Albany
76 Festing Street
Albany WA 6330
T 0447446343

Perth
2 Bulwer Street
Perth WA 6000
T (08) 9227 2600
F (08) 9227 2699

DISCUSSION PAPER – GREENHOUSE GAS EMISSIONS: MANAGEMENT PLAN AND OFFSETS

Organisation:	TNG Limited	**Date:**	22 January 2021
To:	Sharon Arena Animal Plant Mineral Pty Ltd (APM)	**From:**	Noel Davies & Melanie Price
Email:	sharon@animalplantmineral.com.au	**Reference:**	V3

Introduction	In 2019, TNG submitted an Environmental Impact Statement (EIS) to the Northern Territory (NT) Environmental Protection Authority (EPA) for the proposed TNG Darwin Processing Plant. The EPA requested more detailed consideration of greenhouse gas (GG) emissions. In preparing this discussion paper, Aurora Environmental recognises that the NT is in the process of developing a policy framework for GG emissions, offsets and strategies to transition to net zero emissions by 2050. Prior to the finalisation of these policies, it is likely that the NT will look to Commonwealth and Western Australian requirements, tools and methodology in the approach to management and potentially offsets for GG emissions. The information below sets the current framework and options for TNG's approach to preparation of a Greenhouse Gas Management Plan (GGMP) and potential approaches to offsets.
Background	• The TNG EIS contained the Aurora Environmental report *Greenhouse Gas and Climate Change Impact Assessment* which indicated that in the absence of a published Greenhouse Offset Policy in the NT and in view of the fact that the greenhouse emissions were not a significant fraction of the overall emissions in the NT, that no off-sets are required. • However, the NT Government issued a *Climate Change Discussion Paper* in September 2019 which was intended to promote discussion about emission targets. Consultation occurred over the period from October to December 2019 and a final decision on targets was to be published in the period January – April 2020. The Northern Territory Government has subsequently set a target of nett zero emission by 2050 and issued a *Draft Offset Environmental Policy* dated December 2019. This policy, while not specifically dealing with greenhouse gas emissions, outlines the following principles in relation to offsets. *1 Offsets must contribute positively to relevant Territory environmental targets.* *2 Offsets will not always be available or appropriate.* *3 The mitigation hierarchy must be rigorously applied.* *4 Offsets to be designed to deliver maximum benefit to the Territory.* *5 Benefits of offsets must be additional and secured.* *6 Disclosure and transparency is required.* *7 Participation with communities and stakeholders is critical.*

	8 Offsets must be knowledge-based and design must be responsive. The *Draft Offset Environmental Policy* indicates that there are two scenarios where offsets may be considered suitable for negotiation: **1. Projects Under Environmental Impact Assessment (EIA)** (This part is applicable to TNG) The NT EPA assesses development proposals that are likely to have a significant impact on the environment. Determining significance is addressed in the *NT EPA Environmental Factors and Objectives (2018)*. In its Assessment Report, the NT EPA will identify any significant residual impacts; i.e. those impacts that have not been adequately avoided or mitigated by management measures to be implemented as part of the proposed development. The NT EPA will also consider the nature of the significant residual impacts and whether an offset in accordance with this Policy could be an appropriate mechanism for the project to achieve compliance with the principles of ecologically sustainable development. **2. Projects Not Under Environmental Impact Assessment** (This part is potentially applicable to TNG) This Policy may be applied to other regulatory approval processes where an assessment of the environmental impacts has identified that the development proposal is likely to have residual impacts that cannot be avoided or mitigated by the proposed management measures. The *Environment Protection Regulations 2019* may specify regulatory approval processes that must apply this Policy. When negotiating voluntary offsets, the NT Government will use this Policy to guide decision making. The policy document also offered the following guidance: **Offset Design** • It is the proponent's responsibility to identify potential offsets for any expected or identified significant residual impact. • Offsets must be designed according to the offset principles outlined in the policy and any other relevant guiding documents released by the NT or Australian governments. • The offset proposal must include the expected or identified significant residual impact that is being offset, the relevant Territory environmental targets, performance indicators, stakeholder participation, monitoring and reporting, and responsive management framework. • Wherever possible, offsets should address identified Territory targets to the agreed quantum. • If the residual impact does not relate to agreed targets, offset proposals may require independent review by a panel of relevant experts engaged on a case by case basis. **Offset Assessment** • Offset proposals are assessed with input and advice from relevant experts who are familiar with the project and assessment process and the NT EPA may be requested to provide advice on the adequacy of the offset in relation to the expected significant residual impacts. • The *NT Environmental Impact Assessment Guide on Greenhouse Gas Emissions* (2006) states that the objective for managing GG emissions from new operations is to minimise emissions to a level that is as low as possible and outlines that the following should be estimated:

