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# 2021

**CLIMATE  
REPORT**





## Acknowledging country

Woodside recognises Aboriginal and Torres Strait Islander peoples as Australia's first peoples. We acknowledge the unique connection that Indigenous people have to land, waters and the environment. We extend this recognition and respect to Indigenous peoples and communities around the world.

## About this report

This Climate Report 2021 summarises Woodside's climate-related plans, activities, progress and climate-related data for the period 1 January 2021 to 31 December 2021.

This report has been structured to align with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations framework and provide a balance of disclosures that reasonably meet the recommendations of the TCFD while avoiding overwhelming users with information. The report has also been prepared with reference to selected relevant metrics from the Sustainable Accounting Standards Board (SASB) Oil and Gas Exploration and Production Standard.<sup>1,2</sup> Woodside is a supporter of the TCFD.

Woodside Petroleum Ltd (ABN 55 004 898 962) is the ultimate holding company of the Woodside group of companies. In this report, unless otherwise stated, references to "Woodside", "our", "us" or "we" refer to Woodside Petroleum Ltd and its controlled entities.

This report also contains references to the proposed combination (Proposed Transaction) of Woodside and BHP Group Limited's oil and gas business (BHP's petroleum business). There is no certainty or assurance that the Proposed Transaction will complete on the intended schedule or at all.

Further information regarding the scope of this report, risks, emissions data and other important information, including in relation to the Proposed Transaction, is contained in the Disclaimer on pages 44-45.

## Annual Report 2021 and Sustainable Development Report 2021

Our Annual Report 2021 provides a summary of Woodside's operations and activities for the 12 month period ended 31 December 2021 and Woodside's financial position as at 31 December 2021.

Our Sustainable Development Report 2021 provides a summary of Woodside's sustainability approach, health and safety performance and other material information for the 12-month period ended 31 December 2021.

Together this report, the Annual Report 2021 and the Sustainable Development Report 2021 provide a complementary review of Woodside's business.



The reports are available on our website at [www.woodside.com.au](http://www.woodside.com.au).

## Report feedback

We welcome feedback on our reports via [companyinfo@woodside.com.au](mailto:companyinfo@woodside.com.au)

## External assurance

Selected greenhouse gas emissions data is assured by GHD. Please refer to page 46-47 for more information on the scope of assurance.



We are working with Green Reports™ on an initiative ensuring that communications minimise environmental impact and create a more sustainable future for the community.

<sup>1</sup> Financial Stability Board 2017. "Recommendations of the Task Force on Climate-related Financial Disclosures. Final Report." Figure 4, Page 14.

<sup>2</sup> Sustainability Accounting Standards Board 2018. "Oil & Gas - Exploration and Production. Sustainability Accounting Standard. Version 2018-10." Table 1, Page 6.

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# MESSAGE FROM THE CHAIR OF THE BOARD

We are pleased to document for all stakeholders this Climate Report for Woodside, which outlines our strategy to respond to climate change and the energy transition.

During the course of 2021, we took final investment decisions for our Scarborough and Pluto Train 2 projects and announced the proposed merger with BHP's petroleum business. These announcements represent transformative steps for Woodside and climate change formed part of our considerations.

Climate change is a complex and material strategic governance issue that is directly overseen by the Board, with the support of our committees. Climate change is also a standing agenda item for each meeting of the Sustainability Committee, headed up by my Board colleague, Ann Pickard. In 2021, the committee considered many climate-related matters, including the Scope 3 emissions plan and investor expectations of climate-related disclosures.

This report includes our updated Climate Policy, which reinforces our objective to thrive through the energy transition as a low-cost, lower carbon energy provider.

The report outlines a plan to meet our near- and medium-term targets to reduce our net equity Scope 1 and Scope 2 greenhouse gas emissions by 15% in 2025 and 30% in 2030 in support of our aspiration of net zero emissions by



Richard Goyder, AO

2050 or sooner.<sup>1</sup> The report also details Woodside's Scope 3 emissions plan which includes a target to invest US\$5 billion in new energy products and lower-carbon services by 2030<sup>2</sup>.

We will put the Climate Report to a non-binding, advisory vote of shareholders at Woodside's 2022 Annual General Meeting, as requested by our shareholders.

The release of the report reinforces our commitment to communicating our climate strategy as we confirm our role in the energy transition.

**Richard Goyder, AO**

Chairman

17 February 2022

## Woodside's climate timeline

2016

- Announced an initial energy efficiency target of 5% over 5 years (2016-2020)<sup>3</sup>

2017

- Signed the World Bank's Zero Routine Flaring by 2030 Initiative, the first Australian company to do so

2018

- Established a carbon business to develop and acquire large scale offsets
- Signed the Methane Guiding Principles

2019

- Set a new 5% energy efficiency improvement target for 2021-2025<sup>4</sup>

<sup>1</sup> Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.

<sup>2</sup> Investment target assumes completion of the proposed merger with BHP's petroleum business. Individual investment decisions are subject to Woodside's investment hurdles. Not guidance.

<sup>3</sup> Efficiency improvement target performance (%) was measured relative to product energy efficiency prior to 2016.

<sup>4</sup> Superseded in 2020 by net equity Scope 1 and 2 greenhouse gas emissions targets.

# INTRODUCTION FROM THE CEO

Today, Woodside is an oil and gas company. I expect that these products will be used by the world for decades to come. This is because the human population is growing and becoming more prosperous. Throughout history this has meant consuming more energy, for a variety of uses - to keep warm, to stay cool, to cook, to keep the lights on and to provide fuel for transportation.

But the science of climate change is clear: if the world is to limit temperature rise, it will need to change the way that it produces and consumes energy. This process – sometimes called the “energy transition” – has already begun. In fact, energy markets have been in a constant state of transition as new sources and uses of energy have emerged.

The opportunities to transform our energy system are diverse. Different countries have different needs and approaches. Even within individual countries, the opportunities are often keenly debated. The role of natural gas is contested by some, despite ongoing robust demand. Conversely while there is stronger consensus about the future role of fuels like hydrogen and ammonia, market demand for them remains relatively small.

Woodside’s approach to climate strategy is simple. First, like all companies and consumers, we must reduce our net equity greenhouse gas emissions. Secondly, as an energy producer, we have to ensure that we profitably invest in the products and services that our customers need, as they too reduce their emissions. The uncertainty of how the energy transition will unfold means that we need diversity in our portfolio and the ability to adapt our product mix to meet changing demand.



Meg O'Neill

In this report, Woodside sets out its perspective and we draw on expert sources where we can. We explain how we intend to deliver on our climate strategy and we provide an update on our progress in 2021, including the challenges and risks that we face. A glossary and a disclaimer section at the end of this report explains key terms and assumptions. I know that not everybody will agree with our approach, and I respect and welcome diverse opinions.

This report provides an accessible summary of how we intend to work through the energy transition. I believe our approach provides the flexibility and product diversity required to responsibly optimise value in the coming years.

**Meg O'Neill**  
 CEO and Managing Director  
 17 February 2022

## 2020

- Surpassed initial 2016-2020 energy efficiency target, achieving an 8% improvement in energy efficiency against baseline<sup>3</sup>
- Set new net equity Scope 1 and 2 greenhouse gas emissions reduction targets of 15% by 2025, 30% by 2030 and a net zero aspiration by 2050 or sooner<sup>1</sup>
- Published “Next Steps” for climate change risk management disclosures utilising the Task Force on Climate-related Financial Disclosures framework
- Published a review of industry association alignment on climate
- Announced increased investment in new energy and our carbon business

## 2021

- Published a Scope 3 emissions plan
- Set a target of US\$5 billion investment in new energy products and lower-carbon services by 2030<sup>2</sup>
- Announced a collaboration with Heliogen for a 5 megawatt (MW) commercial-scale concentrated solar energy demonstration facility in California
- Commenced front end engineering and design on the H2OK hydrogen project in Oklahoma
- Secured land for the H2Perth and H2TAS hydrogen and ammonia projects in Australia
- Signed as a supporter of the Task Force on Climate-related Financial Disclosures

<sup>1</sup>All footnotes on this page are displayed on page 4.

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# EXECUTIVE SUMMARY

## SCOPE 1 AND 2 EMISSIONS

**15%** by 2025 | **30%** by 2030

Net equity emissions reduction targets with an aspiration of net zero by 2050 or sooner.<sup>1</sup>

**2021 highlight:** Achieved 10% reduction compared to 2016-2020 gross annual average.

### Strategy

Woodside's climate strategy is to reduce our net equity greenhouse gas emissions, while investing in the products and services that our customers need as they reduce their emissions.

We have a portfolio of quality oil and gas assets, and are developing new energy products and lower-carbon services.

In 2021 our three major markets (Japan, China and Republic of Korea) updated their Nationally Determined Contributions under the Paris Agreement and set mid-century "net zero" goals.<sup>3</sup>

We have set near- and medium-term targets to reduce net equity Scope 1 and 2 greenhouse gas emissions.

We have three ways to achieve these targets: avoiding emissions through design; reducing them through efficient operations; and offsetting the remainder. Avoiding and reducing emissions are our first priority. Offsets, that are scientifically verified and accurately accounted for, also have an important role.

We are a signatory to the Methane Guiding Principles and are actively pursuing methane emissions reduction and measurement opportunities.

We have announced a Scope 3 emissions plan, containing three elements: investing in new energy products and lower-carbon services; supporting our customers and suppliers to reduce their net emissions; and promoting global measurement and reporting.

We have tested our portfolio of producing and sanctioned assets against a range of climate-related scenarios from the International Energy Agency, including scenarios aligned with limiting climate change to 1.5 degrees Celsius.

## SCOPE 3 EMISSIONS

Targeting investment of **US\$ 5 billion**

in new energy products and lower-carbon services by 2030.<sup>2</sup>

**2021 highlight:** Announced progress of a suite of potential new energy opportunities.

### Targets and metrics: our progress in 2021

In 2021, Woodside's net equity Scope 1 and 2 greenhouse gas emissions were 10% below the 2016-2020 gross annual average, on course to meet our 2025 target of a 15% reduction. These reductions were achieved by a range of design, operations and offsetting actions.

Methane emissions were less than 0.1% of production by volume. This is already well below the Oil and Gas Climate Initiative (OGCI) 2025 methane intensity target of below 0.2%.

### Risk management

Climate change is one of nine strategic risks identified within Woodside's strategic risk profile.

A range of transitional and physical risks and opportunities have the potential to affect Woodside's strategy in the short-, medium- and long-term.

### Governance

Woodside's Board oversees climate change as a complex and material strategic and governance issue. It regularly discusses climate change, and incorporates climate-related matters into its decision-making.

The Board reviewed Woodside's Climate Policy in 2021 and adopted revisions in early 2022. The Climate Policy is shown on page 7.

Woodside's executive team is responsible for the delivery of Woodside's strategy, in particular the delivery of emissions reduction targets and the development of new investment opportunities.

<sup>1</sup> Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.

<sup>2</sup> Investment target assumes completion of the proposed merger with BHP's petroleum business. Individual investment decisions are subject to Woodside's investment hurdles. Not guidance.

<sup>3</sup> The Paris Agreement was adopted on 12 December 2015. Please refer to <https://www.unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement/>

## WOODSIDE POLICY



### BACKGROUND

The Intergovernmental Panel on Climate Change has stated that “it is unequivocal that human influence has warmed the atmosphere, ocean and land”. An objective of the Paris Agreement is to hold “the increase in the global average temperature to well below 2°C above pre-industrial levels” and to pursue “efforts to limit the temperature increase to 1.5°C”. Many countries have set targets to reduce greenhouse gas emissions, including by changing the way they produce and consume energy.

### OBJECTIVE

Woodside's objective is to thrive in this energy transition as a low cost, lower carbon energy provider.

### PRINCIPLES

Woodside aims to achieve the objective by:

- Setting science-based<sup>1</sup> near, mid, and long-term net emissions reduction targets that are consistent with Paris-aligned<sup>2</sup> scenarios, covering equity scope 1 and 2 emissions, both operated and non-operated.<sup>3</sup>
- Developing and operating oil and gas projects in a manner that is consistent with these targets. This includes the deployment of lower-emission technologies (Design Out), supporting efficient operations (Operate Out) and use of robust offsets (Offset) as methods to reduce and offset greenhouse gas emissions.
- Investing in new energy products and lower carbon services to reduce customers' emissions (part of Woodside's Scope 3 emissions), including but not limited to hydrogen, ammonia and carbon capture, utilisation and storage.
- Publishing transparent climate-related disclosures aligned to the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) or other recognised global reporting standards.
- Aligning our advocacy to the principles of this Climate Policy.

### APPLICABILITY

Responsibility for the application of this policy rests with all Woodside employees, contractors and joint venture participants engaged in activities under Woodside operational control. Woodside managers are also responsible for promotion of this policy in non-operated joint ventures.

This policy will be reviewed regularly and updated as required.

*Reviewed in January 2022*

<sup>1</sup> Woodside is using the draft Prototype IFRS Sustainability Disclosure Standard definition of “science-based” (published 2021) which states “targets are considered ‘science-based’ if they are in line with what the most recent climate science sets out is necessary to meet the goals of the Paris Agreement—limiting global warming to below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit warming to 1.5 degrees Celsius.” See <https://www.ifrs.org/content/dam/ifrs/groups/trwg/trwg-climate-related-disclosures-prototype.pdf> (Appendix A).

<sup>2</sup> Woodside is using the draft Prototype IFRS Sustainability Disclosure Standard definition of “Paris-aligned scenarios” (published 2021) which states “scenarios consistent with limiting global warming to below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit warming to 1.5 degrees Celsius.” See <https://www.ifrs.org/content/dam/ifrs/groups/trwg/trwg-climate-related-disclosures-prototype.pdf> (Appendix A).

<sup>3</sup> Equity emissions means the share of the total emissions arising from an activity that are attributable to Woodside in proportion to Woodside's ownership interest in the activity, irrespective of whether Woodside operates the activity. Operated emissions are the total emissions arising from an activity that Woodside operates, irrespective of Woodside's ownership interest.

# STRATEGY

## The science of climate change

Climate science is a rapidly evolving field in which new observations continue to improve our understanding of the current and potential impacts of global warming. The Intergovernmental Panel on Climate Change (IPCC) provides a synthesis of current science that is broad based, robust and supported by statements of scientific confidence.

In August 2021, the IPCC released its report “Climate Change 2021 – The Physical Science Basis”.<sup>1</sup> This is the Working Group I contribution to the IPCC’s Sixth Assessment Report (the AR6-WG1 report) and is a summary of current published scientific knowledge on climate change. It is intended to provide a common base on which policy can be developed. It has 234 authors from 66 countries, 14,000 cited references, and received a total of 78,007 expert and government review comments. Further reports in this 6th Assessment Cycle will be issued during 2022 covering impacts, adaptation and vulnerability (AR6-WG2), mitigation of climate change (AR6-WG3) and a final synthesis report (AR6-SYR).

The AR6-WG1 report states that it is unequivocal that there is human-induced warming. It also shows that many climate model predictions associated with global warming, such as increased rainfall, increased average temperatures and more frequent extreme weather events, have now been observed.

The AR6-WG1 report also states that increased carbon dioxide levels in the atmosphere, generated by human activity, are the largest driver of warming over the long-term. There are also a range of short-term factors. Most notable of these are emissions of methane (which increase warming in the short-term) and atmospheric aerosols, particularly sulphur dioxide (which is a pollutant but also decreases warming in the short-term). Aerosol pollution is declining which means the cooling impact it has had to date is decreasing.

The IPCC says that there are three high level requirements to limit further climate change. The world needs to keep future CO<sub>2</sub> emissions within a set carbon budget, reach net zero CO<sub>2</sub> emissions, and support the first two requirements with strong, rapid and sustained reductions in other greenhouse gas emissions including methane.

<sup>1</sup> IPCC (2021). “Climate Change 2021 – the Physical Science Basis. Summary for Policymakers. Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change”.





## The energy transition

The use of fossil fuels for energy accounts for around three quarters of total anthropogenic greenhouse gas emissions.<sup>1</sup> This means that efforts to meet climate change goals must include changes to the way that the world produces and consumes energy. These changes are referred to as the “energy transition”.

The precise shape and pace of the energy transition is uncertain. It will vary in different countries – because they have different starting points, development requirements, resources and capabilities.

Woodside expects the energy transition to involve a sequence of overlapping changes. Net zero represents the point at which the world stops adding to the atmospheric concentration of greenhouse gases. The trajectory that

net emissions follow to reach net zero is important as it will impact how much of the allowable carbon budget is used and therefore the magnitude of climate change that occurs as a result. Utilising solutions now that can reduce emissions in the near-term, even if they are not the preferred solutions for the long-term is, in Woodside's view, the right thing to do.

This means that the use of some of today's energy technologies will increase, others will decrease, and some will disappear. New technologies need to be invented.

As an energy provider, we aim to adapt our portfolio of products and services to meet changing demand, balance risk and deliver acceptable returns.

<sup>1</sup> IEA 2021. "Net Zero 2050 – A Roadmap for the Global Energy Sector", page 13. All rights reserved.

Landscape near Karratha



## Woodside's climate strategy

Woodside aims to thrive through the energy transition by building a low-cost, lower-carbon, profitable, resilient and diversified portfolio. Our climate strategy is an integral part of our company strategy. It has two key elements: reducing our net equity Scope 1 and 2 greenhouse gas emissions, and investing in the products and services that our customers need as they reduce their emissions.

In this section we describe our strategic approach to these elements.

