) that:

> The EPA has recommended that the NWS extension proposal be accepted despite there being no published results from the monitoring conducted through the Murujuga Rock Art Strategy (MRAS); Report 1727 states that 'initial data and interim findings are anticipated in 2023' (p34). However, there is uncertainty about whether the findings will be available then and one to two years of monitoring are insufficient to provide meaningful data about whether there has been change. (Note: the start of the monitoring program was delayed for several years).

Supplementary information cited by appellants included the most recent Murujuga Rock Art Conservation Project report by UWA Professor of Archaeology (World Rock Art) Benjamin Smith (2024), which states:

> The most comprehensive pH testing undertaken to date has therefore confirmed what scientists have been saying for the past 20 years. The rock surfaces of Murujuga have become increasingly acidic due to acidic emission from industry in the area. When these emissions are mixed with rain and heavy dews (a distinctive feature of Murujuga in winter months) they create nitric and sulphuric acids.
>
> The Murujuga Rock Art Conservation Project team has shown, under controlled laboratory conditions, that these acids dissolve the outer crusts of both gabbro and granophyre – the engraved rocks of Murujuga. Equally alarming, the WA Government commissioned Murujuga Rock Art Monitoring Program findings have proven that this damage is occurring not just in the immediate environs of industry, but across the entire peninsula and even the islands.

A number of appellants stated that satellite monitoring data (e.g. European Union Copernicus Satellite) and the National Pollutant Inventory confirmed the presence of acidic gas emissions in the Murujuga airshed.

Failure to apply the precautionary principle

Many appellants contended that the EPA failed to demonstrate that it had undertaken a thorough risk assessment nor adequately applied the precautionary principle.

Section 4A of the EPA Act describes the precautionary principle as follows:

> Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
>
> In the application of the precautionary principle, decisions should be guided by:
>
> a. careful evaluation to avoid, where practicable, serious or irreversible damage to the environment;
>
> b. an assessment of risk-weighted consequences of various options.

Many appellants argued that the EPA had not properly evaluated the risk-weighted consequences of the various options in its application of the precautionary principle.

FARA stated (2023:4) that:

> If a thorough 'assessment of risk-weighted consequences' was carried out with integrity, the EPA would have realised that their recommendation of a 40% decrease in NOx emissions

> from the NWS facility by 2030 is too little, too late to prevent irreversible damage to the petroglyphs on Murujuga. And what about the 10,000 tonnes of NOx still allowed from 2030 – 2070? – this would be a death knell for the long-term preservation of the rock art!
>
> Therefore, FARA strongly contends that, in spite of their claim to have given particular consideration to the precautionary principle, the EPA has in fact contravened every section of the very principle on which their charter pivots…
>
> Surely there should be no question from the EPA chair (covering letter to EPA Report 1727) of '…whether or not the Extension Proposal may be implemented' – any proper consideration of the Precautionary Principle should make it perfectly obvious that the NWS Extension proposal should NOT be allowed to go ahead on environmental grounds.

CCWA, in their appeal, stated (2022:10) that:

> The EPA has failed to consider or apply, properly or at all, the 4A Principles. . . in the context of the EPA's reliance on scientific uncertainty as to whether acid gas emission limits would prevent harm to the Murujuga rock art as justification to postpone the implementation of mitigation measures limiting such emissions.

In its response to the s106 Report, the EDO, on behalf of CCWA, stated (2023:66) that:

> The EPA also recommended the condition to ensure that no air emissions from the Proposal "have an adverse impact accelerating the weathering of rock art within Murujuga beyond natural rates". This initially appears to be a preventative measure, which properly should be applied in the context of scientific uncertainty and a threat of serious and irreversible harm to the rock art. However, given the EPA has recognised scientific uncertainty about the measurement and attribution of impacts to the rock art, it is difficult to see how the EPA would envisage this condition being audited and enforced. It engages only with impact, and not with preventing the industrial emissions that may cause serious and irreversible harm to the rock art. The precautionary principle directs preventative measures to be taken immediately in response to the uncertainties and threats of serious and irreversible damage identified in Report 1727. The recommended conditions still allow for additional emissions to be created by the Proposal, with partial emissions reductions occurring later, and require meeting outcomes that have not yet been established. These effects are inconsistent with the precautionary principle.

Appellants contended that, instead of undertaking a thorough risk assessment or applying the precautionary principle, the EPA relied on the future results of the MRAMP.

FARA argued (2022:3) that:

> Although the WA EPA's Decision Report states that they considered the impact of industrial emissions on nationally and internationally significant Murujuga's rock art in reaching their decision, FARA maintains that this is an unsupportable statement; the EPA's assessment and recommendations were biased to rely on as-yet unavailable data.

Appellants questioned the EPA's recommendation for the Proposal to proceed, despite the results of the MRAMP not being available. They argued that the uncertainty around the impacts of industrial emissions on the Murujuga rock art should be addressed by awaiting the outcomes of the MRAMP before determining whether or not the Proposal should be approved.

FARA further stated (2024:3-4) that one of the outcomes from the appeal process they were seeking is that:

> The EPA delays their decision regarding the proposed NWS extension until the Proponent can show that the acidic industrial emissions are not causing and will not cause irreparable damage to the Indigenous cultural heritage of Murujuga, which has already been acknowledged by the State and Federal Governments are culturally significant, unique and worthy of protection as a World Heritage site.

The ACCR contended (2023:4) that:

> The precautionary principle suggests that oxides of nitrogen (NOx) limits should be dramatically tightened. The scientific understanding of rock weathering mechanisms and rates should be determined prior to the Proposal being approved.

The ACCR further stated (2023:21) that

> Since the impact of NOx on the Murujuga Rock Art is uncertain or contested, but the consequences of destroying these petroglyphs are serious, requiring significantly steeper cuts in NOx emissions is a logical application of the precautionary principle.

Adequacy of conditions

Most appellants contended that the EPA's recommended conditions for the Proposal were inadequate, especially in relation to NOx emissions.

FARA stated (2022:3) that:

> The EPA has failed to recommend conditions that will adequately protect the irreplaceable Indigenous cultural heritage of Murujuga which is very likely to be subjected to additional significant degradation as a result of the additional emissions resulting from the NWS extension.

The ACCR stated (2023:24) that:

> When looking at the facilities on or near the Burrup, the bulk of NOx emissions are from KGP. Even if the proposed conditions are met to reduce NOx by 40%, this would still leave KGP as the dominant source of NOx emission on the Burrup'.
>
> In the latest year of data from the National Pollutant Inventory, KGP emitted 79% of the NOx on the Burrup. . . if the proposed conditions had applied, and KGP's NOx emissions were 40% lower it would still have emitted 70% of the NOx on the Burrup' (ACCR, 20/7/2022, p43).
>
> The ACCR therefore argued that the Proponent should be required to 'limit NOx emissions from the NWS Extension on the Burrup to 750 tpa by 2030.

Many appellants argued that the additional measures proposed by the EPA to manage impacts on the rock art are uncertain, unenforceable and ineffective. These appellants felt that terms such as 'reasonable' and 'practicable' were too vague to lead to reductions in emissions. An appellant who met with the Committee argued that the conditions specified in a works approval or licence must have clear scientific parameters rather than be reduced to a minimum, highlighting the necessity for specific and measurable criteria.

In an expert report provided as part of the EDO appeal on behalf of CCWA, Associate Professor Robyn Schofield, argued that (2023:11) a:

> … management plan's actions need to be tangible: elimination, mitigation, and protection actions to achieve reductions in emissions, with compliance tracked via monitoring. Simply defining baselines or targets and describing the monitoring with delayed reporting is an ineffectual management plan.

Most appellants contended that the EPA should have recommended conditions for the Proposal that require immediate and proactive steps using existing emissions reduction technologies to minimise impacts on the rock art.

FARA suggested (2022:4) inclusion of the following conditions:

- Condition of zero acidic gas emissions, especially NOx and NO_2 based on the health impacts (e.g. Barnett, 2014 and Orellanoa et al., 2020).
- Condition requiring Selective Catalytic Reduction scrubbers in series or similar technology to limit NO_2 emissions to 25 mg/m^3 from every outlet (based on information provided by Woodside General Manager Environment and Karratha Plant Manager to FARA in November 2018).
- Condition that there is an independent technical review of the pollution control equipment to be installed to ensure it is best available technology and acidic emissions reduced to 25 mg/m^3 or below.
- Condition that the Proponent monitor air emissions using less than hourly averaging periods and publicly report the monitoring data at least monthly.
- Condition that there be substantial fines for NOx emissions above 25 mg/m^3 and for non-compliance regarding the provision of data regularly (i.e. $150,000-$250,000 per breach).

4.3.3 Appeal consideration

Appellants contended that the predicted emissions emanating from the Proposal would cause permanent and irreversible damage to the Murujuga rock art and might jeopardise the World Heritage Listing of the Murujuga Cultural Landscape and the diverse collection of rock art.

The Committee notes the EPA's acknowledgement that the maintenance of appropriate and effective management and conservation measures are critical to the success of the World Heritage Nomination. The Committee further notes that the EPA acknowledges the role that MAC and the WA Government have in establishing appropriate and effective management and conservation measures for Murujuga that are critical to the success of the World Heritage nomination.

The Committee acknowledges that Report 1727 does not make any recommendations regarding the World Heritage listing of the Murujuga Cultural Landscape but notes that, where similar concerns were raised in appeal against Report 1705 Perdaman Urea Project, Burrup Peninsula, the EPA was quoted in the Appeals Convenor's Report (OAC 2022:64) as stating that:

> … the World Heritage nomination/listing is however an independent process. That process does not require the EPA to delay its assessment pending the World Heritage nomination outcome, or determine the outcome of the EPA's assessment process. In the meantime as the nomination process continues, the EPA remains responsible to assess the impacts of the proposal in line with its responsibilities under the EP Act.

The Committee notes appellants' concern that the EPA had not undertaken a thorough risk assessment, such as in accordance with ISO 31000 – Risk Management. The Committee understands that, in its risk assessment process, the EPA considered numerous sources, including information from the proponent, aims of the MRAMP, findings of the Ramboll Study, and information from the Senate inquiry into the protection of Aboriginal rock art of the Burrup Peninsula, to lead it to find (2022:33) that:

> There may be a threat of serious or irreversible damage to the rock art from industrial air emissions (in particular NOx and SOx from the Proposal) accelerating the natural weathering.

The Committee reviewed the scientific publications provided by appellants and other relevant research related to the weathering of rock art. The Committee met with traditional owners, appellants, and many of the scientists who have undertaken research work on the rock art and published on these findings in peer reviewed journals and by other means.

The Committee notes the EPA identified that the science was contested, but the Committee acknowledges that appellants, and most of the scientists interviewed, believe that the evidence confirms that NOx is the main contributor to damage to the rock art, above natural weathering. While the preference of appellants generally was for industry not to exist on the site and therefore emissions of NOx and other emissions to effectively be reduced to zero, they contended that in the absence of that outcome, NOx from the Proposal should be reduced to the levels they identified.

The Committee notes that condition 3-5(1)(e) includes a requirement for the Proponent to reduce NOx emissions at a minimum by 40 per cent by 2030. The Committee also notes that, since the assessment was undertaken, the Proponent has committed to further reducing NOx emissions. Based on an operating baseline of 7,662 tonnes per year, the Proponent has committed to reducing NOx emissions by, at a minimum, 60 per cent by 2030, to 3,065 tonnes per year. The Proponent has considered a range of alternatives and has indicated that this outcome will be achieved through a combination of equipment retirement and/or investments in modifications.

The Committee noted comments attributed to the KGP Plant Manager in 2018 but the Committee could not independently verify them. However, the Committee is of the view that in the absence of any guidance from the MRAMP on tentative EQCs, NOx emissions should still be reduced further.

The Committee considers that, to reduce the risk of any damage to rock art, NOx emissions may be further reduced through lowering stack emissions limits and the application of best practice measures, which should be independently verified by a suitable technical expert, in accordance with condition 3-5(7). The Committee notes that the reduction in one type of emissions may lead to an increase in another type of emissions. For example, the application of certain technologies reducing NOx emissions may result in an increase in emissions of ammonia. The Committee understands that ammonia is also an emission of concern being monitored by the MRAMP.

The Committee investigated the current licence conditions for the KGP, specifically with respect to NOx emissions, which allow a maximum of 170ppmv (350mg/m^3) at reference O_2 (15 per cent for gas turbines) for Trains one, two and three and 49ppmv (100mg/m^3) at reference O_2 (15 per cent for gas turbines) for Trains four and five. The Committee acknowledges these licence conditions are the upper limits that cannot be exceeded. The Committee understands the current NOx emission ranges under 'non-upset' or normal operating conditions are 40-90ppmv for Trains one, two and three and 15-35ppmv at reference O_2 for Trains four and five (WEL 2024b).

The Committee considers that NOx emissions may be further reduced through lowering of the exhaust stack emissions limits under 'non-upset' or normal operating conditions. The Committee recommends that the stack emissions limits for Trains one, two and three should be lowered to 49ppmv at reference O_2 (15 per cent for gas turbines) by 2030.The Committee understands this means that the operational range for Trains one, two and three would generally be between 20 to 35ppmv at reference O_2 (15 per cent for gas turbines). There is no change to the limit and range for Trains four and five. The Committee considers that these limits are expected to further reduce the annual NOx emissions below 3,065 tpa beyond 2030.

The Committee notes appellants' concern with respect to monitoring and reporting, and considers that continuous monitoring is required, with the results made publicly available at least annually in accordance with condition 3-5(7). The Committee notes that exceedances of air emission threshold criteria are reported to DWER in accordance with condition 3-7.