	• GG emissions for the construction and operational phases in absolute and carbon dioxide equivalent figures, and gas by gas source. • Project lifecycle of GG emissions. • Proponents must also demonstrate preparedness for climate change, minimisation of emissions (measures and technologies) plus emissions monitoring and reporting regimes.
Government Frameworks	**Commonwealth** • Under the Paris Climate Agreement to tackle rising global temperatures, Australia has set a target for 2030 of making a 26-28% reduction in its emissions compared with 2005 levels. • National Greenhouse and Energy Reporting Scheme (NGER): Established by the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), is a national framework for reporting and disseminating company information about greenhouse gas emissions, energy production, energy consumption and other information specified under NGER legislation. • Emissions Reduction Fund (ERF): ERF has three key elements, including crediting, purchasing and safeguarding emissions reductions. By supporting projects to reduce emissions, businesses, local councils, state governments, land managers and others can earn Australian carbon credit units (ACCUs). These units can be sold to the Australian Government through a carbon abatement contract, or to other businesses seeking to offset their emissions. Over 770 projects have been registered under many eligible activities, including energy efficiency, waste management, revegetation, livestock management and savanna fire management. • The ERF safeguard mechanism places a legislated obligation on Australia's largest greenhouse gas emitters to keep net emissions below their emissions limit (or baseline). The safeguard mechanism operates under the framework of the NGER scheme and applies to facilities with direct scope 1 emissions of more than 100,000 tonnes of carbon dioxide equivalent (t CO_2-e) per year. Safeguard facilities will be able to surrender Australian carbon credit units (ACCUs) to offset emissions over their baseline. • The *Climate Solutions Fund* was announced on 25 February 2019 by the Australian Government, providing funds to Australian farmers, businesses and Indigenous communities to undertake emissions reduction projects that provide local benefits e.g. for revegetation projects, replenishing the carbon content of soils and savanna fire management projects. **Northern Territory** • The NT Government has stated an objective to transition the Territory's economy to a low carbon economy. This objective is reflected in the *Climate Change Response net zero emissions by 2050* target which indicates to industry that the Territory expects all reasonable and practical steps to be taken when designing and implementing projects, to ensure greenhouse gas emissions are kept as low as reasonably possible. • Greenhouse gas offsetting is expected to support achievement of this target. However, progress towards this target will be influenced by a broader emissions reduction strategy. Development of a *Greenhouse Gas Offsets Policy* and supporting Technical Guidelines will be informed by the Northern Territory's Emissions Reduction Strategy. Offsets are expected to be based on avoidance, mitigation, management of impacts, with financial contributions ranked lowest in terms of desired outcome. Staged offsets will be considered.

	• The NT Impact Assessment provides general advice and does not specifically require a commitment to offsets but does suggest that there should be at least consideration of options, including through mitigation (emission reduction, design and/or procurement).
	
	Western Australia
	
	• In the absence of specific requirements regarding management and offsetting of GG, the NT EPA is likely to use WA guidelines for GG.
	
	• WA has released a *Greenhouse Gas Emissions Policy for Major Works (2019)* which is relevant to the Northern Territory economy because of the strong emphasis in both jurisdiction's economies on mining and natural gas-based industries. The key features of the WA Greenhouse emissions policy are:
	
	  • Government will work with all sectors of the Western Australian economy towards achieving net zero greenhouse gas emissions by 2050.
	
	  • In relation to new projects, the Government may impose a requirement through the environmental assessment process for a proponent to develop a Greenhouse Gas Management Plan (GGMP).
	
	• A GGMP is meant to:
	
	  • Outline strategies to avoid, reduce, mitigate and offset the project's direct (Scope 1) emissions contributing towards the State's aspiration of net zero greenhouse emissions by 2050;
	
	  • Utilise strategies that are unique to a proposal's specific circumstances;
	
	  • Take into account opportunities for emissions reduction or offset at either the facility level or across national operations;
	
	  • Propose timeframes and interim targets developed by the proponent;
	
	  • Include requirements for periodic public reporting against their targets; and
	
	  • Account for and align with Commonwealth requirements.
	
	• The WA *Environmental Factor Guideline for Greenhouse Gas Emissions* (EPA, 2020) indicates that an assessment of greenhouse emissions will be required when emission exceed 100,000 tpa of Scope 1 emissions. This aligns with the threshold criteria for the Commonwealth Government's safeguard mechanism. The EPA indicates that as a minimum, the GGMP should outline:
	
	  • Intended reductions in Scope 1 emissions over the life of the proposal;
	
	  • Regular interim and long-term targets that reflect an incremental reduction in Scope 1 emissions over the life of the proposal; and
	
	  • Strategies which demonstrate that all reasonable and practicable measures have been applied to avoid, reduce and offset a proposal's Scope 1 emissions over the life of the proposal.
	
	• In relation to offsets, the WA EPA indicates that it may request information on any considered and proposed mitigations that demonstrate that all reasonable and practicable measures have been applied at each step of the mitigation hierarchy, including:
	
	  • Avoiding emissions through best practice design. This may involve comparing emissions and energy intensity performance metrics with comparable facilities and ensuring emissions and energy intensity are minimised at the design stage and/or a particular level of emissions intensity performance is attained through adoption of renewable/low emissions technologies;

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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; and
Development of carbon offsets through the implementation of a GG emissions offset package for some or all residual emissions.

The WA EPA advises that where carbon offsets are to be implemented, they should meet offset integrity principles and be based on clear, enforceable and accountable methods. For example, the EPA recognises Australian Carbon Credit Units (ACCU) issued under the Carbon Credits (Carbon Farming Initiative) Act 2011 (Cth) as meeting these standards. Compliance offsets under the Safeguard Mechanism, as well as voluntary offsets purchased to reduce residual emissions, may contribute to a proponent's GGMP and will be recognised by the EPA.

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<tr><td>Other Considerations: Life Cycle Emissions of Energy Sources</td><td>
When considering emissions for different sources of energy for power generation, a life cycle assessment allows for a realistic comparison. The following Table indicates emissions for different energy sources, some of which are not likely to be considered for the TNG processing operation.

Coal is the worst performing energy source (median 820 gCO_2eq/kWh) compared to all other sources. Natural gas – combined cycle (490 gCO_2eq/kWh) is significantly better than coal, but higher than other energy sources. The lowest overall emitters for commercial purposes are solar photo voltaics (PV) – utility scale (48 gCO_2eq/kWh), geothermal (27 gCO_2eq/kWh), concentrated solar power (27 gCO_2eq/kWh), nuclear (as gCO_2eq/kWh) and wind - onshore (11 gCO_2eq/kWh).