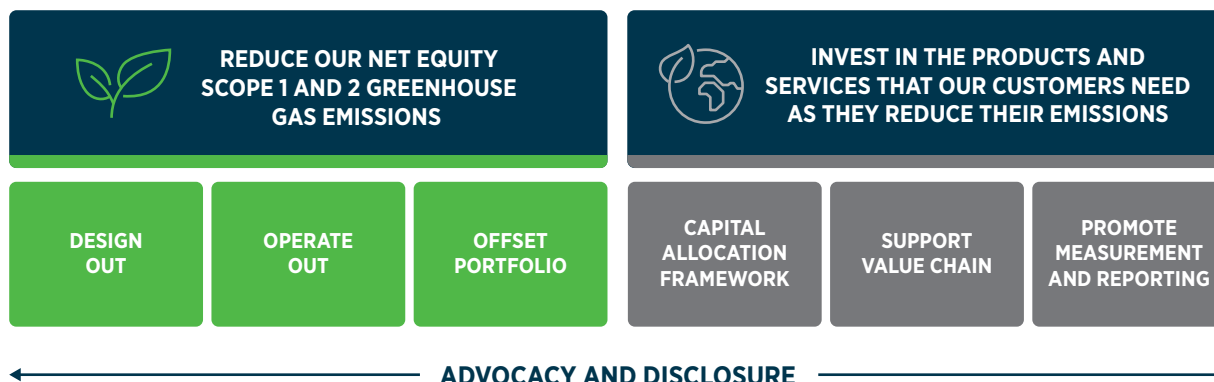
In the subsequent Targets and metrics section we report on our 2021 progress on pages 24-29. Short-, medium- and long-term risks and opportunities that could impact on our business are discussed in the Risk management section on pages 30-33.

### WOODSIDE'S STRATEGY

## THRIVE THROUGH THE ENERGY TRANSITION



### CLIMATE IMPERATIVES SUPPORTING THE STRATEGY



## Capital allocation framework

Woodside has a portfolio of quality oil and gas assets that provides the foundation to deliver new growth opportunities. We are also developing a portfolio of new energy projects. These projects have limited scale today with the potential for significant future growth, as customer demand increases and technology decreases the cost of supply.

Our capital allocation framework sets target investment criteria for oil, gas and new energy opportunities. Not all energy investments are the same, and these three investment types are fundamentally different in nature and have different risk/return profiles. We will use this capital allocation framework to create a diversified and flexible portfolio which is responsive to changes in demand and supply for our products.

The Scope 1 and 2 greenhouse gas emissions from projects in all capital allocation categories need to be managed to meet our net equity emissions reduction target of 30% by 2030 and a net zero aspiration by 2050 or sooner.<sup>3</sup>

	OIL	GAS		NEW ENERGY
	OFFSHORE	PIPELINE	LNG	DIVERSIFIED
Focus	Generate high returns to fund diversified growth, focusing on high quality resources	Leveraging infrastructure to monetise undeveloped gas, including optionality for hydrogen		New energy products and lower-carbon services to reduce customers' emissions; hydrogen, ammonia, CCUS <sup>1</sup>
Characteristics	High cash generation Shorter payback period Quick to market	Stable long-term cash flow profile Resilient to commodity pricing	Long-term cash flow Strong forecast demand Upside potential	Developing market Lower capital requirement Lower risk profile
Opportunity targets	IRR > 15% Payback within 5 years <sup>2</sup>	IRR > 12% Payback within 7 years <sup>2</sup>		IRR > 10% Payback within 10 years <sup>2</sup>
Emissions reduction	30% net equity emissions reduction by 2030, net zero aspiration by 2050 or sooner <sup>3</sup>			

## Natural gas in our portfolio

Natural gas is the dominant product in Woodside's portfolio, representing approximately 81% of equity production in 2021. Most of our natural gas is sold as liquefied natural gas (LNG). Some relevant attributes of natural gas are:

- When used to generate electricity, natural gas emits around half the life cycle emissions of coal;<sup>4</sup>
- The International Energy Agency (IEA) advises that while renewable, nuclear and other low carbon power sources are expected to meet most additional power demand, gas and coal are expected to compete to fill the gap;<sup>5</sup>
- More than half of the world's natural gas supply is used in sectors other than power generation, such as in industrial applications and fertiliser manufacturing, some of which have lower emissions intensity than power generation;<sup>6,7</sup>

- In the form of LNG, natural gas is transportable and flexible between destinations, which is an advantage during an uncertain and potentially volatile energy transition;<sup>8</sup>
- While energy storage technologies (such as batteries) continue to improve, natural gas enables cost-effective and reliable conversion of power grids to renewable electricity because of its ability to 'firm up' intermittent generation (that is, support intermittent renewable generation by quickly ramping up or down to ensure stable electricity supply);<sup>9</sup>
- Natural gas is also used for hydrogen manufacture by steam methane reforming. This process, including carbon capture and storage (CCS), is predicted by the IEA to represent almost half of hydrogen production in 2030 in their Net Zero Emissions by 2050 Scenario (NZE).<sup>10</sup>



Refer to IEA report at [iea.org/reports/the-role-of-gas-in-todays-energy-transitions](https://www.iea.org/reports/the-role-of-gas-in-todays-energy-transitions)

<sup>1</sup> CCUS refers to carbon capture utilisation and storage.

<sup>2</sup> Payback refers to ready for start-up (RFSU) + x years.

<sup>3</sup> Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.

<sup>4</sup> IEA 2019. "The role of gas in today's energy transitions", page 4. All rights reserved.

<sup>5</sup> IEA 2021. "Coal 2021 - analysis and forecast to 2024", pages 11, 14 and 27. All rights reserved.

<sup>6</sup> IEA 2021. "World Energy Outlook 2021", page 185. All rights reserved.

<sup>7</sup> Perdaman Urea Project 2019. "Greenhouse Gas Assessment - Final Report", pages 7-8.

<sup>8</sup> IEA 2020. Website accessed 2022. <https://www.iea.org/commentaries/record-year-for-gas-liquefaction-investment-lights-a-path-towards-market-flexibility>. All rights reserved.

<sup>9</sup> Wood, T. and Ha, J. (2021). "Go for net zero". Grattan Institute. Page 30.

<sup>10</sup> IEA 2021. "Net Zero 2050 - A Roadmap for the Global Energy Sector", page 76. All rights reserved.

Natural gas can also help address poor air quality which can cause material health impacts.<sup>1</sup> Compared to coal and biomass combustion, natural gas is relatively low in particulates, sulphur dioxide and nitrous oxides that can contribute to poor air quality.<sup>2,3</sup>

Gas projects typically generate long-term cash flows and tend to be resilient through the commodity price cycle. We will target an internal rate of return (IRR) greater than 12% and payback within 7 years.<sup>4</sup> The business case for the recently sanctioned Scarborough project exceeded these investment hurdles. Gas projects can also include adjacent hydrogen production, depending on nearby resources and market.

We also see a significant ongoing role for Woodside's LNG production to support our customers' decarbonisation commitments, which are described further on page 14.

### Oil in our portfolio

Oil plays an important part in Woodside's portfolio. Even in the most ambitious decarbonisation scenarios, such as the IEA's NZE scenario, oil consumption is modelled to remain in excess of 24 million barrels per day in 2050 (compared to 90 million in 2020).<sup>5</sup> On average, the Scope 1 and 2 greenhouse gas emissions arising from conventional offshore oil production are lower than from the production of LNG, but when combusted the Scope 3 emissions from using the product are higher.<sup>6,7</sup>

Oil demand will be increasingly substituted out of the relatively easy to abate sectors such as power generation and road passenger vehicle transportation, but remain stronger for hard-to-abate and non-combustion uses such as aviation and synthetic materials.<sup>8</sup>

Oil projects typically have shorter payback periods than LNG projects.<sup>4</sup> They also typically generate strong cash flow, so we expect them to be an important part of funding Woodside's investment into new energy and lower-carbon services through the energy transition. For future oil developments we will target an IRR greater than 15% and payback within 5 years.<sup>4</sup>

### New energy products and lower-carbon services in our portfolio

We recognise that while unabated natural gas can help countries move *towards* net zero greenhouse gas emissions, it cannot help them reach zero on its own because most end uses of natural gas result in greenhouse gas emissions.

**“Industry, transportation, coal power plants and household solid fuel usage are major contributors to air pollution. Air pollution threatens the health of people in many parts of the world. New estimates in 2018 reveal that 9 out of 10 people breathe air containing high levels of pollutants. Both ambient (outdoor) and household (indoor) air pollution are responsible for about 7 million deaths globally per year.”<sup>1</sup>**

To reach net zero these residual greenhouse gas emissions need to be abated, such as through carbon capture utilisation and storage (CCUS). Alternatively, natural gas can be supplemented and eventually displaced by emerging products such as hydrogen. We refer to these emerging products as “new energy”.

New energy demand is expected to be driven by customers and government policies, with the active support of suppliers like Woodside, that can collaborate to build supply and demand. We recognise that demand is likely to increase when the cost of these new energy sources is low enough for customers to switch to them. Woodside intends to accelerate this switch by pursuing low-cost solutions that reduce emissions today and offer a pathway to further reduce emissions in the future as markets, technology and costs improve.

In 2021, Woodside set a US\$5 billion investment target by 2030 for new energy products and lower-carbon services such as hydrogen, renewables and CCUS.<sup>9</sup> We announced projects that support this strategy, summarised on pages 28-29.

New energy projects are not exposed to upstream or resource risk in the way a traditional oil or gas development is. There is also a lower financial barrier to entry, given the lower capital required for development. We will target an unlevered IRR greater than 10% and payback within 10 years.<sup>4</sup> New energy projects can potentially be scaled up to meet demand as the market develops.

<sup>1</sup> World Health Organisation. Website accessed 2022. [www.who.int/westernpacific/health-topics/air-pollution](https://www.who.int/westernpacific/health-topics/air-pollution)

<sup>2</sup> IEA 2019. Website accessed 2022. <https://www.iea.org/articles/does-household-use-of-solid-biomass-based-heating-affect-air-quality>. All rights reserved.

<sup>3</sup> Progress in Energy and Combustion Science 2018. “The role of natural gas and its infrastructure in mitigating greenhouse gas emissions, improving regional air quality, and renewable resource integration”, page 66.

<sup>4</sup> Payback refers to ready for start-up (RFSU) + x years.

<sup>5</sup> IEA 2021. “World Energy Outlook 2021”, page 73. All rights reserved.

<sup>6</sup> Wood MacKenzie 2019. Website accessed 2022. <https://www.woodmac.com/news/opinion/greener-Ing-is-vital-to-asias-sustainable-development/>

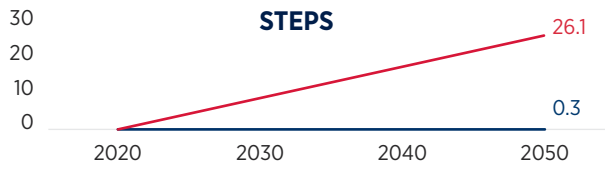
<sup>7</sup> IEA 2017. Website accessed in 2022. <https://www.iea.org/commentaries/the-environmental-case-for-natural-gas>. All rights reserved.

<sup>8</sup> IEA 2021. “Net Zero by 2050: a roadmap for the global energy sector”, pages 45 and 102. All rights reserved.

<sup>9</sup> Investment target assumes completion of the proposed merger with BHP's petroleum business. Individual investment decisions are subject to Woodside's investment hurdles. Not guidance.

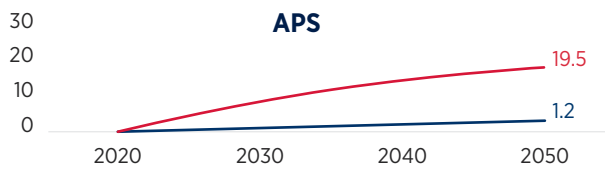
The IEA has modelled a range of scenarios by which the energy transition could unfold. It is clear there is an important role for oil, gas and hydrogen in all IEA scenarios. Even in the Net Zero Emissions scenario the forecast cumulative global investment in oil and gas needed to meet the world's energy needs is approximately US\$10 trillion by 2050.

**ESTIMATED CUMULATIVE GLOBAL INVESTMENT UNDER THE RANGE OF IEA SCENARIOS (US\$ TRILLION)<sup>1</sup>**



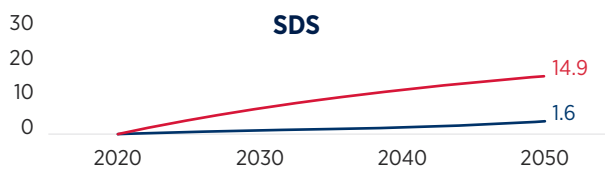
**Stated Policies (STEPS) >2.0°C**

Not Paris aligned. Global temperature rise above 2°C



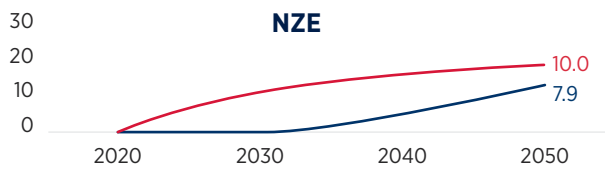
**Announced Pledges (APS) ~2.1°C**

Not Paris aligned. Global temperature rise to 2.1°C with a 50% probability



**Sustainable Development (SDS) ~1.5 to 1.65°C**

Paris aligned scenario. Global temperature rise is limited to 1.65°C with a 50% probability (potentially 1.5°C with some level of net negative emissions)



**Net Zero Emissions (NZE) ~1.5°C**

Paris aligned scenario. Global temperature rise is limited to 1.5°C with a 50% probability

— Oil and gas — Hydrogen

<sup>1</sup> Based on data from IEA 2021. "World Energy Outlook 2021" and IEA 2021: "Net Zero by 2050: a roadmap for the global energy sector" (all rights reserved) as modified by Woodside analysis, real terms 2019. These scenarios are described in full on page 22.



Karratha Gas Plant and Pluto LNG are part of Woodside's portfolio of oil and gas assets

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## Country decarbonisation plans

The decarbonisation plans of Woodside's target markets provide insight into their future energy mix and inform Woodside strategy. Under the terms of the Paris Agreement each country submits its "Nationally Determined Contribution" (NDC) to the Agreement's goals. These NDCs summarise national targets and plans. They are published by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat.



### Japan

Japan updated its First Nationally Determined Contribution on 22 October 2021. It states:

"Japan aims to reduce its greenhouse gas emissions by 46 percent in fiscal year 2030 from its fiscal year 2013 levels, setting an ambitious target which is aligned with the **long-term goal of achieving net zero by 2050**. Furthermore, Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emission by 50 percent." (Page 1)

Japan also published an "Outline of Strategic Energy Plan" in October 2021.<sup>1</sup>

This plan assumes that LNG, while reducing from 37% in 2019, still makes up 20% of Japan's electricity generation mix in 2030. Renewables double from 18% to 36-38% and nuclear power increases from 6% to 20-22% (page 12). Outside the electricity sector it says in respect of heating **"We will pursue the shift to natural gas on demand side** and decarbonization of gas through methanation and other means, which play a significant role in decarbonizing heat demand. We will also work to further strengthen the resilience of gas." (Page 11)



### China

The People's Republic of China updated its First Nationally Determined Contribution on 28 October 2021. It states:

"On September 22, 2020, President Xi Jinping declared, at the General Debate of the 75th Session of the United Nations General Assembly, that China would scale up its Nationally Determined Contributions (NDCs) by adopting more vigorous policies and measures, and **aims to have CO<sub>2</sub> emissions peak before 2030 and achieve carbon neutrality before 2060.**" (Page 5)

"China will stringently curb coal-powered projects, set strict limitation on the increase in coal consumption over the 14th FYP period and to

phase it down in the 15th FYP period.<sup>2</sup> The large scale development of wind and solar power will be accelerated, hydro power in accordance with local condition will be developed, nuclear power will be advanced in an ordered manner with the premise of ensured safety, **and peaking power including energy storage and gas-powered electricity will be stepped up rapidly.**" (Page 34)

"China will push forward technological breakthroughs in various fields to support the green and low-carbon transition, **such as renewable energy, hydrogen energy, smart grid and energy storage, CCUS**, circular economy, low-carbon transportation and smart cities, climate change impact and risk assessment." (Page 48)



### Republic of Korea

The Republic of Korea updated its First Nationally Determined Contribution on 23 December 2021. It states:

"The Republic of Korea declared to move towards the **goal of carbon neutrality by 2050** in December 2020 and has finalized its 2050 carbon-neutrality scenarios as a follow-up measure." (Page 1)

"The Republic of Korea is seeking to dramatically phase down coal-fired power generation while ramping up renewable power. **Aged coal power plants will be shut down or shift their fuels from**

**coal to Liquefied Natural Gas (LNG).** The uptake of solar and wind power will be scaled up as well." (Page 2)

"The Republic of Korea has markedly raised its 2030 target on the **deployment of zero-emission vehicles such as the ones powered by electricity and hydrogen.**" (Page 3)



Refer to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat at [unfccc.int](http://unfccc.int).

Emphasis on this page has been added by Woodside.

<sup>1</sup> Government of Japan, Agency for Natural Resources and Energy (METI) 2021. "Sixth Strategic Energy Plan."

<sup>2</sup> FYP is an abbreviation of Five Year Plan.

