NET ZERO MOMENTUM TRACKER

RESOURCES SECTOR

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MONASH SUSTAINABLE DEVELOPMENT INSTITUTE
ClimateWorks AUSTRALIA

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This report is part of a series focusing on sectors within the Australian economy.

Net Zero Momentum Tracker – an initiative of ClimateWorks Australia with the Monash Sustainable Development Institute – demonstrates progress towards net zero emissions in Australia. It brings together and evaluates climate action commitments made by Australian businesses, governments and other organisations across major sectors. Sector reports from the project to date include property, banking, superannuation, local government, retail, transport and resources. We have assessed 58 per cent of ASX200 companies, as well as those accountable for 35 per cent of national emissions.

Achieving net zero emissions prior to 2050 is a key element of the Paris Climate Agreement (UNFCCC 2015) to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels and to strive for 1.5 degrees.

SUMMARY

The Australian resources sector must rise to the challenge of the global net zero transition

This report analyses 22 of Australia's biggest emitters within the resources sector. It evaluates each company's alignment with the global goal of net zero emissions by 2050, based on its stated commitments and actions.

It finds all 22 companies are taking steps to decarbonise their operations, with half committed to reducing their operational emissions in line with the net zero by 2050 goal. It also finds that action to reduce their most significant emissions – those that stem from customer use of their products and the goods and services the resources companies procure – falls well short of that 2050 goal.

Australian resources are domestically and globally significant from an economic and greenhouse gas emissions perspective. Australia is one of the world's top exporters of coal and liquefied natural gas; its resource extraction and processing companies are amongst the largest in the world.

Direct (scope 1) emissions generated from the oil, gas, mining and metals processing industries and indirect (scope 2) emissions from the energy powering their operations contribute more than one-quarter of Australia's total greenhouse gas emissions. Typically, 80 per cent or more of emissions from companies within these industries are from indirect (scope 3) emissions – such as those associated with the commodities that Australian resource companies supply. Some estimates suggest that, by 2030, emissions from the use of Australian fossil fuel exports alone could be responsible for over 10 per cent of global carbon dioxide emissions.

This analysis focuses on coal mining, oil and gas exploration and refining, and the mining, refining, processing and manufacture of metals. It looks specifically at 22 companies involved in these activities that reported the highest total scope 1 and 2 emissions in Australia in 2018-19.

The report finds 50 per cent of the companies assessed have commitments aligned with net zero by 2050 for their operational scope 1 and 2 emissions, of which:

Five – Anglo American, BHP, Fortescue, Santos and South32 – have specific targets and strategies to achieve net zero by 2050 (with Anglo American, Santos and Fortescue seeking to reach this by 2040).

Six others – ConocoPhillips, GFG Alliance (Liberty Primary Metals), Glencore, Rio Tinto, Shell and Woodside – have expressed an aspiration to reach net zero by 2050 or have interim targets aligned with this goal.

In terms of indirect scope 3 emissions, the analysis finds:

- One company, Glencore, has set an aspiration to reach net zero emissions by 2050 for emissions from the downstream use of their products.
- The majority – 18 companies, representing 82 per cent of those assessed – are undertaking emissions reduction initiatives. Of those, five – Anglo American, BHP, Fortescue, Santos and Shell – have set targets or goals that address scope 3 emissions, but none of these is aligned with a net zero by 2050 pathway.
- The remaining three companies, or 14 per cent of companies assessed, have no emissions reduction targets or activities for their scope 3 emissions.

Strategies developed to reduce scope 3 emissions include a diversification into renewables and zero carbon fuels, such as green hydrogen, and investments in the development of low-carbon processes and products, such as low-carbon steel and aluminium. Over half of the companies assessed are implementing carbon capture and storage technologies or investing in its development. These strategies tend to focus on the growth of low-carbon solutions, but very little action is currently undertaken to reduce the production of high-emissions goods.

To decarbonise their operations, resource companies increasingly power facilities, vehicles and equipment with renewable electricity and alternative fuels. Metal manufacturers recycle from scrap to reduce lifecycle energy consumption; oil, gas and coal companies try to reduce flaring and fugitive emissions of the potent greenhouse gas methane, including through collaborations to improve methane emissions regulation and quantification.

The climate ambition of resource companies has recently increased materially, with 82 per cent of those assessed as net-zero aligned having adopted a net zero target or aspiration for their operational (scope 1 and 2) emissions in the past 12 months. This corresponds with a strong push by investors for climate risk management, for example through the Climate Action 100+ initiative, and with the increase in company-led sectoral initiatives to decarbonise, such as the Oil and Gas Climate Initiative, Australian Industry Energy Transitions Initiative and ResponsibleSteel.

Several of Australia's biggest trading partners (including China, Japan, South Korea and the EU) have committed to achieve net zero within the second half of this century or sooner. More are expected to follow. As the global transition to net zero accelerates, resource companies face unprecedented declines in demand for carbon intense commodities, declines that raise the prospect of dramatic asset write-downs. Yet the net zero transition also presents opportunity. Australia has reserves of mineral commodities required for technology needed to reach net zero, and ample renewable energy resources to power its resources sector and facilitate green hydrogen production for domestic use and for export.

By acting now to implement their own comprehensive net zero by 2050 targets and strategies, Australian resource companies can capitalise on the transition and secure their future within a global net zero economy. Key steps they can take to improve their alignment to net zero include: strengthening actions to reduce scope 3 emissions by engaging with suppliers and customers to ensure they have targets and commitments; committing to reduce production of commodities associated with high emissions; implementing and investing in suitable technologies to tackle emissions from downstream processing of their products; and investing in and deploying nature-based and technological solutions that offset and sequester unavoidable emissions.

NET ZERO BY 2050 EMISSIONS ASSESSMENT OF AUSTRALIA'S RESOURCES SECTOR

WE ASSESSED THE CLIMATE COMMITMENTS AND ACTIVITIES OF 22 OF AUSTRALIA'S BIGGEST EMITTERS WITHIN THE RESOURCES SECTOR, AND FOUND THAT:

+4%

has expressed an aspiration to achieve net zero scope 3 emissions by 2050. These include emissions from the downstream use and processing of fossil fuel and mineral products.

+50%

are fully aligned or on a pathway to net zero by 2050 for their operational emissions, which include direct emissions from the oil, gas, mining and metals processing industries and from energy purchased to power their operations.