The Committee reviewed the Murujuga Rock Art Monitoring Program (MRAMP): Monitoring studies data collection and analysis plan (DWER & MAC 2022), which provides a technical evaluation of the scientific studies investigating natural weathering processes and the impacts of industrial emissions on Murujuga rock art. The studies included investigations into colour changes of the rock art and the effects of inorganic geochemical processes and the microbiome on the rock art surfaces. The Committee notes that the MRAMP '*will provide reliable information on changes and trends in the condition of the rock art and whether the rock art is showing signs of accelerated change*' (DWER 2023b).

The Committee notes that the MRAMP is expected to '*determine whether anthropogenic emissions are accelerating the natural weathering, alteration, or degradation of the rock art'* (EPA 2022:34*).* The Committee also notes that the '*MRAMP will facilitate the development of air quality standards'* (2022:34).

The Committee noted the 2023 report of the MRAMP and is advised that the next findings are due before the end of 2024. The 2024 report (DWER 2023b) is expected to:

- develop interim Environmental Quality Criteria (EQC)

- implement the ongoing monitoring program
- commence reporting against the interim EQC.

The Committee notes that the EPA in Report 1727 recommends that the Proposal be required to meet future detailed air quality objectives and criteria which are developed for future emissions sources when there is adequate certainty about these. Adequate certainty is expected to be available with the definition of environmental quality criteria available from the MRAMP, which was expected in 2023 but will not be provided until late 2024. The Committee further notes that (EPA 2022:36):

> The EPA has assessed that with the proposal specific outcomes-based regulation, MRAMP derived environmental quality standards for cumulative impact regulation, and other recommended conditions, the Extension Proposal may be implemented in a way which is not likely to be inconsistent with the EPA's objectives.

The Committee also notes the EPA's assertion in its s106 Report (2023c:4) that '*the proposed condition 3-5(1) allows for future results of the MRAMP to be incorporated into the Proponent's AQMP once data becomes available*'.

Furthermore, the Committee notes the EPA's statement that (2022:79):

> The EPA recommends that when the opportunity arises to review the ministerial conditions of other existing industrial facilities within the Murujuga, the review should include a consideration of additional measures to reduce the risk of cumulative impacts to rock art from air emissions.

4.4 Recommendations

The Committee considers that, with respect to air quality, the EPA has assessed the Proposal against its 2020 Environmental Factor Guideline for Air Quality and against applicable standards and criteria, requiring the Proponent to apply the mitigation hierarchy to avoid and reduce emissions, adopt best practice measures to minimise harmful emissions to air, and to undertake regular monitoring and reporting.

The Committee expects that the Proponent be required to reduce emissions and ensure the minimisation of air emissions by the adoption of best practice measures, as per condition 3-5(5). This outcome would further assist in achieving the EPA objectives for human health and for rock art, and would reduce emissions generally.

Overall, the Committee finds that air quality at the nearest receptors meets relevant air quality standards and that the recommended conditions would lead to ongoing improvements in air quality. For these reasons, the Committee concludes that the Proposal would meet the EPA's objectives for air quality.

With regard to air quality and the MRA, the Committee notes that the 2024 MRAMP report is expected to establish interim EQCs to ensure the Murujuga rock art is protected. It is understood that these interim EQCs will be cumulative for the airshed, and a subsequent process will be required to indicate the extent to which any further conditions should be applied to the Proposal in relation to NOx or other emissions. The Committee notes it did not have access to the 2024 MRAMP report and recommends that until certainty around the MRAMP outcomes and implementation is known, the application of the precautionary principle requires the reduction of emissions as much as practicable.

Considering the above, and to reduce the risk of potential negative impacts on rock art, the Committee recommends that the appeal grounds with respect to the air quality factor be upheld to the extent that conditions are amended to reflect the following:

- condition (3-5(1)(e) is amended to require that, at a minimum, NOx emissions from the Proposal are reduced to 3,065 tpa by 31 December 2030
- stack NOx emissions cannot exceed 49ppmv [100mg/m^3] at reference O_2 (15 per cent for gas turbines) from each of the five trains from 31 December 2030
- from 2030 or earlier, each stack should be monitored continuously and the results made publicly available at least annually
- condition 3-5(6) is updated to require that identified air pollution abatement measures and the subsequent comparison against international industry best practice are verified through an independent review undertaken by a suitable technical expert, as recommended by the EPA in its s106 Report. This condition has been renumbered to condition 3-5(7)
- condition 3-5(8) is expanded to include a provision that annual monitoring reports made to the CEO of DWER be made publicly available by the Proponent, within a reasonable timeframe from the date of submission to DWER, as recommended by the EPA in its s106 Report
- condition 3 is expanded to include condition 3-13, which provides for all subsequent, approved versions of the AQMP to be made publicly available by the Proponent, within a reasonable timeframe from the date of approval, as recommended by the EPA in its s106 Report.

The Committee further recommends that, for consistency and transparency, a template for the AQMP is developed in a similar way to the template for Greenhouse Gas Environmental Management Plan (GHG EMP).

The Committee expects that the requirements under condition 3 will be reflected in the Proposal's licence under Part V of the EP Act (L5491/1984/18). In particular, but not limited to, the reduction of NOx and VOC emissions and the requirement to minimise emissions to air through the adoption of independently verified best practice measures.

Furthermore, the Committee refers to Section 3 on GHGe with respect to the GHGe limits that have been set and the GHGe reduction trajectory to net zero by 2050.

The Committee notes the uncertainty about the impact of industrial emissions on rock art, and that the MRAS is expected to provide interim EQCs in its 2024 report, in accordance with key milestones (DWER 2023b). However, should the interim EQCs not be provided as expected and any impact of industrial emissions on rock art remains unclear, the Committee suggests it is open to the Minister to remit the Proposal to the EPA to ensure its objective for protection of the rock art is achieved.

5 Social surroundings (Aboriginal culture and heritage)

5.1 Introduction

Social surroundings is a key environmental factor for this Proposal. The EPA's environmental objective for social surroundings was to protect social surroundings from significant harm. Report 1727 indicated that the information provided by the Proponent was generally consistent with the Environmental Factor Guideline – Social Surroundings (EPA 2016b) in place at the time of assessment. As an extension proposal, the assessment did not include direct impacts of additional ground disturbance, or ongoing impacts of light, noise, traffic or visual amenity.

Social surroundings are defined in the EP Act (Section 3(2)) as:

> In the case of humans, the reference to social surroundings in the definition of environment in subsection (1) is a reference to aesthetic, cultural, economic and other social surroundings to the extent to which they directly affect or are affected by physical or biological surroundings.

The EPA Guidance[13] (2023b:1) on this factor notes the constraints on what can be considered under this factor as follows:

> For social surroundings to be considered in EIA, there must be a clear direct link between a proposal or scheme's impact on the physical or biological surroundings and the subsequent effect on a person's aesthetic, cultural, economic or other social surroundings.

In Report 1727, the EPA acknowledged that the development envelope is located within a culturally significant landscape with important values, including heritage relevant to Murujuga and concluded that the significant social surrounding matter relevant to the proposal is Aboriginal heritage and culture.

In focusing solely on this matter in its assessment, the EPA noted that the other elements relevant to social surroundings (noise, amenity, lighting etc) were not investigated, notwithstanding that appellants did raise these issues. The EPA argued that the Proposal is an extension of existing operations and did not involve any additional ground disturbance, subsea dredging or construction, and that these impacts remain unchanged and are being managed within existing approvals.

Report 1727 lists the following Aboriginal cultural and heritage values in the proximity to the development envelope as described in the Proponent's ERD:

- Murujuga National Park, located 120m east of the facilities, which includes one of the largest concentrations of rock art in the world
- Deep Gorge (Ngajarli), located approximately 3km east of the facilities and is within the Murujuga National Park. The site includes rock art, a boardwalk and interpretative signage to educate visitors about cultural significance of the area
- the facilities are adjacent to the National Heritage Listed Area, although a small section of the facilities in the NW contained within National Heritage Listed Area (Figure 1)
- some of the vegetation has heritage value
- certain heritage features within the marine environment
- 134 recorded Aboriginal heritage sites within the development envelope.

The EPA noted heritage sites have tangible and intangible Aboriginal heritage values, recognised the Proponent's commitment to avoidance and mitigation measures described in

[13] The Environmental Factor Guideline – Social Surroundings was updated in 2023 and at the time of EPA Report 1727, the EPA assessed it against the 2016 version. The Committee reviewed this assessment with the 2023 guideline and new technical guidance and found it to be consistent with both.

the Cultural Heritage Management Plan (WEL 2021c) and addressed the following residual impacts of the Proposal in Report 1727:

- potential for accidental direct impact on the 134 Aboriginal heritage sites or their associated intangible heritage values within the development envelopes
- restricted traditional owner and custodian access to Aboriginal heritage sites and culturally significant areas within the development envelope during operation
- traditional owner and custodian potential loss of access and connection to the Aboriginal heritage sites or culturally significant areas within the development envelope following decommissioning
- insufficient consultation with traditional owners and custodians during the life of the Proposal
- odour impacts to traditional owners and custodians accessing Aboriginal sites to undertake cultural activities within the development envelope.

To meet the objective for this factor, the EPA recommended management measures and additional conditions to address the residual impacts, including revising the Cultural Heritage Management Plan accordingly.

Appellants raised the following broad concerns that relate to social surroundings and Aboriginal heritage and culture:

- impact on Murujuga rock art
- impact on the cultural heritage in the marine environment
- the scope of EPA's assessment of Aboriginal heritage and culture.

The EPA did not provide a response to appeal grounds relating to Social Surroundings.

5.2 Impact on Murujuga rock art

The likely impacts from acidic air emissions from the proposal on the Murujuga rock art was a concern raised in over half of the appeals where the adequacy of the EPA's assessment was queried. In particular, appellants argued that the EPA did not apply the precautionary principle properly. This ground of appeal has been addressed in Section 4.3 of this report.

5.3 Impact on cultural heritage in the marine environment

Appellants were concerned that ongoing wastewater discharge and dredging would impact the cultural heritage in the marine environment. This ground of appeal has been addressed in Section 6 of this report.

The Committee considers the process recommended by the EPA to revise the MEQMP within 12 months, consulting traditional owners and custodians to incorporate environmental quality requirements for cultural heritage and spiritual values is adequate.

5.4 Assessment of Aboriginal heritage and culture

In this regard, the appeal by traditional custodians of the Burrup is the most relevant and important.

The appellants argued (Alec & Cooper 2022) that:

> In its assessment, the EPA has relied upon a narrow and technical approach to measuring the impacts to cultural heritage. For example, examining impacts of rock art through the lens of scientific monitoring that measures a very limited range of parameters, the EPA has concluded that impacts are scientifically uncertain.

They went on to advise that custodians perceive rock art differently and more broadly (Alec & Cooper 2022):

> Custodians perceive the rock art and cultural landscape in a very different way and we are already seeing and experiencing impacts that are not scientifically measurable, or at least not in the ways that current monitoring is seeking to detect.
>
> The monitoring that has been undertaken to date has not been designed to detect the spiritual or energetic forces that are connected with each piece of rock art, or how they are connected together in an energetic network, which in turn connects to all plants and animals, our totemic system, skin system, language, cultural practices; and sea, land and sky country in a dynamic, ever changing energetic web. The scientific monitoring instruments have not been calibrated to detect the ways the rock art is in spiritual and energetic connection with custodians and country, or how strong these connections are. It does not measure what we feel and understand.

For these reasons the way monitoring is carried out and impacts measured '*denies the richness of cultural tradition that we hold as traditional Custodians*.' Consequently, they contend that they are being told '*our ways of knowing and understanding impacts are of no consequence or legitimacy'* (Alec & Cooper 2022).

The appellants argued that the EPA assessment was arbitrary, uninformed, and culturally insensitive and that (Alec & Cooper 2022):

> The EPA is not in a position to judge what is an acceptable impact to rock art which has survived for over 50,000 years. The EPA is not in a position to understand what impact the destruction of rock art has on our people, our culture, and our future generations.

Taking all this into account, the appellants argued that the proposal should be remitted to the EPA for further assessment which should (Alec & Cooper 2022):

> … include proper respect and inclusion of our knowledge and understanding of Murujuga and the impacts the proposal would have.

To do this, the appellants advised that the EPA needs make its determination on this matter '*with the consent of all of those who are affected by the impacts'* (Alec & Cooper 2022).

5.5 Appeal consideration

The Committee acknowledges and accepts that custodians perceive the rock art and cultural landscape in a very different way than as assessed by the EPA, and that the EPA assessment is much narrower in connectiveness as described by appellants. The Committee also understands the MRAMP does not consider the issues identified by the appellants.

The Committee also acknowledges that the Committee cannot speak for Country and for custodians' cultural values.

In considering this appeal ground the Committee is constrained to inquiring into the EPA assessment of the Proposal and includes consideration of whether the EPA erred in its assessment against its policy and legislative constraints. The Committee is also constrained into considering the Proposal as assessed, in this case it is the length of time that the facilities could operate, and that the life of the project be extended. No new infrastructure is proposed, and the EPA invoked the precautionary principle to manage potential risk to the rock art.

As noted above, and by the appellants, the EP Act defines social surroundings as:

> … a reference to aesthetic, cultural, economic and other social surroundings to the extent to which they directly affect or are affected by physical or biological surroundings.

Aboriginal heritage is within the scope of the EPA's social surroundings factor. The EPA has a Guideline (EPA 2023b) that sets out how Social Surroundings is considered by the EPA

when carrying out EIA and a specific Technical Guidance on Aboriginal cultural heritage and EIA (EPA 2023g).

The Guideline notes that for social surroundings to be considered during an EIA of a proposal or scheme (2023b:1):

> … there must be a clear direct link between a proposal or scheme's impact on the physical or biological surroundings and the subsequent effect on a person's aesthetic, cultural, economic or other social surroundings.

In this case, the physical or biological surroundings are the Murujuga rock art, and there is a clear cultural connection to these rocks. It is for these reasons the EPA assessed the impacts of air quality on the rock art. This includes all the rock art on the Burrup.

The Committee investigated whether broader landscape cultural values are within the scope of an EPA assessment and whether the EPA should have considered broader cultural impacts in the event that rock art is impacted by industry-created air contaminants.