## Woodside's Scope 1 and 2 emissions plan

Woodside reports and sets company-wide targets to reduce Scope 1 and 2 greenhouse gas emissions on a net equity basis, including both operated and non-operated assets.<sup>1</sup>

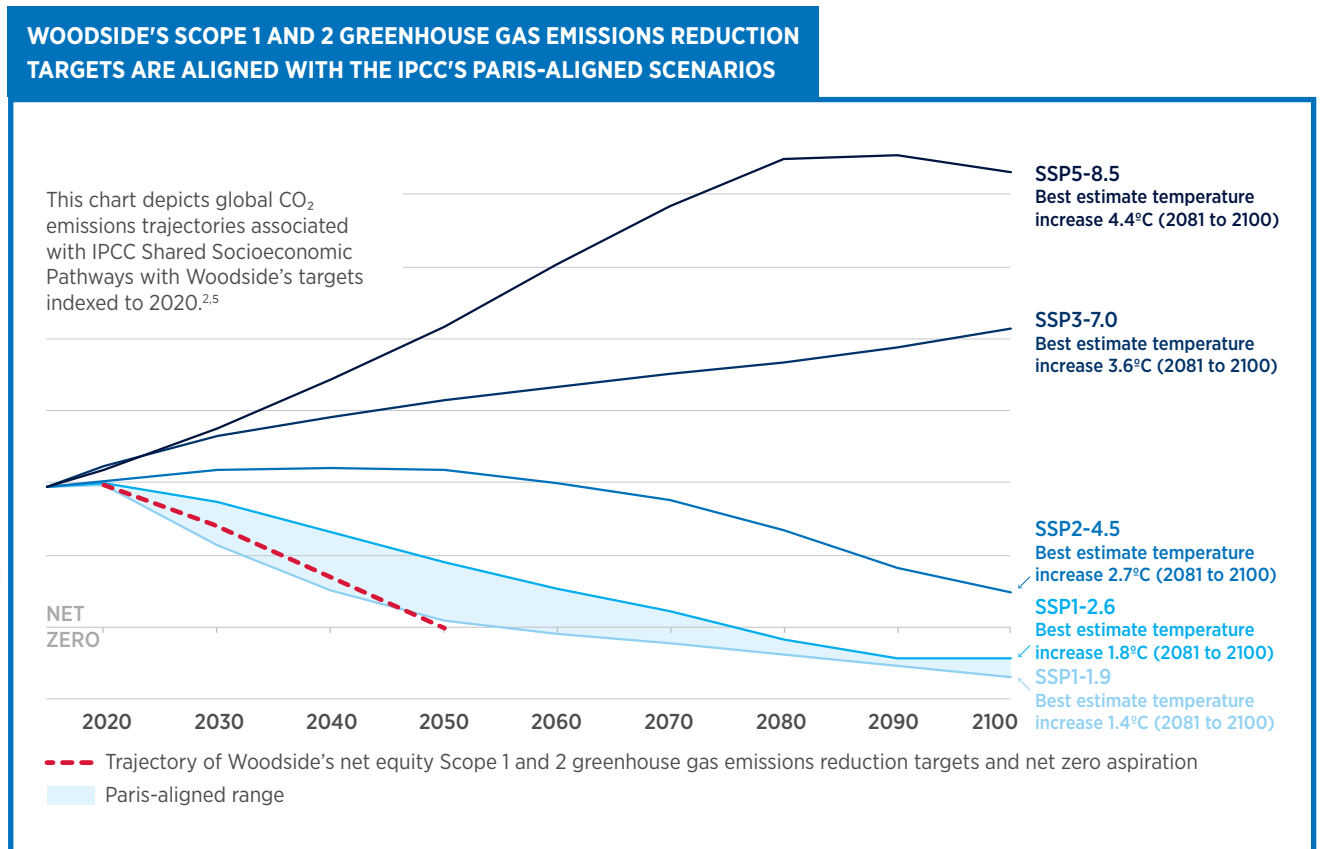
In 2020, Woodside announced targets for near- and medium-term emissions reduction below the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020. These targets are to reduce net equity Scope 1 and 2 greenhouse gas emissions by:

- 15% by 2025
- 30% by 2030
- Towards an aspiration of net zero by 2050 or sooner.<sup>2</sup>

Woodside considers targets to be “science-based” if they are in line with what the most recent climate science sets out is necessary to meet the goals of the Paris Agreement - limiting global warming to below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit warming to 1.5 degrees Celsius. This is also the definition included in the International Financial Reporting Standards (IFRS) Foundation's draft Climate-related Disclosures Prototype.<sup>3</sup>

The chart below is drawn from the IPCC's AR6-WG1 report, published in August 2021. Woodside's targets and net zero aspiration are superimposed upon the chart, to demonstrate that they are aligned to the IPCC's “SSP1-1.9” scenario which would achieve a 1.4 degrees Celsius outcome by 2100. Woodside uses the IPCC Pathways when considering greenhouse gas emissions as they are a definitive and peer-reviewed source for global emissions pathways linked to climate impacts.

Woodside is aware that the Science Based Targets Initiative (SBTi) is considering a methodology for the oil and gas sector. The methodology is not yet complete. Woodside has discussed technical matters with SBTi in respect of the methodology that need to be resolved in order for it to be applicable to Woodside. Woodside also monitors and engages with the Transition Pathway Initiative, Climate Action 100+, Carbon Tracker and Influencemap.<sup>4</sup>



<sup>1</sup> Greenhouse gas emissions, energy values and global warming potentials are estimated in accordance with the National Greenhouse and Energy Reporting (NGER) methodology as applicable in FY20-21. Equity share is calculated in accordance with the GHG Protocol's Corporate Accounting and Reporting Standard, page 17: "Under the equity share approach, a company accounts for GHG emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation". [www.ghgprotocol.org](http://www.ghgprotocol.org). Please refer to the Glossary on page 41 for further definition of Scope 1 and 2 greenhouse gas emissions.

<sup>2</sup> Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.

<sup>3</sup> IFRS 2021. "Climate-related Disclosures Prototype". Page 15 (Appendix A).

<sup>4</sup> SBTi - <https://sciencebasedtargets.org>; Transition Pathway Initiative - <https://www.transitionpathwayinitiative.org>; Climate Action 100+ - <https://www.climateaction100.org>; Carbon Tracker - <https://carbontracker.org>; Influence Map - <https://influencemap.org>

<sup>5</sup> IPCC 2021. "Climate Change 2021 - the Physical Science Basis. Summary for Policymakers. Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change", page 41.

Woodside's targets are absolute reduction targets from an historically established baseline, aiming to deliver net emissions reduction even as Woodside grows its business and makes new investment decisions in accordance with its capital allocation framework described on page 11.

Woodside can achieve its net equity Scope 1 and 2 greenhouse gas emissions reduction targets in three ways:

- Avoiding greenhouse gas emissions through the way we **design** our assets;
- Reducing greenhouse gas emissions through the way we **operate** our assets; and
- Originating and acquiring **offsets** for the remainder.

Woodside also plans to influence the adoption of similar measures at non-operated assets.

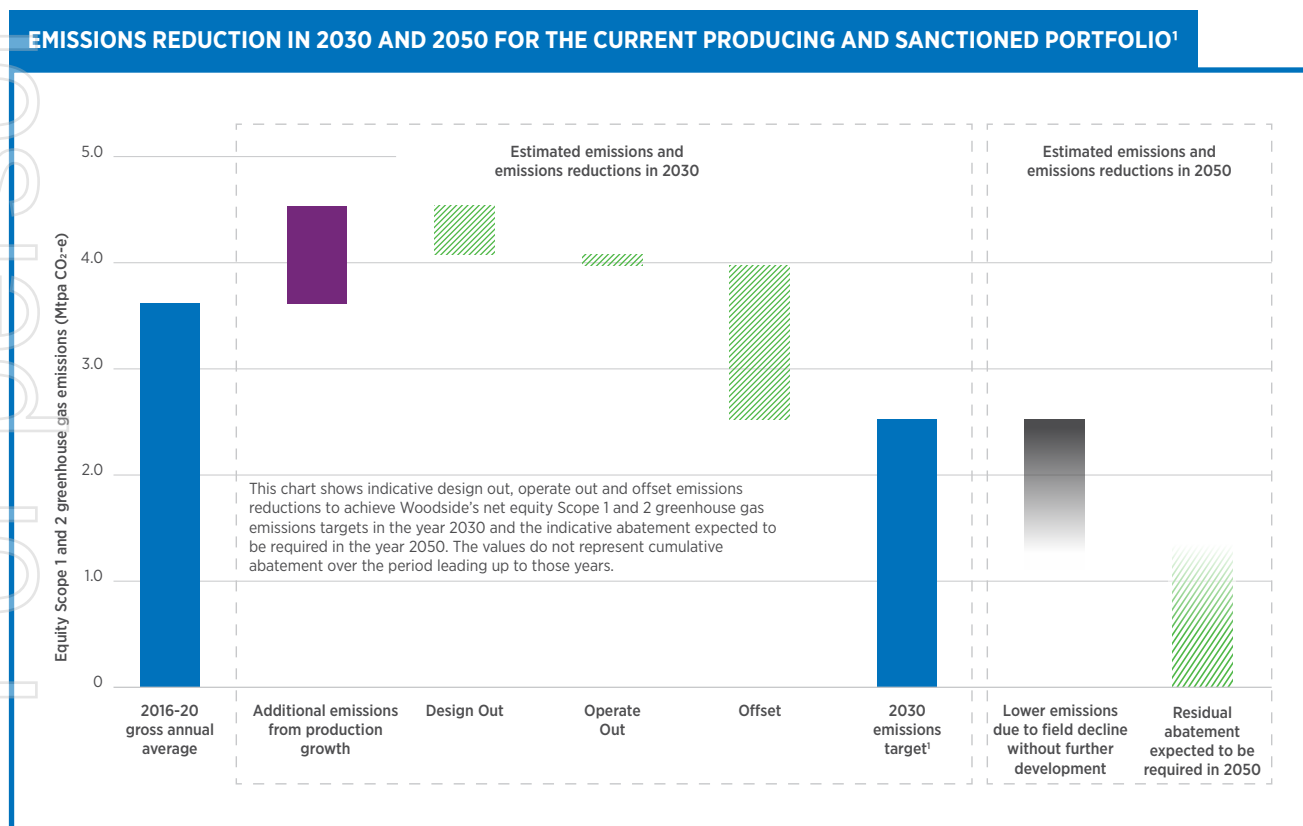
**Avoiding greenhouse gas emissions** in design ("design out") is achieved through making modifications to the configuration of the asset. This is primarily done in the initial design phase before the asset is built or through major modifications during the asset's life, when these can be achieved without over-capitalising the asset. Woodside intends to develop decarbonisation plans for each operated asset in 2022 to ensure that the right opportunities are pursued, with further technology developed where needed.

**Reducing greenhouse gas emissions** through operations ("operate out") is achieved through incremental improvements to operating practices as well as minor modifications to plant and infrastructure. Each operated asset produces a plan with ongoing governance and calibration of emissions reduction opportunities throughout the year. This includes maturing an energy efficiency mindset across assets and challenging operational philosophies such as saving fuel gas through start-up procedures and minimising spare capacity in power generation.

Avoiding and reducing emissions depends on changing the design or operating practice at our assets, which may require joint venture approval and face technical and economic constraints. However, **offsets** can be pursued on a project basis to meet regulatory requirements, or a Woodside-only basis to meet our voluntary targets. The role of offsets is discussed further on page 19.

Abatement opportunity decisions are made assuming a long-term cost of abatement of US\$80 t CO<sub>2</sub>-e (real terms). This carbon price is reviewed and selected by Woodside as one of the assumptions it applies to economic evaluation.

The chart below shows the approximate contribution towards achieving our 2030 emissions reduction target from designing out, operating out or offsetting, and the residual abatement which may be required in 2050.



<sup>1</sup> Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.



### Emissions reduction opportunities

Approximately 68% of Woodside's equity Scope 1 greenhouse gas emissions in 2021 were from the combustion of natural gas as a fuel source. Please refer to the data table on page 40 for more details. Options for reducing these emissions include replacing gas power generation with renewables and battery storage, and electrifying stationary energy turbines. Turbines can also be made more efficient, such as through the incorporation of aero-derivative turbines in the proposed Pluto Train 2. Retrofitting these opportunities onto existing assets is technically viable today but introduces trade-offs in economics, reliability and risk, all of which are expected to evolve over time as technology and the cost of carbon develop. For this reason, emissions reduction opportunities are regularly reviewed.

Other emissions come from flaring, from reservoir CO<sub>2</sub> that has been removed from the produced natural gas stream prior to processing, and from fugitive methane emissions. CCUS technologies have the potential to provide an abatement option for some of these emissions, providing collection of sufficient emissions can be achieved close to CCUS infrastructure.

Longer term opportunities for further electrification, emissions capture and efficiency are also possible, with the potential to contribute additional abatement beyond 2030. These opportunities remain subject to successful technology development and improved cost effectiveness.

Examples of some potential long-term opportunities related to Woodside's business are listed in the table below. Not all of these were actively pursued by Woodside in 2021.

#### FUTURE POTENTIAL DECARBONISATION OPPORTUNITIES

Maturity level	Future decarbonisation opportunities
<b>Emerging technologies that could potentially be deployed when cost effective</b>	Hydrogen as partial/total fuel replacement for gas turbines (includes hydrogen storage)
	Carbon capture and storage
	Carbon capture and utilisation
	Next Generation solar photovoltaics (PV)
	Additive manufacturing (3D printing) of components
	Renewable power firming technologies (e.g. ultra-large batteries or switching)
	Fugitive methane emission controls and monitoring
	Hybrid e-drive turbine helper motors
	Green synthetic fuel generation
	Flare elimination
	Recycled green steel
Full electrification of balance of plant	
<b>Technologies at early stage of development</b>	Turbine flue gas capture
	Direct air capture of CO <sub>2</sub>
	Allam cycle generators
	Carbon neutral electric reforming (induction, resistance, plasma) and electro-catalytic reforming
	Low pressure CO <sub>2</sub> shipping


## Woodside's methane emissions plan

After carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) has made the second largest contribution to human-induced climate change and is believed to have contributed to around 30% of the global temperature rise to date.<sup>1</sup>

The Global Methane Initiative estimated that in 2020 approximately 24% of global human-induced methane emissions would come from the oil and gas sector. Other sources include agriculture, coal mines, municipal solid waste and wastewater.<sup>2</sup>

According to the IEA, tackling methane emissions from fossil fuel operations represents one of the best near- and medium-term opportunities for limiting the worst effects of climate change because of its short-lived nature in the atmosphere and the large scope for cost-effective abatement, particularly in the oil and gas sector.<sup>3</sup>

Minimising methane emissions has been a priority for Woodside because if leaked at significant levels, methane could create a safety risk on our assets and result in a loss to our production of LNG. Because of the emphasis we have had on containing methane effectively, our methane emissions are less than 0.1% of our production by volume. This is already well below the Oil and Gas Climate Initiative (OGCI) 2025 methane intensity target of below 0.2%.

 Refer to OGCI methane and carbon intensity targets at [ogci.com/ogci-sharpens-its-methane-and-carbon-intensity-targets/](https://ogci.com/ogci-sharpens-its-methane-and-carbon-intensity-targets/)

Woodside is a signatory of the Methane Guiding Principles which are intended to drive action on methane emissions across the oil and gas industry and with its customers. The principles aim to advance understanding and best practices for reducing methane emissions, and to develop and implement methane policies and regulations.

In 2022 we will further refine methane action plans for our operated assets and trial quantitative measurement of methane emissions. Frontline engineering, operations and maintenance staff are empowered to understand and act on methane emissions to support a sustainable "find and fix" philosophy that can be implemented by site personnel.

Woodside will also work with non-operated joint ventures to help them improve robust methane emissions management.

Given the short-term nature of methane as a greenhouse gas compared to CO<sub>2</sub>, Woodside assesses methane abatement opportunities using a 20 year global warming potential rather than the IPCC standard 100 year potential. Combined with our long-term carbon price assumption of US\$80 t CO<sub>2</sub>-e (real terms), this results in the prioritisation of methane opportunities when considering the financial value of abating CO<sub>2</sub>-e emissions.

<sup>1</sup> IEA (2021). Curtailing methane emissions from fossil fuel operations - Pathways to a 75% cut by 2030. Page 7. All rights reserved.

<sup>2</sup> Global Methane Initiative factsheet "Global Methane Emissions and Mitigation Opportunities" at [www.globalmethane.org/documents/gmi-mitigation-factsheet.pdf](https://www.globalmethane.org/documents/gmi-mitigation-factsheet.pdf). Page 1.

<sup>3</sup> IEA (2021). Curtailing methane emissions from fossil fuel operations - Pathways to a 75% cut by 2030. Page 2. All rights reserved.

Tree planting in Western Australia forms part of our portfolio of carbon origination projects

### The use of offsets to achieve net emissions reduction

Avoiding and reducing emissions are our first priority when planning how to achieve our net equity Scope 1 and 2 greenhouse gas emissions reduction targets. However, offsets – where emissions from within Woodside’s business are balanced by reduction or avoidance of emissions elsewhere – also play an important role.

In the short- to medium-term, offsets can help Woodside to accelerate net equity emissions reduction beyond technical and economic limits for design-out or operate-out opportunities within our business, or while these opportunities are being implemented. This is important because near-term net emissions reduction preserves the world’s carbon budget, which is the amount that can be emitted prior to achieving net zero emissions, if it is to stay within any given temperature increase.

In the longer term, some of the technologies that underpin offsets are expected to play a sustained role in both neutralising the emissions from hard-to-abate sectors, and in driving towards “net negative” global emissions so that the concentration of greenhouse gases in the atmosphere begins to reverse. The importance of carbon dioxide removal (CDR) has most recently been described in the IPCC’s AR6-WG1 report.<sup>1</sup> Woodside’s use of offsets provides investment into these technologies to help them develop and scale, and our direct participation helps to improve the robustness of methodologies and accounting techniques.

At the COP-26 global climate summit in 2021, world governments agreed to progress the rules for international carbon offset trading through Article 6 of the Paris Agreement.

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**“Anthropogenic CO<sub>2</sub> removal (CDR) has the potential to remove CO<sub>2</sub> from the atmosphere and durably store it in reservoirs (high confidence).”<sup>1</sup>**

### Woodside’s approach

Woodside recognises that there are important conditions on the use of offsets:

- 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.

Woodside established a carbon business in 2018 to develop a sustainable offset portfolio in support of our base business and new energy projects. We **acquire** offsets from carbon markets and also **originate** our own, managing them on a portfolio basis to optimise the cost of meeting both regulatory and corporate targets.

This approach is intended to manage the risk of future changes to the cost, availability and regulatory framework for offsets, by developing a diverse portfolio differentiated by vintage, methodology and geography.