Alcoa, Anglo American, BHP, BlueScope, Chevron, ConocoPhillips, ExxonMobil, Fortescue, GFG Alliance (Liberty Primary Metals), Inpex, Peabody, Rio Tinto, Santos, Shell, South32, Viva Energy, Woodside, Yancoal

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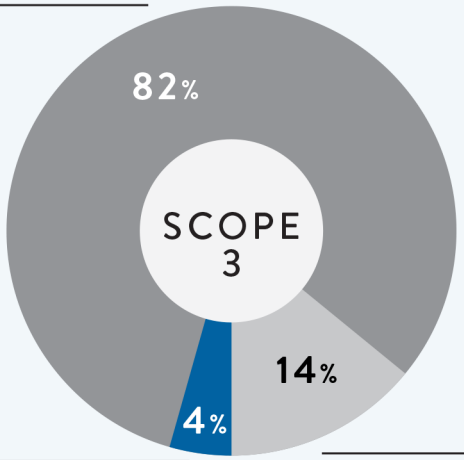


1

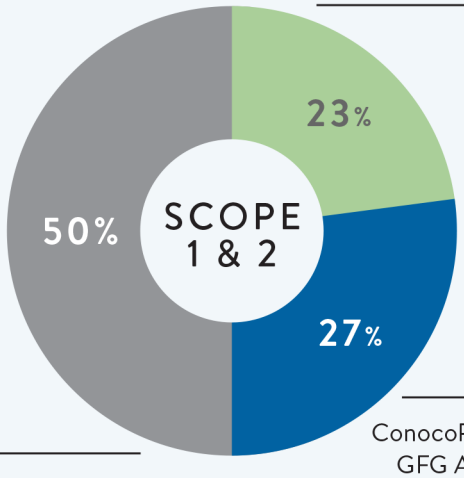
Glencore

3

Centennial, Newcrest Mining, Whitehaven

Anglo American, BHP, Fortescue, Santos, South32

5



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ConocoPhillips, GFG Alliance (Liberty Primary Metals), Glencore, Rio Tinto, Shell, Woodside

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Alcoa, BlueScope, Centennial, Chevron, ExxonMobil, Inpex, Newcrest Mining, Peabody, Viva Energy, Whitehaven, Yancoal

- **FULLY ALIGNED** — Net zero by 2050 target for all emissions
- **CLOSELY ALIGNED** — Net zero by 2050 target for a significant proportion of emissions
- **ALIGNED ASPIRATION/PATHWAY** — Aspiration to achieve net zero by 2050 for all emissions, or an aligned interim target
- **NO TARGETS** — No disclosed emissions reduction targets or commitments
- **NOT ALIGNED** — Undertaking activities to reduce emissions but not in line with net zero by 2050, or the alignment is unclear
- **PARTIALLY ALIGNED** — Net zero by 2050 target for a small proportion of emissions

5

CONTEXT

Australia is endowed with diverse and extensive mineral and energy reserves.

The resources sector accounts for more than eight per cent of Australia's GDP and over half of its exports (Australian Industry ETI 2020; Department of Industry Science Energy and Resources 2020).

During the first two decades of the 21st century, Australian resources exports tripled to over AU$260bn, driven by demand from China and other Asian countries for iron ore, liquefied natural gas (LNG) and coal, and by a subsequent rise in prices (Phillips 2016).

By 2019, Australia had become the world's top exporter of coal and LNG, making its resource companies some of the world's largest (Climate Analytics 2019; Consultancy.org 2019; Toscano 2020a). As a result, the Australian resources sector exerts a significant influence on the local and international economy, and contributes substantially to global greenhouse gas emissions.

Direct (scope 1) emissions from resources sector operations and indirect (scope 2) emissions from energy used by the sector account for more than a quarter of Australia's emissions (Australian Industry ETI 2020). The bulk of greenhouse gas emissions associated with resource companies, however, come from indirect (scope 3) value chain emissions, with more than 80 per cent of emissions from the downstream use and processing of fossil fuel and mineral products. In 2019, one estimate put Australia's coal, oil and gas exports at almost four per cent of global carbon dioxide emissions. If government and industry projections for fossil fuel exports are accurate, the figure could increase to over 10 per cent by 2030, with the largest contribution coming from exports of thermal and metallurgical coal (Climate Analytics 2019; Morton 2019). Australian mineral exports can also have high associated scope 3 emissions since they often require energy and emissions intensive downstream processing.

Four out of Australia's five biggest trading partners now maintain mid-century net zero targets, with Japan and South Korea announcing their 2050 targets after China made its commitment to net zero by 2060 in October 2020. Other countries, including the United States of America, are expected to follow (Emerson 2020). Early signs suggest these targets are already affecting demand for Australia's fossil fuel reserves (Durrant 2020; IGCC 2020; Macdonald-Smith 2020; McCurry 2020; Morton 2020a).

Globally, many resources companies are striving to achieve emissions reduction targets to meet growing demand for greener options from customers and more stringent regulatory requirements, which are incentivising the need for low-carbon commodities (Yep 2020). Some organisations are already providing carbon neutral products, although with a strong reliance on offsetting at this stage. For example, Shell has agreements with Tokyo Gas and GS Energy, and with China's CNOOC Gas & Power Group, to supply carbon neutral LNG. Similarly, French multinational Total has committed to achieve net zero emissions across all production and energy products used by its customers in Europe by 2020 (Shell 2019; Shell 2020; Total 2020).

Investors and lenders increasingly expect organisations they back to manage their climate risks and set emissions reduction targets. Australia's biggest four banks have all committed to stop financing thermal coal, with ANZ, Commonwealth Bank and Westpac to cease in 2030, and the National Australia Bank to follow in 2035. Institutional investors, such as HESTA, Aware Super and BlackRock, are divesting from some fossil fuels and closely engaging with high emitting companies. Superannuation funds AustralianSuper, Cbus, HESTA, Rest and UniSuper have committed to net zero portfolios by 2050. This focus on decarbonising investment and lending portfolios is increasing capital costs for carbon-intensive industries (Livsey 2020; Mills 2019), and means companies in hard-to-abate sectors such as resources must now consider and communicate how they will viably transition to a net zero global economy (Blundell 2020). The Climate Action 100+ initiative also demonstrates investors' growing expectation for companies to manage and disclose climate risks. This coalition of over 500 global investors is targeting 167 of the world's largest greenhouse gas emitting companies to ensure they put in place net zero business strategies (Climate Action 100+ 2020; Moore 2020).

ANALYSIS

This study examines companies whose primary activities include coal mining, oil and gas exploration and refining, and the mining, refining, processing and manufacture of metals (note that gas extraction companies such as Origin and AGL with a substantial energy retailing and generation portfolio will be included in a Net Zero Momentum Tracker energy sector report). Within these parameters, this analysis looks at the 25 entities that reported the highest total scope 1 and 2 emissions in 2018–19 under Australia's National Greenhouse and Energy Reporting (NGER) scheme (Clean Energy Regulator 2020). Taking into consideration parent/subsidiary relationships, this means a focus on 22 organisations. Scope 3 emissions are not incorporated into the selection criteria since multinational resources sector companies with Australian operations typically do not report the scope 3 emissions associated specifically with commodities extracted and processed in Australia. Seven of the 22 companies analysed do not disclose their scope 3 emissions at all. Scope 3 reporting is not required under the NGER scheme, and there are inconsistencies in emissions sources included by companies that do report
scope 3 (Downie & Stubbs 2013). Figure 1 shows the total scope 1 and 2 emissions for top resources sector emitters that report under the NGER scheme, and the cut-off for companies included in the analysis. Those excluded have comparatively lower scope 1 and 2 emissions. BP, which is amongst those excluded on this basis, has recently announced pending closure of its Kwinana refinery, a material contributor to the company's emissions.