On the matter of potential adverse impacts on the landscape's cultural and spiritual values that extend beyond the physical or biological surroundings and location of the rock art, the Committee concludes that this is a matter beyond the scope of social surroundings as set out in the EPA Guidance – i.e. the guidance refers specially to '*physical or biological surroundings'* and not the landscape related cultural and spiritual values that extend beyond the physical or biological surroundings.

The Committee is of the view that any broader cultural impacts that may occur in the event that rock art is impacted by industry created air contaminants is a broad policy matter, and that this should be included in considerations for an appropriate strategic approach to ensure that air quality is not impacting rock art, and to determine the scope of any impacts within the context of social surroundings.

5.6 Other concerns

Many appellants expressed concern of the impacts to the cultural heritage values of Murujuga, mainly to the rock art (see Section 4.3). Some appellants raised other issues such as:

- MAC's potential conflict of interest and failure to apply the principle of Free, Prior and Informed Consent (FPIC) in assessing cultural heritage impacts
- concern regarding the WA Government's failure to protect Aboriginal heritage and resulting assessment under *Aboriginal and Torres Strait Islander Heritage Protection Act* (ATSIHP Act) has not been determined.

A small number of appellants raised concerns about MAC, and its potential conflict of interest in the EPA's assessment process. The appellants contended that MAC is constrained under the Burrup and Maitland Industrial Estates Agreement (BMIEA) and by the funding agreements with Woodside and other proponents.

In its 1727 report, the EPA advised that it had undertaken consultation with MAC throughout the assessment of the Extension Proposal. The EPA also highlighted a number of issues which had been raised by MAC in relation to development in Murujuga but which the EPA said addressed matters which were outside the assessment scope of this Extension Proposal. This includes MAC supporting the implementation of a strategic environmental management framework to manage the potential for cumulative effects on the sea, country and airshed of Murujuga, and that MAC is seeking for proponents situated within Murujuga to implement locally based offset projects, carbon trading and research into climate change adaption and resilience on Murujuga associated with GHG emissions.

The Committee met with MAC in relation to Report 1727 and understood that the EPA consulted with MAC as part of its assessment process. The Committee notes the EPA's recommended conditions to update the Cultural Heritage Management Plan to ensure ongoing consultation with key Murujuga stakeholders (including MAC and NYFL) regarding management of cultural heritage and ongoing, safe access to those sites within the development envelope. The Committee is of the view that the EPAs assessment and recommendation did not appear to be constrained in the way the appellants thought may exist.

The EPA did not address this matter of FPIC in the s106 Report, however, where the same claim was made in appeals against EPA Report 1705 – Perdaman Urea Project, Burrup Peninsular, the EPA was quoted in the Appeals Convenor's Report (OAC 2022:65) as stating that

> … any process that requires the demonstration of Free, Prior and Informed Consent of Traditional Owners and custodians is a separate, independent process to the EPA's assessment.

This Proposal is an extension of existing operations, it does not involve the direct disturbance of any sites and KGP has approval under the existing provisions in the *Aboriginal Cultural Heritage Act 1971*.

The Committee understands that in February 2022 a request was made to Federal Ministers to assess threats posed from industry to Murujuga Aboriginal heritage under section 10 of the ATSIHP Act. Some appellants are of the view that the EPA should have waited for the outcome of the section 10 assessment before determining whether any impacts to the cultural heritage of Murujuga are acceptable. The EPA did not address this matter in Report 1727 or the s106 Report. The Committee notes the ATSIHP Act process is ongoing, and it is not privy to the timing of a decision. The Committee notes the Federal Minister will make a determination in due course, at which point the WA Government may need to respond. The WA Government would determine which legislative mechanisms would be most appropriate to apply if a response is required.

Given these matters are dealt with through other legislative processes and not within the remit of the EPA to determine, the Committee finds the EPA's assessment of cultural heritage values was consistent with the EP Act and its assessment framework.

5.7 Recommendation

The Committee finds that the EPA applied its existing policy correctly, and recommends that these appeal grounds be dismissed. In doing so, the Committee recognises that this can be seen by custodians as demonstrating that their 'ways of knowing and understanding impacts are of no consequence or legitimacy.' This is not the intention of the Committee as it is of the view that these ways of knowing should be included as part of a strategic approach to managing and measuring impacts on rock art on the Burrup.

6 Marine environmental quality

6.1 Introduction

Marine Environmental Quality (MEQ) is a key environmental factor for the Proposal. The EPA objective for MEQ is *'to maintain the quality of water, sediment, and biota so that environmental values are protected'* (EPA 2016a:1). Report 1727 concluded that the Proponent's investigations undertaken for the assessment were generally consistent with the applicable EPA guidance. The EPA reported that it assessed the Proposal in the context of the existing NWS Project and had regard to the combined and cumulative effect that the implementation of the approved extension proposal may have on MEQ. The EPA reported that public comment raised concerns about the composition and impacts of third-party gas and fluids on wastewater discharges, concerns around consultation with traditional owners and custodians on environmental values, and the need to present cumulative impacts for the marine environment. These concerns were considered and addressed in the EPA's assessment of the proposal.

The EPA addressed the following potential residual impacts of the Proposal in Report 1727:

- ongoing discharge of wastewater and stormwater from the Jetty Outfall and Administration Drain to Mermaid Sound
- migration of onshore contaminants to sediment
- marine turbidity from vessel traffic and short-term maintenance dredging activities.

A small number of appellants raised a diverse array of concerns related to the Proposal's impact on MEQ. The EPA did not provide a response to appeal grounds in relation to MEQ. The Committee reviewed all matters related to MEQ and considered whether they had been addressed by the EPA in accordance with relevant EPA guidance.

6.2 Waste and storm water discharges

The topic raised by appellants most frequently was the adequacy of the treatment and monitoring of wastewater and stormwater discharges to the marine environment. Some appellants stated that the EPA did not consider wastewater discharge or stormwater run-off at all in relation to the Proposal. Sea Shepherd Australia's appeal stated (Sea Shepherd Australia Ltd 2022):

> All wastewater discharges from the proposal should be treated to remove any risk of accumulation of toxicants in sediment or any impact to the marine environment through bioaccumulation processes or cumulative impact.

Appellants argued that wastewater treatment is either non-existent or inadequate, resulting in poorly treated wastewater and contaminated stormwater being discharged into the ocean. Additionally, appellants highlighted inadequacies with monitoring of these discharges, indicating that no limits have been implemented to regulate contaminants being released into the marine environment.

Several appellants considered that conditions should be imposed to address wastewater discharge to the marine environment, including the requirement for stormwater runoff to be monitored and for all wastewater discharges from the proposal to be treated to prevent any accumulation of toxicants in sediment.

The appellants claimed that the five-yearly sediment monitoring program is inadequate to respond to potential contamination and the lag-time for revision of the MEQMP and the potential impacts were not acceptable.

In Report 1727 the EPA discussed that discharges including treated sewage, process water from LNG and Domgas operations, and stormwater run-off may contain contaminants posing physical and chemical stressors to the marine environment. The EPA considered planned wastewater discharges by evaluating measures outlined in the Marine Environmental Quality Management Plan (MEQMP). This plan identifies environmental values, sets environmental quality objectives, and defines areas with varying levels of ecological protection. It includes monitoring criteria to ensure that water and sediment quality meets required standards as well as discharge limits self-set by the Proponent. The EPA reviewed these measures, along with modelling and validation studies, to confirm that the proposed management strategies would ensure that the current management and monitoring measures are sufficient to continue protecting environmental values.

It is noted that monitoring data indicates that the quality of discharged wastewater is adequate and below the treated effluent quality trigger values. Long-term monitoring of the marine environment indicates that there have been no significant environmental changes observed. Given this, and with no significant changes in operations expected, the EPA anticipated that extending the life of the Proposal would not increase the risk to the marine environment. Additionally, it was noted that the Proponent plans to install equipment to further reduce hydrocarbons and heavy metals in discharges. The EPA concluded that the Proposal was unlikely to have significant adverse impacts on water, sediment, and biota, thus aligning with its objective to protect environmental values.

With respect to appellants' claims that wastewater discharge is not monitored adequately or at all, the Committee notes that wastewater discharge is monitored from the Administration Drain monthly and the Jetty Outfall per pump-out, as per the Part V EP Act licence (L5491/1984/18). Results are reported annually in the Annual Environmental Report submitted to DWER along with wastewater discharge monitoring data.

The lack of defined wastewater discharge quality limits in L5491/1984/18 is noted; however the Committee understands that the Proponent has applied to amend the licence to implement improvements to wastewater treatment. The Proponent has advised that upgrading of the wastewater treatment system will further reduce hydrocarbons and heavy metals discharged from the Jetty Outfall. Any changes to wastewater management will be reflected in the required update of the MEQMP.

The MEQMP establishes trigger values for water quality monitoring parameters. These trigger values are consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) which support Australia's National Water Quality Management Strategy. Exceedances of trigger values initiate a management action response by the Proponent such as corrective measures and further monitoring.

The Committee considers that monitoring through Part V EP Act licensing is designed to detect any ongoing issues with wastewater discharge quality and accepts this is an appropriate mechanism to regulate emissions of this kind.

The Committee understands that baseline monitoring and modelling outputs informed the establishment of the MEQMP and determined the EPA adequately assessed and recommended appropriate conditions relating to potential impacts to marine environmental quality, including fauna. The Committee also notes that the EPA recommended the implementation of the MEQMP as a condition (Condition 5-3) and required its revision within 12 months (Condition 5-4) of the issue date of the Ministerial Statement, in consultation with key stakeholders.

Noting the requirements of the MEQMP as an adaptive management plan to verify compliance with environmental quality objectives, the Committee concurs with the EPA that this is a suitable approach to mitigate residual impacts. For this reason, the Committee recommends that this appeal ground is dismissed.

6.3 Contaminant migration

Several appellants claimed that the EPA did not adequately consider the impacts of the migration of onshore contaminants to the marine environment, specifically with regard to those in the per- and poly-fluoroalkyl substances (PFAS) family of chemicals. The Australasian Centre for Corporate Responsibility detailed in its appeal (ACCR 2022:46):

> LNG facilities have historically used perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) containing firefighting foams. Appropriate alternatives for these foams now exist and have been adopted by other facilities. The EPA should ensure the use of these foams is phased out from the facility and remaining contamination is identified and remediated to ensure PFOS and PFOA do not enter the marine environment via the surface and groundwater movement at the facility. The environmental sampling and monitoring noted in the MEQMP do not consider PFOS or PFOA.

In Report 1727, the EPA assessed the potential migration of onshore contaminants to the marine environment, acknowledging historical contamination of bio-accumulating PFAS that will require detailed investigation under the *Contaminated Sites Act 2003*. The EPA evaluated the Proponent's existing management measures for storage, usage and disposal of hydrocarbons and chemicals and their potential pathway to the marine environment. Additional to the management measures examined, the EPA noted that the Proponent is phasing out the use of PFAS and continuing the Chemical and Ecological Monitoring of Mermaid Sound (ChEMMS) program[14]. The Proponent has implemented screening levels in the MEQMP, prepared in support of the ERD.

The EPA concluded that PFAS was unlikely to present material risk as levels were well below limits for human health and the Proponent had advised it would discontinue the use of PFAS and implement other management measures through the MEQMP. The EPA recommended conditions requiring the MEQMP be updated to require monitoring of PFAS in sediments.

The Committee notes that the MEQMP can effectively manage the risk of contaminant migration, provided it is regularly updated to incorporate current scientific understanding, particularly concerning bio-accumulating chemicals. The Proponent has subsequently advised that it has discontinued the use of PFAS at the Proposal location (Coffey 2024). For these reasons, the Committee finds that the EPA adequately considered and assessed the migration of onshore contaminants to sediment, including PFAS and its constituents.

The Committee also notes that historical contamination of PFAS can be managed through requirements of the *Contaminated Sites Act 2003*.

The Committee considers that the EPA's assessment of this matter was consistent with its assessment framework and the EP Act and ongoing management through update and ongoing revisions to the MEQMP is appropriate. For this reason, the Committee recommends that this appeal ground is dismissed.

[14] The Proponent conducts chemical and biological monitoring of the intertidal and subtidal environments within and adjacent to the Proposal development envelope. ChEMMS includes annual monitoring of contaminant concentrations (e.g., metals, hydrocarbons) in sediments, oysters, and mud whelks, as well as mangrove health, and coral health monitoring every five years.

6.4 Dredging and turbidity

A few of the appellants claimed that the Proposal would result in increased vessel traffic, dredging and blasting activities that will disrupt the marine environment, increase turbidity and impact migratory mammals.

The EPA's assessment of the proposed maintenance dredging primarily considered the environmental impact of turbidity caused by sediment disturbance. Past dredging operations and their environmental outcomes were reviewed to gauge effectiveness of implemented measures in minimising turbidity levels. Given existing regulatory frameworks and operational practices, the EPA concluded that environmental risks from dredging activities are sufficiently mitigated.

Ship movements are not expected to increase as a result of the Proposal and impacts from shipping activities are evaluated through existing environmental monitoring programs which will continue to be implemented as part of the Proposal. For this reason, short-term turbidity impacts from shipping movements were not further considered by the EPA.

The Committee considers that appellants' concerns that the Proposal would lead to increased dredging and blasting activities are not supported by the available information. The proposal involves only maintenance dredging, with no blasting activities or installation of pipelines. Maintenance dredging is expected to occur every five to 10 years and lasts for up to two weeks each time. The Proponent advised in its s106 Report that planned dredging is temporary, infrequent, and relatively minimal to maintain shipping channels, and is managed under an Australian Government Sea Dumping Permit.

The Committee considers that the impacts of the continuation of maintenance dredging has been appropriately assessed by the EPA. The Committee agrees that the current operational practices adequately manage any potential impacts to achieve the environmental objective for MEQ and therefore recommends that this appeal ground be dismissed.