We retire offsets annually to meet our net equity Scope 1 and 2 greenhouse gas emissions reduction targets. Details of our activities in 2021 are provided on page 25.

### KEY CHALLENGE

**The acceptability of some offset technologies might change over time. The Oxford Principles for Net Zero Aligned Carbon Offsetting were published by the Smith School of Enterprise and the Environment at the University of Oxford in September 2020.<sup>2</sup> They propose a hierarchy for how offset portfolios might develop. Woodside is considering how to align its carbon offset strategy with these principles.**

<sup>1</sup> IPCC (2021). “Climate Change 2021 – the Physical Science Basis. Summary for Policymakers. Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, page SPM-39.

<sup>2</sup> University of Oxford Smith School of Enterprise and the Environment 2020. “The Oxford Principles for Net Zero Aligned Carbon and Offsetting.”

## Woodside's Scope 3 emissions plan

Scope 3 emissions are the indirect greenhouse gas emissions that occur in a company's value chain, other than those included in Scope 1 emissions (that is, direct emissions from owned or controlled sources) and Scope 2 emissions (that is, indirect emissions from the generation of purchased energy consumed by the reporting company). For example, they include the emissions that arise when the products we sell are transported to customers and consumed; or when the goods and services that we buy get created.

The chart below, modified from the Greenhouse Gas Protocol's "Corporate Value Chain (Scope 3) Accounting and Reporting Standard", provides an overview of the three GHG Protocol scopes and selected categories of Scope 3 emissions.<sup>1</sup> The GHG Protocol is an initiative of the World Resources Institute and the World Business Council for Sustainable Development which establishes global standardised frameworks to measure and manage greenhouse gas emissions.

Importantly, Woodside's Scope 3 emissions are also a different entity's Scope 1 emissions. However, Woodside has an interest in their appropriate management through the energy transition.

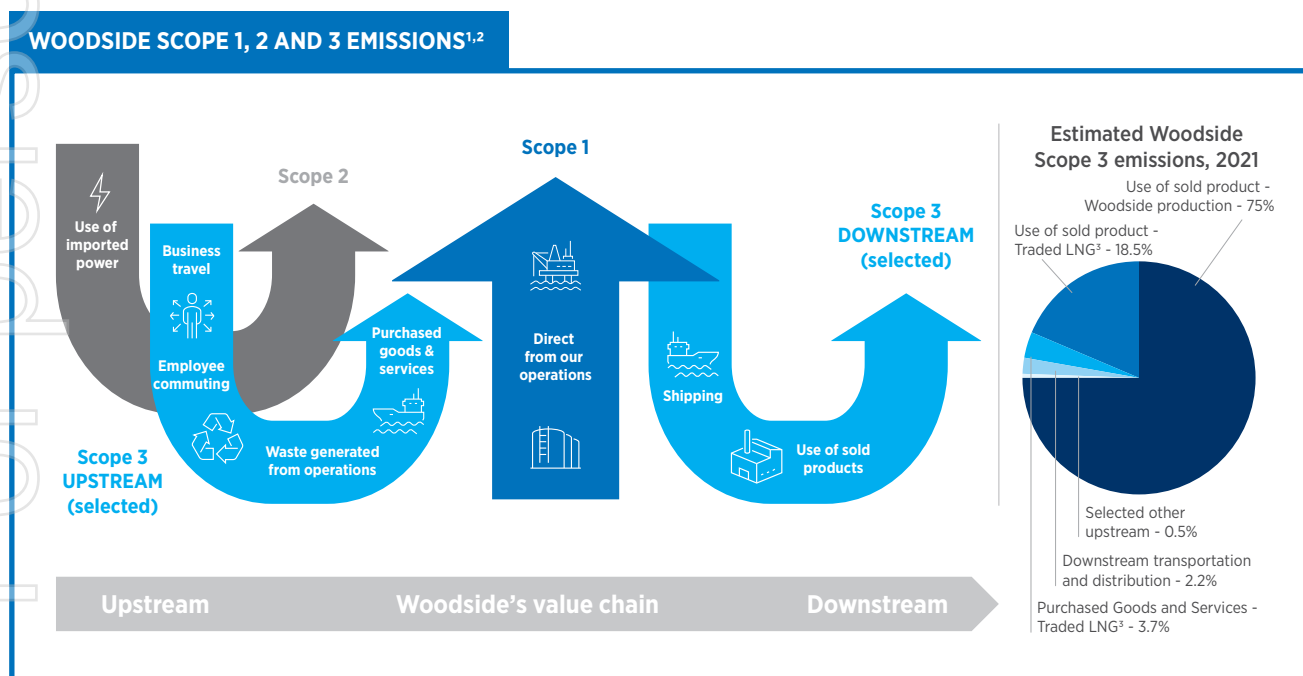
For Woodside, the largest source of Scope 3 emissions is from the use of oil and gas by our customers or "use of sold product". Therefore, the key focus of our Scope 3 plan is on investing in the development of new energy products,

such as hydrogen and ammonia, and lower-carbon services such as CCS, that can significantly reduce these end-use emissions. From 2021, Woodside will report estimated Scope 3 emissions associated with our traded volumes of LNG as well as our own production, noting that this will result in some double counting of Scope 3 emissions with the original producer of this Traded LNG.<sup>3</sup>

Other sources of Scope 3 emissions for Woodside include waste, business travel, the purchase of goods and services, and the shipping of our products. Although these are a smaller proportion of emissions than those arising from the use of our product, these emissions may be easier to measure and influence.

Challenges to robust Scope 3 emissions reporting include inconsistent reporting regimes across the global value-chain of our products and services, boundaries that ignore the real-world emissions reduction impact of offsets and coal-to-gas switching, and average end-use emissions factors that fail to identify differences in end-use emissions between customers. Woodside's Scope 3 emissions plan aims to find solutions to address these issues. Over time, we believe reporting regimes will evolve to better support global decarbonisation across value-chains and the successful implementation of global carbon markets.

Our 2021 Scope 3 emissions estimates are included in the data table on page 40.



<sup>1</sup> World Resources Institute and World Business Council for Sustainable Development (2011). "Corporate Value Chain (Scope 3) Accounting and Reporting Standard", page 5.

<sup>2</sup> Data supporting these categories is provided in the climate related data table on page 40.

<sup>3</sup> Traded LNG means the purchase and/or sale of spot and/or strip of LNG cargoes.

Woodside has a three-point Scope 3 emissions plan to address these emissions.

SCOPE 3 EMISSIONS PLAN

## INVEST

### NEW ENERGY PRODUCTS | LOWER-CARBON SERVICES

Collaboration with customers to build market demand  
Recent announcements: Heliogen, H2Perth, H2TAS, H2OK, CCS

## SUPPORT

### CUSTOMER AND SUPPLIER EMISSIONS REDUCTION

Carbon offset cargoes | Methane Shipping | Contracting | Business travel

## PROMOTE

### GLOBAL MEASUREMENT AND REPORTING

Emerging harmonisation of global standards  
Transparent emissions reporting

**New energy investment consistent with Paris-aligned pathways<sup>1</sup>**

#### 1. Invest in new energy products and lower-carbon services

Woodside expects increasing demand for new energy products such as hydrogen and ammonia, and lower-carbon services such as CCUS. These can reduce the emissions arising when our customers consume energy compared to unabated use of fossil fuels.

Our intention is to add these new products and services to our portfolio to support our customers' chosen decarbonisation pathways, taking care to match the pace and scale of our investment to support and meet global demand.

In December 2021, Woodside announced a US\$5 billion investment target by 2030 for these products and services.<sup>2</sup>

We recently announced several projects in support of our strategy, summarised on pages 28-29.

These projects are supported by research and development, including partnerships for hydrogen refuelling infrastructure in Korea, and substitution of coal by ammonia in Japan.

#### 2. Support our suppliers and customers to reduce net emissions

Woodside can support the decarbonisation goals of its suppliers and customers by forming partnerships with them and by taking action ourselves. For example, we are planning to:

- Review emissions reduction opportunities for our upstream Scope 3 emissions, such as business air travel;
- Develop a plan to address net emissions from the shipping of our products during 2022;
- Partner with customers on data-sharing and technical collaboration;
- Include emissions data reporting requirements in major contracts.

#### 3. Promote global measurement and reporting

Our Scope 3 emissions reporting is currently based on estimates rather than actual measurements. This inhibits the ability to set targets, focus our actions and report our progress.

To address this we are planning to continue:

- Developing bilateral tracking methods with customers where we have agreed to deliver carbon-offset cargoes;
- Participating in industry collaboration initiatives, such as through the International Standards Organisation, to develop robust cross-border tracking methodology.

<sup>1</sup> Relative oil and gas versus hydrogen potential investment consistent with a range of outcomes predicted between IEA's Net Zero Emissions (NZE2050) and Sustainable Development Scenario (SDS). The NZE2050 global temperature rise is limited to 1.5 degrees Celsius with a 50% probability and the SDS global temperature rise is limited to 1.65 degrees Celsius with a 50% probability (potentially 1.5 degrees Celsius with some level of net negative emissions).

<sup>2</sup> Investment target assumes completion of the proposed merger with BHP's petroleum business. Individual investment decisions are subject to Woodside's investment hurdles. Not guidance.

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## Financial resilience testing of Woodside's portfolio using scenarios

Woodside uses a range of climate scenarios to test the financial resilience of our portfolio of producing assets and sanctioned projects, including the four scenarios published in the IEA's 2021 World Energy Outlook. The IEA scenarios were selected because they are publicly available and provide a wide range of potential energy transition pathways linked to different climate outcomes for resilience testing.

The scenario analysis estimates the impact of each scenario on the potential average annual free cashflow (FCF) generated by our portfolio.

A summary of insights from the scenario analysis is:

- FCF is positive in all scenarios, including NZE, a 1.5 degrees Celsius scenario. The APS, SDS and STEPS scenarios generate additional FCF, but of these only SDS is aligned with the Paris Agreement outcomes;
- Average FCF from 2022 to 2026 is lower than subsequent periods due to high capital expenditure during this period for Scarborough, Pluto Train 2 and the Sangomar Field Development Phase 1;
- FCF generation increases from the late 2020s after Scarborough start-up. This then declines due to the natural field decline of older assets in our portfolio,

because the analysis assumes no new oil and gas investment;

- Oil and gas price differences between the scenarios have a greater impact on FCF through to 2040 than carbon pricing.

The analysis includes a price on carbon for all emissions above our net equity Scope 1 and 2 greenhouse gas emissions reduction targets of 15% by 2025 and 30% by 2030.<sup>1</sup> Carbon pricing is not applied to Scope 3 emissions as this is accounted for in the demand and therefore the oil price calculated in each scenario by the IEA's World Energy Model.<sup>2</sup> The carbon price assumptions used in the analysis are provided on page 23.

### Business growth

The scenarios illustrate that there are a wide range of possible pathways for the energy transition. This supports the rationale for Woodside using market analysis and a disciplined capital allocation framework to inform investment decisions as we grow and diversify our portfolio. Woodside can realise additional value by investing in projects that complement our existing portfolio, including new energy products such as hydrogen.

### IEA'S DESCRIPTION OF SCENARIOS USED

The IEA's World Energy Outlook 2021 (WEO) explores three main scenarios in the analyses in the chapters and also includes projections for the Sustainable Development Scenario (SDS) for continuity with previous editions of the WEO and to provide pathways that are compliant with the Paris Agreement for regions that have not yet announced net zero pledges. These scenarios are not predictions – the IEA does not have a single view on the future of the energy system. In contrast to the 2020 edition of the WEO, it does not vary the assumptions about public health and economic recovery implications across the scenarios. The scenarios are:

The **Net Zero Emissions by 2050 Scenario (NZE)** shows a narrow but achievable pathway for the global energy sector to achieve net zero CO<sub>2</sub> emissions by 2050, with advanced economies reaching net zero emissions in advance of others. This scenario also meets key energy-related United Nations Sustainable Development Goals (SDGs), in particular achieving universal energy access by 2030. The NZE does not rely on emissions reductions from outside the energy sector to achieve its goals, but assumes that non-energy emissions will be reduced in the same proportion as energy emissions. It is consistent with limiting the global temperature rise to 1.5°C without a temperature overshoot (with a 50% probability).

The **Sustainable Development Scenario (SDS)** is a "well below 2°C" pathway, and represents a gateway to achieving the outcomes targeted by the Paris Agreement. The SDS assumes all energy-related SDGs are met, all current net zero pledges are achieved in full, and there are increased efforts to realise near-term emissions reductions; advanced economies reach net zero emissions by 2050, China around 2060, and all other countries by 2070 at the latest. Without assuming extensive net negative emissions, this scenario is consistent with limiting the global temperature rise to 1.65°C (with a 50% probability). With some level of net negative emissions after 2070, the temperature rise could be reduced to 1.5°C in 2100.

The **Announced Pledges Scenario (APS)** takes account of all of the climate commitments made by governments around the world, including Nationally Determined Contributions as well as longer term net zero targets, and assumes that they will be met in full and on time. The global trends in this scenario represent the cumulative extent of the world's ambition to tackle climate change as of mid-2021. The remaining difference in global emissions between the APS and the goals in the NZE or the Sustainable Development Scenario shows the "ambition gap" that needs to be closed to achieve the goals agreed in the Paris Agreement in 2015.

The **Stated Policies Scenario (STEPS)** does not take for granted that governments will reach all announced goals. Instead, the STEPS explores where the energy system might go without additional policy implementation. As with the APS, it is not designed to achieve a particular outcome. It takes a granular, sector-by-sector look at existing policies and measures and those under development. The remaining difference in global emissions between the STEPS and the APS, represents the "implementation gap" that needs to be closed for countries to achieve their announced decarbonisation targets.



Source: [iea.org/reports/world-energy-outlook-2021](https://www.iea.org/reports/world-energy-outlook-2021).

<sup>1</sup> Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.

<sup>2</sup> IEA 2021. "World Energy Model Documentation". All rights reserved.

**MODELLED IMPACT OF CLIMATE SCENARIOS ON POTENTIAL ANNUAL AVERAGE FREE CASH FLOW FROM CURRENT PRODUCING AND SANCTIONED ASSETS (NOT GUIDANCE)<sup>1,2</sup>**



**Oil price (US\$/bbl, Brent)\* <sup>3</sup> and carbon price (US\$ t CO<sub>2</sub>-e) average real 2020<sup>4</sup>**

	2022 - 2026	2027 - 2031	2032 - 2036	2037 - 2040
<b>IEA NZE</b>	48 59	36 117	31 160	29 194
<b>IEA SDS</b>	62 55	57 108	54 140	53 163
<b>IEA APS</b>	70 55	68 108	66 140	66 163
<b>IEA STEPS</b>	74 23	76 37	79 50	82 61

\*2017-2021 average real terms 2020 Brent price was US\$62/bbl.

**Climate considerations for the Scarborough investment decision**

The final investment decisions for the Scarborough and Pluto Train 2 projects demonstrate how climate-related considerations can inform decision making by Woodside. These considerations included:

- The project economics included the cost of meeting our net equity Scope 1 and 2 greenhouse gas emission targets given the incremental emissions from Scarborough. This was modelled using an US\$80 t CO<sub>2</sub>-e (real terms 2022) long-term cost of carbon applied to meeting the expected regulatory abatement requirements and our corporate voluntary abatement targets. Sensitivities were considered at higher and lower-carbon prices based on IEA and other published scenarios;
- The resilience of the business case was tested for a range of gas prices based on the assumptions that Woodside applies to economic evaluation which are in turn informed by a wide range of externally published scenarios including those from the IEA;
- The Board and executive team considered a range of opportunities to avoid emissions through the design of

the facilities including power generation options and electrification;

- A risk assessment for the decision was undertaken, covering climate-related issues such as regulatory and legal factors and informed by externally published scenarios.

These considerations were discussed regularly at both Board and executive levels in the lead up to the decision.

**Limitations of the analysis**

Scenario analysis has limitations and is based on a wide range of assumptions. It involves interpreting each scenario to generate annual average price points (see chart above). It further requires isolating all variables except for oil and carbon pricing to enable examination of climate-related factors.

The scenario analysis, therefore, does not include decisions Woodside could make in response such as acquisitions, divestments or cost reduction.

This analysis must therefore not be interpreted as Woodside investment guidance. These are scenarios not forecasts and no likelihood is assigned to any of these scenarios eventuating.

<sup>1</sup> Nominal Cashflows.

<sup>2</sup> Equity assumptions used: Woodside only (i.e. not including the Proposed Transaction to merge with BHP's petroleum business), Sangomar 82%, Scarborough 73.5% and Pluto T2 51%.

<sup>3</sup> Based on data from IEA 2021. "World Energy Outlook 2021" as modified by Woodside analysis. Woodside used interpolation techniques to estimate Brent annual price points in between the years that the IEA disclosed price points for (which are real terms 2020). For gas pricing assumptions all non-contracted LNG volumes were assessed at IEA's Japan import price, as a proxy for North Asian LNG spot price. Woodside used interpolation techniques to estimate annual gas price points in between the years that the IEA disclosed prices for (which are real terms 2020). For oil linked LNG contracts, prices are derived from the Brent forecasts and the terms of the contracts.

<sup>4</sup> Based on data from IEA 2021. "World Energy Outlook 2021" as modified by Woodside analysis. The IEA only provide carbon prices from 2030 onwards. As a result, Woodside used a 2020 average Australian regulatory carbon price to derive a starting price point of US\$11.51 t CO<sub>2</sub>-e RT2022. Woodside used the 2020 starting price point and the IEA's published 2030 and 2040 carbon prices for each scenario to interpolate annual price points through to 2040.

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# TARGETS AND METRICS: OUR PROGRESS IN 2021

## 2021 net equity Scope 1 and 2 greenhouse gas emissions performance

Woodside's net equity Scope 1 and 2 greenhouse gas emissions totalled 3,235 kt CO<sub>2</sub>-e in 2021, which was 10% below the 2016-2020 gross annual average, and on course to achieve Woodside's 2025 target of a 15% reduction.