Life cycle CO_2 equivalent (including albedo effect) from selected electricity supply technologies. Arranged by decreasing median (gCO_2eq/kWh) values
<table>
<tr><th>Technology</th><th>Minimum</th><th>Median</th><th>Maximum</th></tr>
<tr><td>Coal - PC</td><td>740</td><td>820</td><td>910</td></tr>
<tr><td>Natural Gas – Combined Cycle</td><td>410</td><td>490</td><td>650</td></tr>
<tr><td>Oil</td><td>325</td><td>375</td><td>430</td></tr>
<tr><td>Biomass - Dedicated</td><td>130</td><td>230</td><td>420</td></tr>
<tr><td>Solar PV – Utility Scale</td><td>18</td><td>48</td><td>180</td></tr>
<tr><td>Geothermal</td><td>6</td><td>38</td><td>79</td></tr>
<tr><td>Concentrated Solar Power</td><td>8.8</td><td>27</td><td>63</td></tr>
<tr><td>Nuclear</td><td>3.7</td><td>12</td><td>110</td></tr>
<tr><td>Wind Onshore</td><td>7</td><td>11</td><td>56</td></tr>
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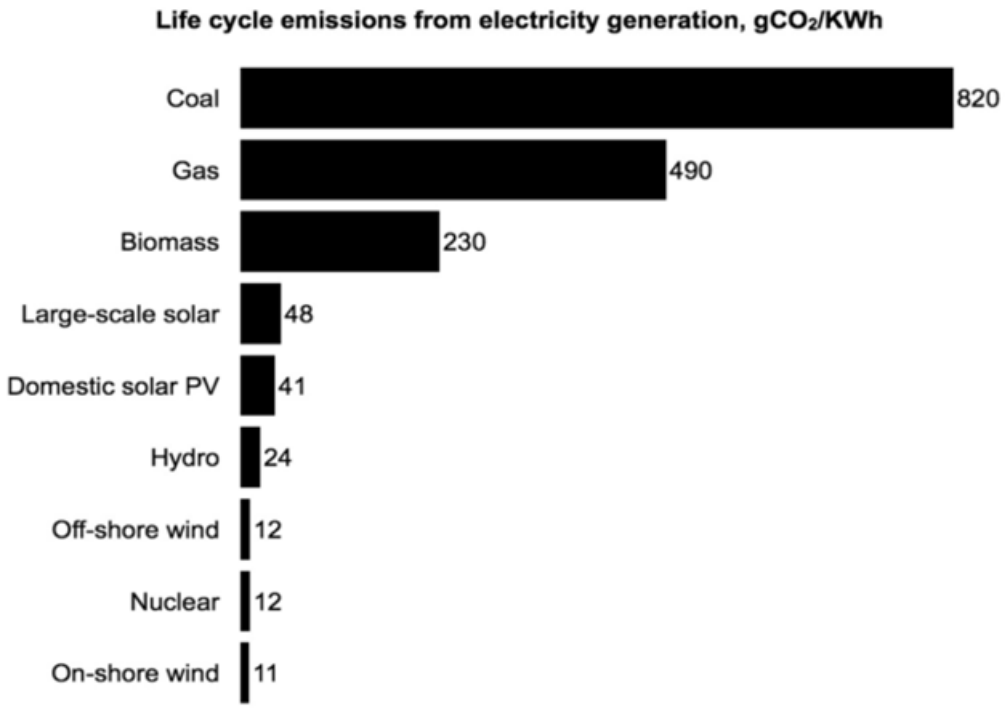


Source: IPCC (2014) based on median emissions

Technologies such as offshore wind, tidal, wave and roof top solar PV have not been included as they are either pre commercial technologies or unlikely to be used at the proposed location.

Although the life cycle analysis presented above suggest that technologies such as biomass, large scale solar, wind power and nuclear are very attractive, there are a range of other factors which render many of the problematic in terms of servicing a large, energy intensive, industrial facility.

Nuclear power for examples can be excluded given the very long lead times for approval and construction, lack of scalability to suit the energy demands of the Northern Territory grid and significant socio-political concerns. Biomass power is superficially attractive but faces difficulties in locating and securing a long-term secures sources of Biomass fuel.

The intermittent nature of wind and solar power mean they need to be supported by expensive batteries or be able to secure back-up power from the grid. The technology required to supply reliable baseload power from wind and solar sources is still evolving with solar likely to be the most attractive alternative source of electricity for the Darwin facility in the future. In view of this, it is appropriate that TNG commit to monitoring the suitability of solar – photovoltaic to supply at least a portion of the electricity demand for the facility in the future.

Greenhouse Gas Calculations

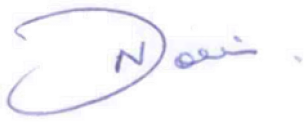
Currently, based on the most recent data from TNG for the plant, direct emissions are likely to be 944,020 CO_2eq tpa based on 7000 hrs per year of operation.

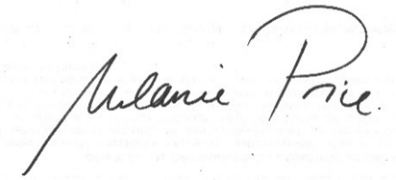
Indirect emissions have been re-calculated based on all electricity being sourced from the Northern Territory Grid and Greenhouse gas intensity of 0.56 kg $CO2_{eq}$/kw hr of consumed electricity. The previous calculation was based consumption for 1316 TJ/Year. The updated consumption, as advised by TNG is 1596.7 TJ. This results in updated Indirect CO_2 emission of 248,383 t CO_2eq.

Thus, the updated total of the annual Direct and Indirect Emissions for the Project is 1,192,401 t CO_2eq.