6.5 Other concerns

Appellants expressed general concern of the impacts to the marine environment and marine fauna, stating their position that the EPA did not adequately assess MEQ, particularly:

- marine fauna, including the movement of wildlife between discharge points, whale migration behaviours, noise, light, traffic, and visual amenity impacts on sensitive marine species, and the introduction and spread of invasive marine species
- risk of unplanned environmental emergencies, including shipping disasters and pipeline fractures
- the cumulative effects of the Proposal in conjunction with existing operations in the area
- cultural and spiritual values of the marine environment.

Marine fauna was not identified as a key environmental factor by the EPA. The Proponent's ERD indicated that impacts on marine fauna would be minimal, with limited effects on less mobile species and no significant exposure risks for mobile species. Additionally, the Proposal is not expected to increase shipping vessel traffic. With the MEQ condition in place, marine fauna is expected to be protected from wastewater discharge impacts. The Committee agrees that considering the information provided in the Proposal and the recommended MEQ condition (condition 5), marine fauna is expected to be protected from the impact of wastewater discharges.

The risk of introduction of invasive marine species was considered at the scoping phase of the referral (WEL 2018), despite this, the EPA concluded that invasive marine fauna did not pose

a significant environmental threat. Pipelines for the NWS are regulated via the Petroleum (Submerged Lands) (Environment) Regulations 2012 and the Petroleum Pipelines (Environment) Regulations 2012, which require Environment Plans to be submitted and revised every five years. Management practices applied to prevent the introduction of invasive marine species include vessel assessment and ensuring compliance with Australian biosecurity requirements, including the Australian Ballast Water Management Requirements (WEL 2020).

The EPA did not assess the regulation of unplanned discharges from pipelines and vessels as this is managed by the NWS Trunklines (State Waters) Environment Plan, prepared in accordance with the Petroleum (Submerged Lands) (Pipelines) Regulations 2007 and Petroleum (Submerged Lands) (Environment) Regulations 2012. Vessel discharges are managed as per the requirements of the Australian Marine Orders and Pilbara Ports Authority. The Committee agrees that existing regulatory measures are available to manage these impacts and that no additional proposed conditions are necessary.

The EPA assessed the information from the Pilbara Coast Report (DoE 2006) and the proponent's proposed Environmental Quality Plans for the Jetty Outfall and Administration Drain to determine the closest industrial impacts to discharges from the Proposal. The EPA considered that no mixing of discharges or overlapping impact zones are expected and cumulative impacts are likely to be immaterial.

The MEQMP identifies that there are no guidelines specifically for the protection of cultural and spiritual values but assumes (WEL 2021e:10):

> If water quality is managed to protect ecosystem integrity, then this may go some way towards maintaining cultural values.

Consultation with Aboriginal custodians is ongoing, focusing on potential impacts to cultural and spiritual values. EPA recommended revising the MEQMP within twelve months, consulting with stakeholders to incorporate environmental quality requirements for cultural and spiritual values. The Committee considers this process to be adequate to identify potential impacts of cultural and spiritual significance to traditional owners and custodians.

The Committee is of the view that other concerns raised by the appellants have either been considered by the EPA in accordance with its assessment framework and the EP Act or do not fall under the remit of the EPA to assess. In such circumstances, the EPA has identified other relevant responsible decision-making authorities. For these reasons, the Committee recommends these appeal grounds relating to MEQ be dismissed.

6.6 Recommendation

The Committee considers that primary issues raised by appellants of impact to water quality due to discharges, potential contaminant migration, and turbidity from ship activities and dredging were adequately assessed by EPA in accordance with applicable guidance noting the existing data shows no significant impacts.

The Committee also considers the proposed conditions, including the requirement for the implementation and revision of the MEQMP, in consultation with relevant stakeholders is sufficient to manage identified impacts. The Committee also acknowledges that the monitoring and discharge of treated wastewater are managed by a Part V licence, and this is an appropriate mechanism to regulate emission of this kind.

7 Holistic impact assessment

7.1 Introduction

Section 3 of Report 1727 provides the EPA's holistic assessment of the Proposal. The EPA notes (2022:68-71) that:

> While the EPA assessed the impacts of the Extension Proposal against the key environmental factors individually, the EPA also recognises the links between greenhouse gas emissions, air quality, social surroundings and marine environmental quality and has therefore also considered the connections and interactions between parts of the environment to inform a holistic view of impacts to the whole environment.

The key factors considered as part of its assessment were:

- Greenhouse gas emissions
- Air quality – Social surroundings
- Marine environmental quality – Social surroundings.

In its holistic assessment of GHGe, the EPA referred to the risk of climate change and its impacts on the Western Australian environment and concluded that a reduction in emissions, including reaching net zero by 2050, mitigated the impacts on key values. In its discussion of air quality, the EPA primarily discussed the significance of Murujuga's outstanding conservation and heritage values, including one of the most dense and diverse collections of rock art in the world, in the context of the cumulative impacts of industry and other activities within Murujuga. In reference to marine environmental quality the EPA considered that the MEQMP proposed would mitigate impacts on social surroundings values.

The outcome of the holistic assessment was a recommendation that a five yearly environmental performance report responding to trends in air emissions and in quality of discharges to the marine environment be required. In response to what is stated to be the cumulative nature of impacts, the EPA indicated that the five yearly reports could be done individually, or with other proponents operating in the area. To acknowledge impacts on heritage and cultural values, the EPA also recommended that MAC and NYFL be consulted by the proponent when it reviews and submits management plans required for the Proposal.

The EPA concluded (2022:71) as follows:

> When the separate environmental factors of the Extension Proposal were considered together in a holistic assessment, the EPA formed the view that the impacts from the Extension Proposal would not lead to any change to its view about consistency with the EPA's factor objectives.

7.2 The appeals

Appellants argued that Chapter 3 of Report 1727 purports to be a holistic assessment, but that no proper holistic assessment was undertaken.

More specifically, appellants referred to the EPA's statement in Chapter 2.1.5 that the matter of whether the Proposal represented a sufficiently large source of WA's GHGe that refusal of it could be seen to make a meaningful contribution to reducing WA's emissions was addressed as part of the holistic assessment. Appellants consider this matter was not actually addressed in the holistic assessment and that consequently the impacts of climate change on the Western Australian environment were not adequately considered. One appellant also stated (Hutchison 2022) that holistic assessment was not possible in the absence of a carbon budget:

> The EPA should take a properly holistic assessment of the impact a major emitting project like North West Shelf will have on the Western Australian environment. Whilst of course the

project is only part of the picture, it is of such a scale and duration that its contribution to climate change impacts on the environment require proper assessment.

7.3 Appeal consideration

The EPA Procedures Manual (2021:67) defines Holistic Impact as:

> Connections and interactions between impacts, and the overall impact of the proposal on the environment as a whole.

The document Instructions: How to prepare an environmental review document (EPA 2024), was updated in 2021 to align with the 2020 EP Act amendments and applied by the EPA in its assessment. The Committee notes that the EPA Strategic Plan 2023-26 (EPA 2023f) signals the EPA's intent to develop guidance which will clarify requirements and expectations to improve cumulative and holistic environmental impact assessment.

In Report 1727, the EPA's holistic assessment of the key environmental factors provided a summary of the assessment of individual key environmental factors and referred to connections with other key environmental factors. Other than noting the established link between GHGe and climate change, the holistic assessment did not involve further or additional consideration of matters addressed in Chapter 2 of Report 1727.

In its discussion of air quality, the EPA noted the link between the impacts of air emissions on the significant cultural and heritage values associated with Murujuga rock art. The EPA also noted the link between Marine Environmental Quality and cultural and spiritual values of the social surroundings environmental factor. No additional impacts were identified in the holistic assessment that changed the EPA's views about the consistency of assessment of individual environmental factors with the EPA's factor objectives.

The Holistic Assessment did however result in the recommended addition of a condition to better respond to management of cultural and spiritual values. The recommended condition requires five yearly environmental performance reports, to involve consultation by the proponent with MAC and NYFL.

In its advice on appeals relating to holistic assessment the EPA stated (2023c:15-16), that it had not recommended against implementing the proposal because:

- The proposal demonstrated consistency with all other EPA factor objectives,
- The proposal is an existing facility with no increase in annual emissions (and in fact will have a decrease in Scope 1 emissions to net zero),
- Scope 3 emissions are a result of the Proposal but not within the proponent's control,
- There is no broader carbon budget or framework against which to consider the reasonableness of a decision to recommend refusal.

This EPA advice also addressed appeals stating the assessment was inadequate as Report 1727 did not discuss whether recommending against implementation would made a meaningful contribution to reducing WA's GHGe.

The Committee notes the s106 report and acknowledges that the absence of a WA State carbon budget or framework constrains the EPA's approach to, and outcomes from, the EIA process.

In the absence of any further EPA guidance on assessment approach and noting that appellants did not specifically address the details of what a proper holistic assessment should entail and, the Committee concludes the assessment was adequate. Consequently, it is recommended that this appeal ground be dismissed.

8 Matters of National Environmental Significance

8.1 Introduction

On 3 May 2019, the then DoEE determined the proposal to be a controlled action under the EPBC Act as likely to have a significant impact on one or matters of MNES, being National Heritage places (EPBC Act Reference 2018/8335). National Heritage places include natural, Indigenous and historic places that are of outstanding heritage value to the nation. The EPA assessed the controlled action on behalf of the Australian Government as an accredited assessment under the EPBC Act. Chapter 4 of Report 1727 addressed the EPA findings on MNES.

In its MNES assessment the EPA stated it had regard to Australian Government policy and guidance and confirmed consultation undertaken by the Proponent. Impacts from the continued operation of the KGP in the Proposal relating to the heritage values of the natural heritage were identified as:

- Aboriginal rock art
- the Murujuga Cultural Landscape World Heritage Listing
- Aboriginal heritage sites and cultural values.

Report 1727 refers to and relies on the assessment undertaken for key environmental factors of Air Quality and Social Surroundings.

8.2 The appeals

Appellants stated that the EPA assessment was inadequate as it only considered impacts on the Murujuga Cultural landscape as the National Heritage place, and failed to assess the direct and indirect impacts of GHGe in contributing to global warming and the impact this is having on all of Australia's National Heritage Places, such as the Great Barrier Reef and Ningaloo Reef. Appellants believe that the EPA did not provide justification for limiting its assessment in this way and that the EPA is not restricted to only considering the Western Australian environment.

Other appellants, using the same logic, stated that the EPA should have assessed indirect consequences of the Proposal (ie climate change) on all EPBC Act listed threatened species. One appellant stated (Hare 2022:17):

> However, under the Indirect Consequences policy pursuant to the EPBC Act indirect consequences must be assessed. There is no evidence that the EPA has applied the indirect consequences policy in assessing the impacts of the proponents Scope 3 emissions on matters of national environmental significance, including World Heritage areas in Western Australia.

Appellants stated that Report 1727 is inadequate to comply with the EPBC Act and EPBC Regulations. In particular that the assessment should have regard to the marine environmental values of the Dampier Archipelago as a component of the National Heritage site. The reefs and marine environment are argued to be a component of the Dampier Archipelago as they are within the mapped boundaries of the National Heritage listing. Evidence relating to the likely impacts of climate change on values of Australian Coral Reefs was provided in support of this argument.

The Australian Conservation Foundation provided information that stated (Mackey 2024:15):

> It is anomalous that the EPA acknowledged observed climate change impacts and projected climate risks on the natural environment in WA but made no assessment of how these impacts

and risk might harm the natural heritage value of heritage places in WA. The EPA should reassess to meet EPBC Act requirements for assessment of National Heritage places.

8.3 Appeal consideration

It is noted that the EPA did not the issues raised with respect to other MNES in its s106 report. The Committee has referred in this report, to the various sections in Report 1727 where the EPA's assessment of MNES was discussed and reviewed with publicly available information on the EPBC Act and accredited assessment processes. There is overlap with respect to appeal matters raised on the key environmental factors of GHGe, air quality and marine environmental quality and these have been addressed previously in this report.

Under section 77 of the EPBC Act – Notice and reasons for decision – the Minister must decide whether an action that is the subject of a proposal is a controlled action or not. Section 77 (2) of the EPBC Act states that if the decision is that the action is a controlled action, the notice must identify each of the controlling provisions. That is, the assessment and approval phases under the EPBC Act only look at impacts identified and recorded as part of the controlled action decision.

In considering this matter, the Committee notes that on 8 July 2022, following the release of Report 1727, there was a request for reconsideration of the controlled action decision from Environmental Justice Australia on behalf of the Environment Council of Central Queensland Inc. The basis of the request, as published on the EPBC Act website, was that substantial new information was available relating to the impacts of climate change on multiple MNES not listed as controlling provisions in the controlled action decision. This reconsideration request was one of multiple requests lodged on oil and gas projects being assessed under the EPBC Act, resulting in what is known as the Living Wonders climate cases[15]. It is noted that at the date of writing the request for reconsideration of decision on this proposal had not been determined. This decision is a matter for the Federal Minister for Environment.

In May 2024, the Full Court of the Federal Court of Australia delivered its decision to dismiss the appeals in the Living Wonders cases. It is understood that the effect of this decision is to uphold the approach taken by the Minister to decline to identify broader MNES despite an action having considerable scope 3 GHGe.

The Committee considers the EPA was justified in restricting its assessment to National Heritage places as this was the only MNES determined by the Federal Minister for Environment as a controlling provision.

The EPA undertook an accredited assessment, meaning the assessment report is provided to the Federal Minister for the Environment who then decides whether to approve the proposal under the EPBC Act. Under an accredited assessment, Federal approvals occur separately from Western Australian approvals. It is consequently a matter for the Federal Minister to decide whether to rely on the outcomes of a state assessment or not. In addition, it is open to the Federal Minister to undertake additional investigations before making a decision.