In 2021, 68% of Woodside's equity Scope 1 greenhouse gas emissions were from fuel combustion to power our assets, 19% came from venting of which the majority is associated with removal of reservoir CO<sub>2</sub> as part of the LNG process, and 13% from flaring.

Assets operated by Woodside accounted for 85% of these emissions, and the remainder came from assets in which Woodside has ownership but not direct operational control.

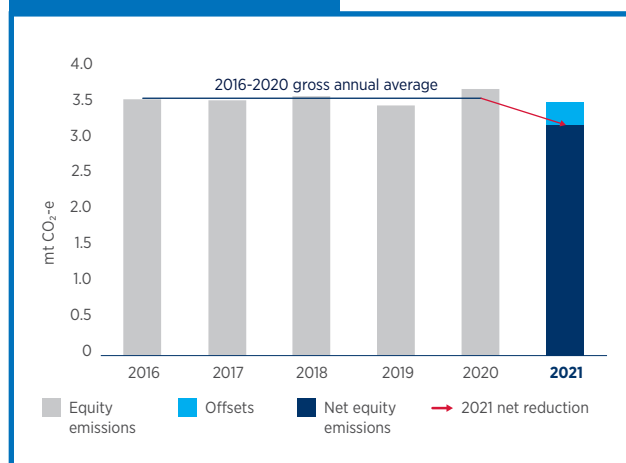
### Avoided and reduced emissions

Design-out emissions reductions are estimated against current engineering design, and operate-out emission reductions are estimated against planning forecasts which necessarily make assumptions about future operating conditions. We provide best engineering judgments but recognise that they are only estimates.

In 2021, equity Scope 1 and 2 greenhouse gas emissions were an estimated 59.8 kt CO<sub>2</sub>-e lower than the business planning forecast.

Some examples of the many actions Woodside has taken to avoid and reduce emissions are provided on pages 26-27, along with estimates of the emissions savings arising from these actions.

### SCOPE 1 AND 2 EMISSIONS<sup>1</sup>



### Action on methane emissions

Woodside's methane emissions were less than 0.1% of production by volume in 2021. Woodside has taken specific actions to address methane emissions, and reported them via the Methane Guiding Principles website. Please refer to the below table for examples of 2021 initiatives.



Please refer to Methane Guiding Principles at [methaneguidingprinciples.org](https://methaneguidingprinciples.org)

Methane Guiding Principle	Woodside 2021 initiative
<b>Continuously reduce methane</b>	<ul style="list-style-type: none"> <li>Pursued design-out opportunities associated with seal oil venting and flaring.</li> <li>Delivered operate-out methane emissions reduction including:                             <ul style="list-style-type: none"> <li>streamlining the process of trunkline depressurisation for the turnaround at Karratha Gas Plant;</li> <li>undertaking acid gas removal unit process optimisation trial to reduce co-absorption of methane.</li> </ul> </li> <li>Added methane as a 'check box' on SAFE (See, Assess, Fix, Encourage) cards to support operational 'find and fix' behaviours in the workforce.</li> </ul>
<b>Advance strong performance across gas value chains</b>	<ul style="list-style-type: none"> <li>Initiated a technical engagement workshop with local operators, pipeline operators and gas distribution operators focused on methane emissions reduction at all our Western Australian operations.</li> <li>Engagement with non-operated joint venture participants to support identification of methane emissions reduction opportunities across non-operated assets.</li> <li>Developed a Scope 3 emissions plan for engagement with customers and suppliers to support methane emissions reduction and promote global measurement and transparent greenhouse gas emissions reporting.</li> </ul>
<b>Improve accuracy of methane emissions data</b>	<ul style="list-style-type: none"> <li>Commenced satellite survey monitoring.</li> <li>Undertook a gap analysis and technology assessment for methane measurement and reporting.</li> <li>Continued integration of survey data and laboratory sampling to complement our inventory of site-specific methane factors.</li> </ul>
<b>Advocate sound policy and regulations on methane emissions</b>	<ul style="list-style-type: none"> <li>Chaired the International Petroleum Industry Environmental Conservation Association (IPIECA) Net Zero Task Force and participated in the Australian Petroleum Production and Exploration Association (APPEA) Methane Taskforce.</li> <li>Advocated via industry consultation for updates to reporting frameworks that more closely align with internationally recognised methods such as the American Petroleum Institute (API) and improve the completeness and accuracy of reported methane emissions nationally.</li> </ul>
<b>Increase transparency</b>	<ul style="list-style-type: none"> <li>Woodside's climate-related disclosures are structured to align with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).</li> </ul>

<sup>1</sup> Equity Scope 1 and 2 greenhouse emissions. This chart includes emissions of inert compounds which have a global warming potential of zero, in order to align with Australian regulatory standards. This inclusion explains the differences to the equivalent chart in the Sustainable Development Report, which does not include the inert compounds prior to 2021 for reasons of consistency with previous reports.



## Carbon portfolio

Woodside has built a portfolio of offsets and carbon origination projects. These are already sufficient to meet our net equity Scope 1 and 2 greenhouse gas emissions reduction target of 15% by 2025.<sup>1</sup> The average cost of offsets secured for this period is less than US\$15 t.<sup>2</sup>

Woodside estimates the quantity of offsets required to meet expected future regulatory requirements and our corporate emissions targets, considering the production and greenhouse gas emissions forecasts and risk factors associated with oil and gas businesses.<sup>3</sup> Estimates are compared to actual results at each asset to provide insight on performance against emissions reduction targets and to improve the accuracy of future forecasts.

## Retiring offsets

In respect of 2021 net equity Scope 1 and 2 greenhouse gas emissions, Woodside has retired international offsets accredited by two independent non-government organisations, Verra and Gold Standard.<sup>4</sup> These organisations' standards have been reviewed by the Australian Government and are included as eligible offsets under the Climate Active Carbon Neutral Standard for Organisations.<sup>5</sup> The offsets retired are described in the table below. Woodside was not required to retire any Australian Carbon Credit Units (ACCU) in 2021.

### SOURCES OF OFFSETS RETIRED IN RESPECT OF 2021 EMISSIONS

Project Name	Project ID	Project developer	Project Type	Method	Country	Vintage
<b>Antai Group Waste Gas Recovery for Power Generation Project</b>	Gold Standard GS 605	South Pole Carbon Asset Management Limited	Energy Efficiency - Industrial	ACM0012: Waste energy recovery	China	2016 - 2017
<b>19.2 MWp Solar Power Project by HZL at Debari and Dariba, Rajasthan</b>	Verra VCS 1819	Hindustan Zinc Limited	Energy industries (renewable/non-renewable sources)	ACM0002: Grid-connected electricity generation from renewable sources	India	2017
<b>Bundled Wind Power Project in Tamilnadu, India</b>	Verra VCS 1353	Tamilnadu Spinning Mills Association (TASMA-V2)	Energy industries (renewable/non-renewable sources)	ACM0002: Grid-connected electricity generation from renewable sources	India	2017
<b>Hyundai Steel Waste Energy Cogeneration Project</b>	Verra VCS 786	Hyundai Green Power and CERPD	Energy Efficiency - Industrial	ACM0012: Waste energy recovery	Republic of Korea	2017
<b>WithOneSeed Timor Leste Community Forestry Program</b>	Gold Standard GS 4210	WithOneSeed	Forestry	Gold Standard for the Global Goals: A/R GHG Emissions Reduction & Sequestration Methodology	Timor Leste	2018
<b>Katingan Peatland Restoration and Conservation Project</b>	Verra VCS 1477	PT. Rimba Makmur Utama (PT. RMU)	Agriculture Forestry and Other Land Use	VM0007: REDD Methodology Modules	Indonesia	2018
<b>GS1729 - Myanmar Stoves Campaign</b>	Gold Standard GS 1729	Soneva Foundation	Energy Efficiency - Domestic	GS MS Simplified Methodology for Efficient Cookstoves v1	Myanmar	2018

<sup>1</sup> Assumes equity Scope 1 and 2 greenhouse gas emissions are as currently forecast in Woodside's business plan. Target is for net equity Scope 1 and 2 greenhouse gas emissions, relative to a starting base of the gross annual average equity Scope 1 and 2 greenhouse gas emissions over 2016-2020 and may be adjusted (up or down) for potential equity changes in producing or sanctioned assets with an FID prior to 2021. Post-completion of the Woodside and BHP petroleum merger (which remains subject to conditions including regulatory approvals), the starting base will be adjusted for the then combined Woodside and BHP petroleum portfolio.

<sup>2</sup> Based on offset sale and purchase contracts executed from 1 October 2018 to 31 December 2021. Current costs are not an indicator of potential future costs which may increase as market demand for offsets increases.

<sup>3</sup> Including but not limited to: drilling and production results, reserves estimates, loss of market, physical risks and project delay or advancement, as well as assessment of current and possible future greenhouse gas regulatory requirements and abatement able to be delivered through engineering or operational changes.

<sup>4</sup> Retiring a carbon credit means an action by the issuing offset registry to prevent resale or double counting of offset units and represents an offset of one metric tonne of CO<sub>2</sub>-e

<sup>5</sup> Commonwealth of Australia 2020. "Climate Active Carbon Neutral Standard for Organisations, Commonwealth of Australia 2020."

## Carbon origination projects

We have invested more than A\$100 million across Australia through native tree planting over the past 10 years, and we continue to undertake carbon projects in regional Western Australia.

Woodside in partnership with Greening Australia planted trees on 3,000 hectares during 2020 and 2021 on three Woodside-owned properties in Western Australia: Cowcher, Sukey Hill and Manalling Springs. In 2021, Woodside worked with Greening Australia to establish a program aimed at directly leasing portions of land in Western Australia for biodiverse carbon plantings.

More recently Woodside purchased an additional two properties, Willcocks and Linscott, in Western Australia's Wheatbelt region for planting in 2022.

# STRATEGY IN ACTION: DELIVERING ON EMISSIONS REDUCTION

## AVOIDING EMISSIONS IN DESIGN

### Pluto Train 2

The Pluto Train 2 design resulted in a significantly improved design efficiency over earlier Woodside LNG trains. The two most material decisions were the LNG technology and selection of aero-derivative gas turbines for liquefaction compressors.

**LNG technology selection:** A design similar to Pluto Train 1 would have required installation of four heavy duty industrial gas turbine generators for auxiliary power generation, compared to the one generator required for the selected technology. The integrated power supply will allow optimisation of power generation and supply, maximum energy efficiency and sparing.

Estimated savings compared to alternative choice: 300 kt CO<sub>2</sub>-e p.a.<sup>1</sup>

**Aero-derivative gas turbine.** The chosen turbines had the highest thermal efficiency and lowest greenhouse gas emissions compared to alternatives considered.

Estimated savings compared to alternative choice: 125 kt CO<sub>2</sub>-e p.a.<sup>1</sup>

### Scarborough battery energy storage system

A battery energy storage system (BESS) has been included in the design of the Scarborough floating production unit (offshore platform). This will allow operation with two power generator turbines online instead of three, because the third turbine is no longer required to operate as 'spinning reserve' (back up). This saves combustion of fuel gas and resulting greenhouse gas emissions.

Estimated savings compared to operating additional turbine as spinning reserve: 9 kt CO<sub>2</sub>-e p.a.<sup>1</sup>

## SCOPE 3: SUPPORTING SUPPLIER EMISSIONS REDUCTION

### Reducing marine emissions

As part of a tender process for marine vessel contracting, Woodside's logistics team analysed vessel technology, fuel type and fuel consumption. As a result the team was able to introduce smaller sized vessels, and integrate battery technology with the larger vessels.

Estimated savings: up to 38 kt CO<sub>2</sub>-e over the 5 year term of the contract.<sup>1</sup>

"Finding ways to reduce emissions is considered whenever Karratha Gas Plant equipment is shutdown or started up. An example is Engineering, Maintenance and Operations working together to ensure gas turbines and boil-off-gas compressors are proactively turned off in a timely manner whenever they're not required."

- LNG panel operator

"It has been satisfying seeing the reduction in flaring at Karratha Gas Plant over the past few years."

- Domestic gas panel operator

"It is rewarding working with other disciplines to hunt down opportunities to reduce plant emissions and increase efficiency. It has now become an ingrained component of our operational culture and inherent in our planning."

- LNG lead operator

<sup>1</sup> The estimated GHG savings quoted in each example are estimated using engineering judgment by appropriately skilled and experienced Woodside engineers. Emissions quoted are total project share, not equity share.

## REDUCING EMISSIONS IN OPERATIONS

### Karratha Gas Plant turbine optimisation

Periods of spare gas processing capacity at Karratha Gas Plant have presented the opportunity to use advanced process controls to prioritise the most modern and efficient gas turbines in real time. The net result is increased energy efficiency compared to a non-prioritised approach.

Estimated savings: 55 – 150 kt CO<sub>2</sub>-e p.a.<sup>1</sup>

### High efficiency filters on gas turbines

The combustion process requires gas turbines to take in clean air filtered to remove any contaminants. Advances in filter technology have produced air filters that have a higher efficiency rating, significantly reducing contaminants and increasing compressor efficiency over time. As part of regular maintenance cycles on gas turbines, high efficiency filters are being installed across Woodside's assets.

Estimated savings depend on the size and use of each machine. Filters installed in the North Rankin offshore export gas turbines are estimated to reduce emissions by 1.7 kt CO<sub>2</sub>-e p.a. per machine.<sup>1</sup>

### Compressor seal gas vent methane stream re-directed to flare

During the production of LNG, low pressure methane vapor (end-flash gas) produced after the liquefaction process is captured and compressed so that it can be recycled back through the LNG train. At Pluto, the end-flash gas compressor was originally designed so that during normal operation a small amount of methane venting occurred from the seal system. In 2021, new controls and piping were installed to enable routing of the dry gas seals into the Pluto flare.

Estimated savings compared to venting uncombusted methane: 2.4 kt CO<sub>2</sub>-e p.a.<sup>1</sup>

## KEY CHALLENGE

**Precise measurement of greenhouse gas emissions from individual units of plant and equipment is challenging. Typically, emissions are estimated based on the performance standards provided by original equipment manufacturers, rather than measured through meters. It is therefore difficult to be precise about the impact of emissions reduction initiatives, which also need to be estimated rather than measured. Woodside plans to improve emissions measurement in 2022.**

"It was very satisfying for the engineering team working on the Scarborough battery energy storage system that the solution not only helped to reduce emissions, but also improved the robustness and the reliability of the power system. This added value by improving expected production reliability, fuel gas consumption, start-up time and blackout risk."

– Lead electrical engineer

<sup>1</sup> The estimated GHG savings quoted in each example are estimated using engineering judgment by appropriately skilled and experienced Woodside engineers. Emissions quoted are total project share, not equity share.

# STRATEGY IN ACTION: NEW ENERGY PRODUCTS AND LOWER-CARBON SERVICES

During 2021 Woodside progressed the following opportunities as part of a developing portfolio of new energy products and lower-carbon services, and announced a US\$5 billion investment target by 2030.<sup>1,2</sup>



## H2Perth

H2Perth is a proposed world-scale hydrogen and ammonia production facility in southern metropolitan Perth, Western Australia. The initial proposal is targeting ~110,000 tonnes per annum (tpa) of hydrogen production. It is planned to commence with gas reforming, and include a 250 megawatts (MW) electrolysis component which has the potential to scale to over 3 GW as customer demands grows. In December 2021, Woodside, Keppel Data Centres, City Energy, Osaka Gas Singapore and City-OG Gas Energy Services entered into a memorandum of understanding (MOU) to study the feasibility of a liquid hydrogen supply chain to Singapore and potentially Japan from H2Perth.



## H2OK

H2OK is a proposed liquid hydrogen production facility to be built in Ardmore, Oklahoma. Subject to approvals and customer demand, H2OK will involve construction of an initial 290 MW electrolysis facility producing up to 33,000 tpa of liquid hydrogen for the heavy transport sector, with potential expansion to 550 MW. Woodside commenced front-end engineering design activities in December 2021 and is targeting a final investment decision in 2022.



## H2TAS

H2TAS is a proposed 1.7 GW renewable hydrogen and ammonia production facility near Bell Bay, northeast Tasmania. The initial phase is targeting a capacity of up to 300 MW and production of 200,000 tpa of ammonia. H2TAS would use a combination of hydropower and wind power to create a 100% renewable ammonia product for export as well as renewable hydrogen for domestic use. In May 2021, Woodside announced a project consortium under a heads of agreement with Japanese companies Marubeni Corporation and IHI Corporation. The parties have completed initial feasibility studies and concluded that it is technically and commercially feasible to export ammonia to Japan from the Bell Bay area.

<sup>1</sup> Developments are subject to regulatory and joint venture approvals.

<sup>2</sup> Investment target assumes completion of the proposed merger with BHP's petroleum business. Individual investment decisions are subject to Woodside's investment hurdles. Not guidance.

### Heliogen

Woodside is working with Heliogen, a US based concentrated solar thermal (CST) energy developer, to build a 5 MW commercial scale demonstration facility in California. The artificial intelligence (AI) enabled technology has the potential to overcome the challenge of intermittency in solar power generation and offer nearly 24/7 power supply. Woodside and Heliogen expect construction to begin in 2022, and are working towards a proposed joint marketing arrangement for the technology in the US and Australia.



### Woodside Solar Project

Woodside is evaluating a solar photovoltaic (PV) power facility, approximately 15 km south-west of Karratha in Western Australia. This will generate electricity from a large-scale solar PV farm, complemented by a battery energy storage system and other associated infrastructure. Initially, the proposed facility could supply 100 MW of solar energy to Pluto LNG and other customers located near Karratha, with potential expansion to a maximum capacity of 500 MW.