Options for Approach	In the absence of clear policies on offsets, it is challenging to provide definitive advice on the best approach to developing an offset package. Aurora Environmental recommends consideration of the following: • As described above, there is no clear guidance on what would be required in an offset package or whether an offsets package is a requirement. The approach adopted in the WA guidelines requiring the preparation and implementation of a GGMP appears to provide a sound basis for TNG to develop a comprehensive response to mitigating greenhouse gas emissions. • The issue of controlling greenhouse emissions from resource projects is problematic as they are inherently energy intensive in nature. • Given the nature of the proposed project, it is difficult to say that it will be feasible to achieve nett zero emissions in a cost-effective manner. This inevitably leads to an approach of relying on offsets to reduce greenhouse gas impacts. By way of example, INPEX made a cash commitment to an environmental and social benefits package which included a specific allocation for a greenhouse gas offset plan based on a savannah fire management plan in the Daly River area and the Delissaville-Wagait-Larrakia Aboriginal Land Trust. Based on this, the following is likely to be the most realistic approach for TNG: • TNG should commit to the development of a GGMP for the facility within 5 years of commissioning that includes the following elements: 1. A review of the current facility design in relation to greenhouse gas intensity/efficiency. 2. A commitment to 5 yearly reviews of energy efficiency and renewables use over the life of the project, with a view of reducing direct greenhouse emissions on a year on year basis over the life of the project. Noting that even a small annual emission decrease compounded over a 40-year project life represents a substantial emissions reduction over the life of the project. Such reductions could be focussed in the later years of the project where it is likely that new technologies will allow for substantial reductions of greenhouse gases in a more cost effective manner. 3. Prepare an offset package which could include: • Simply buying carbon credits on the market; • Rehabilitating degraded pastoral station land; or • Like INPEX, offering to assist with savannah fire management. This is an attractive target as the NT's discussion paper suggests that 58% of the Territory's greenhouse gas emission come from savannah grasslands and agriculture (i.e. land use, land-use change and forestry). A strong commitment to an offset by TNG will clearly be beneficial for TNG in terms of establishing a clear social licence for the project.

For and on behalf of Aurora Environmental





Noel Davies
Manager: Special Projects

Melanie Price
Principal Environmental Scientist

GLOSSARY/ TERMS

National		
NEG	National Energy Guarantee	The National Energy Guarantee (NEG) aims to combine the goals of reliable electricity and lower carbon emissions in a single policy. To meet the emissions obligation, retailers and large users can use "any contractual arrangement" they wish to allocate emissions from a generator to a retailer via a central registry drawing on existing greenhouse gas reporting. Abandoned by Libs but Labour has said it would adopt.
GG	Greenhouse gases	The greenhouse gases that are reported under the NGER Scheme include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6) and specified kinds of hydro fluorocarbons and perfluorocarbons. When reporting emissions, energy production and energy consumption data, only those activities, fuels and energy commodities for which there are applicable methods under the NGER Scheme are reported. Greenhouse gas emissions are measured as kilotonnes of carbon dioxide equivalence (CO_2-e). This means that the amount of a greenhouse gas that a business emits is measured as an equivalent amount of carbon dioxide which has a global warming potential of one. For example, in 2015–16, one tonne of methane released into the atmosphere will cause the same amount of global warming as 25 tonnes of carbon dioxide. So, the one tonne of methane is expressed as 25 tonnes of carbon dioxide equivalence, or 25 t CO_2-e.
S1E	Scope 1 emissions	Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level. Scope 1 emissions are sometimes referred to as direct emissions. Examples are: • emissions produced from manufacturing processes, such as from the manufacture of cement • emissions from the burning of diesel fuel in trucks • fugitive emissions, such as methane emissions from coal mines, or • production of electricity by burning coal. **Scope 1 emissions are specified under the NGER legislation and must be reported.**
S2E	Scope 2 emissions	Scope 2 greenhouse gas emissions are the emissions released to the atmosphere from the indirect consumption of an energy commodity. For example, 'indirect emissions' come from the use of electricity produced by the burning of coal in another facility. Scope 2 emissions from one facility are part of the scope 1 emissions from another facility. For example, a power station burns coal to power its generators and in turn creates electricity. Burning the coal causes greenhouse emissions to be emitted. These gases are attributed to the power station as scope 1 emissions. If the electricity is then transmitted to a car factory and used there to power its machinery and lighting, the gases emitted as a result of generating the electricity are then attributed to the factory as scope 2 emissions. **Scope 2 emissions are specified under the NGER legislation and must be reported.**
S3E	Scope 3 emissions	**Scope 3 greenhouse gas emissions are not reported** under the NGER Scheme, but can be used under Australia's National Greenhouse Accounts. Scope 3 emissions are indirect greenhouse gas emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business. Some examples are extraction and production of purchased materials, transportation of purchased fuels, use of sold products and services, and flying on a commercial airline by a person from another business.
	Energy production	Reporting energy production and consumption guideline is reported under the NGER Scheme so that data on energy flows and transformations occurring