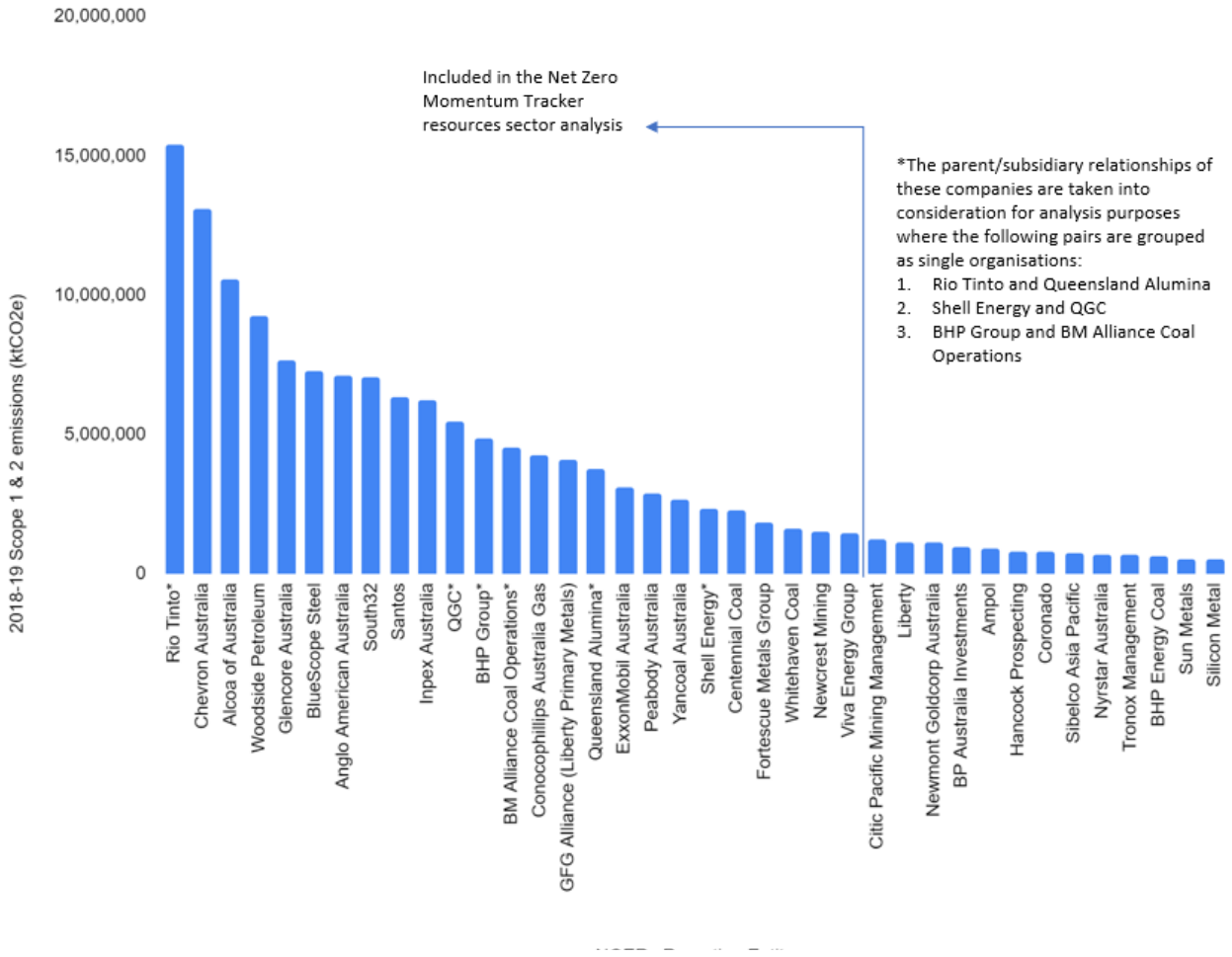


***Figure 1**: Australian scope 1 & 2 emissions reported by resources sector entities for 2018-19*

This Net Zero Momentum Tracker resources sector report assessed the pledges, commitments and activities of 22 resource companies to evaluate their degree of alignment with achieving net zero emissions by 2050.

Together, these companies represent 31 per cent of scope 1 and 2 emissions reported under Australia's National Greenhouse Gas and Energy Framework, and 15 per cent of market capitalisation in the ASX200.

Seventy per cent of the assessed companies report their major sources of scope 3 emissions.

This analysis considers commitments and activities that address: scope 1 and 2 emissions from each company's Australian operations, and those that address their scope 3 emissions, such as those generated by their suppliers and from use and processing of their products by customers (The Greenhouse Gas Protocol 2004).

Table 1 provides an indication of each company's overall net zero by 2050 ambition, with separate assessments also shown for scope 1 and 2, and scope 3 ambition.

Table 2 illustrates findings from assessment of each company's scope 1 and 2 emissions reduction commitments and activities for four categories: energy conservation, renewable energy, electrification and fuel switching, and non-energy/offsets. The latter category includes efforts related to carbon capture and storage. Table 3 provides the same assessment with a focus on activities and initiatives that address scope 3 emissions.

Supporting details for Tables 1, 2 and 3 are provided in the appendix.

Overall ambition is strongly influenced by efforts to reduce scope 3, the most material emissions for all 22 companies. The highest level of overall ambition among the companies considered is 'aligned aspiration/pathway' (Figure 2).

- One company assessed – Glencore – has expressed an aspiration to achieve 'net zero total emissions by 2050' for its scope 1, 2 and 3 emissions.

The 'partially aligned' category is assigned to 10 of the 22 companies assessed: namely, those that have targets for net zero by or before 2050 covering a small proportion of their emissions.

Although some of the companies assessed have strong commitments to decarbonise their operations, only Glencore's net zero aspiration indicates the company is taking steps to align its scope 3 emissions with net zero by 2050.

Action on scope 3 emissions is emerging amongst other companies. Of the 22 companies assessed:

- Eighteen are taking some steps to reduce their scope 3 emissions. Of these, five companies – Anglo American, BHP, Fortescue, Santos and Shell – have targets or goals that address scope 3 emissions. These, however, are either not aligned with net zero by 2050, target a small proportion of emissions, or are broad statements of support rather than explicit targets.

Three companies – Centennial, Newcrest Mining and Whitehaven – have no disclosed scope 3 emissions reduction targets or commitments.

Strategies adopted by the fossil fuel companies to address their scope 3 emissions include diversification into renewables and low-carbon fuels; pivoting towards customers and suppliers with net zero aligned emissions reduction targets and strategies; working with their customers to reduce their scope 1 and 2 emissions; and investment in development of carbon capture and storage technologies.

For example, Shell, which has a target to reduce the emissions intensity (gCO2e/MJ) of its products by 65 per cent by 2050, is diversifying into renewables and alternative fuels through its New Energies business. It has bought Sonnen, a company that supplies home battery storage in Europe, North America and Australia, and owns a 49 per cent stake in ESCO Pacific, a utility-scale solar developer that has implemented almost 500MW of operational solar generation in Australia. Shell has also expressed interest in producing green hydrogen as a commodity, to be sold either as a zero emissions fuel or industrial feedstock, as have Fortescue and Woodside.

To reduce the emissions intensity of their products, metals and mining companies are investing in development of low-carbon processes and products such as low-carbon aluminium, and steel manufactured using green hydrogen rather than metallurgical coal (Green Review 2020). In doing so, they are collaborating and engaging with peers, suppliers and customers to share knowledge and align approaches. BHP has made a broad pledge to assist the steelmaking industry achieve a 30 per cent emissions intensity reduction by 2030.