### Carbon capture and storage (CCS)

Woodside has established a consortium with bp and Japan Australia LNG (MIMI) Pty Ltd to assess the opportunity to develop a large-scale, multi-user project near Karratha, Western Australia. The consortium aims to assess the technical, regulatory and commercial feasibility of capturing carbon emitted by multiple industries located near Karratha on the Burrup Peninsula and storing it in offshore reservoirs in the Northern Carnarvon Basin.<sup>1</sup>

## KEY CHALLENGE

**Customer demand for new energy products and lower-carbon services is still relatively small compared to conventional hydrocarbons. This limits the ability of energy producers to invest capital in new production and technology. To address this, Woodside is working with customers so that they invest in the infrastructure and equipment needed to consume these products, at the same time as Woodside invests in their supply.<sup>1</sup>**

<sup>1</sup> Please refer to additional examples in the Sustainable Development Report 2021.

# RISK MANAGEMENT

## Risk management framework

Woodside is committed to managing risks in a proactive and effective manner as a source of competitive advantage. We apply a structured and comprehensive approach to the identification, assessment and treatment of current risks and in response to emerging risks.

Our approach to risk management aims to enable us to take risk in return for reward, protect us against negative impacts and improve our resilience to emerging risks. Woodside recognises that risk is inherent in our business and the effective management of risk is vital to deliver our strategic objectives, continued growth and success.

Our framework is aligned with the intent of the International Standard ISO31000 for risk management, providing line of sight of risk at appropriate levels of the organisation, including the executive team and the Board, based on defined materiality thresholds.

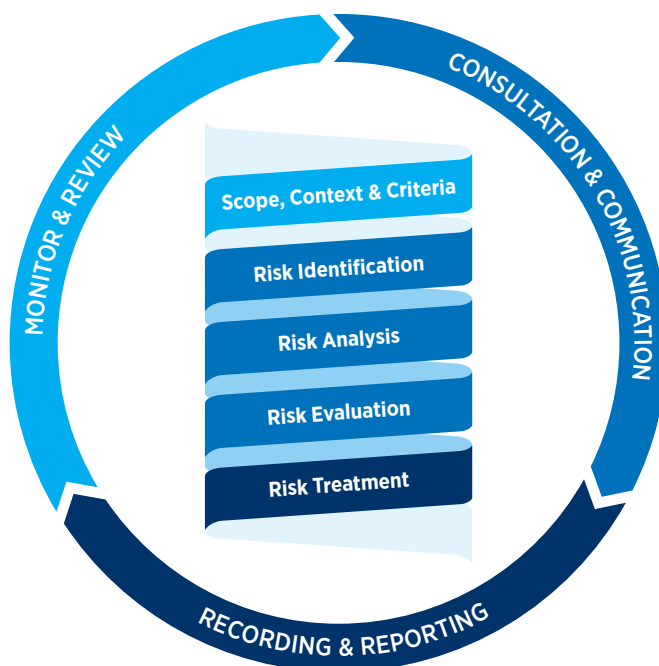
A key objective of our approach to risk management is to provide a single consolidated view of risks across the company to quantify our full risk exposure and prioritise risk management and governance. Our assessment of risk considers both financial and non-financial exposures, including health and safety, environment, finance, reputation and brand, legal and compliance, social and culture.

The framework requires a twice-yearly review by the executive team and the Board to evaluate the strategic risk profile, the effectiveness of the management of the material current risks and our resilience to emerging risks. The Board reviewed and confirmed in 2021 that our risk management framework is sound, and that Woodside is operating with due regard to the risk appetite endorsed by the Board.

Climate change is one of the nine strategic risks identified within Woodside's strategic risk profile. This means that the risk management framework described on these pages is specifically applied to consideration of climate-related risks and opportunities. The identified potential key risks and opportunities are described on pages 32-33.

The risk management framework helps to ensure an integrated and coordinated approach to the management of climate change across the business and that the risks posed by the transition to a lower-carbon economy are recognised, including changes in policy, regulation or social expectations in current or future markets.

## RISK MANAGEMENT PROCESS





### **Risk appetite**

In 2020, the Board endorsed Woodside’s Risk Appetite Statement. This is a set of principle based, qualitative statements that presents a collective and aligned view of the Board’s appetite to take and accept risk, in pursuit of our strategic objectives. It provides guidance to the executive team on the type and amount of risk that is acceptable and is intended to encourage conscious engagement and informed decision making consistent with other company policies including our Climate Policy.

### **Our risk and compliance behaviours**

Woodside recognises that when faced with challenge and uncertainty it is the actions, behaviours and response of our leaders at all levels that shapes our culture. In 2021, Woodside released an “Our Risk and Compliance Behaviours” framework to provide further guidance on the positive behaviours that promote a strong risk and compliance culture.

These behaviours recognise that the world we live and work in is constantly changing and we need to adapt and thrive as a business within a lower-carbon economy. They recognise the need to confront and embrace risk, challenge our conventional ways of working and make courageous decisions, while keeping each other safe, complying with the law and maintaining our social licence to operate.

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**Our assessment of risk considers both financial and non-financial exposures, including health and safety, environment, finance, reputation and brand, legal and compliance, social and culture.**

### **Risk register**

Woodside prioritises risk management actions and governance through use of a common risk register tool.

Functionality within the tool provides for increased transparency and enhances the ability of senior leaders to effectively manage and govern climate-related risks, including checking that identified actions to address or manage risk have been closed out.

## Short-, medium- and long-term risks and opportunities

KEY CLIMATE-RELATED RISKS AND OPPORTUNITIES						
Type of risk	Timeframe <sup>1</sup>			Risk	Potential financial impacts	Potential mitigations
	S	M	L			
Transition risks	<b>Policy and legal risks</b>					
	✓	✓	✓	Exposure to litigation	<ul style="list-style-type: none"> <li>Increased operating costs</li> <li>Deferred revenue from project startups</li> <li>Asset valuation changes</li> <li>Legal costs and fines</li> <li>Increased decommissioning cost</li> </ul>	<ul style="list-style-type: none"> <li>Operate a “low-cost, lower-carbon” business</li> <li>Adopt and deliver science-based targets for net equity emissions reduction</li> <li>Report in alignment with TCFD recommendations</li> <li>Build a diverse, high quality carbon offsets portfolio</li> <li>Engage regulators and stakeholders</li> <li>Monitor global policy developments</li> </ul>
	✓	✓	✓	Delays to project approvals		
	✓	✓	✓	Increased pricing or other regulatory control of emissions		
		✓	✓	Mandates or controls on hydrocarbon product use		
	<b>Technology</b>					
	✓	✓		Unsuccessful investment in new technologies	<ul style="list-style-type: none"> <li>Loss of R&amp;D expenditure</li> <li>Increased operating costs</li> <li>Reduced demand for a particular technology</li> </ul>	<ul style="list-style-type: none"> <li>Technology collaboration and partnerships</li> <li>Opportunity management process</li> <li>Rigorous investment framework</li> <li>Maintain internal capability with proven track record</li> </ul>
		✓	✓	Higher than expected costs of transition to new technologies		
	<b>Market</b>					
		✓		Faster than expected substitution of hydrocarbon products	<ul style="list-style-type: none"> <li>Reduced demand for hydrocarbon, new energy or lower-carbon services relative to investment case</li> <li>Natural gas crowded out of carbon budget by coal and unable to attract lower-carbon premium</li> <li>Under or over investment in product portfolio components</li> </ul>	<ul style="list-style-type: none"> <li>Adopt the Scope 3 emissions plan focused on demand side risk management</li> <li>Capital allocation framework</li> <li>Customer and market engagement</li> <li>Scenario analysis</li> </ul>
		✓	✓	Slower than expected adoption of new energy and lower-carbon services		
	✓	✓	✓	Slower than expected phase-out of coal		
		✓	✓	Uncertainty/regional variation in transition pathways		
	<b>Reputation</b>					
	✓	✓		Increased stakeholder concern	<ul style="list-style-type: none"> <li>Increased operating costs</li> <li>Increased capital costs</li> <li>Exacerbated policy and legal risks</li> </ul>	<ul style="list-style-type: none"> <li>Adopt and deliver science-based targets for net equity emissions reduction</li> <li>Report in alignment with TCFD recommendations</li> <li>Engage regulators and stakeholders</li> </ul>
	✓	✓		Targets fail to meet stakeholder expectations		
	✓	✓		Stigmatisation of energy sector		
	✓	✓		Constrained access to talent		
		✓		Constrained access to capital		
	✓	✓		Inability to pursue full range of Paris-aligned pathways		

This table describes potential risk and opportunities, potential financial impacts and potential mitigations. This does not necessarily mean that the risks have materialised in practice or that the mitigations are currently being pursued.

### <sup>1</sup>Timeframe

Short: now to 2025

Medium: 2026-2035

Long: 2036 and beyond



KEY CLIMATE-RELATED RISKS AND OPPORTUNITIES (CONTINUED)

Type of risk	Timeframe <sup>1</sup>			Risk	Potential financial impacts	Potential mitigations
	S	M	L			
Physical risks	<b>Acute</b>					
	✓	✓	✓	Increased severity of extreme weather events such as cyclones and bushfires	<ul style="list-style-type: none"> <li>Decreased production (due to outages) or asset life</li> <li>Increased operating and capital costs required to maintain current performance</li> <li>Loss of tree planting</li> <li>Increased decommissioning cost</li> </ul>	<ul style="list-style-type: none"> <li>Asset reference plans</li> <li>Business and performance planning</li> <li>Geographic diversity in tree planting portfolio</li> </ul>
	<b>Chronic</b>					
		✓	✓	Hotter working conditions	Decreased production leading to lower revenue	HSE culture and procedures
		✓	✓	Lower rainfall in tree planting areas	Increased operating and capital costs required to maintain current performance	Asset reference plans
			✓	Rising sea levels and storm surge risk	Underperformance of tree-planting	Business and performance planning
		✓	✓	Reduced access to water	Increased operating costs	Geographic diversity in tree planting portfolio
		✓	✓	Impact to cultural heritage	Exacerbated policy and legal risks	Desalination as technology option for access to water
			✓			Risk management framework
	Opportunities	<b>Resource efficiency</b>				
✓		✓	✓	Fuel gas savings diverted to sales gas	<ul style="list-style-type: none"> <li>Increased sales revenue</li> <li>New revenue streams</li> <li>Reduced operating costs</li> </ul>	<ul style="list-style-type: none"> <li>Asset decarbonisation plans</li> <li>Optimisation reference plans</li> <li>Scope 3 emissions plan influencing suppliers</li> </ul>
✓		✓	✓	More efficient shipping fleet		
✓		✓	✓	More efficient building stock		
✓		✓	✓	Recycling of decommissioned materials		
<b>Energy source</b>						
✓		✓	✓	Use of renewable energy generation	Increased production	Develop a new energy business
✓		✓	✓	Use of efficient technologies	Reduced operating costs	Design out emissions
✓		✓	✓	Use of energy storage	Reduced exposure to carbon costs	Asset decarbonisation plans
<b>Products and services</b>						
✓		✓	✓	Paris-aligned portfolio of products and services	Reduced demand side risk	Capital allocation framework
✓		✓	✓	Development of new business lines	More diverse portfolio	Technology collaboration and partnerships
✓		✓	✓	New technologies for forecasting physical risk	Ability to capture premium for lower-carbon	Customer and market engagement
			✓		Lower operating costs	
<b>Markets</b>						
✓		✓	✓	Use of public sector incentives	Reduced development cost	<ul style="list-style-type: none"> <li>Engage regulators and stakeholders</li> <li>Climate related advocacy</li> </ul>
✓		✓	✓	Collaborative partnership with customers, research institutions and broader industry organisations		
✓		✓	✓	Access to new markets		
<b>Resilience</b>						
✓		✓	✓	Broader portfolio inclusive of oil, gas and new energy opportunities	<ul style="list-style-type: none"> <li>Diverse revenue streams</li> <li>Better competitive position to reflect shifting consumer preferences</li> </ul>	<ul style="list-style-type: none"> <li>Capital allocation framework</li> <li>Scope 3 emissions plan</li> </ul>
✓	✓	✓	Access to sustainable finance			
✓	✓	✓	Decrease climate risk in the supply chain			
✓	✓	✓	Capital allocations strategy to flex between product streams			

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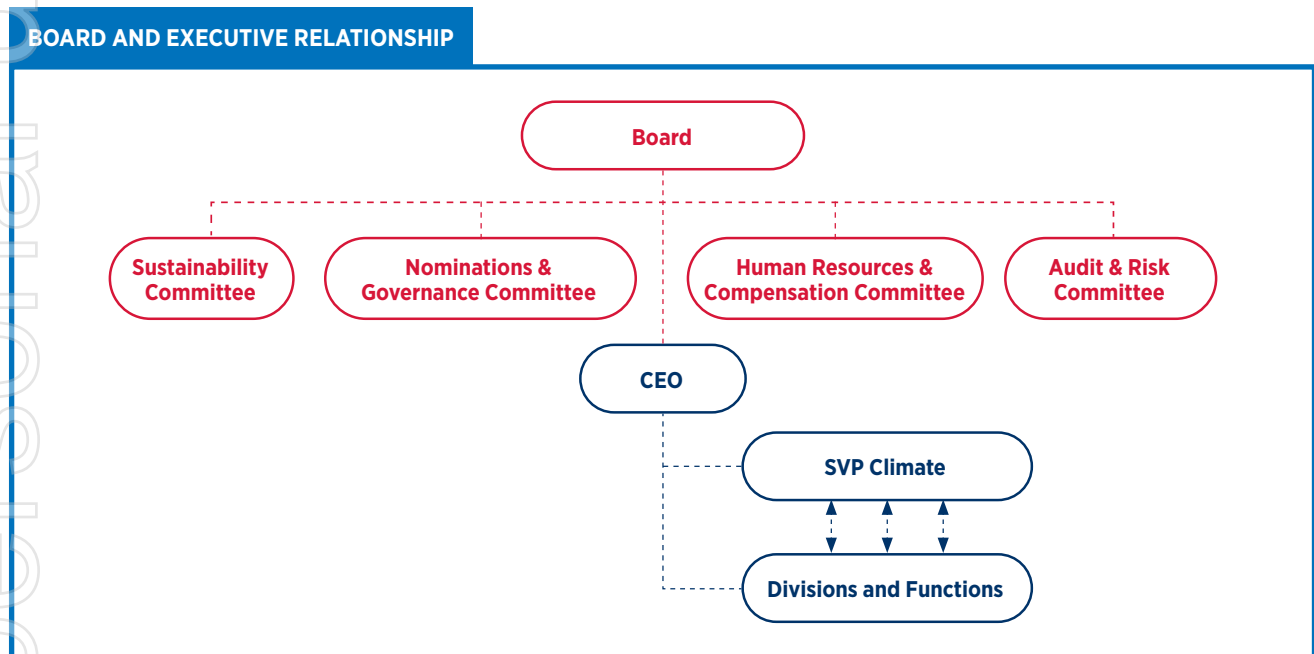
# GOVERNANCE

## The Board's oversight of climate-related risks and opportunities

Climate change is a complex and material strategic and governance issue that is directly overseen by the Board, with the support of its various committees. During 2021 climate change was discussed at each Board or Sustainability Committee meeting, including during strategy discussions and investment decisions as well as in a number of special "deep-dive" sessions to support the Scarborough final investment decision and the BHP petroleum merger proposal.

The Board also engages with shareholders to ensure that they understand and have the opportunity to provide feedback on Woodside's approach to climate change. This occurs through a range of formal and informal channels, such as the Annual General Meeting (AGM) and routine engagements with major investors. At the 2022 AGM, the Board will put this Climate Report to a non-binding advisory vote of the shareholders.

The chart below describes the relationship between the Board, its committees, and the executive team.



### Sustainability Committee

The role of the Sustainability Committee is to assist the Board to meet its oversight responsibilities in relation to Woodside's sustainability policies and practices. Climate change is a standing item on the agenda for each meeting of the Sustainability Committee, which is scheduled to meet at least four times a year. As well as receiving regular updates, the Committee uses its meetings to provide feedback to the executive team on the development of climate-related initiatives prior to their formal presentation to the Board. In 2021, for example, this included feedback about the development of our Scope 3 emissions plan, and in connection with investor expectations of climate-related disclosures. The Committee also considered climate-related aspects of the Scarborough project, and of potential new opportunities to supply new energy products and lower-carbon services.

### Audit & Risk Committee

The role of the Audit & Risk Committee is to assist the Board to meet its oversight responsibilities in relation to Woodside's financial reporting, compliance with legal and regulatory requirements, internal control structure, risk management and insurance procedures and the internal and external audit functions. The climate change risk, which is one of Woodside's strategic risks, is formally reviewed twice a year. In addition, during 2021 the Committee discussed the approach to inclusion of climate-related disclosures in statutory reporting and received advice from the external auditor.

## Human Resources & Compensation Committee

The role of the Human Resources & Compensation Committee is to assist the Board in establishing human resources and compensation policies and practices that are aligned with Woodside's strategy and the expectations of shareholders. This includes reviewing and making recommendations to the Board on executive and other employee remuneration. In 2021, Woodside has adopted a specific measure for equity Scope 1 and 2 greenhouse gas emissions reduction in the Corporate Scorecard, which is used to determine performance-based remuneration for all staff.

## Nominations & Governance Committee

The role of the Nominations & Governance Committee is to assist the Board to review Board composition, performance and succession planning. This includes identifying, evaluating and recommending candidates for the Board, taking into account the factors addressed below.

## Board skills and diversity

The Board considers that collectively the directors represent the skills, knowledge and experience necessary and desirable to direct the company, including in relation to their oversight of climate-related risks and opportunities. The non-executive directors contribute operational and international experience, an understanding of the industry in which Woodside operates, knowledge of financial markets and an understanding of the health, safety, environmental, community and other sustainability matters that are important to Woodside. The Board supplements its expertise with internal and external subject matter experts as appropriate (for example, regular attendance at Board meetings by relevant executives).