	and energy consumption reporting	throughout the economy can be captured. This includes the initial extraction and own-use of energy, and the transformation of energy occurring within and between facilities. The NGER Scheme legislation requires the total amount of each commodity to be reported, including each transformation of energy from one fuel or commodity into another.
NGER	National Greenhouse and Energy Reporting scheme	The National Greenhouse and Energy Reporting (NGER) scheme, established by the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), is a national framework for reporting and disseminating company information about greenhouse gas emissions, energy production, energy consumption and other information specified under NGER legislation.
NGER - R	NGER – Reporting Regulations	The National Greenhouse and Energy Reporting Regulations 2008 — sets out the details that establish compliance rules and procedures for administering the NGER Act. For example, the NGER Regulations specify the information that must be provided in reports under the NGER Act and the way in which the NGER Act must be applied (commenced on 1 July 2008).
NGER-M	NGER - Measurement	The National Greenhouse and Energy Reporting (Measurement) Determination 2008 — describes the methods, standards and criteria to be applied when estimating greenhouse gas emissions, energy production and energy consumption (commenced on 1 July 2008). Further information to assist NGER reporters is available under the Measurement Determination webpages.
NGER-A	NGER - Audit	The National Greenhouse and Energy Reporting (Audit) Determination 2009 — sets out the requirements for preparing, conducting and reporting on greenhouse and energy audits (commenced on 7 January 2010).
NGER-SM	NGER - Safeguard Mechanism	The National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 — sets out the details that establish compliance rules and procedures for administering the safeguard mechanism (commenced on 1 July 2016).
CER	Clean Energy Regulator	The Clean Energy Regulator is an Australian Government body responsible for accelerating carbon abatement for Australia through the administration of the National Greenhouse and Energy Reporting scheme, Renewable Energy Target and the Emissions Reduction Fund. The Clean Energy Regulator is bound by the *Clean Energy Regulator Act 2011* which established the Clean Energy Regulator and sets out its functions and powers.
ERF	Emissions Reduction Fund	The Emissions Reduction Fund provides incentives for emissions reduction activities across the Australian economy. Under the Fund, a range of activities are eligible to earn ACCUs. Projects must comply with an approved method that measures verifiable reductions in emissions and sets out the rules for activities which can earn carbon credits. The Government purchases credits through a reverse auction system. The first six Emission Reduction Fund auctions contracted more than191 Mt CO2-e of emissions reductions at an average price of $11.90 per tonne. https://www.environment.gov.au/climate-change/emissions-reduction-fund
	Safeguard Mechanism	The Safeguard Mechanism is part of the Emissions Reduction Fund. It puts limits (baselines) on the emissions of facilities that emit more than 100,000 tonnes of emissions a year. These baselines cover around half of Australia's emissions, including facilities in the manufacturing, electricity, mining, oil and gas, transport and waste sectors. A single sectoral baseline applies to grid connected electricity generators. https://www.environment.gov.au/climate-change/emissions-reductionfund/about/safeguard-mechanism
ACCU	Australian Carbon Credit Unit	Each ACCU represents one tonne of **carbon** dioxide equivalent net abatement (through either emissions reductions or **carbon** sequestration) achieved by eligible activities. Eligible activities are undertaken as 'eligible **offsets** projects'[5]. Spot price for ACCU in 2019 was $16.10 per ACCU
NT		
	Offsets	Offsets are a regulatory tool that can be used to compensate or "offset" the residual impact of an action or set of actions on the environment. The use of an

		offset is only ever considered when avoidance and mitigation measures have been exhausted and residual impacts remain. Offsets are used to compensate for these residual impacts and are intended to achieve long-term, secure and measurable environmental outcomes.
GG Offsets	Greenhouse Gas Offsets	Greenhouse gas emissions offsets (GHG): actions undertaken to reduce or absorb GHG emissions in one location/locations (e.g. via sequestering carbon in replanted forests) in order to compensate for an increase in GHG emissions produced elsewhere.
NTOM	NT Target Offsets Model	The Territory-specific target-based offsets model is designed to facilitate strategic offset programs that deliver landscape-scale outcomes. This approach recognises the Territory's unique environmental characteristics and supports improved environmental outcomes. This offsets model will use targets designed to address the most serious environmental threats or those elements of habitat or biodiversity which are most threatened, valued or amenable to recovery. This approach supports offset actions that apply a strategic and holistic approach to species protection, biodiversity and ecosystem management. This differs from traditional offsetting approaches that focus on a single species or habitat type, usually within a small area. Read the Target-based outcomes offsets model factsheet PDF (565.2 KB) for more information.

Programs

- Emissions Reduction Fund
  Provides incentives for organisations and individuals to adopt new practices and technologies to reduce their greenhouse emissions and store carbon.

- Renewable Energy Target
  The Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and to encourage the additional generation of electricity from sustainable and renewable sources.

- Clean Energy Innovation Fund
  Invests commercially to increase the flow of funds into renewable energy, energy efficiency and low emissions technologies. The CEFC is a $10 billion fund dedicated to accelerating Australia's transformation towards a more competitive economy in a carbon-constrained world.

- Climate Active
  Certifies organisations, products and services as carbon neutral against the Climate Active Carbon Neutral Standard. To achieve carbon neutral certification organisations must measure emissions, reduce these where possible, offset remaining emissions and report on their carbon neutrality.

- Solar Communities Program
  A $5 million program to support local responses to climate change and help deliver lower electricity costs for community organisations through the installation of rooftop solar panels, solar hot water and solar-connected battery systems.

- National Greenhouse and Energy Reporting Scheme (NGERS)
  NGERS support the Department's National Greenhouse Gas Inventory Program and underpins Australian emission reduction policies including the Emission Reduction Fund, Safeguard Mechanism and Renewable Energy Target. It provides a national framework for corporations to report on greenhouse gas emissions, energy consumption and energy production data.

- Energy efficiency measures
  Australian households and businesses can significantly reduce their energy use through appliances including fridges, washing machines, televisions and lights. Practical information on how to save energy and cut power bills is available at energy efficiency. It includes information for designers, builders and householders about how to design, build and live in an environmentally sustainable home.

- Engaging with the United Nations Framework Convention on Climate Change
  Australia's negotiations through the United Nations Framework Convention on Climate Change and other issues that intersect with Australia's domestic responsibilities.

- Asia-Pacific Rainforest Partnership
  Promotes action to reduce emissions from deforestation and forest degradation in the Asia-Pacific region.

- Mission Innovation Initiative
  Australia is a member of Mission Innovation, an initiative formed in Paris aiming to double investment in clean energy innovation over the next five years.

- Blue Carbon
  The Australian Government is involved in domestic and international efforts to protect and enhance the carbon stored in coastal ecosystems.

- Engaging with the Intergovernmental Panel on Climate Change
  The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change and key source of scientific information and technical guidance to the UN Framework Convention on Climate Change. The Department is Australia's IPCC national focal point.