Inpex and ConocoPhillips state that they are including climate change considerations in their supplier selection criteria.

Efforts to decarbonise shipping are evident from three companies. Anglo American has flagged support for efforts to decarbonise international shipping by 2050. BHP has committed to support a '40 per cent emissions intensity reduction of BHP-chartered shipping' in alignment with the International Maritime Organization's (IMO) target, which was made legally binding in October 2020 (Harvey 2020). Fortescue also supports the IMO targets and is working closely with shipping partners to deliver on these targets. However, shipping only constitutes approximately two per cent of scope 3 emissions for these companies.

Under net zero by 2050 scenarios, carbon capture and storage is expected to play a role in addressing residual emissions from extraction and industrial processes, amid ongoing demand for some fossil fuels as a feedstock and energy source for manufacturing for example (IPCC 2018). More than half of the companies assessed are investing in development of carbon capture and storage technologies – particularly those working in oil, gas and coal.

Strategies amongst the companies assessed to address emissions from use and processing of their products tend to focus on growth of low-carbon solutions, but very little action is currently being undertaken to reduce production of high emissions goods. For example, none of the oil and gas companies have targets to reduce their production of fossil fuels.

In general, our analysis finds a far greater alignment with net zero by 2050 for operational scope 1 and 2 emissions, with all of the 22 companies assessed taking some steps to reduce their operational emissions.

Eleven companies, or 50 per cent of those assessed, have commitments aligned with net zero by 2050 for their operational emissions, of which:

- Five – Anglo American, BHP, Fortescue, Santos and South32 – are 'fully aligned' and have specific targets and strategies to achieve net zero for their operations by 2050, with Anglo American, Santos and Fortescue seeking to reach this by 2040.
- Six others – ConocoPhillips, GFG Alliance (Liberty Primary Metals), Glencore, Rio Tinto, Shell and Woodside – have expressed an 'aligned aspiration' to reach net zero by or before 2050, or have interim targets aligned with the goal.

The other 50 per cent have commitments or are undertaking activities that will reduce their operational emissions but these are 'not aligned' with net zero by 2050, of which:

- Five companies – Alcoa, BlueScope, Chevron, Inpex and Newcrest – have interim targets or commitments to reduce emissions that are not aligned with net zero by 2050.
- Six – Centennial, ExxonMobil, Peabody, Viva Energy, Whitehaven and Yancoal – have not made any commitments but are engaged in a range of activities to reduce operational emissions.

The companies assessed are decarbonising their energy use by electrifying facilities, vehicles and equipment; purchasing renewable energy; investing in renewable energy generation and storage; and using alternative fuels such as hydrogen, biofuels, furnace off-gas and coal mine waste gas.

South32, Santos, Shell, Centennial and Fortescue have all deployed onsite renewable generation at their own facilities, or invested in large-scale renewable and battery storage projects. BlueScope Steel and aluminium smelter Alcoa are manufacturing steel and aluminium from recovered and recycled scrap, which significantly reduces lifecycle energy consumption. Anglo American, BHP and Fortescue have formed a Green Hydrogen Consortium with engineering consultancy Hatch to look at ways hydrogen can be used to decarbonise their operations (Hatch 2020; Woodside 2020). GFG Alliance (Liberty Primary Metals), Shell and Woodside have also shown an interest in using green hydrogen for their operations.

Strategies to address non-energy emissions include minimising methane leakage and fugitive emissions, implementing carbon capture and storage, and investing in offsetting solutions. Rio Tinto and Alcoa have partnered through the ELYSIS joint venture to develop an aluminium smelting process with no direct greenhouse gas emissions, a technique they plan to license in 2024.

Many of the fossil fuel companies assessed emphasise collaboration and investment to reduce resources sector emissions of methane, a potent greenhouse gas. Centennial, South32 and Whitehaven are investing in studies on methane capture and utilisation. As a member of the Oil & Gas Climate Initiative (OGCI), ExxonMobil is working with other OGCI members to reduce the methane intensity of their oil and natural gas products (ExxonMobil 2020). Four of the oil and gas companies assessed – Chevron, ExxonMobil, Shell and Woodside – have committed to the Methane Guiding Principles, which requires collaboration through industry partnerships, trade associations and proactive stakeholder engagement to improve methane emissions management across their supply chains (Methane Guiding Principles 2020).

Shell and Woodside have endorsed the World Bank's Zero Routine Flaring initiative, which requires them to eliminate routine flaring by 2030.

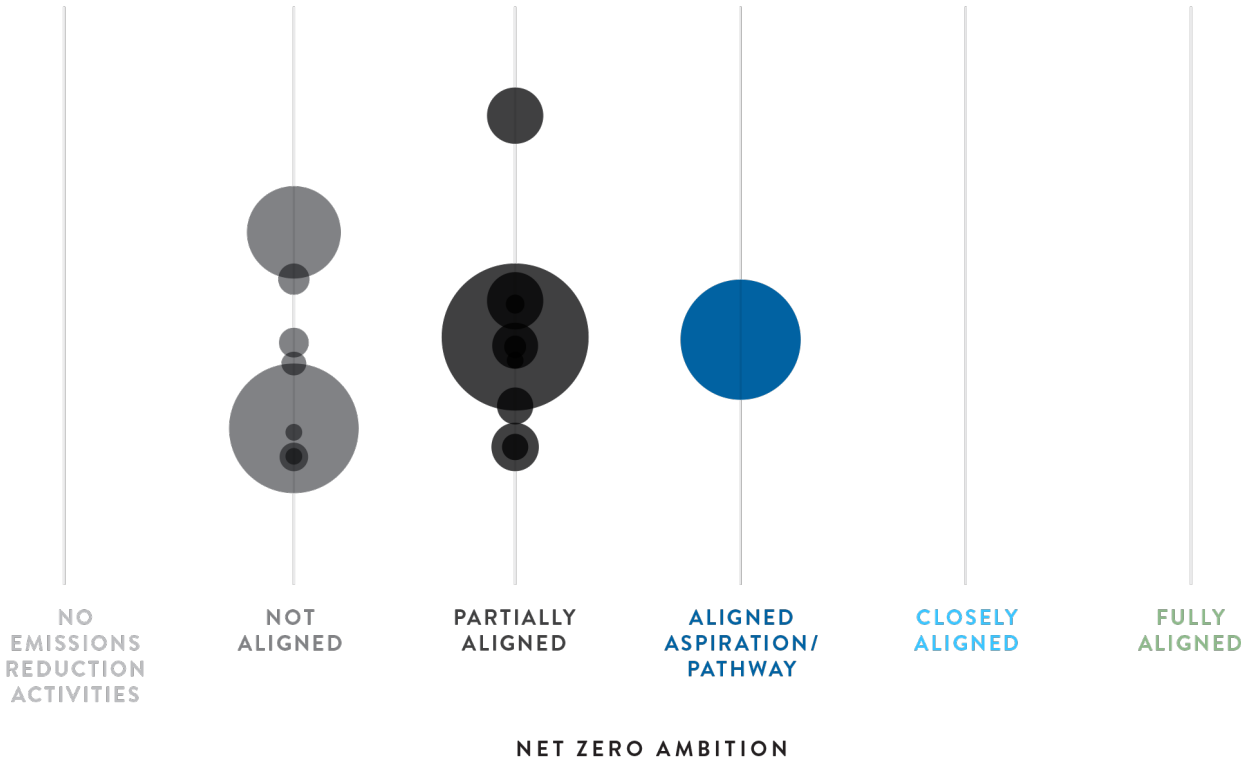
The Chevron-led Gorgon Carbon Dioxide Injection Project is expected to capture 40 per cent of the total emissions from one of the world's largest natural gas projects, located in Western Australia. Both Shell and ExxonMobil also have an interest in this joint venture (Macdonald-Smith 2020b; Morton 2019b). Alcoa, Woodside, Shell, Glencore, Inpex and BHP are investing in natural solutions, including reforestation, afforestation and 'blue' carbon, to offset their emissions.