In 2021, the Nominations & Governance Committee adopted changes to the director competencies matrix for the assessment of directors' competencies, including adding energy transition components and increasing the climate related components to further align with TCFD recommendations. Please refer to Table 2 of the Corporate Governance Statement 2021 which is available on our website.

The Board supplements its climate change expertise by seeking input of executives, including Dr Tom Ridsdill-Smith, Senior Vice President Climate, and independent advisers to ensure its decisions are informed by climate change science and expert advisers.

## Board consideration of climate related matters

The Board first adopted a Climate Policy in 2017. This policy was reviewed in 2021 and updated in 2022. It is included on page 7.

In addition to considering its Climate Policy and regular risk updates, the Board also discussed a number of other climate-related matters including:

- Latest reports from the IPCC and the IEA, including the IEA's Net Zero Roadmap;<sup>1</sup>
- Shareholder engagement and the decision to hold a non-binding advisory vote on Woodside's climate reporting at the 2022 AGM;
- Monitoring Woodside's net equity Scope 1 and 2 greenhouse gas emissions reduction progress;
- The development and publication of our Scope 3 emissions plan;
- The future of energy supply and demand especially in Woodside's target markets;
- Management of climate-related aspects of the Scarborough project;
- The development of new businesses supplying new energy products and lower-carbon services
- The identification of policy, regulatory, legal and reputational risks.

## Executive remuneration

Woodside's approach to executive remuneration is detailed in our Annual Report. Woodside's 2021 Corporate Scorecard included five equally weighted measures, including Material Sustainability Issues. This component assesses performance against Woodside's year-end equity greenhouse gas emissions abatement target, including operational reliability, delivery of emissions reductions projects and securing carbon offsets. Executives were also assessed against individual metrics including advancing the company's strategy to transform the way we work in response to the energy transition and progressing our portfolio of new energy investments.

Refer to pages 79, 81 and 82 of our Remuneration Report in the Annual Report 2021 for details of the Corporate Scorecard outcomes, and the individual performance of the CEO and senior executives and their remuneration outcomes for 2021.

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**In 2021, for the first time Woodside has adopted a specific measure for equity Scope 1 and 2 greenhouse gas emissions reduction in the Corporate Scorecard, which is used to determine performance-based remuneration.**

<sup>1</sup> IEA 2021. "Net Zero 2050 - A Roadmap for the Global Energy Sector". All rights reserved.

## Management's role in assessing and managing climate-related risks and opportunities

In 2020, Woodside created a specific role reporting directly to the CEO to oversee climate strategy, risks and opportunities. Dr Tom Ridsdill-Smith was appointed as Senior Vice President Climate. The position is accountable for driving company-wide strategy, setting targets and ensuring appropriate governance is in place to deliver them.

The SVP Climate's team is structured in two parts.

A **solutions team** is internally facing and is charged with ensuring Woodside tracks and meets its net equity Scope 1 and 2 greenhouse gas emissions reduction targets and participates in technical collaboration on emissions reduction in the sector. It assures the SVP Climate and the executive team of the accuracy of emissions reporting data and the effectiveness of emissions reduction delivery. The team is also responsible for reporting Scope 1 and 2 greenhouse gas emissions performance to regulators.

An **engagement team** is externally facing and is charged with delivery of the Scope 3 emissions plan, climate reporting, and supporting Woodside's climate-related engagement with equity and debt investors, customers and policymakers. It ensures that the SVP Climate and the executive team are appropriately informed about external climate-related developments through meaningful dialogue and monitoring and that Woodside is effectively disclosing its climate-related plan.

In 2021, the Woodside Emissions Reduction and Abatement Panel (WERAP) was formulated to provide cross business governance of emissions reduction delivery. Led by the solutions team it brings together representatives from across the business to oversee performance and to prioritise opportunities. The purpose of this is to ensure that execution of climate strategy is embedded consistently within the business through clear processes and leadership expectations.

Minimising emissions is an important part of many roles, from operators and maintainers on site, through to engineers and management. This is a key priority of all operated sites, along with maintaining safe and cost efficient operations, and is embedded into daily activities such as including a methane check box on daily SAFE cards (See, Assess, Fix, Encourage) to support operational 'find and fix' behaviours. Reward and recognition is also linked to emissions reduction activities.

Activities will be undertaken in 2022 to educate and inform key roles to further encourage individuals to take action. To support this, a statement is being included in performance metrics for key personnel in 2022 to build understanding of the emissions footprint of their role and how they can influence outcomes.

Woodside also has a staff led community network Woodside Energy Climate Awareness Network (WECAN) which encourages employees to share knowledge and contribute to Woodside's objective to thrive in the energy transition as a low-cost, lower-carbon energy provider. WECAN has more than 420 members.



Woodside employees  
at Mia Yellagonga

## Climate-related advocacy

Woodside regularly engages with governments of countries where we are active in support of our business strategy, to exchange information, and to inform policy development and decision making. This engagement is undertaken both directly and by working with industry associations.

When these engagements are on climate-related topics, we ensure our own advocacy and the advocacy of our industry associations is aligned with Woodside's Climate Policy.

Woodside's participation in government consultations related to climate change is summarised in the table below. Woodside also participates in a number of industry associations and our approach to this is explained in our Industry Association Climate Alignment Review.

During 2021, Woodside engaged with a range of State and Commonwealth Members of Parliament to understand their interests and to communicate information about our activities.

In addition, Woodside staff have:

- Co-chaired the Australian based, Markets for Natural Climate Solutions Task Force of the Carbon Market Institute (CMI) and the International Emissions Trading Association (IETA);
- Chaired the Net Zero Taskforce of the International Petroleum Industry Environment and Conservation Association (IPIECA);
- Participated in the steering committee of the Australian Energy Transition Initiative which researches the pathways to net zero for Australia's "hard to abate" industrial sectors.

### CLIMATE-RELATED ADVOCACY UNDERTAKEN BY WOODSIDE 2020-2021

#### Crediting below baseline

Woodside made a submission in response to the Australian Government's discussion paper about a proposed Safeguard Crediting Mechanism. We supported the introduction of the mechanism as a potential step towards an economy-wide carbon price, and provided technical comments on how the proposal could operate as a low emission technology incentive.

#### Low Emissions Technology Roadmap

Woodside made a submission to the Australian Government's process for developing a Low Emissions Technology Investment Roadmap. It highlighted the need for government support to be aggregated in order to deliver deployment at commercial scale rather than studies and pilots, and advocated for increasing research and development spending to the OECD average and setting ambitious targets for low emissions capacity.

#### Corporate Emissions Reduction Target Report

The Australian Government has proposed to establish a voluntary Corporate Emissions Reduction Target (CERT) Report. Woodside has set near- and medium-term targets for corporate emissions reductions and supports the opportunity to be able to report against them. Woodside made a submission advocating for simplicity in reporting, and that reporting should be on an "equity" basis reflecting a share of a company's emissions from a particular asset.

Woodside has subsequently agreed to participate in a pilot program to commence in 2022.

#### The Emissions Reduction Fund and the Safeguard Mechanism

The Climate Change Authority reviewed the Emissions Reduction Fund (ERF) in 2020. Woodside made a submission addressing various technical and operational aspects of the ERF and encouraging high levels of integrity in carbon accounting, and a deep, liquid and transparent carbon market.

#### Carbon Capture and Storage ACCU Method

The Australian Government has proposed to enable CCS projects to earn Australian Carbon Credit Units. Woodside supports the proposal and made a submission advocating various legislative and regulatory changes that would reflect the long-term and large scale nature of such projects.

#### Environmental regulation

The Commonwealth's Environment Protection and Biodiversity Conservation (EPBC) Act and the Western Australian Environmental Protection (EP) Act have both been recently reviewed by the respective Parliaments. Both of these review processes primarily addressed the efficacy of the legislation and regulation. Woodside advocated for clarity of regulatory responsibility for emissions regulation across jurisdictions.



Additional detail on our advocacy submissions can be viewed on the Woodside website at [woodside.com.au/sustainability/climate-change](https://www.woodside.com.au/sustainability/climate-change)

## Just transition

The energy transition is expected to result in economic and social impacts which can be related to the United Nations Sustainable Development Goals (UN SDGs). Some governments have commenced planning for an equitable transition, often referred to as a "just transition".<sup>1</sup> We see our potential contribution to a just transition in the following areas.

### Providing lower-carbon and affordable energy (SDG 7 and 13)

The targets under UN SDG 7 (Affordable and Clean Energy) call for countries to expand access to modern and sustainable energy services for all.

In the Asia-Pacific region, where 1.5 billion people are expected to increase their standard of living and join the middle class by 2030, energy use is expected to increase.<sup>2</sup>

Woodside's contribution to supplying this energy in the form of LNG and new energy products has been discussed throughout this report.

### Providing decent work (SDG 8)

Transitioning to a lower-carbon economy will entail extensive policy, legal, technology, and market changes which may be disruptive for many traditional sources of employment. As part of our strategy which prioritises UN SDG 8 (Decent Work and Economic Growth), we aim to be a supportive and responsible employer and provide opportunities across our value chain.

Our approach to local content and social investment seeks to support economic diversification and resilience. In Karratha, Exmouth and in Senegal, we partner with local organisations to help small businesses effectively engage in our supply chain and build their capability.

<sup>1</sup> IEA 2021. "Recommendations of the Global Commission on People-Centred Clean Energy Transitions." All rights reserved.

<sup>2</sup> Kharas, H., Brookings Institution 2017. "The unprecedented expansion of the global middle class: an update." Page 14.



Woodside employees at Karratha Gas Plant

**Stakeholder engagement**

We engage our stakeholders in a transparent and meaningful way. We seek to understand the expectations of the communities where we are active and share information about our operations.

We recognise the importance of our role to deliver sustainable social outcomes in the areas where we operate. Our Sustainable Communities Policy and Indigenous Communities Policy set expectations for understanding the priorities, needs and expectations of the communities where we are active. We do this by engaging with a variety of stakeholders, including vulnerable groups, and sharing information about our activities and plans.

Our approach is informed through social research (such as community perception surveys, social impact assessments and ongoing active engagement) to ensure our activities contribute to building long-term capacity and capability.

Our Community Grievance Guideline provides a framework for receiving and responding to grievances in a consistent, timely way. We have developed localised community grievance mechanisms for Karratha and Roebourne, and our activities in Senegal.

Within our Australian operations we provide updates to our workforce and communities at formal meetings, and encourage ongoing dialogue.

**KEY CHALLENGE**

**The policy options to address climate change are diverse and contested in political and community debate. This can impact upon the reputation of companies in the energy sector, potentially impacting their access to talent and capital. To address this, Woodside aims to be transparent about its actions – for example by publishing reports like this one and being clear about the aims of its policy advocacy.**



# CLIMATE-RELATED DATA

Metric	Unit of measure	2021 data
<b>Hydrocarbon production</b>		
Total – equity	kt	10,522
Total – operated	kt	25,807
Sales (including Traded LNG) – equity <sup>1</sup>	kt	12,977
<b>Global Scope 1 and 2 greenhouse gas emissions</b>		
Scope 1 and 2 emissions – equity (net)	kt CO <sub>2</sub> -e	3,235
Scope 1 emissions – equity (gross)	kt CO <sub>2</sub> -e	3,541
Scope 2 emissions – equity (gross)	kt CO <sub>2</sub> -e	6
Equity offsets retired in respect of 2021 emissions	kt CO <sub>2</sub> -e	312
Scope 1 and 2 emissions – operated (gross)	kt CO <sub>2</sub> -e	8,908
Scope 1 emissions – operated (gross)	kt CO <sub>2</sub> -e	8,901
Scope 2 emissions – operated (gross)	kt CO <sub>2</sub> -e	8
Percentage of equity Scope 1 and 2 emissions covered under emissions limiting regulations <sup>2</sup>	%	99.5
<b>Sources of Scope 1 greenhouse gas emissions</b>		
Fuel combustion	kt CO <sub>2</sub> -e	2,412
Flare	kt CO <sub>2</sub> -e	461
Venting	kt CO <sub>2</sub> -e	667
Other	kt CO <sub>2</sub> -e	0.2
<b>Methane</b>		
Methane emissions (greenhouse equivalent) - equity <sup>3</sup>	kt CO <sub>2</sub> -e	133
Percentage of equity gross Scope 1 and 2 emissions that are methane	%	3.7
Methane intensity – equity	t CH <sub>4</sub> / kt total production	0.45
Methane intensity – equity (Sm <sup>3</sup> / Sm <sup>3</sup> marketed gas) <sup>4</sup>	%	0.064
Methane emissions (greenhouse equivalent) - operated <sup>5</sup>	kt CO <sub>2</sub> -e	326
Methane intensity – operated	t CH <sub>4</sub> / kt total production	0.45
Methane intensity – operated (Sm <sup>3</sup> / Sm <sup>3</sup> marketed gas) <sup>4</sup>	%	0.064
<b>Global Scope 3 greenhouse gas emissions estimates</b>		
Scope 3 emissions – equity, total	kt CO <sub>2</sub> -e	37,186
Scope 3 emissions – purchased goods and services, related to Traded LNG – equity	kt CO <sub>2</sub> -e	1,375
Scope 3 emissions – selected other upstream – equity <sup>5</sup>	kt CO <sub>2</sub> -e	200
Scope 3 emissions – downstream transportation and distribution – equity	kt CO <sub>2</sub> -e	819
Scope 3 emissions – use of sold product, related to Woodside production – equity	kt CO <sub>2</sub> -e	27,906
Scope 3 emissions – use of sold product, related to Traded LNG – equity	kt CO <sub>2</sub> -e	6,886
<b>Greenhouse gas emissions intensity</b>		
Scope 1 and 2 emissions intensity – equity (net)	kt CO <sub>2</sub> -e / kt	0.31
Scope 1 and 2 emissions intensity - operated (gross)	kt CO <sub>2</sub> -e / kt	0.34
Scope 1, 2, 3 emissions intensity of production <sup>6</sup>	Grams CO <sub>2</sub> -e / MJ	58

<sup>1</sup> Traded LNG means the purchase and/or sale of spot and/or strip of LNG cargoes.

<sup>2</sup> Remaining 0.5% is due to additional greenhouse gas emissions that Woodside reports beyond the requirements of National Greenhouse and Energy Reporting (NGER).

<sup>3</sup> Calculated using a 100 year Global Warming Potential in accordance with the Australian National Greenhouse and Energy Reporting (NGER) regulations.

<sup>4</sup> Marketed gas includes LNG, LPG and domestic gas production

<sup>5</sup> Selected upstream emissions from GHG Protocol Categories 1 (purchased goods and services, not including production of purchased LNG); 5 (waste generated in operations); 6 (business travel); and 7 (employee commuting).

<sup>6</sup> Emissions intensity calculated based on net equity Scope 1, 2 and 3 greenhouse gas emissions and Woodside's share of production. Metric excludes emissions and production related to Traded LNG.



# GLOSSARY AND UNITS OF MEASURE

<b>AR6-WG1</b>	IPCC (2021). "Climate Change 2021 – the Physical Science Basis. Summary for Policymakers. Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change".
<b>Board</b>	The board of directors of Woodside Petroleum Ltd.
<b>CCS</b>	Carbon capture and storage
<b>CCU</b>	Carbon capture and utilisation
<b>CCUS</b>	Carbon capture utilisation and storage
<b>CH<sub>4</sub></b>	Methane
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2</sub>-e</b>	CO <sub>2</sub> equivalent. The universal unit of measurement to indicate the global warming potential of each of the seven greenhouse gases, expressed in terms of the global warming potential of one unit of carbon dioxide for 100 years. It is used to evaluate releasing (or avoiding releasing) any greenhouse gas against a common basis. <sup>1</sup>
<b>COP-26</b>	The 26th Conference of the Parties to the United Nations Framework Convention on Climate Change, meeting in Glasgow, November 2021.
<b>Equity greenhouse gas emissions</b>	Woodside sets its Scope 1 and 2 greenhouse gas emissions reduction targets on an equity basis. This ensures that the scope of its emissions reduction targets is aligned with its economic interest in its investments. Equity emissions reflect the greenhouse gas emissions from operations according to Woodside's share of equity in the operation. Its equity share of an operation reflects its economic interest in the operation, which is the extent of rights it has to the risks and rewards flowing from the operation. <sup>2</sup>
<b>FID</b>	Final investment decision
<b>GHG or greenhouse gas</b>	The seven greenhouse gases listed in the Kyoto Protocol are: carbon dioxide (CO <sub>2</sub> ); methane (CH <sub>4</sub> ); nitrous oxide (N <sub>2</sub> O); hydrofluorocarbons (HFCs); nitrogen trifluoride (NF <sub>3</sub> ); perfluorocarbons (PFCs); and sulphur hexafluoride (SF <sub>6</sub> ). <sup>1</sup>
<b>IRR</b>	Internal rate of return
<b>LNG</b>	Liquefied natural gas
<b>Lower-carbon services</b>	Woodside uses this term to describe technologies, such as CCUS or offsets, that may be capable of reducing the net greenhouse gas emissions of our customers.
<b>Net greenhouse gas emissions</b>	Woodside has set its Scope 1 and 2 greenhouse gas emissions reduction targets on a net basis, allowing for both direct emissions reductions from its operations and emissions reductions achieved from the use of offsets. Net greenhouse gas emissions are equal to an entity's gross greenhouse gas emissions reduced by the number of retired offsets.
<b>Net equity greenhouse gas emissions</b>	Woodside's equity share of net greenhouse gas emissions.
<b>Net zero</b>	Net zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period. Where multiple greenhouse gases are involved, the quantification of net zero emissions depends on the climate metric chosen to compare emissions of different gases (such as global warming potential, global temperature change potential, and others, as well as the chosen time horizon). <sup>3</sup>
<b>New energy</b>	Woodside uses this term to describe energy technologies, such as hydrogen or ammonia, that are emerging in scale but which are expected to grow during the energy transition due to having lower greenhouse gas emissions at the point of use than conventional fossil fuels.
<b>Offsets</b>	Carbon offsets. Avoided GHG emission, GHG emission reduction or GHG removal and sequestration made available to another organization in the form of a carbon credit to counterbalance unabated/residual GHG emissions. <ul style="list-style-type: none"> <li>• Avoidance offsets: Offsets which result in the avoidance of GHG emissions that would otherwise occur without the protective actions implemented to generate the offset, for example, the avoidance of deforestation.</li> <li>• Reduction offsets: Offsets that result in a reduction of GHG emissions from an activity that is additional, for example, CO<sub>2</sub> capture and geological storage.</li> <li>• Removal offsets: Offsets based on the withdrawal of GHG emissions from the atmosphere, for example through the use of GHG sinks or GHG removal technologies. Removal offsets are important in achieving net-zero emissions as they help remove and store residual emissions.<sup>4</sup></li> </ul>

\*All footnotes related to this table are displayed on the next page.