In considering arguments relating to the powers of the EPA to assess potential impacts on National Heritage places outside Western Australia, the Committee notes that the EPA's jurisdiction is constrained to the environment of Western Australia.

The Committee considers that arguments relating to attribution of impacts of a proposal on specific environmental values as a result of climate change also apply to arguments raised by

[15] For further information on the Living Wonders cases see [2023] FCA 1208 (Living Wonders – Federal Court) and [2024] FCAFC 56 (Living Wonders – Full Federal Court).

appellants in respect to assessment of MNES. Attribution is discussed in Section 3: GHGe. The Committee's view is that the current assessment framework and the lack of accepted methodologies to attribute specific climate change impacts to an individual proposal also apply to MNES within Western Australia.

In considering the matters raised by appellants, the Committee understands these matters are for DCCEEW and the Federal Minister for Environment to consider under the EPBC Act.

9 Other matters

Many appellants raised information with the Committee that while of significant interest, was outside the scope of the EPA to consider. Notwithstanding this, the Committee is of the view that a summary of these issues could be provided for the Minister's awareness where they have not been raised elsewhere in this report.

9.1 Cumulative impact of industry in Murujuga

Many appellants provided adverse comment on the assessment methodology applied by the EPA that only considered the impacts of the Proposal and did not consider the impact of cumulative emissions from all industries on Murujuga. Some appellants identified the need for an overarching and Strategic Environmental Management Framework, such as an Environmental Protection Policy (EPP) or similar, to be established to manage the cumulative effects of industrial development on the sea, country, and airshed of Murujuga to protect its unique environmental assets.

In Report 1727, the EPA considered (2022:79):

> … that there is a need for the Government of Western Australia to establish an overarching and strategic environmental management framework (e.g. an Environmental Protection Policy under Part III of the EP Act or other relevant policy and guidance instruments) to strategically manage the potential for cumulative effects on the sea, country and airshed of Murujuga.

The Committee supports the establishment of an Environmental Protection Policy for Murujuga – similar to the mechanism that applies for the airsheds of Kwinana and Kalgoorlie - to understand and strategically manage the cumulative impacts of existing and any new industry on the sea, country and airshed of Murujuga. The Committee notes that the establishment of the Murujuga Ambient Air Quality Network and the MRAMP is expected to be the basis of a strategic framework. The Committee is also of the view that in addition to establishment of an EPP, the DWER considers the development of an air quality dashboard for the Murujuga airshed, similar to the Port Hedland Air Quality Network, which would allow real time data to be publicly available.

The Committee supports that in the meantime, and consistent with previous assessments, the EPA's recommendation (2022:79):

> … that when the opportunity arises to review the Ministerial conditions of other existing industrial facilities within Murujuga, the review should consider whether the conditions should include additional requirements to reduce the cumulative risk of impacts to rock art from air emissions.

9.2 Climate change

The Committee recognises that scientific developments and policy and regulatory changes have occurred since the Proposal was referred in 2018. Appellants provided further information from the scientific community on the impacts of human induced climate change and their calls for action to reduce GHGe in order to limit global warming to well below 2°C and pursue efforts to limit it to 1.5°C. Policy and regulation at both State and Australian Government level has evolved (See section 3.3) and in 2023, the EPA released a revised Environmental Factor Guideline on Greenhouse Gas Emissions and accompanying templates for a Greenhouse Gas Environmental Management Plan and GHG EMP Summary Plan.

Appellants argued that these changes do not go far enough in reducing industry emissions and considering impacts on the environment, and are not consistent with many calls to reduce GHGe, such as the IEA, which indicated that in order to limit warming to 1.5°C, the world needs

to stop making final investment decisions on new oil and gas fields from 2021 (IEA 2021). As identified by appellants, this report acknowledges that there are many other scenarios that achieve 1.5°C, but the IEA's is '*the most technically feasible, cost-effective and socially acceptable'* (IEA 2021:3).

Appellants also provided many comments on the current state of climate change and the need for urgent action to prevent further negative impacts, including from the UN Secretary General who in 2023 (Guterres), said the:

> Earth's vital signs are failing: record emissions, ferocious fires, deadly droughts and the hottest year ever. We are miles from the goals of the Paris Agreement – and minutes to midnight for the 1.5-degree limit', and 'The science is clear: The 1.5-degree limit is only possible if we ultimately stop burning all fossil fuels. Not reduce. Not abate. But Phaseout – with a clear timeframe aligned with 1.5 degrees.

Notwithstanding the many comments from appellants, the Committee acknowledges the EPA's consideration of this Proposal was done in accordance with its assessment framework. In its s106 Report, the EPA acknowledged changes in its own policy and guidance and recommended amending certain conditions to be more in line with the current guidance, such as in relation to best practice, offsets integrity, and the consideration of scope 3 GHGe. Those amendments, and others recommended by the Committee, are provided in Appendix 2 of this report.

The Committee notes that, irrespective of the requirement for a scope 1 GHGe reduction trajectory to net zero by 2050, approval of the Proposal in accordance with the EPA's recommendation will lead to additional GHGe being emitted into the atmosphere. It will be a matter for the EPA and/or decision makers as to how they manage these matters in the future in accordance with any new policies, agreements, legislative changes and the potential introduction of a State carbon budget.

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11 Definitions

Abbreviation	Definition
AC	Appeals Convenor
ACCR	Australasian Centre for Corporate Responsibility
ACCU	Australian Carbon Credit Unit
AGRU	acid gas recovery unit
Air NEPM	National Environment Protection (Ambient Air Quality) Measure
ALARP	as low as reasonably practicable
ANZG	Australian and New Zealand Governments
AQMP	Air Quality Management Plan
AR5	IPCC Fifth Assessment Report
ATSIHP Act	*Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
BMIEA	Burrup and Maitland Industrial Estates Agreement
BTEX	Benzene, toluene, ethylbenzene and xylene
CCAC	Climate and Clean Air Coalition
CCWA	Conservation Council of Western Australia
CEO	Chief Executive Oficer
ChEMMS	Chemical and Ecological Monitoring of Mermaid Sound
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
COP26	The 2021 United Nations Climate Change Conference, from 31 October to 13 November 2021
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy the Environment, and Water
DEA	Doctors for the Environment Australia
DISER	Department of Industry, Science, Energy and Resources (currently Climate Change, Energy, the Environment and Water)
DMA	Decision Making Authority
DoEE	Department of Energy and Environment
Domgas	domestic gas
DWER	Department of Water and Environmental Regulation
EDO	Environmental Defenders Office

Abbreviation	Definition
EFG - GHG	Environmental Factor Guideline – Greenhouse Gas Emissions (specifiy 2020 or 2023)
EIA	Environmental Impact Assessment
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPP	Environmental Protection Policy
EQC	Environmental quality criteria
ERD	The proponent's Environmental Review Document
ESD	The proponent's Environmental Scoping Document
FARA	Friends of Australian Rock Art
FBSIA	Future Burrup Strategic Industrial Area
FPIC	Free, Prior and Informed Consent
GHGe	greenhouse gas emissions
GHG EMP	Greenhouse Gas Environmental Management Plan
GHGMP	Greenhouse Gas Management Plan
GLCs	ground level concentrations
GWP	global warming potential
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
KGP	Karratha Gas Plant
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
MAC	Murujuga Aboriginal Corporation
MEQ	Marine Environmental Quality
MEQMP	Marine Environment Quality Management Plan
MGP	Methan Guiding Principles
MNES	Matters of National Environmental Significance
MRAMP	Murujuga Rock Art Monitoring Program
MRAS	Murujuga Rock Art Strategy
Mt	Million tonnes
NDC	National determined contribution
NEPM	National Environment Protection Measure

Abbreviation	Definition
NGER Act	*National Greenhouse and Energy Reporting Act 2007 (Cth)*
NO	nitric oxide
NO_2	nitrogen dioxide
NOx	oxides of nitrogen
NPI	National Pollutant Inventory
NWS	North West Shelf
NWSJV	North West Shelf Joint Venture
NYFL	Ngarluma Yindjibarndi Foundation Ltd
O_2	molecular oxygen
O_3	ozone
OAC	Office of the Appeals Convenor
OGCI	Oil and Gas Climate Initiative
PFAS	per-and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PM_{10}	particulate matter with an equivalent aerodynamic diameter of 10 micrometres or less
$PM_{2.5}$	particulate matter with an equivalent aerodynamic diameter of 2.5 micrometres or less
PSM	Public Service Medal
RTO	regenerative thermal oxidisers
SGM	Australian Government Safeguard mechanism
SOx	oxides of sulfur
SO_2	sulfur dioxide
UNESCO	United Nations Educational, Scientific and Cultural Organisation.
UNFCCC	United Nations Framework Convention on Climate Change
UWA	University of Western Australia
VOC	volatile organic compounds
WEL	Woodside Energy Limited

Appendix 1 List of appellants

1	Ms Rebecca Purchon
2	Mr Lachlan Wells
3	Mrs Karen Barber
4	Ms Lilyana Jovic
5	Climate Action Sydney Eastern Suburbs
6	Ms Kate Goodman
7	Mr Shannon O'Grady
8	Ms Helen and Peter Morcombe
9	Mr Simon Wetz
11	Mrs Sara Wetz
12	Mr Geoff Taylor
13	Dr Simon White
14	Mr Paul Sutherland
15	Dr Malcolm Cochran
16	Mrs Jenny Davis
17	Dr Judith shaw
18	Ms Joanna van Kool
19	Dr Christopher Magarey
20	Ms Birgit Graefner
21	Mr Andrew Blanckensee
22	Ms Mary Edwards
23	Mrs Geraldine Stack
24	Ms Gaye Kolomyjec
25	Mr Thomas Colley
26	Mr Graeme Batterbury
27	Prof John Biggs
28	Miss Bertha Granados
29	Mrs Buddhima Kannangara
30	Ms Elizabeth Byrne
32	Ms Meri Fatin
33	Ms Teresa Russell
34	Mr Angus Thompson
35	Prof Anna Gibbs
36	Mr Paul Sargeant
37	Mr Miguel Heatwole
38	Ms Robyn Gilbert
39	Miss Ruth McColl
40	Ms Crina Virgona
41	Ms Anne Makhijani
42	Ms Olivia White
43	Mr Trevor Hoare
44	Mrs Judy Mills
45	Dr Oliver Hosking
46	Mr Robert Boakes
47	Dr Richard Yin
48	Ms Stephanie Murphey
50	Mr David Meredith
51	Ms Robyn Weir
52	Mr Leonard Fitzpatrick
53	Mr John Auer
54	Mr Horacio Mijail Anton Quiles
56	Mr Murray Masters
57	Mr Adam Bennett
58	Ms Gail Wyatt
59	Mr Serle Wells
60	Mr Bernd Jahn
61	Mrs Fern Huck
62	Mrs Miriam Botman
63	Amenity Urban & Natural Environments Pty Ltd
64	Ms Renee Engl
65	Ms Emma Barrett
66	Mr Raymond Stephens
67	Mr Martin Dickie
68	Mr Martin Scerri
69	Mr Ronald Cleghorn
70	Mr Greg Neave
71	Dr James Butler
72	Mrs Jenny Andrews
73	Dr Richard Parncutt
74	Mr Gregory Middleton
75	Mr Bruce Hogben
76	Ms Katrina Emmett
77	Ms Virginia Amorebieta
78	Ms Maureen Flynn
79	Ms Roz Pearson
80	Mr Liam Lilly
81	Mr Raymond Kennedy
82	Ms Jules Shakira
83	Dr Eric van Beurden
84	Mr Christian Thompson
85	Ms Sonia Geerlings
86	Ms Felicity Lee
87	Dr John Sved
88	Ms Linelle Stepto
89	Mr Douglas Stetner
90	Ms Evelyn Portek
91	Ms Judy Hardy-Holden
92	Ms Samantha Jenkinson

93 Mr Timothy Carroll
94 Mx Jake Moore
95 Ms Elizabeth Maddox
96 Ms Elizabeth Weiss
97 Mr Ian Heriot
98 Mx Emily-Oscar Siggs
99 Mr Paddy Cullen
100 Dr Keren Witcombe
101 Ms Tricia Edwards
102 Mr Anthony Cornwell
103 Dr Mark Brogan
104 Mr Greg Forster
105 Ms Coral Finlay
106 Ms Liesbeth Paijmans
107 Mr Peter Eckersley
108 Dr Heather Shamrock
109 Mr Oscar Delaney
110 Ms Anna Huband
111 Dr Daniel Ewald
112 Mr Brian Larkin
114 Mr Barry Thompson
115 Mr Tom Ballard
116 Mr Michael Nay
117 Mr Rod Whittle
118 Mr Wesley Huck
119 Miss Shakira Moulton
120 Prof Vivien Holmes
121 Ms Celine Lai
122 Mr Peter Hudson
123 Dr Leonard Warren
124 Ms Lucy Pezzali
125 Ms Christine Bennett
126 Dr Niall McLaren
127 Mr Keaton McSweeney
128 Ms Margaret Owen
129 Dr Mary Dobbie
130 Ms Ariella Brosan
131 Ms Julienne Ginbey
132 Ms Rebecca Perse
133 Ms Sama Bruce-Cullen
134 Mr Ian Kruger
135 Mr Brad Black
136 Ms Rowena Skinner
137 Ms Tanya Marwood
138 Mr Don Stokes
139 Ms Rachael Bayley
140 Mr Reg Went
141 Mrs Kathy Lees
142 Ms Kathy Fenner
143 Miss Tahlia Stolarski
145 Dr Louise Sparrow
146 Ms Jillian McMahon
147 Ms Brynn O'Brien
148 Mr Luc Plowman
149 Dr Graham Lovell
150 Ms Kathleen Macdonald
151 Prof Joshua Mylne
152 Ms Linda du Boulay
154 Mr Steve Johns
155 Mr Michael Smalley
156 Dr Beth Schultz AO
157 Mr William Macham
158 Mr Brian Wooller
159 Miss Jessica Boyce
160 Mrs Cheryl Green
161 Ms Ray Flanagan
162 Dr Catherine Price
163 Mr Joshua Burney
164 Mr Ben Skelton
165 Ms L Coen
166 Ms Jan O'Leary
167 Mrs Ann Lazzaro
168 Ms Laraine Newton
169 Mr Steve Gates
170 Ms Kerry Knights
171 Mrs Jane Paterson
172 Mr Bryan Whitehorn
173 Dr Linda Selvey
174 Ms Lara Sampson
175 Ms Myriam Leonardy
176 Ms Leonie Stubbs
177 Ms Nicoletta Ciffolilli
178 Mr Khoa Mai
179 Mr John de Figueiredo
180 Dr Christine Kuhlmann-Jackson
181 Alex Mateer and Rick Kilpatrick
182 Ms Hazel Butorac
183 Dr Jane Morgan
184 Mrs Lynn Thomas
185 Ms Imogen Zethoven
186 Miss Alice Ding
187 Ms Leith Maddock
188 Mr Dick Clarke
189 Mr Adrian Taylor