Momentum to address emissions within Australia's resources sector has significantly accelerated in the past year. Nine of the 11 companies assessed as aligned with net zero by 2050 for their operational emissions set commitments conducive to this status within the past 12 months. Within this time period, heavyweights such as Shell, Glencore and BP have all announced plans to reduce operational emissions to net zero and steps to address their material scope 3 emissions. (Although BP is not included in this analysis, a case study of the company's commitments can be found at netzerotracker.org).

Although a primary driver is the accelerating transition towards net zero in key export markets, this momentum also corresponds to increased pressure from investors for companies to disclose and manage their climate risks. Twelve of the 22 companies assessed are being targeted by Climate Action 100+, a coalition of over 500 global investors targeting the world's largest greenhouse gas emitting companies to ensure they have net-zero business strategies and targets (Climate Action 100+ 2020; Moore 2020). Most of the companies examined are also members of peak bodies, and collaboration initiatives such as the Oil and Gas Climate Initiative, Australian Industry Energy Transitions Initiative and ResponsibleSteel, which are mobilising companies in the sector to increase their climate ambition and supporting them in charting pathways towards net zero emissions.

Figure 2: *Distribution of resources organisations assessed by net zero ambition – where the bubble size is proportional to their revenue. Companies within the same category are arranged by ascending scope 1 and 2 emissions.*

RESOURCES COMPANIES' OVERALL NET ZERO AMBITION LEVEL



- **FULLY ALIGNED**
  Net zero by 2050 target for all emissions
- **CLOSELY ALIGNED**
  Net zero by 2050 target for a significant proportion of emissions
- **ALIGNED ASPIRATION/PATHWAY**
  Aspiration to achieve net zero by 2050 for all emissions, or an aligned interim target
- **PARTIALLY ALIGNED**
  Net zero by 2050 target for a small proportion of emissions
- **NOT ALIGNED**
  Undertaking activities to reduce emissions but not in line with net zero by 2050, or the alignment is unclear
- **NO TARGETS**
  No disclosed emissions reduction targets or commitments

TABLE 1: ASSESSMENT OF NET ZERO AMBITION

The resource organisations listed are the 22 Australian companies involved in coal mining; oil and gas exploration and refining; or the mining, refining, processing and manufacture of metals that reported the highest emissions in 2018-19 under Australia's National Greenhouse and Energy Reporting (NGER) scheme. The assessment of net zero ambition is informed by Table 6 in the appendix.

Overall net zero ambition	Scope 1 and 2 net zero ambition	Scope 3 net zero ambition	Total scope 1 and 2 emissions (tCO_2-e)	Scope 3 emissions (tCO_2-e)[1]	Sub-sector[2]	Company
■	■	■	7,649,458	313,071,000	Coal & Oil	Glencore Australia
▲	★	●	7,122,853	226,000,000	Metals & Mining	Anglo American Australia
▲	★	●	4,879,669	555,100,000	Metals, Mining, Coal, Oil & Gas	BHP Group[3]
▲	★	●	1,856,342	244,500,000	Metals & Mining	Fortescue Metals Group
▲	★	●	6,349,627	24,500,000	Oil & Gas	Santos[4]
▲	★	●	7,061,727	116,000,000	Metals & Mining	South32
▲	■	●	1,981,995[5]	195,200,000	Oil & Gas	ConocoPhillips[6] Australia
▲	■	●	4,101,481	Not reported	Metals & Mining	GFG Alliance (Liberty Primary Metals)
▲	■	●	19,165,784	491,000,000	Metals & Mining	Rio Tinto[7]
▲	■	●	7,789,359	576,000,000	Oil & Gas	Shell[8]
▲	■	●	9,227,810	74,017,000	Oil & Gas	Woodside Petroleum

[1] Including only categories reported by the company. Sources of emissions are not Australia-specific.
[2] With metallurgical coal under Metals & Mining and thermal coal under Coal
[3] Including BHP Group Ltd and BM Alliance Coal Operations Pty Ltd
[4] Reported emissions do not include those associated with acquisition of ConocoPhillips' Australia-West business
[5] Data reported under the Safeguard Mechanism 2018-19. The company does not report on scope 2 emissions since the facility generates power on site.
[6] Company currently only has operational control of APLNG facility on Curtis Island
[7] Including Rio Tinto Ltd and Queensland Alumina Ltd
[8] Including Shell Energy Holdings Australia Ltd and QGC Pty Ltd

Overall net zero ambition	Scope 1 and 2 net zero ambition	Scope 3 net zero ambition	Total scope 1 and 2 emissions (tCO_2-e)	Scope 3 emissions (tCO_2-e)[9]	Sub-sector[10]	Company
●	●	●	10,570,996	39,600,000	Metals & Mining	Alcoa Australian
●	●	●	7,270,583	13,300,000	Metals & Mining	BlueScope Steel
●	●	●	13,100,237	1,442,000,000	Oil & Gas	Chevron Australia
●	●	●	3,115,380	Not reported	Oil & Gas	ExxonMobil Australia
●	●	●	6,238,520	56,222,351	Oil & Gas	Inpex Australia
●	●	●	2,885,529	Not reported	Coal	Peabody Australia
●	●	●	1,430,993	Not reported	Oil & Gas	Viva Energy Group
●	●	●	2,670,882	Not reported	Coal	Yancoal Australia
●	●	o	2,276,272	25,841,648	Coal	Centennial Coal
●	●	o	1,495,557	Not reported	Metals & Mining	Newcrest Mining
●	●	o	1,621,007	Not reported	Coal	Whitehaven Coal

★ **Fully aligned**	The organisation has a target to achieve net zero by 2050 for all of its emissions, supported by a strategy and/or interim targets.
☆ **Closely aligned**	The organisation has a target to achieve net zero by 2050 for a significant proportion of its emissions, supported by a strategy and/or interim targets.
■ **Aligned aspiration/ pathway**	The organisation has expressed an aspiration to achieve net zero by 2050 for all of its emissions, or has an interim target aligned to this goal.
▲ **Partially aligned**	The organisation has a target to achieve net zero by 2050 for a small proportion of its emissions.
● **Not aligned**	The organisation has made a commitment, pledge or is undertaking activities that will reduce its emissions but not in alignment with net zero by 2050, or the alignment is unclear due to insufficient information.
o **No emissions reduction targets or activities**	The organisation has not disclosed any emissions reduction targets, commitments or activities.

