

OUR ENVIRONMENT

GREENHOUSE GAS (GHG) EMISSIONS

2023 Highlights:



29.6 tonnes of CO₂e offset



Finalised Carbon Strategy



Progressed commercial arrangements for emissions offsets

Our approach in 2023

Carnarvon recognises the challenges associated with reducing and offsetting emissions from oil and gas operations, as well as the opportunities that the energy transition presents in terms of emerging technologies and new products like biofuels.

In-line with our commitment to achieving net zero emissions by 2050, if not sooner, Carnarvon formalised a Carbon Strategy during the reporting period to ensure that management of greenhouse gas (“GHG”) emissions is incorporated as an integral part of our business planning.

Carnarvon also put in place some of the key commercial arrangements required for emissions offsets, which will allow Carnarvon to acquire and / or generate ACCUs (and potentially other high quality international offsets e.g. Verra) and ‘bank’ these to offset future emissions from the Dorado production facilities, or any other oil and gas operations.

These steps reflect the changing regulatory landscape in Australia, and particularly the reforms to the Safeguard Mechanism under the NGER Act, which will require the Dorado production facilities to offset any emissions above the prescribed ‘baseline’ once operational. In addition to offsets, Carnarvon is also working with the Dorado operator to investigate emissions reduction measures as part of the design of the Dorado production facilities, as well as future operational practices that could achieve energy efficiencies.

GHG emissions from our assets which are owned and operated by us are reported on each year. Where we do not have operational control, we work proactively with the asset operator and key contractors to ensure best practice emissions reduction is implemented, where possible. Consistent with previous Sustainability Reports, we have no mandatory reportable emissions under the NGERs Act.

We report Scope 2 emissions from the consumption of electricity at our corporate headquarters in Perth on a voluntary basis. These emissions are calculated using the location-based methodology for energy consumption. During the reporting period, our Scope 2 emissions were calculated as 29.6 CO₂e tonnes, which was lower than our energy consumption in the previous reporting period (see chart below). These emissions were offset by the retirement of an equivalent number of ACCUs purchased by Carnarvon on-market.



Looking ahead to 2024

As part of FEED optimisation for the Dorado development, we will work with the operator to investigate emissions reduction measures as part of the design of the Dorado production facilities.

We will also consolidate the commercial arrangements we have put in place for emissions offsets, with a view to building up our carbon ‘bank’ by the acquisition and / or generation of ACCUs so we have a sufficient volume of low-cost offsets available once the Dorado production facilities commence operation.

Our 2024 Goal

- Incorporation of emissions reduction measures as part of the design of the Dorado production facilities.

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CLIMATE ADAPTATION, RESILIENCE & TRANSITION

2023 Highlights:



Biofuels business progressed



Updated scenario analysis



Carbon pricing model revised

Our approach in 2023

Carnarvon recognises that climate change is an important global challenge that requires action to transition to a low carbon economy. As an energy company, Carnarvon has an important role to play in this transition by providing reliable, low carbon, sources of energy.

During the reporting period, Carnarvon undertook further climate change scenario analysis (refer to page 24) to assess the impact of the reforms to the Safeguard Mechanism on the Dorado development (and Carnarvon's Bedout assets as a whole), consider updated oil demand scenarios published by key industry participants like the IEA, BP and OPEC, and revised its carbon pricing model to reflect projected ACCU pricing up to 2030.

We also re-considered our alignment with the TCFD framework (refer to page 22), recognising that standardised requirements for the disclosure of climate related financial risks and opportunities are likely to be introduced for companies in Australia in the next few years.

Our biorefining joint venture, FEA, advanced the Narrogin Project over the year, with the current focus centred on closing out the technology pathway. Separate to FEA, Carnarvon assessed the feasibility of various other biofuels investment opportunities in Australia and overseas.

Climate and sustainability continues to be overseen by Carnarvon's RGS Committee and the Climate Change Working Group ("CCWG"). Both groups meet twice a year and report to Carnarvon's Board, or its Chief Executive Officer, as applicable.

These activities support Carnarvon in its continued goal of integrating climate considerations into our business planning and processes.