190 Mrs Angelina Bowden-Jones
191 Miss Mikayla Bowden-Jones
192 Dr Peter Bennett
193 PaYUng Contracting
194 Mr Thomas Helps
195 Mrs Judith Darby
196 Miss Tessa Purdy
197 Mr James Yeates
198 Mr James Wakeham
199 Ms Helen Koustas
200 Ms Cynthia (Ruby) Rosenfield
201 Mr David Cervi
203 Ms Anne Shay
204 Mr James Bowen
206 Mr Michael McVeigh
207 Mr Jeremy Akerman
208 Miss Ainslee Hunter
209 Mrs Susan Starr
210 Dr Craig Chappelle
211 Dr Anna Molan
212 Western Australian Council of Social Service
213 Mr Matti Puckridge
214 Mr Lindsay Talbot
216 Mr Bruce Paterson
217 Prof Chilla Bulbeck
218 Mr Owen Martin
219 Ms Janice Mackenzie
220 Mr Adrian Pyle
221 Mr Neil Forbes
222 Ms Gayle Davies
223 Ms Felicity Townsend
224 Ms Sara Boranga
225 Mr Simon Ball
226 Mr Stephen Rawlinson
227 Mx Alex Wallace
228 Ms Karin Wittwer
229 Mr Jack Pearson
230 Sector Insight
231 Mx Chris Woods
232 Mr Peter Kerr
233 Dr Helen Flavell
234 Ms Raya Stanton
235 Dr Steffen Zorn
236 Mrs Daniele Prongue
237 Mrs Sarah Stewart
238 Dr Marek Misiewicz
239 Miss Cait Taylor
241 Mr Andrew Cox
242 Ms Lisa Bodley
243 Raaise Pty Ltd
244 Ms Marian Kiely
245 Midwest Carbon Zero
246 Dr Nicholas D'Alonzo
247 Mr Cliff Harris
248 Mr Sayardeen Mohammed
249 Miss Carmen Stobaus
250 Doctors for the Environment Australia
251 Mrs Geogia Efford
252 Ms Deborah Knott
254 Mr Brad Parks
255 Ms Caroline Le Couteur
257 Ms Pauline McMinn
258 Mr Robert Mazzilli
259 Mr Darin Dunstan
260 Mx Hannah Meagher
261 Ms Beryn Jewson
262 Ms Jacqui O'Toole
263 Mr Daniel Jeffreys
265 Prof Charles Greenfield
266 Mr Geoff Wishart
269 Dr Rob Bohmer
270 Mr Andrew Williams
272 Ms Candice Krynauw
273 Ms Dianne Braithwait
275 Mrs Martina Van der Eecken
276 Mr Christopher Balanzategui
277 Mrs Kerry Mulligan
279 Mrs Renate Culliton
280 Ms Hannah Busch
281 Dr Jane Hutchison
282 Ms Anna Harvey
283 Mr Thomas Knowles
285 Dr Annabelle Lukin
286 Mr Darren Reid
287 Mr James Shadbolt
288 Mr Richard Horton
289 Dr Joe Dortch
292 Mr Richard Laslett
293 Mr Brendan Dwyer
294 Dr Millie Rooney
295 Ms Andrea Siedl
296 Mr David Bryant
297 Ms Nicola Ruane

298 Mr Roland van Amstel
299 Ms Lauren Anker
300 Mrs Shannon Conley
301 Ms Clare Harvey
302 Dr John Darby M.b.,B.S
305 Mrs Kim Archer
306 Prof John Quiggin
307 Dr Chloe Mason
308 Mr Rick Shulver
309 Mr Daniel Coughlan
311 Ms Kejal Dodhia
313 Dr Steven Du
314 Dr Erich Schulz
315 Ms Roselyne Chedel
316 Mrs Amy Clark
317 Ms Robyn Kerr
318 Dr Emily Lester
319 Mr Max van Someren
321 Ms Kate Hulett
322 Mr Ricky Cvejic
323 Ms Vanessa Randolph
324 Mrs Karinda Stone
325 Mr Mark Carolane
326 Mrs Sandra Hohnen
328 Mr Julian Larnach
329 Dr Andrew Stock
330 Mx Kim Reid
331 Mr Tim Davies
332 Ms Allison Manners
333 Mr Callum Diamond-Smith
334 Mr Joshua Thillagaratnam
335 Mx Aja Stuart
336 Mrs Moira Bandt
337 Mrs Hazel Law
338 Ms Alycia Johnston
340 Dr Anandashila Saraswati
341 Mr Nick Ritchie
342 Ms Beverley Crossley
343 Ms Jess Scully
344 Ms Susan Carlyle
345 Ms Jenifer Wilder
346 Dr Harriet Cunningham
347 Mr Sean Grogan
348 Mrs Denise Harfoushian
349 Mr Graham Chauvin
350 Ms Emily Edwards
351 Dr Helen Ritter
353 Ms Bonnie James
354 Mr Sam Mooney
355 Ms Gwyneth Dean
356 Mr David Hamilton
357 Mr Warwick Boardman
358 Mrs Lee-Anne Miles
359 Mrs Emily Burton
360 Mr Gregory Andrews
361 Mr Sam Carpenter
362 Mrs Alison Wylie
363 Ms Hermine Lee
364 Ms Jo Vallentine
366 Mr Palaniappan Subramanian
367 Dr Madeleine Ferraro
368 Ms Jane Page
369 Ms Jo Bower
370 Dr Rory Walsh
371 Mr Anthony Sharp
372 Ms Sarah Reid
374 Mr Ekkachai Oonnankat
375 Ms Emma Vickery
376 Miss Grace Rice
377 Ms Virginia King
378 Mr Jonathan Trott
379 Girl Geek Academy
380 Dr Alan Lane
381 Ms Anne Jacobs
382 Mr Gary Steadman
383 Mr Thomas Picton-Warlow
384 Ms Sarah Coffey
385 Prof Martin Hensher
386 Ms Hannah Fitch-Rabbitt
387 Ms Beka Hunter
388 Mr Scott Brookman
389 Dr Paul Jackson
390 Ms Kathleen Halloway
391 Ms Kim Preston
392 Ms Michelle Grosser
393 Ms Kaia Koglin
394 Mrs Lynette Serventy
395 Mr Phil Allen
396 Mx Kester McKay
397 Appropriate Technology International
398 Dr Tracey Steinrucken
399 Mr Simon Blee
400 Mr Alex Talbot
401 Mr Paul Ryan

402 Mrs Cilia O'Hagan
403 Australasian Centre for Corporate Responsibility
404 Ms Merome Darlington
405 Ms Aimee Smith
407 Ms Nancy Williams
408 Miss Benita Botha
409 Ms Anne Wakefield
410 Mr Chris Stephanou
411 Mr Donovan Chong
412 Mrs Gabrielle Wennekes
414 Ms Lesley Hodges
415 Miss Rachel Jack
416 Ms Casey Reitsma
417 Miss Prudence Robertson
418 Mrs Angela Nilsen
419 Mrs Eleni Stephanou
420 Ms Andrea Belunek
421 Mr Michael Cull
422 Mr Peter Crosthwaite
423 Dr Karl Kruszelnicki
424 Mr Paul van den Bos
425 Permaculture Sydney North
426 Ms Claire Brittain
427 Ms Phillippa Griffiths
428 Ms Rebecca Stewart
429 Ms Susan Wellington
430 Mr Leigh Ritchie
431 Ms Diana Shanks
432 Ms Teresa Geertsen
433 Mrs Sandra Noble
434 Ms Shirly Sareyka
435 Ms Vanessa McLean
436 Mr Hendrik de Groot
437 Ms Rachel Coppel
438 Mr Mark Thompson
440 Dr William Nash
441 Ms Peta James
442 Ms Angela Winkle
443 Miss Olivia Marmion
445 Mr Jonathan Savy
446 Dr Guy Keulemans
447 Mrs Maria Emerlyn Van Ryt
448 Mr Paul Desmond
449 Mr Scott Baker
450 Mrs Sally Mullins
451 Miss Winona Wroe
452 Dr Fiona Bruce
453 Mrs Nickey Ludkins
454 Ms Kay Lefevre
455 Mr Raoul Abrutat
456 Mr Stuart Venables
457 Ms Karen Vegar
458 Dr Miranda Coulson
459 Ms Flavia Pardini
460 Ms Robyn Tooke
461 Mr Damon Leigh
462 Dr Claire Greenwell
463 Ms Shannon Walliss
464 Mr Jason Ginn
465 Dr Andrew Chapman
466 Mr Luke Sweet
467 Mr Russell Meeking
468 Ms Annie Shaddock
469 Dr Bronwyn Walker
470 Miss Meredith Kidby
471 Dr Peter Wales
473 Mrs Adrienne Kabos
474 Mrs Katie Gray
475 Ms Judith Manitzky
476 Ms Annette Lin
477 Mr Peter Murray
478 Mrs Kristy Collins
479 Ms Helen Scott
480 Dr Anne Campbell
481 Ms Jessica Chapman
482 Ms TM McGann
483 Mr Jonathan Brisbane
484 Miss Briony Spencer
485 Ms Wendy Dugmore
486 Ms Penelope Tangey
487 Ms Anne Jones
488 Ms Christiane Jaeger
489 Mrs J Vangiessen
490 Mr Peter Enge
491 Ms Gita Sonnenberg
492 Mr Louis de Villiers
493 Ms Margaret Matassa
494 Ms Serena Fletcher
495 Ms Maduvanthi Venkatesan
496 Dr Wendy Blake
497 Mr Tim Bayley
498 Dr Courtney Babb
499 Mrs Victoria Batten

500 Mrs Nancy Pallin
502 Dr John L Black
503 Dr Melanie Clark
504 Ms Merrilee Baker
505 Dr Bridget Leggett
506 Miss Alyssa Buttrum-Virco
507 Australian Marine Conservation Society
508 Ms Christine Carmichael
509 Mr Michael Solly
510 Mrs Grace Keast
511 Dr Yung En Chee
512 Ms Simone Collins
513 Ms Tegan Jenkins
514 Ms Nicole Leonard
515 Sea Shepherd Australia Ltd
516 Ms Ellen Wilson
517 Mr Jean-Klaas Gunnink
519 Dr Bradley Pettitt
521 Ms Pippin Margaria
522 Ms Freya Hohnen
523 Dr Jenny Donnelly
524 Ms Annie Malcolm
525 Mr Dave Burrows
526 Ms Fiona Brown
527 Ms Elisabeth Aroney
528 Dr Chris Curry
529 Mrs Josephine Cummins
530 Ms Jenny Kiss
531 Ms Judith Anderson
532 Mr Ian Darby
533 Dr Tim Dymond
534 Perth Bushwalkers Club (Inc)
535 Ms Josie Alec and Ms Raelene Cooper
536 Mr Ian Coates
537 Ms Ann Dragon
538 Dr John Nelson
539 Mr Rufus Morse
540 Dr Jennifer Sinclair
541 Ms Dianne Wykes
542 Ms Janice Baird
543 Ms Amanda Miller
544 Ms Helen Sibree
545 Ms Carol Kenchington
546 Mr Steve Milton
547 Mr Anthony Ross
548 Dr Chris Johansen
549 Human Rights Watch
550 Miss Sandra Lim
551 Mr Stephen Yuen
552 Mr Peter Moss
553 Mr Chris Mahony
554 Ms Helen Oxnam
555 Mrs Susan Swain
556 Ms Sandra Chilcott
557 Mr Peter O'Shannessy
558 Ms Pamela Fruin
559 Mr Ben Hermann
560 Ms Supriya Perera
561 Miss Sasha Cambrie
562 Ms Simone van Hattem
563 Ms Marie Bermingham
564 Ms Kerry Wallace
565 Mr Harry McNally
566 Ms Amy Blain
567 Mrs Carolyn McGinty
568 Miss Isabella Tripp
569 Mx Adam Reader
570 Climate Action Network Australia
571 Ms Gayle O'Leary
572 Clin Prof Mark Thomas
573 Busselton Dunsborough Environment Centre Inc.
574 Mx Scott Percival
576 Mr Greg Brennan
577 Mr Stuart Wearne
578 Mrs Liz Kloosterman
580 Ms Jenni Woodroffe
581 Mrs Ethel De Pinto
582 Australian Conservation Foundation Incorporated
583 Mr Stephen Foley
584 Dr Christie Noble
585 Mrs Carolyn Kent-Muldrew
586 Tripple Ventures Unit Trust
587 Mr Niaal Holder
588 Miss Erin Davies
589 Ms Brigette Fyfe
590 Ms Pamela Twiss
591 Dr Anita Cosgrove
592 Mr Razvan Popa
593 Ms Ann Flynn
594 Ms Celia Mary Gray OAM
595 Mr Mark Oliver