[9] Including only categories reported by the company. Sources of emissions are not Australia-specific.
[10] With metallurgical coal under Metals & Mining and thermal coal under Coal

TABLE 2: ASSESSMENT OF SCOPE 1 AND 2 EMISSIONS REDUCTION COMMITMENTS AND ACTIVITIES

This assessment of scope 1 and 2 emissions reduction activities and initiatives is informed by the pledges and commitments summarised in Table 5 (included in the appendix).

Company	Sub-sector[11]	Energy conservation	Renewable electricity	Electrification / fuel switching	Non-energy
Centennial Coal	Coal	■	■	■	■
Peabody Australia		o	o	o	o
Whitehaven Coal		■	o	o	■
Yancoal Australia		■	o	o	o
Glencore Australia	Coal & Oil	■	■	o	■
Alcoa Australian	Metals & Mining	■	o	o	■
Anglo American Australia		☆	■	o	■
BlueScope Steel		■	■	o	■
Fortescue Metals Group		■	■	■	■
GFG Alliance (Liberty Primary Metals)		■	★	★	★
Newcrest Mining		■	■	o	o
Rio Tinto		■	■	■	☆
South32		■	■	☆	■
BHP Group	Metals, Mining, Coal, Oil & Gas	■	■	☆	■
Chevron Australia	Oil & Gas	■	■	o	■
ConocoPhillips Australia		■	o	o	■
ExxonMobil Australia		☆	■	o	■
Inpex Australia		■	■	o	■
Santos		■	■	■	■
Shell		☆	■	o	☆
Viva Energy Group		■	■	o	o
Woodside Petroleum		☆	o	■	■

[11] With metallurgical coal under Metals & Mining and thermal coal under Coal

★ Specific target that aligns with net zero emissions before 2050. For example:
Energy conservation - commitment equivalent to an energy efficiency/intensity target aligned with net zero by 2050 or equivalent
Renewable energy - commitment to use 100 per cent renewable energy
Electrification or fuel switching: commitment to shift to 100 per cent electrification and/or non-emitting fuels
Non-energy/Offsets - commitment to abate all non-energy emissions and offset unavoidable emissions only

☆ Activities to reduce emissions supported by a detailed strategy or target.

■ Activities without a detailed strategy or target that will reduce emissions.

o Generic expression of intent or no information.

TABLE 3: ASSESSMENT OF SCOPE 3 EMISSIONS REDUCTION COMMITMENTS AND ACTIVITIES

This assessment of scope 3 emissions reduction activities and initiatives is informed by the pledges and commitments summarised in Table 5 (included in the appendix).

Company	Sub-sector[12]	Energy conservation	Renewable electricity	Electrification / fuel switching	Non-energy
Centennial Coal	Coal	o	o	o	o
Peabody Australia		o	o	o	■
Whitehaven Coal		o	o	o	o
Yancoal Australia		■	o	o	o
Glencore Australia	Coal & Oil	o	o	o	■
Alcoa Australian	Metals & Mining	■	o	o	☆
Anglo American Australia		o	o	■	o
BlueScope Steel		■	o	o	o
Fortescue Metals Group		■	o	■	o
GFG Alliance (Liberty Primary Metals)		■	o	o	o
Newcrest Mining		o	o	o	o
Rio Tinto		■	o	o	■
South32		■	o	o	■
BHP Group	Metals, Mining, Coal, Oil & Gas	■	o	■	■
Chevron Australia	Oil & Gas	o	■	■	o
ConocoPhillips Australia		o	o	o	■
ExxonMobil Australia		■	o	■	■
Inpex Australia		o	o	■	o
Santos		o	o	■	■
Shell		■	☆	■	■
Viva Energy Group		o	o	■	o
Woodside Petroleum		o	o	■	o

[12] With metallurgical coal under Metals & Mining and thermal coal under Coal

★ Specific target that aligns with net zero emissions before 2050. For example, engage with suppliers and customers to ensure they have targets to:

Improve operational efficiency aligned with net zero by 2050 pathway or equivalent
Use 100 per cent renewable energy
Shift to 100 per cent electrification and/or non-emitting fuels
Abate all unavoidable non-energy emissions

☆ Activities to reduce emissions supported by a detailed strategy or target.

■ Activities without a detailed strategy or target that will reduce emissions.

o Generic expression of intent or no information.

Next steps

To fully align themselves with net zero by 2050, resource companies must commit to decarbonising their operations by 2050, and set absolute net zero by 2050 scope 3 targets that include emissions from the use and processing of their products. They must support these goals with strategies that outline interim targets, and signal to customers, suppliers and investors a pathway to decarbonisation through:

- A transition to low-carbon practices and products where feasible
- Inclusion of climate change criteria for supplier selection and mandatory emissions criteria in supplier agreements (Cuff 2018)
- Investment in suitable technologies and nature-based solutions that offset and sequester unavoidable greenhouse gas emissions
- Collaboration with peers, customers and suppliers to decarbonise across the resources value chain through initiatives such as the Mission Possible Platform, the Oil and Gas Climate Initiative, Australian Industry Energy Transitions Initiative and ResponsibleSteel.

Transformation of the sector to align with an economic transition to net zero requires long-term investment and re-skilling of the workforce. In Australia, now is an excellent time to act.

In the wake of the COVID-19 pandemic, the Reserve Bank of Australia has cut the cash interest rate to an historic low, significantly reducing corporate borrowing costs (Holden 2020). Investors and lenders are also increasingly providing financial incentives and products geared towards supporting industry decarbonisation. For example, transition bonds are a new asset class designed to enable industries with high greenhouse gas emissions to raise capital for decarbonisation of their business and supply chains (BNP 2020; Gross & Stubbington 2020).

To stimulate business investment, Australia's 2020 federal budget enhanced asset write-off arrangements, allowing businesses with up to AU$5 billion in annual turnover to claim an immediate deduction of the full value of eligible, depreciable assets such as plant and infrastructure used or installed before 30 June 2022 (ATO 2020; Janda & Chalmers 2020).

The Australian government has also said, in its 'Low Emissions Technology Statement' of September 2020, that it will prioritise investment in the technologies necessary to support decarbonisation of the resources sector, such as 'clean' hydrogen, low-carbon steel and aluminium, as well as carbon capture and storage (ARENA 2020; Department of Industry Science Energy and Resources 2020).

Resource companies that fail to act risk unprecedented declines in demand for emissions intense commodities, resulting in dramatic asset write downs – as more trading partners follow China, Japan and South Korea in setting net zero targets, and the global transition towards net zero by 2050 accelerates (Blackmon 2020; Livsey 2020; Morton 2020b).

This transition also presents opportunities for Australia. The country's resources sector has a comparative advantage, with access to ample renewable energy to power operations and produce greener products. Australia also has enviable reserves of commodities required for electrification and the storage and generation infrastructure necessary to achieve net zero emissions. Other advantages include existing mining expertise, effective logistics and an attractive investment landscape.

We are in the transformational decade for addressing climate change (ClimateWorks 2020). By acting now, the resources sector will be better positioned to manage climate risks and capitalise on the global net zero transition.