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TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

TCFD Recommendations	CVN Statement 2023
Governance	
Describe the Board's oversight of climate-related risks and opportunities.	The RGS Committee assists the Board in fulfilling its oversight responsibilities in relation to risk management, corporate governance, and the company's sustainability policies and practices. The RGS Committee consists of three non-executive directors and is informed by Carnarvon senior management, as well as the CCWG. The CCWG is made up of a selection of relevant Carnarvon senior management and staff. The CCWG meets periodically to assess climate-related topics. Items progressed through the CCWG are presented to the RGS Committee for their information/endorsement. The RGS Committee then presents developments to the Board on a biannual basis. The Board has reviewed climate-related risks as part of its wider review of the corporate risk register and is regularly updated by the RGS Committee on the status of mitigations and action items.
Describe management's role in assessing and addressing climate-related risks and opportunities.	Carnarvon senior management conducts climate specific risk assessments and incorporates relevant risks and opportunities into the corporate risk register. Risks, opportunities, and progress against mitigations are assessed and updated by management on a regular basis, including during the formal annual review.
Strategy	
Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long term.	Transitional risks such as regulatory changes, impact on oil demand, or community expectations regarding climate action, are the focus of Carnarvon's short (<1 year) and medium-term (2-5 years) planning. Transitional opportunities such as diversification and low-carbon technologies are the focus of Carnarvon's medium (2-5 years) and longer (5+ years) term planning. Medium term (2-5 years) and longer-term (5+ years) physical risks are considered in the engineering design process for the development of assets through the risk management processes.
Describe the impact of climate related risks and opportunities on the organisation's businesses, strategy, and financial planning.	Carnarvon's resilience to different climate-related scenarios is described in detail in the climate scenario analysis on page 24.
Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	

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TCFD Recommendations	CVN Statement 2023
Risk Management	
<p>Describe the organisation’s processes for identifying and assessing climate-related risks.</p> <p>Describe the organisation’s processes for managing climate-related risks.</p> <p>Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation’s overall risk management.</p>	<p>Carnarvon uses risk management software CGR to record and manage risks and opportunities associated with climate change. This software allows progress against mitigation measures to be easily monitored and ensures that risk owners are accountable. The risk register is reported to the RGS Committee biannually.</p> <p>Risks that are considered material to Carnarvon’s operations are incorporated into the corporate risk register which is reviewed by the Board on at least an annual basis in line with the Carnarvon Risk Management Policy.</p>
Metrics and Targets	
<p>Disclose the metrics used by the organisation to assess climate related risks and opportunities in line with its strategy and risk management process.</p> <p>Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.</p> <p>Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.</p>	<p>Carnarvon uses a variety of metrics to assess climate-related risks including impact(s) on IRR, NPV, CAPEX, OPEX, oil price and access to capital.</p> <p>Carnarvon’s Scope 2 emissions are summarised on page 20. As Carnarvon does not have production at the current time there are no Scope 1 emissions.</p> <p>Carnarvon currently offsets 100% of Scope 2 emissions and will continue to do so as part of our commitment to net zero by 2050.</p> <p>Carnarvon has formalised a Carbon Strategy to manage GHG emissions associated with future production operations over the longer-term.</p>

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Climate Change

During the reporting period, our Carbon Strategy was formalised, and we effected commercial arrangements to facilitate the acquisition and / or generation of ACCUs.

Carbon pricing

Following changes to the Safeguard Mechanism under the NGER Act, Carnarvon has reviewed the carbon price it utilises to assess the economic viability of future projects, and for screening new business opportunities.

Carnarvon has set a 'low end' price for ACCUs of A\$30/tCO₂-e, and a 'high-end' price of A\$75/tCO₂-e, escalated at CPI plus 2% per year from the 2023 – 2024 financial year in accordance with the 'cost containment' measure for ACCUs in the Safeguard Mechanism. Whilst this pricing methodology has relative certainty until 2030, beyond this date the price of ACCUs can't be accurately forecast and Carnarvon has assumed continued escalation at CPI plus 2% until the end of production from the Dorado field. Carnarvon's current intent is to ensure it has 'banked' a sufficient volume of ACCUs prior to 2030 through acquisition or generation using ACCU scheme methods to offset the entirety of its projected obligation under the Safeguard Mechanism for the Dorado development, with a contingency for possible future backfill.

Carnarvon has modelled the impact of the Safeguard Mechanism reforms on the Dorado development using low, mid and high end ACCU pricing consistent with the parameters noted. This has confirmed that the project remains economically robust under all conditions, with the impact of the Safeguard Mechanism reforms more pronounced in the later years of production, assuming there is no backfill and a lower rate of production applies.