- Australian Renewable Energy Agency (ARENA)
  ARENA funding helps to bridge the gap between bright ideas and commercialisation. From laboratory research to large-scale pre-commercial and deployment activities, ARENA funding spans the entire innovation chain.

- Carbon Capture and Storage Research Development and Demonstration Fund
  Aims to reduce the barriers to deploying large-scale carbon capture and storage (CCS) projects and encourage industry investment in the technology.

- Hydro-fluorocarbon management
  Controls on the manufacture, import and export of a range of ozone depleting substances and synthetic greenhouse gases.

- Equipment Energy Efficiency (E3) Program
  A national and New Zealand collaboration to deliver a single, integrated program on energy efficiency standards and energy labelling for appliances, equipment and buildings.

- Taxation measures
  The threshold for tax on luxury cars is higher for those that are more fuel efficient to encourage buyers to consider the environmental impact of vehicles.

- 20 Million Trees
  A scheme to plant 20 million trees by 2020 benefiting environmental conservation through community engagement and contributes to reducing greenhouse gas emissions.

- National Low Emissions Coal Initiative
  Helps to accelerate the development and deployment of low emission technologies and CO2 transport and storage infrastructure to cut greenhouse gas emissions from coal usage.

- National Landcare Program
  A locally focussed initiative supporting projects protecting and restoring the environment, making agriculture more sustainable and productive, contributing to greenhouse gas reductions.

- Food Rescue Charity Program
  The $1.2 million Food Rescue Charity Program is assisting four charities to invest in solar, batteries and energy efficient refrigeration.

- Carbon Farming Futures
  Delivers research, on-farm trials and communication of activities that support greenhouse emission reductions.

Australian Climate Agencies

- The Australian Renewable Energy Agency aims to make renewable energy solutions more affordable and increase the supply of renewable energy in Australia through various programs and projects.

- The Commonwealth Scientific Industrial Research Organisation (CSIRO) uses climate simulations to project future climate.

- The Clean Energy Finance Corporation finances cleaner power solutions, including large and small-scale solar, wind and bioenergy. It also invests in more energy efficient property, vehicles, infrastructure and industry.

- The Clean Energy Regulator administers schemes to reduce carbon emissions and increase clean energy use. These include the National Greenhouse and Energy Reporting scheme, the Carbon Farming Initiative, and the Renewable Energy Target.

- The Climate Change Authority advises the Australian Government on Australia's climate change policies and future emissions reductions targets.

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"IPCC Working Group III – Mitigation of Climate Change, Annex II Metrics and Methodology - A.II.9.3 (Lifecycle greenhouse gas emissions)" *(PDF). pp. 1306–1308.*

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Western Australian Environmental Protection Authority (2020) *Environmental Factor Guideline for Greenhouse Gas Emissions*

ATTACHMENT 1
WA EPA Guidance

Environmental Factor Guideline

Greenhouse Gas Emissions

The environmental objective of the *Greenhouse Gas Emissions* factor is:

To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change.

Purpose

The purpose of this guideline is to outline how and when the *Greenhouse Gas Emissions* factor is considered by the Environmental Protection Authority (EPA) in the environmental impact assessment (EIA) process.

Specifically, the guideline:

- describes why the EPA has published the guideline
- outlines how EPA guidelines are applied
- provides background on the *Greenhouse Gas Emissions* factor
- identifies activities that may be considered under this factor
- describes how this factor links with other environmental factors
- outlines when the EPA may apply this guideline
- describes EIA considerations for this factor
- provides a summary of the information required by the EPA to undertake EIA related to this factor (including consideration of scope 1, 2 and 3 emissions)
- outlines periodic public reporting requirements
- identifies issues commonly encountered by the EPA during EIA of this factor
- outlines the timeframes for reviewing this guideline.

Why does the EPA need an Environmental Factor Guideline for Greenhouse Gas Emissions?

Under section 15 of the *Environmental Protection Act 1986* (EP Act), the EPA has the objective to *use its best endeavours to protect the environment and to prevent, control and abate pollution and environmental harm*. One way in which the EPA discharges this objective is to assess proposals referred to it under Part IV of the EP Act. The reports that the EPA produces following these assessments must set out what the EPA considers to be the key environmental factors identified in the course of the assessment, the EPA's recommendation as to whether the proposal may be implemented, and (if the EPA recommends that implementation be allowed) the conditions and procedures that should apply to that implementation.

This guideline provides guidance on when greenhouse gas (GHG) emissions will be considered to be a key environmental factor and how this factor will be dealt with in the EPA's assessment reports.

The section 15 objective, combined with 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, means that the EPA can consider the effects of proposals which would increase the State's emissions, and contribute to environmental harm.

How are EPA guidelines applied?

The intent of EPA guidelines is to *inform* the development and assessment of a proposal, not determine the outcome of the EPA's assessment. In the end, each proposal is assessed on its individual merits. These guidelines do not bind EPA assessments; they are explicitly not intended to be predictive of EPA advice.

EPA guidelines do not seek to unnecessarily duplicate other regulatory approaches. The approach outlined in our guidelines will be applied with regard to evolving state and national policy settings or new international commitments. The EPA will take contemporary policy settings or commitments into account as it undertakes its assessments, and will update its guidelines if these settings or commitments change significantly and materially.

What are greenhouse gases and what is their relationship to Western Australia's environment?

This guideline relates to the six categories of greenhouse gases covered by the United Nations Framework Convention on Climate Change (UNFCCC) Reporting Guidelines on Annual Inventories. These gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), hydro fluorocarbons (HFCs) and perfluorocarbons (PFCs).