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<b>Operated and non-operated</b>	Oil and gas joint venture participants will typically appoint one company as the operator, which will hold the contractual authority to manage joint venture activities on behalf of the joint venture participants. Where Woodside is the operator of a joint venture in which it holds an equity share, this report refers to that joint venture as being operated. Where another company is the operator of a joint venture in which Woodside holds an equity share, this report refers to that joint venture as being non-operated.
<b>Paris aligned scenarios</b>	Consistent with limiting global warming to below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit warming to 1.5 degrees Celsius. <sup>1</sup>
<b>Science-based targets</b>	Targets are considered science-based if they are in line with what the most recent climate science sets out is necessary to meet the goals of the Paris Agreement—limiting global warming to below 2 degrees Celsius above pre-industrial levels and pursuing efforts to limit warming to 1.5 degrees Celsius. <sup>1</sup>
<b>Short-, medium- and long-term</b>	This report refers to ranges of time as follows: short-term means from now until 2025; medium-term means 2026-2035; long-term means 2036 and beyond.  Woodside also refers to “near-term” and “medium-term” in the specific context of its net equity Scope 1 and 2 greenhouse gas emissions reduction targets. In this context near-term refers to the 2025 as a point in time, and medium term refers to 2030 as a point in time, being the years to which the targets relate.
<b>Scope 1 GHG emissions</b>	Direct GHG emissions. These occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment. <sup>2</sup> Woodside estimates greenhouse gas emissions, energy values and global warming potentials in accordance with the National Greenhouse and Energy Reporting (NGER) methodology as applicable in FY20-21.
<b>Scope 2 GHG emissions</b>	Electricity indirect GHG emissions. Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organisational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated. <sup>2</sup> Woodside estimates greenhouse gas emissions, energy values and global warming potentials in accordance with the National Greenhouse and Energy Reporting (NGER) methodology as applicable in FY20-21.
<b>Scope 3 GHG emissions</b>	Other indirect GHG emissions. Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services. <sup>2</sup> Please refer to the data table on page 40 for further information on the Scope 3 emissions categories reported by Woodside.

#### Units of measure

<b>Tonnes (t and kt)</b>	In this report, “t” means tonne and “kt” means kilotonne, being one thousand tonnes.
<b>MJ</b>	Megajoule
<b>MW</b>	Megawatt
<b>MWh</b>	Megawatt Hour
<b>GJ</b>	Gigajoule
<b>GW</b>	Gigawatt

<sup>1</sup> See IFRS Foundation 2021: Climate Related Disclosures Prototype. Appendix A.

<sup>2</sup> World Resources Institute and World Business Council for Sustainable Development 2004. “GHG Protocol: a corporate accounting and reporting standard”.

<sup>3</sup> IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press. Page 555.

<sup>4</sup> IPIECA 2022. “Net zero emissions: glossary of terms”. <https://www.iecea.org/resources/awareness-briefing/net-zero-emissions-glossary-of-terms/>, page 5.

# INDEX

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## INDEX TO TCFD RECOMMENDATIONS AND SUPPORTED RECOMMENDED DISCLOSURES<sup>1</sup>

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Describe management's role in assessing and managing climate-related risks and opportunities.	Pages 30-37
<b>Strategy: Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.</b>	
Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	Pages 32-33
Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	Pages 8-33
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<sup>1</sup> Financial Stability Board 2017. "Recommendations of the Task Force on Climate-related Financial Disclosures. Final Report." Figure 4, Page 14.

<sup>2</sup> Sustainability Accounting Standards Board 2018. "Oil & Gas - Exploration and Production . Sustainability Accounting Standard. Version 2018-10." Table 1, Page 6.

# DISCLAIMER, RISKS, EMISSIONS DATA AND OTHER IMPORTANT INFORMATION

## Disclaimer and risks

1. This report has been prepared to provide our investors and potential investors with information on our plan to help us achieve our strategic aim to thrive through the energy transition and how we are progressing against that strategic aim. This report will be put to a non-binding, advisory vote of our shareholders at our 2022 Annual General Meeting. Our disclosures structured to align with the TCFD recommendations framework are included in this report (rather than our most recent Annual Report) to make it simpler for our shareholders to vote on our climate reporting at our 2022 Annual General Meeting. Woodside has sought to achieve in this report an appropriate balance of disclosures that reasonably meet the recommendations of the TCFD while avoiding overwhelming users with information.
2. This report has not been prepared as financial or investment advice or to provide any guidance in relation to our future performance. It should be read in conjunction with our periodic reporting and other announcements made to the Australian Securities Exchange.
3. Given the focus of this report, it is necessarily oriented towards future events. Neither our plan to help us achieve our strategic aim, nor this report more generally, is a statement that future events will or are likely to occur.
4. The information in this report provides some level of insight into how we currently intend to direct the management of our assets and to deploy our capital, to help us achieve our strategic aim. The matters disclosed in this report are a 'point in time' disclosure. We operate in a dynamic and uncertain market and external environment. Plans and strategies can and must adapt in response to dynamic market conditions, joint venture decisions, new opportunities that might arise or other changing circumstances. Investors should not assume that our plan to achieve our strategic aim is locked in and will not evolve and be updated as time passes. Additionally, a number of aspects of our plan involve developments or strategies that are complex and may be delayed, more costly than anticipated or unsuccessful for many reasons.
5. This report contains forward looking statements that are subject to risk factors, including those associated with oil and gas businesses and the global transition to a lower-carbon economy.
6. Those forward looking statements are not guidance, forecasts, guarantees or predictions of future events or performance, but are in the nature of aspirational targets that Woodside has set for itself and its management of the business. Actual performance against these targets (including all items that are described as a target) may be affected by various risks associated with the Woodside business, the uncertainty as to how the global energy transition to a lower carbon economy will evolve, and physical risks associated with climate change, many of which are beyond Woodside's control. Further detail on certain of these risks can be found in the Risk Management section of this report. These risks include, but are not limited to:
  - the risk that climate change will impact the transition to a lower-carbon economy and may impact demand (and pricing) for oil and liquids, LNG and its substitutes in our portfolio, the policy and legal environment for its production, our reputation and our operating environment. Further, the availability and cost of emission allowances or carbon offsets could adversely impact costs of operations;
  - the potential for higher than expected costs of transition to new technologies, and poor efficacy of new technologies that could adversely impact the costs of operations and reduce demand for hydrocarbon products, new energy or lower carbon services; and
  - the decarbonisation plans of other countries.
7. Investors and prospective investors should review and have regard to these risks when considering the information contained in this report. Investors should also note that the high degree of uncertainty around the nature, timing and magnitude of climate-related risks, and the uncertainty as to how the energy transition will evolve, makes it difficult to determine and disclose the risks and their potential impacts with precision. Investors are cautioned not to place undue reliance on any forward looking statements contained in this report.

8. It is believed that the expectations reflected in the forward looking statements in this report are reasonable as at the date of this report but they may be affected by a variety of variables and changes in underlying assumptions which could cause actual results to differ materially, including but not limited to the risks referenced above and price fluctuations, actual demand, currency fluctuations, drilling and production results, reserve estimates, loss of market, industry competition, environmental risks, transition risks, physical risks, legislative, policy, fiscal and regulatory developments, changes in accounting standards, economic and financial market conditions in various countries and regions, political risks, abatement able to be delivered through engineering or operational changes, project delay or advancement, approvals and cost estimates. Some matters are subject to approval of joint venture participants. The targets and opportunities described in this report might also change materially if Woodside changes its strategic aim set out in this report.
9. Woodside makes no representation, assurance or guarantee as to the accuracy or likelihood of fulfilment of any forward looking statement or any outcomes expressed or implied in any forward looking statement. The forward looking statements in this report reflect expectations held at the date of this report and scenario analysis undertaken by Woodside. There are inherent limitations with scenario analysis, including the limitations set out on page 23 of this report, and it is difficult to predict which, if any, of the scenarios might eventuate. Scenario analysis relies on assumptions that may or may not be, or prove to be, correct and that may or may not eventuate and scenarios may also be impacted by additional factors to the assumptions disclosed. As part of its scenario analysis, Woodside has used climate scenarios published in the IEA's 2021 World Energy Outlook. The TCFD Guidance on Scenario Analysis for Non-Financial Companies (on page 66) describes limitations and uncertainties associated with the use of the IEA scenarios, while also noting the benefits, including that the IEA scenarios are widely used and accepted.<sup>1</sup>
10. Woodside does not undertake to provide ongoing market updates on the plan to achieve its objective or targets, or performance against the plan, except to the extent it has a legal obligation to do so.
11. Subject to any terms implied by law which cannot be excluded, Woodside accepts no responsibility for any loss, damage, cost or expense (whether direct or indirect) incurred by you as a result of any error, omission or misrepresentation in information in this report.
12. This report does not include any express or implied prices at which Woodside will buy or sell financial products.

## Emissions data

13. All greenhouse gas emissions data in this report are estimates, due to the inherent uncertainty and limitations in measuring or quantifying greenhouse gas emissions, including those uncertainties set out in the GHD Assurance Statement.
14. Woodside "greenhouse gas" or "emissions" information reported are Scope 1 GHG emissions, Scope 2 GHG emissions, and Scope 3 GHG emissions. Further information regarding the calculation of these emissions is contained in the supporting table of climate related data provided on page 40 of this report.
15. There may be differences in the way third parties calculate or report greenhouse gas emissions compared to Woodside, which means third party data may not be comparable to Woodside's data.

## Other important information

16. This report also contains references to the proposed combination of Woodside and BHP Group Limited's oil and gas business (Proposed Transaction). The Proposed Transaction remains subject to satisfaction of certain conditions precedent including shareholder and regulatory approvals. Completion is targeted in early June, with an effective date of 1 July 2021. There is no certainty or assurance that the Proposed Transaction will complete on the intended schedule or at all. Information in this report regarding the Proposed Transaction must be read subject to that uncertainty. For more information, refer to the announcement "Woodside and BHP to create a global energy company" by Woodside dated 22 November 2021, available at <https://www.woodside.com.au/media-centre/announcements>. Further detail on the risks associated with the Proposed Transaction can be found in Woodside's "2022 Notice of Meeting" which is expected to be released in April 2022.

<sup>1</sup> The Task Force on Climate-related Financial Disclosures (2020). "Guidance on Scenario Analysis for Non-Financial Companies".



## Independent Assurance Statement on Woodside Petroleum Ltd's Greenhouse Gas (GHG) Statement – Climate Report 2021

To the Management of Woodside Petroleum Ltd (Woodside)

We have undertaken a reasonable assurance engagement of Woodside's:

- Hydrocarbon production: total - equity (kt), total - operated (kt), sales (including LNG produced by third parties) - equity (kt)
- Global Scope 1 and 2 greenhouse gas emissions: scope 1 and 2 emissions – equity (net) (kt CO<sub>2</sub>-e), scope 1 emissions – equity (gross) (kt CO<sub>2</sub>-e), scope 2 emissions – equity (gross) (kt CO<sub>2</sub>-e), equity offsets surrendered in respect of 2021 emissions (kt CO<sub>2</sub>-e), scope 1 and 2 emissions intensity – equity (net) (kt CO<sub>2</sub>-e / kt), scope 1 and 2 emissions – operated (gross) (kt CO<sub>2</sub>-e), scope 1 emissions – operated (gross) (kt CO<sub>2</sub>-e), scope 2 emissions – operated (gross) (kt CO<sub>2</sub>-e), scope 1 and 2 emissions intensity - operated (gross) (kt CO<sub>2</sub>-e / kt), percentage of equity Scope 1 and 2 emissions covered by regulation (%)
- Sources of scope 1 and 2 greenhouse gas emissions: fuel combustion (kt CO<sub>2</sub>-e), flare (kt CO<sub>2</sub>-e), venting (kt CO<sub>2</sub>-e), other (kt CO<sub>2</sub>-e)
- Methane: methane emissions (greenhouse equivalent) - equity (kt CO<sub>2</sub>-e), percentage of equity gross Scope 1 and 2 emissions that are methane (%), methane intensity – equity (t CH<sub>4</sub> / kt total production), methane intensity – equity (Sm<sup>3</sup> / Sm<sup>3</sup> marketed gas), methane emissions (greenhouse equivalent) - operated (kt CO<sub>2</sub>-e), methane intensity – operated (t CH<sub>4</sub> / kt total production), methane intensity – operated (Sm<sup>3</sup> / Sm<sup>3</sup> marketed gas)
- Global Scope 3 greenhouse gas emissions estimates: scope 3 emissions – equity, total (kt CO<sub>2</sub>-e), scope 3 emissions – purchased goods and services, relating to traded LNG (kt CO<sub>2</sub>-e), scope 3 emissions – selected other upstream (assured on aggregate, including: purchased goods and services, waste generated in operations, business travel and employee commuting) (kt CO<sub>2</sub>-e), scope 3 emissions – downstream transportation and distribution (kt CO<sub>2</sub>-e), scope 3 emissions – use of sold product, relating to produced LNG (kt CO<sub>2</sub>-e), scope 3 emissions – use of sold product, relating to traded LNG (kt CO<sub>2</sub>-e)
- Greenhouse gas emissions intensity: scope 1, 2, 3 emissions intensity of production (grams CO<sub>2</sub>-e / MJ)

for the year ending 31 December 2021, comprising the values shown in the supporting data table of Woodside's Climate Report (the subject matter referred to hereafter as Woodside's greenhouse gas (GHG) statement). A multidisciplinary team including assurance practitioners and engineers conducted this engagement.

### Woodside's responsibility for subject matter

Woodside is responsible for preparing the GHG Statement in accordance with the applicable criteria. This includes the design, implementation and maintenance of internal control relevant to the preparation of a GHG Statement that is free from material misstatement, whether due to fraud or error.

### Our independence and quality control

We have complied with the relevant ethical requirements relating to assurance engagements, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. The firm applied Auditing Standard ASQC 1 *Quality Control for Firms that Perform Audits and Reviews of Financial Reports and Other Financial Information, and Other Assurance Engagements*, and accordingly GHD maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

### Our responsibility

Our responsibility is to express an opinion on the GHG Statement based on evidence obtained. We conducted the reasonable assurance engagement in accordance with Australian Standard on Assurance Engagements ASAE 3410 *Assurance Engagements on Greenhouse Gas Statements* (ASAE 3410). This requires that we plan and perform the engagement to obtain reasonable assurance about whether the GHG Statement is free from material misstatement.

A reasonable assurance engagement in accordance with ASAE 3410 involves performing procedures to obtain evidence about the quantification of emissions. The nature, timing and extent of procedures selected depend on the assurance practitioner's judgement, including the assessment of the risks of material misstatement, whether due to fraud or error, in the GHG Statement. In making those risk assessments, GHD considered internal control relevant to Woodside's preparation of the subject matter. A reasonable assurance engagement also includes:

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- Assessing the suitability of Woodside’s use of the reporting criteria for the GHG Statement, as the basis for preparing the GHG statement.
  - Evaluating the appropriateness of quantification methods and reporting policies used, and the reasonableness of estimates made by Woodside.
  - Evaluating the completeness and accuracy of recording, aggregation and transcription of source data.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

#### **Use of our statement**

This statement has been prepared for Woodside in accordance with our engagement terms dated 21 December 2021. GHD disclaim any assumption of responsibility for any reliance on this statement for any purpose other than that for which it was prepared being the reporting on our reasonable assurance audit.

Our agreed engagement only included the metrics described in this assurance statement for the year ended 31 December 2021. Accordingly, we have not provided assurance over any other GHG data or statements presented elsewhere or any other data or statements contained within Woodside’s Climate Report 2021.

Whilst our assurance procedures included reviewing information contained on Woodside’s website at the date of this assurance statement, our opinion does not extend to statements, data or information presented therein. It is noted that greenhouse gas emissions quantification is subject to inherent uncertainty because of incomplete scientific knowledge used to determine emissions factors and the values needed to combine emissions of different gases.

#### **Inherent limitations**

There are inherent limitations in performing assurance—for example, assurance engagements are based on selective testing of the information being examined—and because of this, it is possible that fraud or error may occur and not be detected. An assurance engagement is not designed to detect all misstatements, as an assurance engagement is not performed continuously throughout the period that is the subject of the engagement and the procedures are performed on a test basis. The opinion expressed in our Independent Assurance Statement has been formed on the above basis.

#### **Further Limitations**

This report has been prepared by GHD for Woodside Petroleum Ltd and may only be used and relied on by Woodside Petroleum Ltd for the purpose of reporting on the GHG Statement presented in Woodside’s 2021 Climate Report.

GHD otherwise disclaims responsibility to any person other than Woodside Petroleum Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

#### **Our opinion**

In our opinion, Woodside’s GHG Statement for the year ended 31 December 2021 comprising the values presented in the data table of Woodside’s Climate Report 2021 has been prepared in accordance with the criteria outlined in the statement’s explanatory note, in all material respects.



#### **Tom Young**

Lead Greenhouse Gas Auditor, RGEA Category 2, GHD Pty Ltd

7 February 2022

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