For the purposes of screening new business opportunities outside Australia a default carbon price is used (in USD) which is informed by the current market price for 'high quality' international offsets like Verra and Gold Standard, with a standard escalation factor then applied.

Scenario modelling

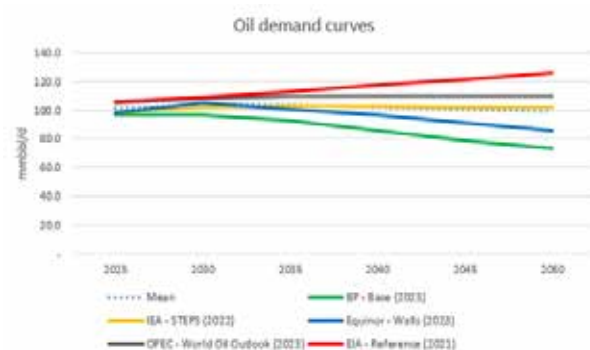
Consistent with its 2022 Sustainability Report ("2022 SR"), Carnarvon considers a range of external data to model the impacts of climate change on its business.

This data is predominantly focused on analysis of oil demand, given Carnarvon's core product is liquid fuels.

Carnarvon refreshed its scenario modelling in the reporting period to take account of the IEA's latest World Energy Outlook 2022, as well as updated analysis by BP, Equinor, Shell, OPEC and the U.S. Energy Information Administration ("EIA"). We also provided for the impact of significant geopolitical factors, like the Russian Federation's continued invasion of Ukraine, uncertain economic conditions, the direction of OPEC+ decisions and a re-calibration of policy settings in some OECD countries to recognise the importance of security of supply over advancing the energy transition without regard to current energy usage.

In assessing the impact of climate change on the forward demand for oil, Carnarvon primarily relies on scenarios prepared by the IEA and others which reflect current policy settings. That is, while 'net zero' scenarios like the IEA's NZE are considered, these are given lesser weight to those scenarios which, in Carnarvon's view, are more reflective of the likely oil demand in the period up to 2050.

The chart below aggregates oil demand projections from the latest updates to the 'base' scenarios prepared by the IEA, BP, Equinor, OPEC and the EIA:



In all referenced scenarios, oil continues to play a significant role in the global energy mix up until 2050, with demand projections varying depending on a range of factors, including emissions reductions, fuel efficiency, electrification, use of alternative liquid fuels, and regulatory intervention. This is unchanged from the analysis undertaken by Carnarvon in the 2022 SR and, in fact, concerns associated with the speed of the energy transition, and security of supply, have

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heightened in the intervening period. Further, without new supply, demand for oil is projected to outstrip current production in the period up to 2050 due to sustained under-investment. This has been recognised by the oil and gas majors, with Shell and BP, the IOCs with arguably the largest renewables portfolios, slowing down investment in this area and re-focusing on their legacy oil and gas businesses. Spending by the oil and gas industry in 2023 is expected to be at the highest level since 2015 based on IEA data, with the number of offshore projects approved this year also reaching a 10-year high.

Carnarvon's position remains that its business is well placed should demand for oil and gas lessen as a result of climate-related risk. The development of the company's Dorado and Pavo resources, as well as any future discoveries in the Bedout Sub-basin, will make an important contribution to regional fuel security once production commences. Demand for light, sweet crude like that produced from Dorado and Pavo is expected to increase in the Asian region over the next decade. This crude has a lower carbon intensity than heavier grades and is highly suited to feedstock for the petrochemical sector, which is forecast to increase oil use by up to 3 million barrels per day in the IEA's latest STEPS scenario.

Gas produced from the Dorado development in the future has a ready market for domestic use in Western Australia, as well as for possible export as LNG. The latest forecast by the Australian Energy Market Operator ("AEMO") is for a tight supply demand balance in the Western Australia gas market in the period up to 2029, with demand exceeding supply by up to 5%. From 2030 onwards, the market is projected to move into a larger deficit, with potential shortfalls of over 200 TJ/day as coal fired power generation is retired increasing the need for gas generation, and production from existing fields declines. Demand for LNG in the Asian region remains robust post 2030 under all the referenced scenarios, with any impact to gas demand caused by accelerated electrification more than offset by declining production due to lack of new regional supply.