596 Mr Dominic Petridis
597 Mr Edward Marynowicz
598 Dr Delphin Swalm
599 Mr Brian Mollan
600 Mr Tony Roccisano
601 Mr Jeffrey Meares
602 Mrs Wendy Wisniewski
603 Dr Christopher Swain
604 Ms Joana Partyka
605 Mr Simon Blears
606 Mr Richard Chapman
607 Mrs Suzanne Worner
608 Mr Angelo Watts
609 Ms Piper Rollins
610 Dr Penelope Wilson
611 Greenpeace Australia Pacific Ltd
612 Conservation Council of WA Inc
613 Mr Rob Gulley
615 Miss Francesca Flynn
616 Ms Sandra Reed
618 Miss Caroline Perks
619 Ms Fiona Moran
620 Dr Tegan Douglas
621 Miss Emma Pegrum
622 Ms Leslie McNulty
623 Dr Julie Hobson
624 Mr Jeffrey (Jeff) Wilson
626 Mr Trent Rojahn
627 Ms Jane Bremmer
628 Mr Richard Hosking
629 Ms Emma Sangalli
630 Dr Alice McGushin
631 Dr Bill Hare
632 Ms Dinny Laurence
633 Dr Giles Thomson
634 Ms Jacinta Rosielle
635 Mr John Bushell
636 Ms Jane Hammond
637 Mr Anthony Collins
638 Dr Jacqui Saw
639 Dr Caroline Orr and Dr Lawrence Ward
640 Ms Sarah Moran
641 Mr Philip Salom
642 Ms Fay Burthem
643 Ms Robyn Devenish
644 Ms Donna Chapman
645 Ms Louise Sartori
646 Miss Rhiannon Murphy
647 Dr John Dunne and Dr Sandra Dunne
648 Dr Nicole Chalmer
649 Mr Matthew Hardy
650 Ms Kirstin Jacka
651 Dr Amanda Thomas
652 Dr Daniel Clarke
653 Clin Prof Phillipa Lamont
654 Mx Rey Nairn
655 Mr Aaron Olszewski
656 Mr Bruce Middleton
657 Mr Brett Friell
658 Mr Francis Burke
659 Mr Max Lorimer
660 Ms Jacob Higgins
661 Ms Kim Bailey
662 Mr Antoine Gansemer
663 Dr Katerina Stephanou
664 Dr Catherine Rye
665 Ms Claire McKinnon
666 Mr James Watt
667 Mr Jayden Engert
668 Miss Mary Hippisley
669 Mr James Rutherford
670 Mr Oliver Jones
671 Mx Vivian Dean
672 Mrs Monika Doepgen
673 Mr Blair Sands
674 Ms Genevieve Burke
675 Mrs Christine Morris
676 Ms Madeleine Churchhouse
677 Ms Kellie Ratcliff
678 Dr Gill ‘Gillian’ Lewin
679 Mrs Mandy Edwards
680 Ms Pam Nairn
681 Mr Luke Fernandez
683 Mr James Mumme
684 Mr Peter Garrett
685 Ms Petrina Harley
686 Ms Corina Sleep
687 Ms Louisa Barnacle
688 Mr Dale Park
689 Mr Clint Uink
690 Mr Glen Ryan
691 Mr Brett Armstrong
692 Ms Olivia Chapman
693 Miss Melisha Leggett

694 Ms Nicole Hodgson
695 Ms Angelica Munoz
696 Ms Brenda Conochie
697 Mrs Helene Fisher
698 Mrs Caroline Kruger
699 Mr Ewan Buckley
700 Miss Kudzai Mlambo
701 Ms Jennifer Holland
702 Ms Nadia Rasheed
703 Ms Kar Yee Chiu
704 Ms Liz Burrow
705 Ms Elsa Fuentes-Hare
706 Mr Anthony Hudson
707 Greenpeace e.V. Germany
708 Ms Jess Beckerling
709 Dr Brett Montgomery
710 Peoples Climate Action Coalition T/A Peoples Climate Assembly
711 Mr Kent Heard
712 Mr Adam Lippiatt
713 Miss Jacqui Snyder
714 Ms Amanda Scotland
715 Ms Cesira Leigh
716 Mr Alexander Whitebrook
717 Miss Sienna Pitt
718 Ms Belinda Edmunds
719 Mrs Nasim Fozdar
720 Dr James Anderson
721 Ms Neve Worthy
722 Mr Paul Castle
723 Dr Nicole Sleeman
724 Ms Heather Whitebrook
725 Mr Samuel Giraudo
726 Mx Anya Sills
727 Friends of Australian Rock Art Inc
728 Mr Gerard Mazza
729 Miss Michelle Whitney
731 Ms Amy Warne
732 Ms Mia Pepper
733 Ms Lisa Thornton
734 Ms Tanya Babaeff
735 Mrs Bridget Atkinson
736 Dr Keith Horton
737 Miss Laura Gale
738 Ms Fiona Bennett
739 Dr Emma Rooksby
740 Ms Maren Whittaker
741 Mr Martin O'Dea
742 Australian Forests and Climate Alliance
743 Ms Karen Rooksby
744 Miss Emily Gale
745 Mr Peter Storie
747 Mr Patrick Kankanange Gunasekera
748 Miss William Hudson
749 Ms Julie Grundy
750 Mrs Judy Blyth
751 Mr Robert Day
752 Citizens' Climate Lobby Australia
753 Australian Religious Response to Climate Change WA
754 Dr Peter Devereux
755 Curtin University Student Guild
756 Prof Andrea Gaynor
757 Ms Hazel Dortch
758 Mr Colin East
759 AgZero2030
760 Dr Monica Leggett
761 The Wilderness Society WA Inc
762 Mr Dirk Williams
763 Dr Jane Aitken
764 Mrs Sze-Lin Hord
765 Ms Di Morrissey AM
766 Ms Margaret Hartley
767 Dr Lisa Caputo
768 Ms Cherie Saxby
769 Dr John Rooney
770 Mr John Brennan
771 Ms Bev Cowan
772 Mr Raymond E Brown
773 Ms Rosemary Elbery
774 Ms Jennifer Hole
775 Dr Sue Ashford
776 Dr Vivienne Mountain

Appendix 2 Recommended condition amendments

The Committee recommends some appeals are upheld to the extent the following variations or new conditions are applied to:

2 – Greenhouse Gases; and

3 – Air Quality

Recommended new conditions and variations are underlined.

2 Greenhouse Gas Emissions

2-1 For the period commencing from the date of issue of this Statement to 30 June 2030, the proponent must avoid, reduce and/or offset the total quantity of **Reservoir Emissions** released to the atmosphere';

2-2 For the purposes of condition 2-1, **Reservoir Emissions** are avoided, reduced and/or offset for a period by the quantity of GHG Emissions represented by:

(1) the amount of **Non-Reservoir Emissions** that have been avoided and/or reduced through a **Certified Improvement**; and/or

(2) the amount of **Authorised Offsets** that meet the **Timing and Reporting Requirements.**

2-3 The proponent must take measures to ensure that Net GHG Emissions do not exceed:

(1) 26.2Mt of CO_2-e for the period between 1 July 2025 and 30 June 2030;

(2) 21.6Mt of CO_2-e for the period between 1 July 2030 and 30 June 2035;

(3) 16.35Mt of CO_2-e for the period between 1 July 2035 and 30 June 2040;

(4) 10.8Mt of CO_2-e for the period between 1 July 2040 and 30 June 2045;

(5) 5.6Mt of CO_2-e for the period between 1 July 2045 and 30 June 2050; and

(6) zero tonnes of CO_2-e for every five-year period from 1 July 2050 to 30 June 2070.

2-4 Subject to, and to the extent that it is not inconsistent with, condition 2-1 and condition 2-3, the proponent must implement the North West Shelf Project Extension Greenhouse Gas Management Plan (Revision 7, G2000RF1401194400, December 2021) from the date this Statement is issued until the CEO confirms in writing that a revision of the plan submitted under condition 2-5 meets the requirements of conditions 2-5(1) to 2-5(10).

2-5 Within twelve (12) months of the date of issue of this Statement, the proponent must revise in consultation with the **Murujuga Key Stakeholders,** and submit to the CEO, the Greenhouse Gas Environmental Management Plan (Revision 7, G2000RF1401194400, December 2021) in accordance with the management plan template provided by Environmental Protection

Authority's most recent Environmental Factor Guideline - Greenhouse Gas Emissions that:

(1) is consistent with the achievement of condition 2-1 and the N**et GHG Emissions limits** in condition 2-3 (or achievement of **Net GHG Emissions** reduction beyond those required by condition 2-3);

(2) specifies the estimated **Proposal GHG Emissions**, **Reservoir Emissions**, **Non-Reservoir Emissions**, **Total Emissions Intensity**, **Emissions Intensity** of each LNG Processing Train, **Reservoir Emissions Intensity** and **Non-Reservoir Emissions Intensity** for the life of the proposal;

(3) includes a comparison of the estimated **Proposal GHG Emissions, Reservoir Emissions, Non-Reservoir Emissions, Total Emissions Intensity, Emissions Intensity** of each LNG Processing Train**, Reservoir Emissions Intensity** and **Non-Reservoir Emissions Intensity** for the life of the Proposal against other relevant emissions reduction practices, pathways, and comparable facilities;

(4) identifies and describes any best practice design and operational measures that the proponent will 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 Emission Intensity**, **Total Emission Intensity** and/or **Emissions Intensity** per LNG Processing Train of the proposal;

(5) identifies and describes measures that the proponent will implement to avoid and reduce **fugitive methane emissions** from operations;

(6) identifies and describes any Authorised Offsets to be used to achieve emissions reduction targets, consistent with offset integrity standards and principles;

(7) considers reasonably practicable options for reductions in scope 3 emissions;

(8) provides for the future review of the plan to:

  (a) assess the effectiveness of measures referred to in condition 2-5(4); and

  (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, Total Emissions Intensity** and/or **Emissions Intensity** of each LNG Processing Train**.**

(9) includes an audit and peer review report carried out by an independent person or independent persons with suitable technical expertise to

review the calculations used to estimate the matters in condition 2-5(2) and assess measures referred to in condition 2-5(4) against international and Australian best practice; and

(10) includes an audit and peer review report carried out by an independent person or independent persons with suitable technical expertise to review any Authorised Offsets proposed and consistency with offsets integrity standards and principles, practicability and availability at the time of proposed surrender.

2-6 The proponent:

(1) may submit to the **CEO** a revision of the **Confirmed** Greenhouse Gas Environmental Management Plan prepared in consultation with the **Murujuga Key Stakeholders**, at any time;

(2) must submit to the **CEO** a revision of the **Confirmed** Greenhouse Gas Environmental Management Plan, prepared in consultation with the **Murujuga Key Stakeholders:**

(a) if there is a material risk that condition 2-1 and/or condition 2-3 will not be complied with, including but not limited to as a result of a change to the proposal;

(b) with each consolidated report required under condition 2-11(1); and

(c) as and when directed to by the CEO in writing.

2-7 Any revision of the **Confirmed** Greenhouse Gas Environmental Management Plan submitted under condition 2-6 must satisfy the requirements of condition 2-5.

2-8 Within one month of receiving confirmation in writing from the **CEO** that:

(1) the Greenhouse Gas Environmental Management Plan submitted to the **CEO** under condition 2-5 or condition 2-6 has been revised and satisfies condition 2-5; or

(2) any subsequent version of the **Confirmed** Greenhouse Gas Environmental Management Plan submitted under condition 2-6.

the proponent must submit a separate summary of the relevant **Confirmed** Greenhouse Gas Environmental Management Plan to the **CEO**, which must:

(a) include a summary of the matters specified in condition 2-5; and

(b) be published as required by condition 2-13.

2-9 The proponent must implement the most recent version of the **Confirmed** Greenhouse Gas Environmental Management Plan until the **CEO** has confirmed by notice in writing that it has been demonstrated that the **Net GHG Emissions** limits in condition 2-3 have been met.

2-10 The proponent must submit an annual report to the **CEO** and the **Murujuga Key Stakeholders**, each year by 31 March, or such other date within that financial year as is agreed in writing by the **CEO** to align with other reporting requirements for **GHG,** specifying for the previous financial year:

(1) the quantity of **Proposal GHG Emissions**;

(2) the quantity of **Non-Reservoir Emissions**;

(3) the quantity of **Reservoir Emissions**;

(4) the quantity of **Fugitive Methane Emissions**;

(5) the **Total Emissions Intensity, Emissions Intensity** of each LNG Processing Train**, Reservoir Emissions Intensity** and **Non-Reservoir Emissions Intensity**, including calculations and calculation methodology for each; and

(6) the tonnes of **LNG** produced (loaded onto ships) and amount of **DomGas** exported (terajoules).

2-11 The proponent must submit to the **CEO** and the **Murujuga Key Stakeholders**, by 31 March 2025 or such other date within that financial year as is agreed in writing by the **CEO** to align with other reporting requirements for **GHG Emissions**, and every five (5) years thereafter:

(1) a consolidated report specifying:

(a) for each of the preceding five financial years, the matters referred to in conditions 2-10(1) and condition 2-10(5);

(b) for the period specified in condition 2-1 or condition 2-3 that ended on 30 June of the year before the report is due:

(i) the quantity of **Proposal GHG Emissions, Reservoir Emissions and Non-Reservoir Emissions**;

(ii) the **Net GHG Emissions**;

(iii) the amount of **Non-Reservoir Emissions** that have been avoided or reduced through a **Certified Improvement** as contemplated by condition 2-2(1), including a description of any **Certified Improvement** that caused the avoidance or reduction;

(iv) the type, quantity, identification or serial number, and date of retirement or cancellation of any **Authorised Offsets** which have been retired or cancelled and which have been used to:

A. offset **Reservoir Emissions** for the purposes of

complying with condition 2-1; or

B. offset **Proposal GHG Emissions** for the purposes of complying with condition 2-3,

including written evidence of such retirement or cancellation; and

(v) any measures that have been implemented to avoid or reduce **Proposal GHG Emissions**; and

(2) an audit and peer review report of the consolidated report required by condition 2-11(1), carried out by an independent person or independent persons with suitable technical expertise dealing with the suitability of the methodology used to determine the matters set out in the consolidated report, whether the consolidated report is accurate and whether the consolidated report is supported by credible evidence.