Case studies

BHP

BHP is a multinational Anglo-Australian company that produces iron ore, copper, nickel, thermal and metallurgical coal, crude oil and gas. It is listed among the top five mining companies in the world by revenue.

In September 2020, it published its 'Climate Change Report', which included its climate commitments and outlined how it would be integrated into its corporate strategy. The detail within this report sets a precedent for others within the resources sector (Ker 2020; Toscano 2020b).

BHP aims to limit operational emissions at or below 2017 levels, reduce them by 30 per cent by 2030 relative to levels in 2020, and achieve net zero operational emissions by 2050. Its plan also states that BHP will support the steel industry to achieve a 30 per cent emissions intensity reduction, and will support a 40 per cent emissions intensity reduction in the shipping of BHP products. BHP plans to strengthen these goals by linking them to executive remuneration.

The company has also signed a memorandum of understanding with steel producer China Baowu, including a stated intention to invest up to US$35 million to support emissions intensity reduction within the global steel industry.

In addition to outlining the goals and strategies the company will adopt to manage its climate risks, BHP's Climate Change Report contains details of analysis conducted to assess the company's likely performance under four climate scenarios: a 'Climate Crisis' (with limited climate action); a 'Central Energy View' (based on current policies: that is, aligned with 3 degrees of warming by 2100); a 'Lower Carbon View' (aligned with 2.5 degrees of warming by 2100); and a '1.5 degrees Paris aligned' scenario.

On the basis of this analysis, BHP has concluded that it will thrive under a Paris-aligned 1.5°C trajectory, since action to decarbonise the global economy will present 'opportunities to invest in commodities such as potash, nickel and copper', which will 'provide a strong foundation' for the business.

Fortescue

Fortescue Metals Group operates within the Pilbara region of Western Australia. It is one of the world's largest iron ore producers.

In August 2020, it published its inaugural 'Climate Change Report', which included a target to achieve net zero operational emissions by 2040, supported by a commitment to reduce scope 1 and 2 emissions from existing operations by 26 per cent from 2020 levels by 2030. Fortescue has validated its targets against scenarios in which global temperatures are limited to 2 degrees or above.

To support decarbonisation of its operations, the company is investing US$700 million in the Pilbara Energy Connect project, which it will build, own and operate. The project includes construction of a solar-gas hybrid facility, incorporating 150MW of solar generation and large-scale battery storage. Fortescue will also be supplied from Alinta's Chichester Solar Gas Hybrid Project, which includes a 60MW solar farm.

The company expects renewable hydrogen to play a significant role in decarbonising its operations. It is collaborating with manufacturers to investigate hydrogen as an alternative to diesel for powering mining vehicles and equipment. The company has entered into a partnership with ATCO Australia to explore the potential to deploy hydrogen vehicle fuelling infrastructure across Western Australia.

Shell

Shell has stated that it plans to be a 'net zero emissions energy business by 2050 or sooner' – and specifically that it will aim for scope 1 and 2 emissions from the manufacture of its products to be net zero by 2050 at the latest.

It has also committed to reduce the emissions intensity of its products. In April 2020, the company raised the ambition of its product intensity target to 65 per cent by 2050 from a previous goal of halving product intensity by then. Shell underpins these targets with scenario modelling, the most ambitious of which models the achievement of net zero carbon dioxide emissions by 2070. The company has said that the sale of renewable energy and alternative fuels constitutes a significant component of its plans to reduce the emissions intensity of its products.

Through its 'New Energies' business, Shell is investing in solar and wind generation, developing fuels made from waste and plants, and deploying electric vehicle charging infrastructure and hydrogen refuelling stations for vehicles. To support these ventures, the company has made new acquisitions, including Select Carbon, a specialist company developing carbon farming projects throughout Australia; NewMotion, a company with one of Europe's biggest electric vehicle charging networks; EOLFI, a French renewable energy developer specialised in floating wind projects; and FORGE, a Canadian biofuel start-up.

The organisation flags carbon capture and storage as a 'critical technology' for decarbonising industrial facilities and power plants, and is collaborating with the Norwegian government and oil companies Statoil and Sasol to advance its development.

Resources

The following are relevant to resource companies seeking to align with net zero by 2050:

Methodologies

Science Based Targets (SBTi 2020)

Science Based Targets (SBTi) champions target setting based on commitments consistent with limiting global temperature rise to well below 2 degrees Celsius or 1.5 degrees Celsius above pre-industrial levels. The initiative is currently developing methodologies for oil and gas companies to set Paris-aligned emissions reduction targets, with a priority to address scope 1 'energy and methane process emissions' and 'embedded emissions in fuel supplied'.

Net Zero Steel Pathway Methodology Project (NZS 2020)

The Net Zero Steel Pathway Methodology Project is a coalition of steel producers aiming to develop net zero transition pathways and tools as a basis for companies within the steel industry to define and track Paris-aligned commitments.

Standards and guidelines

ResponsibleSteel (ResponsibleSteel 2020)

ResponsibleSteel is a global multi-stakeholder standard and certification initiative, based on a concept initially developed by the Australian Steel Stewardship Forum. It is a membership program to certify that materials used by steel manufacturers and consumers are sourced and produced responsibly. In 2020, the initiative published 'Proposals and Consultation Questions on Greenhouse Gas Emission Requirements for the Certification of Steel Products'. Draft requirements include a stated commitment to the goals of the Paris Climate Agreement from corporations seeking certification.

The Methane Guiding Principles (Methane Guiding Principles 2019)

The Methane Guiding Principles were developed collaboratively by a coalition of industry and civil society organisations. The principles, and accompanying guides and tools, focus on reducing methane emissions across the natural gas supply chain, from production to final consumer. Signatories include BP, Chevron, ExxonMobil, Shell and Woodside.

Climate Action 100+ Net-Zero Company Benchmark (Climate Action 100+ 2020)

The Climate Action 100+ Net Zero Company Benchmark is designed to clarify investor expectations for the 167 high emitting companies that are being engaged by the initiative. It will be used to evaluate company action and ambition in tackling climate change. It aims to standardise what constitutes a 'net-zero aligned' business strategy and how to measure alignment with a 1.5 degrees Celsius transition pathway. The benchmark therefore provides a guide for companies to align with a path to achieve this in their respective sectors and regions.

Collaboration initiatives

The Mission Possible Platform (WEF 2020)

The World Economic Forum's Mission Possible Platform is a coalition initiative to develop net zero pathways in hard to abate sectors. It fosters partnerships and initiatives with both public and private organisations to achieve net zero in eight focus areas: aviation, cars, trucks, shipping, aluminium, chemicals, cement and steel. Shell is involved in the Clean Skies for Tomorrow Coalition, with a focus on sustainable aviation fuels, and the Getting to Zero Coalition, which is working towards zero emissions shipping.

The Australian Industry Energy Transitions Initiative (Australian Industry ETI 2020)

The Australian Industry Energy Transitions Initiative facilitates industry collaboration to develop pathways and actions that will accelerate Australia's transition towards net zero supply chains in hard to abate industry sectors. The initiative's industry partners included in this report are BHP, BlueScope, Fortescue and Woodside. ClimateWorks Australia and Climate-KIC Australia are joint conveners of the initiative.