Australia is currently contributing around 1.3 per cent of global GHG emissions[1]. Australia's emissions for the year to March 2019 were approximately 540 million tonnes carbon dioxide equivalent (CO_2-e), up 0.6 per cent on the previous year, primarily due to increased liquefied natural gas (LNG) exports[2]. This is only 11.7 per cent below emissions in 2005[2], and the National Inventory Reports 2014 to 2017 indicate that Australia's GHG emissions have risen each year since 2014[3].

In 2017, Western Australia (WA) contributed 88.5 million tonnes CO_2-e, which is a 23 per cent increase from 2005 levels[4]. The State Greenhouse Gas Inventory show a steady increase in GHG emissions in WA from the early 1990s. Generally, emissions growth in WA is expected to continue in the short to medium term.

The UNFCCC provides the framework for international cooperation to reduce global GHG emissions and limit temperature increases. The UNFCCC Paris Agreement entered into force on 4 November 2016 and Australia is currently committed to reducing GHG emissions by 26 to 28 per cent below 2005 levels by 2030. The Paris Agreement states that net zero emissions will be required in the second half of the century to achieve its goals of limiting warming to well below two degrees Celsius above pre-industrial levels[5]. More recently, the Intergovernmental Panel on Climate Change's (IPCC's) 1.5 report indicated that global emissions need to fall by about 45 per cent from 2010 levels by 2030, reaching 'net zero' around 2050, to limit global warming to 1.5 degrees Celsius.

1 World Resources Institute (2017, April 11). *CAIT Climate Data Explorer*. Retrieved from: http://cait.wri.org
2 Quarterly update of Australia's National Greenhouse Gas Inventory for March 2019. Retrieved from https://www.environment.gov.au
3 Volume 1 - National Inventory Reports 2014 to 2017 (Total net emissions (excluding LULUCF)). Retrieved from http://www.environment.gov.au/climate-change/climate-science-data/greenhouse-gas-measurement/publications#national
4 State and Territory Greenhouse Gas Inventories 2017.
5 The Paris Agreement, United Nations Framework Convention on Climate Change, 2016.

Locally, the Government of Western Australia released the *State Greenhouse Gas Emissions Policy for Major Projects* (State Emissions Policy) in August 2019. The State Emissions Policy commits the State Government to working with all sectors of the Western Australian economy to achieve net zero GHG emissions by 2050, and commits to working with the Australian Government's interim target of emission reductions of 26 to 28 per cent by 2030. The State Emissions Policy contemplates that proponents of projects with significant emissions may develop GHG management plans that detail their contribution towards achieving net zero emissions by 2050. The State Emissions Policy declares that local innovation and local benefits are encouraged, particularly in the development of carbon offsets, and indicates a willingness to consider credible international offsets to limit abatement costs.

In further recognition of the role that climate change is having on the Western Australian environment, and reflecting the growing public interest in this matter, the Government of Western Australia released its *Climate change in Western Australia – Issues Paper* in September 2019. The State Government has also committed to developing a State Climate Policy based on this issues paper in 2020.

National and international greenhouse gas reporting standards define a set of distinct classes (scopes) of GHG emissions that delineate sources and associated responsibilities. Scope 1 GHG emissions are the emissions released to the atmosphere as a direct result of an activity, or a series of activities at a facility level. Scope 2 GHG emissions are the emissions from the consumption of an energy product. Scope 3 emissions are indirect GHG emissions other than scope 2 emissions that are generated in the wider community. Scope 3 emissions occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business[6].

Activities that may be considered under this factor

Development activities that may be considered under this factor include, but are not necessarily limited to:

- the extraction, processing and refining of oil and gas
- the burning of fossil fuels for energy production
- mining and processing of metallic and non-metallic minerals
- waste to energy plants
- infrastructure development
- chemical manufacturing and processing
- development that clears vegetation.

How this factor links with other environmental factors

The EPA recognises that there are inherent links between the *Greenhouse Gas Emissions* factor and other environmental factors through effects on climate. For example, climate change has already caused a significant drying of the State's south-west, which in turn places significant additional pressures on water resources, flora and fauna, marine environmental quality, and social surroundings.

This guideline addresses one of the major causes of a changing climate, however the potential impacts of changes in our climate will be considered under each relevant factor. EPA guidance with respect to maintaining air quality and minimising emissions for human health and amenity are dealt with in the *Air Quality* guideline.

6 Clean Energy Regulator (20 July 2018). *Greenhouse gases and energy*. Retrieved from http://www.cleanenergyregulator.gov.au

When the EPA may apply this guideline

Generally, the geographic scope of the EPA's obligations is the State of Western Australia and its environment.

The EPA will have regard to this guideline when assessing new proposals (including expansions) and changes to proposals resulting in an increase in GHG emissions, which may involve the EPA in the reconsideration of GHG conditions.

Generally, GHG emissions from a proposal will be assessed where they exceed 100,000 tonnes of scope 1 emissions each year measured in CO_2-e. This is currently the same as the threshold criteria for designation of a large facility under the Australian Government's Safeguard Mechanism.

The consideration of GHG emissions from proposals will be subject to the approach as outlined in this guideline to ensure projects are assessed and conditioned in an effective, consistent and equitable manner. Notwithstanding this, the EPA will continue to assess proposals on a case-by-case basis and recognises that a flexible approach is important in driving innovation and improvement in best practice technologies.

Considerations for EIA

Considerations for EIA for *Greenhouse Gas Emissions* factor include, but are not necessarily limited to:

- application of the mitigation hierarchy to avoid, reduce and offset emissions
- the interim and long-term emissions reduction targets the proponent proposes to achieve
- the adoption of best practice design, technology and management appropriate to mitigate GHG emissions
- whether proposed mitigation is plausible, timely, achievable and is all that is reasonable and practicable.

Information required for EIA

Where *Greenhouse Gas Emissions* has been identified as a preliminary key environmental factor, the EPA may require the proponent to provide information including, but not limited to the following categories.