2-12 A consolidated report referred to in condition 2-11(1) must be accompanied by:

(1) a revision of the **Confirmed** Greenhouse Gas Environmental Management Plan under condition 2-6(2)(b); and

(2) a separate summary report covering each of the periods specified in conditions 2-1 and 2-3 that ended on 30 June of the year before the report is due and any previous periods specified in conditions 2-1 and 2-3, and which includes:

(a) a graphical comparison of **Net GHG Emissions** with the **Net GHG Emissions** limits detailed in condition 2-3;

(b) **Total Emissions Intensity** and **Emissions Intensity** of each LNG Processing Train compared to international and Australian industry best practice and comparable facilities;

(c) a summary of measures to avoid or reduce the **Proposal GHG Emissions** undertaken by the proponent for compliance periods detailed in condition 2-3; and

(d) a clear statement as to whether the requirements of condition 2-1 and limits for **net GHG emissions** set out in condition 2-3 have been met, and whether the requirements of condition 2-1 and future **net GHG emissions** limits those requirements are likely to be met in the future, including a description of any reasons why those requirements and limits have not been met, and/or are unlikely to be met.

2-13 The proponent must make the **Confirmed** Greenhouse Gas Management Plan, the summary of that plan required by condition 2-8, and all reports

required by condition 2 publicly available on the proponent's website within the timeframes specified below for the life of the proposal, or in any other manner and for any other timeframe specified in writing by the **CEO**:

(1) any **Confirmed** Greenhouse Gas Management Plan, within two weeks of receiving written confirmation from the **CEO** that it satisfied the requirements of conditions 2-5;

(2) the summary of any **Confirmed** Greenhouse Gas Management Plan required by condition 2-8 and the reports referred to in conditions 2-10, 2-11 and 2-12 within fourteen (14) days of submitting the document to the **CEO**; and

(3) the reports referred to in conditions 2-5 within fourteen (14) days of submitting the document to the **CEO**.

2-14 The Proponent must provide a report to the Minister for Environment by 30 June 2040, which is to be updated by 2045, demonstrating whether the Proposal can remain consistent with the goals of the **Paris Agreement**.

3 Air Quality

3-1 For the purposes of this condition, the **Air Quality Outcome** is:

(1) to ensure that no air emissions from the proposal have an adverse impact accelerating the weathering of rock art within **Murujuga** beyond natural rates.

3-2 The proponent must ensure implementation of the proposal achieves the **Air Quality Outcome**.

3-3 If:

(1) the Minister notifies the proponent in writing, for the purposes of this condition, of one or more air quality standards to be met (including standards derived from the results of the **Murujuga Rock Art Monitoring Program**); and

(2) the proponent complies with all those standards, and any amendments to the standards which are the subject of a notification to the proponent by the Minister in writing for the purposes of this condition,

the proponent is taken to have achieved the **Air Quality Outcome**.

3-4 Subject to, and to the extent that it is not inconsistent with, condition 3-2, the proponent must implement the North West Shelf Project Extension Air Quality Management Plan (Revision 2, G2000RF1401194398, February 2021) until the **CEO** had confirmed in writing that a revision of the plan submitted under condition 3-5 meets the requirements of conditions 3-5(1) to 3-5(13).

3-5 Within 12 months of the issue date of this Statement, 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** and the **DAWE**, a revision of the North West Shelf Project Extension Air Quality Management Plan (Revision 2, G2000RF1401194398, February 2021) that:

(1) sets out measures that will be taken to achieve each of the following outcomes and objectives:

(a) subject to condition 3-2, compliance with the **Air Quality Outcome**;

(b) compliance with all air quality objectives and standards (including, if applicable, those derived from the results of the **Murujuga Rock Art Monitoring Program**), and any amendments to those objectives and standards, which are the subject of a notification to the proponent by the Minister in writing for the purposes of condition 3-3 and/or condition 3-8(3);

(c) contribute to the maintenance of regional air quality in accordance with relevant **Air Quality Standards** by the minimisation of emissions of **NOx**, **SOx** and **VOCs** [including **BTEX**] from the proposal;

(d) the minimisation air emissions (including, but not limited to **NO_x**, **SO_x** and **VOCs** [including **BTEX**]) from the proposal; by the adoption of **best practice** measures;

(e) at a minimum, reduce **NOx** emissions from the proposal to 3,065 **tpa** by 31 December 2030;

(f) at a minimum, reduce **VOC** emissions from the proposal to 10,557 **tpa** by 31 December 2030; and

(g) from 1 January 2031, stack NOx emissions from LNG Processing Trains 1 to 5 must not exceed 49 ppmv [100mg/m^3] (at a 15% O_2 reference level) [1] under normal operating conditions.

(2) is informed by monitoring data which establishes a scientifically valid and robust baseline (the methodology for which has been subject to a peer review by an independent person or independent persons with suitable technical expertise on the suitability of the methodology used to gather the baseline data) that is sufficient to measure whether the **Air Quality Outcome** and the environmental outcomes and objectives specified in condition 3-5(1) have been achieved;

(3) describes and quantifies all of the expected air emissions from the proposal, in accordance with reporting methodologies outlined in the

latest National Pollutant Inventory guideline and their sources;

(4) includes provisions for the adoption of continuous or predictive emission monitoring technologies in each stack for all LNG processing trains by 30 June 2030;

(5) includes a comparison of the expected air emissions for the proposal against **international and Australian industry best practice** for LNG processing facilities;

(6) identifies and describes the **best practice** design and operational measures and efficient technologies that the proponent has implemented or will implement to minimise all air emissions, including the adoption of advances in air pollution control technology and process management, since the date of this Statement (or since the date of the last plan review, whichever is later) and specifies:

(a) when each measure was or will be implemented; and

(b) the method that has been used or that will be used to determine the effectiveness of each measure in minimising air emissions;

(7) includes a peer review report carried out by an independent person or independent persons with suitable technical expertise to review and assess measures referred to in 3-5(4) to 3-5(6) against **international and Australian industry best practice** for LNG processing facilities;

(8) includes provisions for monitoring and reporting to the **CEO** and the **DAWE** at least annually of:

(a) the quantity of air emissions produced by the proposal;

(b) the quantity of air emissions produced from each stack in each **LNG Processing Train**;

(c) on-site meteorological conditions including wind speed / direction, temperature, and rainfall rate;

(d) ambient ground level concentrations for air emissions defined in the Air Quality Management Plan as relating to the proposal and that have the potential to impact on human health, amenity, and rock art;

(e) the implementation of measures required to be included in the Air Quality Management Plan by conditions 3-5(1) to 3-5(13);

(f) any exceedance of trigger criteria and threshold criteria; and

(g) be published as required by condition 3-13;

(9) includes a trajectory of the proposed air emission reductions for the

life of the proposal, commencing in 2025;

(10) specifies scientifically valid and robust:

(a) trigger criteria that will forewarn the approach of threshold criteria and ensure that the **Air Quality Outcome** and outcomes and objectives in condition 3-5(1) will be achieved;

(b) threshold criteria that will demonstrate that the **Air Quality Outcome** and outcomes and objectives in condition 3-5(1) are being achieved;

(c) **adaptive** monitoring program to determine if trigger criteria and threshold criteria have been met;

(d) management and/or contingency actions (including changes to monitoring, operations and reductions in emissions) to be implemented if the trigger criteria required by condition 3-5(10)(a) and/or the threshold criteria required by condition 3-5(10)(b) have not been met;

(11) includes a report of a peer review, carried out by an independent person or independent persons with suitable technical expertise, of the final draft of the Air Quality Management Plan as it relates to each of the items in condition 3-5(10) which assesses the adequacy of that content to achieving the **Air Quality Outcome** and the outcome and objectives in condition 3- 5(1);

(12) provides the format and timing for the reporting to the **CEO** of monitoring results against trigger criteria and threshold criteria over the reporting period in the Compliance Assessment Report required by condition 8-6; and

(13) subject to the peer reviews identified in conditions 3-5(2), 3-5(7) and 3-5(11) sets out reasons for selection or adoption of the measures, criteria, monitoring program and management and/or contingency actions included in the Air Quality Management Plan, including discussion of other options considered.

3-6 The proponent must implement the most recent version of the **Confirmed** Air Quality Management Plan until the **CEO** has confirmed by notice in writing that the proponent has demonstrated that the **Air Quality Outcome** and the outcomes and objectives in condition 3-5(1) have been met.

3-7 If the proponent's monitoring, tests, surveys or investigations indicate an exceedance of threshold criteria specified in the **Confirmed** Air Quality Management Plan, the proponent must:

(1) report a threshold criteria exceedance in writing to the **CEO** and the **DAWE** within 48 hours of an exceedance of threshold criteria being identified;

(2) implement the contingency actions required by the **Confirmed** Air Quality Management Plan within seven (7) days of the exceedance(s) being reported or such other time specified in the **Confirmed** Air Quality Management Plan, and continue implementation of threshold criteria actions until the **CEO** has confirmed by notice in writing that it has been demonstrated that the relevant threshold criteria is being met and implementation of the contingency actions is no longer required;

(3) investigate to determine the cause and potential impact of the threshold criteria being exceeded;

(4) if threshold criteria have been exceeded, investigate the potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded;

(5) provide a further report to the **CEO** within twenty-one (21) days (or such greater time approved in writing by the **CEO**) of the threshold criteria exceedance being reported which must include:

(a) details of management and/or contingency actions implemented;

(b) the effectiveness of the management and/or contingency actions implemented against the threshold criteria;

(c) the findings of the investigations required by conditions 3-7(3) and 3-7(4);

(d) measures to prevent the threshold criteria being exceeded in the future;

(e) measures to prevent, control or abate impacts which may have occurred; and

(f) justification for the threshold criteria remaining, or being adjusted based on better understanding, demonstrating that the **Air Quality Outcome** and the outcomes and objectives in condition 3-5(1) will be met.

3-8 Without limiting conditions 3-4 and 3-6 (implementation of the plan), and notwithstanding compliance with condition 3-7 (response to exceedance), the proponent must not cause or allow:

(1) an exceedance of a threshold criteria specified in a **Confirmed** Air

Quality Management Plan (regardless of whether threshold contingency actions have been or are being implemented);

(2) any non-compliance with the requirements of a **Confirmed** Air Quality Management Plan; or

(3) any non-compliance with any air quality objectives and standards (including those derived from the results of the **Murujuga Rock Art Monitoring Program**), and any amendments to those objectives and standards, which are the subject of a notification in writing to the proponent by the Minister for the purposes of this condition.

3-9 The proponent:

(1) may submit to the **CEO** and the **DAWE** a revision of the **Confirmed** Air Quality Management Plan, prepared in consultation with the **Murujuga Key Stakeholders**, at any time; and

(2) must submit to the **CEO** and the **DAWE** a revision of the **Confirmed** Air Quality Management Plan, prepared in consultation with the **Murujuga Key Stakeholders**:

(a) within six (6) months (or such greater time approved in writing by the **CEO**) of being notified by the Minister of air quality standards or objectives (including those derived from the results of the **Murujuga Rock Art Monitoring Program**) or any amendments to those objectives or standards, for the purposes of condition 3-3 or condition 3-8(3);

(b) as and when directed to by the **CEO** in writing; and

(c) at least every five (5) years.

3-10 Any revision of the **Confirmed** Air Quality Management Plan submitted under condition 3-9 must satisfy the requirements of condition 3-5.

3-11 If a revision of the **Confirmed** Air Quality Management Plan under condition 3-9 involves an amendment to an item that was subject to a peer review under conditions 3-5(2), 3-5(7) or 3-5(11), the proponent must submit to the **CEO** with the revision a report of a further peer review of those item(s), carried out by an independent person or independent persons with suitable technical expertise, unless otherwise advised in writing by the **CEO**.

3-12 The proponent must interpret and report on monitoring data collected for the purposes of the **Confirmed** Air Quality Management Plan to the **CEO,** the **DAWE** and the **Murujuga Key Stakeholders** at least annually.

3-13 The proponent must make the **Confirmed** Air Quality Management Plan and all reports and monitoring data required by condition 3 publicly available on the proponent's website within the timeframes specified below for the life of

the proposal, or in any other timeframe specified in writing by the **CEO**:

(1) any **Confirmed** Air Quality Management Plan, within fourteen (14) days of receiving written confirmation of the **CEO** that it satisfies the requirements of conditions 3-5(1) to 3-5(13); and

(2) the reports referred to in conditions 3-11 and 3-12 within fourteen (14) days of submitting the document to the **CEO.**

DEFINITIONS:

best practice	A method, process, or technique employed within a particular industry that has consistently shown through research and experience results superior to those achieved by applying other means and can be used as a benchmark.
Fugitive methane emissions	Losses, leaks and other releases of methane to the atmosphere that are associated with industries producing gas, oil and coal.[16]
Paris Agreement	The Paris Agreement refers to the international treaty adopted in 2015 under the United Nations Framework Convention on Climate Change (UNFCCC). Its primary goal is to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to keep the increase to 1.5 degrees Celsius.
normal operating conditions	Means any operation of a particular process (including abatement equipment) excluding start-up, shut-down and upset conditions, in relation to stack sampling or monitoring.

[1] These limits proposed by the Committee align with current emissions limits in Part V licences for KGP (L4591/1984/18) and Pluto (L8752/2013/2). It is noted those licences were issued in 2013 and 2014 respectively and the information available in the future may require further reductions. The Minister may wish to seek advice from CEO of DWER through the consultation process with other decision makers to ensure the proposed limits do not constrain the process under Part V that would regulate emissions and set stricter limits if required.

[16] What does science tell us about fugitive methane emissions from unconventional gas? (csiro.au)