Demand for advanced biofuels is also forecast to grow significantly in the period up to 2050 under various of the referenced scenarios, with the highest share of biofuels consumed in aviation and shipping, where large-scale electrician is challenging. Carnarvon remains committed to progressing its biofuels business to scale, with a financially disciplined approach currently focused on de-risking relevant biorefining technologies.

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Biorefining Venture

Carnarvon's biorefining joint venture, FEA, continued to make steady progress on the Narrogin Project over the course of the year.

The Narrogin Project will utilise waste lignocellulose biomass as feedstock which will undergo pyrolysis followed by a non-catalytic distillation process to produce a renewable diesel, and by-products wood vinegar and biochar. The proposed plant will have annual production of 18.8 million litres of renewable biodiesel, 7,424 tonnes of biochar and 6.2 million litres of wood vinegar.

During the year, a number of key deliverables were advanced, with FEED completed by Technip, regulatory approvals (in the form of environmental and development approvals) further progressed and pelletised feedstock secured.

In May of this year, ACIL Allen released an independent economic assessment report on the economic benefits of a renewable diesel industry in Western Australia based of FEA's Narrogin Project. The ACIL Allen report was the result of formal collaboration between FEA and Western Australia's regional power provider, Horizon Power ("**Horizon**"), following Horizon and FEA entering into a non-binding Memorandum of Understanding in July 2022 to jointly explore biorefining opportunities in Western Australia.

Following the end of the reporting period, FEA was successful in obtaining \$4.72 million in funding from the Western Australian Government's Investment Attraction Fund for the Narrogin Project. This funding is conditional on FID of the Narrogin Project, and several other considerations.



3D model of proposed Narrogin biorefinery.

Carnarvon continues to see strong fundamentals for a commercial biofuels business, with the business case underpinned by significant interest in offtake and Government support at both State and Federal level. However, commercialisation of technology remains a key deterrent.

Carnarvon is maintaining a disciplined approach to its investment in FEA as the joint venture progressively works through the various elements required to establish feasibility of the Narrogin project.



Looking ahead to 2024

We will continue to progress the biofuels business in the coming year, focusing on realisation of the technology pathway for the Narrogin Project, and the various other elements required to establish the project's feasibility.

We will also build-on our existing presence in the biofuels sector, maintaining existing relationships with the developers of other biofuels projects and assessing new opportunities that meet our required metrics.

We will monitor regulatory developments in respect of the introduction of the new climate disclosure regime, and ensure Carnarvon is positioned for compliance with the new requirements once these become applicable.

Our 2024 Goals

- Progress biofuels business in a targeted manner.
- Ensure the business is positioned for the introduction of mandatory disclosure of climate related financial risks and opportunities.

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ENVIRONMENTAL REGULATORY MANAGEMENT

2023 Highlights:



Dorado OPP accepted by NOPSEMA



Zero incidents of non-compliance with environmental laws and regulations

Our approach in 2023

Responsible environmental stewardship requires that we have a comprehensive understanding of, and respect for, the environment and our impact on it. Carnarvon recognises that activities and actions carried out during exploration, and in respect of future production operations, all have the potential to impact the environment. We strive to reduce this impact, and are committed to preventing significant environmental incidents from our activities, and complying with all applicable environmental laws and regulations.

A major milestone for Carnarvon during the year was the acceptance of the Dorado OPP by the regulator, NOPSEMA. Acceptance of the OPP means the joint venture has the primary environmental approval in place to proceed with the Dorado development. The joint venture is now focused on progressing secondary regulatory approvals for the Dorado development, including the relevant Environment Plans.

Carnarvon continued to meet all its environmental regulatory requirements during the reporting period, and had zero non-compliances with environmental laws and regulations. Our RGS Committee, along with our existing Health, Safety, and Environment (HSE) Policy, provides the relevant framework and oversight in our business to ensure the protection of the environment. Carnarvon's internal environmental policies can be found on our [website](#), and relevant regulatory approvals can be found on the NOPSEMA and NOPTA websites, as applicable.

Looking ahead to 2024

Carnarvon will work with the operator of the Dorado development, and its Bedout Exploration Permits, to prepare relevant Environment Plans for project development and exploration activities.

It is expected that consultation with relevant stakeholders will commence in respect of some of these Environment Plans in the next reporting period.

Our 2024 Goal

- Commence Environment Plan process for the Dorado development and future Bedout exploration activities.