Estimated emissions

It is in the public interest that GHG emissions arising from significant developments in WA, and measures to mitigate those emissions, are documented and disclosed. The practice of seeking information on scope 1, 2 and 3 emissions from a proposal is not new, and reflects the approach of the Australian Government in relation to recent assessments of proposals in Commonwealth waters under the *Environment Protection and Biodiversity Conservation Act 1999*. On that basis, the EPA may ask proponents to provide estimates of scope 1, 2 and 3 emissions and how they are likely to change over the life of the proposal, to inform the assessment process.

The EPA may request the following information:

- credible estimates of scope 1, scope 2 and scope 3 GHG emissions (annual and total) over the life of a proposal
- a breakdown of GHG emissions by source inclusive of, but not limited to, stationary energy, fugitives, transport, and emissions associated with changes to land use
- projected emissions intensity (emissions per unit of production) for the proposal and benchmarking against other comparable projects.

Greenhouse Gas Management Plan

When the EPA applies this guideline in assessing a proposal, the EPA will require proponents to develop a Greenhouse Gas Management Plan as part of the assessment process that demonstrates their contribution towards the aspiration of net zero emissions by 2050. The EPA notes that both the Paris Agreement and the IPCC's 1.5 report recommends net zero emissions by 2050.

At a minimum, a Greenhouse Gas Management Plan should outline:

- intended reductions in scope 1 emissions over the life of the proposal
- regular interim and long-term targets that reflect an incremental reduction in scope 1 emissions over the life of the proposal
- strategies which demonstrate that all reasonable and practicable measures have been applied to avoid, reduce and offset a proposal's scope 1 emissions over the life of the proposal.

Measures to avoid, reduce and offset GHG emissions

The EPA may request information on any considered and proposed mitigations that demonstrate that all reasonable and practicable measures have been applied at each step of the mitigation hierarchy, including:

- Avoiding emissions through best practice design. This may involve comparing emissions and energy intensity performance metrics with comparable facilities and ensuring emissions and energy intensity are minimised at the design stage and/or a particular level of emissions intensity performance is attained through adoption of renewable/low emissions technologies.
- 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.
- Offsetting emissions (carbon offsets) through the implementation of a GHG emissions offset package to offset some or all residual emissions.

The EPA recognises the importance of innovation as critical to the success of achieving the goal under the Paris Agreement of limiting warming to well below two degrees Celsius above pre-industrial levels, and acknowledges the benefits of providing advice that allows for changes in greenhouse gas management plans over time as more effective mitigation alternatives become available.

The EPA also appreciates that some details of contemplated abatement actions may, for example, constitute commercial-in-confidence information. The proponent may request that specific details are treated as confidential and are not made publicly available, with justification to support this request.

Periodic public reporting against the Greenhouse Gas Management Plan

The EPA supports the requirement for proponents to periodically publicly report against their interim targets as outlined in their Greenhouse Gas Management Plan. Ideally, this reporting should be aligned with the five year milestones set out in Article 4 of the Paris Agreement (e.g. 2025, 2030).

The EPA will also consider undertaking its own periodic statewide reporting, under section 16(i) of the EP Act, to provide public advice on GHG emissions and the progress of mitigation measures developed and implemented by major proposals within WA.

Issues commonly encountered by the EPA during EIA of this factor

The following issues are matters that are commonly encountered by the EPA due to the nature of proposals that are referred to it. Background on these issues is provided here to help proponents and the community engage with EIA. This issues section will be updated from time to time to reflect new issues as they arise in referrals and EIA.

Reasonable and practicable measures to mitigate harmful emissions

Consistent with the objective of the EPA under the EP Act to use its best endeavours to protect the environment and to prevent, control and abate pollution and environmental harm, the EPA encourages the application of all practicable measures to avoid, reduce and offset GHG emissions. This might include facility design, technology choice, operation and closure.

EPA consideration of what information can be expected in this regard include:

- identification of the latest technologies and environmental management procedures available at the scale of the relevant proposal
- evidence that the proposed technologies and procedures are capable of achieving stated GHG reductions
- evidence that proposed mitigation measures (e.g. carbon offsets) are effective
- identification of local conditions and current circumstances of the relevant proposal that might influence the choice of technologies or procedures to mitigate GHG emissions
- feasibility and availability of any additional abatement and offsets.

Expectation regarding GHG (carbon) offsets

The EPA advises that where carbon offsets are to be implemented, they should meet offset integrity principles and be based on clear, enforceable and accountable methods. For example, the EPA recognises Australian Carbon Credit Units issued under the *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth) as meeting these standards. Compliance offsets under the Safeguard Mechanism, as well as voluntary offsets purchased to reduce residual emissions, may contribute to a proponent's Greenhouse Gas Management Plan and will be recognised by the EPA.

Guideline review

This guideline will be reviewed initially after 12 months for the identification and resolution of any technical issues.

The EPA acknowledges that this is a rapidly moving subject area and a comprehensive review will be undertaken within three years to ensure it remains contemporary within the policy environment at that time.

Version	Change	Date
1.0	Initial document	7 March 2019
2.0	Draft guideline – updated following public consultation	9 December 2019
3.0	Final guideline – updated following consultation with the EPA Stakeholder Reference Group	16 April 2020

As EPA documents are updated from time to time, users should consult the EPA website (www.epa.wa.gov.au) to ensure they have the most recent version.

Environmental Protection Authority 2020, *Environmental Factor Guideline: Greenhouse Gas Emissions*. EPA, Western Australia.

More information:

EPA Services
Department of Water and Environmental Regulation
Prime House, 8 Davidson Terrace
Joondalup WA 6027

Locked Bag 10
Joondalup DC WA 6919

p: 08 6364 7000
e: info.epa@dwer.wa.gov.au
w: www.epa.wa.gov.au