The Oil and Gas Climate Initiative (OGCI 2020)

The Oil and Gas Climate Initiative is a CEO-led consortium aiming to accelerate the industry's response to climate change by reducing methane emissions, and reducing and sequestering carbon dioxide. Its members are collectively responsible for 30 per cent of global oil and gas production, and include BP, Chevron, ExxonMobil and Shell.

The Global Gas Flaring Reduction Partnership and Zero Routine Flaring by 2030 (World Bank 2020a, 2020b)

The World Bank's Global Gas Flaring Reduction Partnership and its Zero Routine Flaring by 2030 initiative are coalitions of governments, oil companies and other organisations working to end routine flaring of gases at oil production sites. The Global Gas Flaring Reduction Partnership addresses technical and regulatory barriers to flaring reduction through country-specific programs, research, collaboration, raising awareness and advancing flare measurement and reporting. Zero Routine Flaring by 2030 includes governments and oil companies committed to ensuring that routine flaring ends as soon as possible, and no later than 2030.

Appendix

COMPANIES AND DATA

The analysis focuses on 25 entities which, when taking into consideration parent/subsidiary relationships, translates to 22 organisations in total. These organisations are those involved in coal mining; oil and gas exploration and refining; or the mining, refining, processing and manufacture of metals, that reported the highest total scope 1 and 2 emissions in 2018-19 under Australia's National Greenhouse and Energy Reporting (NGER) scheme (Clean Energy Regulator 2020).

Table 4 lists these 22 organisations and data sources consulted. Tables 5 summarises the information used to inform the analysis. The analysis considers published commitments and activities that will reduce scope 1, 2 and 3 emissions.

TABLE 4: ORGANISATIONS AND DATA CONSIDERED BY THE ANALYSIS

Company	Sub-sector[13]	Revenue[14] (AU$ million)	Relevant initiatives/ memberships*	Climate Action 100+ focus company	Sources
Centennial Coal	Coal	$1,107	- LETA	No	- Annual Report 2019 - Sustainability Report 2019 - Centennial website
Peabody Australia	Coal	$6,466	- Consortium for Clean Coal Utilization - Carbon Capture Coalition - Carbon Utilization Research Council - LETA - Global CSS Institute	No	- Annual Report 2019 - ESG Report 2019 - Peabody website
Whitehaven Coal	Coal	$3,480		No	- Annual report 2019 - Sustainability Report 2019
Yancoal Australia	Coal	$4,525	- LETA	No	- Annual Report 2019 - ESG Report 2019 - Yancoal website
Glencore Australia	Coal & Oil	$300,855	- ICMM	Yes	- Climate Report 2020 - Annual Report 2019 - Sustainability Report 2019 - GRI Data Book 2018 - Glencore website
Alcoa Australian	Metals & Mining	$14,592	- ASI - ICMM	No	- Annual Report 2019 - Sustainability Report 2019 - Alcoa website

[13] With metallurgical coal under Metals & Mining and thermal coal under Coal

[14] Reported revenue converted to AUD using average exchange rates for FY18-19

Company	Sub-sector[13]	Revenue[14] (AU$ million)	Relevant initiatives/ memberships*	Climate Action 100+ focus company	Sources
Anglo American Australia	Metals & Mining	$41,776	- ICMM - ResponsibleSteel™	Yes	- Annual Report 2019 - Sustainability Report 2019 - Anglo American website - Climate Change, Policies and Progress Report - CDP report 2019
BlueScope Steel	Metals & Mining	$17,528	- AIGN - ResponsibleSteel™ - Australian Industry ETI	Yes	- Annual Report 2019 - Sustainability Report 2020
Fortescue Metals Group	Metals & Mining	$13,937	- Green Ammonia Consortium - Australian Hydrogen Council - Australian Industry ETI	No	- Annual Report 2019 - Corporate Social Responsibility Report 2020 - Climate Change Report 2020
GFG Alliance (Liberty Primary Metals)	Metals & Mining	$27,972		No	- Income Statement 2018 - Sustainability Report 2019 - CN30 Brochure - GFG Alliance Website
Newcrest Mining	Metals & Mining	$5,234	- ICMM - International Copper Association, Australia	No	- Annual Report 2019 - Sustainability Report 2019 - Newcrest Mining website
Rio Tinto	Metals & Mining	$63,450	- ASI - IETA - ICMM - AIGN	Yes	- Annual Report 2019 - Climate Change Report 2019
South32	Metals & Mining	$10,173	- ICMM - CMI - LETA	Yes	- Annual Report 2019 - Annual Report 2020 - Our Approach to Climate Change 2019 - Sustainability Development Report 2020
BHP	Metals, Mining, Coal, Oil & Gas	$61,941	- IPIECA - CMI - Australian Industry ETI	Yes	- Annual Report 2019 - Sustainability Report 2019 - Climate Change Report 2020 - BHP website
Chevron Australia	Oil & Gas	$195,615	- IPIECA	Yes	- Annual Report 2019 - Sustainability Report 2019 - Chevron Australia website - Update to Climate Change Resilience Report
ConocoPhillips Australia	Oil & Gas	$45,548	- IPIECA - IETA - CMI	Yes	- Annual Report 2019 - Sustainability Report 2019 - ConocoPhillips website
ExxonMobil Australia	Oil & Gas	$370,543	- OGCI - Methane Guiding Principles - IPIECA	Yes	- Annual Report 2019 - Sustainability Report 2018 - 2020 Energy and Carbon Summary Report

Company	Sub-sector[13]	Revenue[14] (AU$ million)	Relevant initiatives/ memberships*	Climate Action 100+ focus company	Sources
Inpex Australia	Oil & Gas	$12,238	- IPIECA - CMI	No	- Annual Report 2019 - Sustainability Report 2020 - GHG Management Report
Santos	Oil & Gas	$5,641		Yes	- Annual Report 2019 - Climate Change Report 2020 - Climate Change Report 2019 - Santos website
Shell	Oil & Gas	$482,345	- OGCI - CCAC - Methane Guiding Principles - IPIECA - CMI	Yes	- Annual Report 2019 - Sustainability Report 2019 - Shell Energy Transition Report
Viva Energy	Oil & Gas	$16,542	- Australian Hydrogen Council - AIGN	No	- Annual Report 2019
Woodside Petroleum	Oil & Gas	$6,815	- Global CCS Institute - CO2CRC - Australian Hydrogen Council - AIGN - CMI - IPIECA - Australian Industry ETI	Yes	- Annual Report 2019 - Sustainable Development Report 2019 - Sustainable Development Report 2019 Data Tables - TCFD Report 2020 - Woodside website

***** *AIGN: Australian Industry Greenhouse Network*
ASI: Aluminium Stewardship Initiative
CCAC: Climate and Clean Air Coalition
CMI: Carbon Market Institute
CO2CRC: Cooperative Research Centre for Greenhouse Gas Technologies
Australian Industry ETI: Australian Industry Energy Transitions Initiative
ICMM: International Council on Mining and Metals
IETA: International Emissions Trading Association
IPIECA: International Petroleum Industry Environmental Conservation Association
LETA: Low Emission Technology Australia (formerly COAL21)
OGCI: Oil and Gas Climate Initiative

TABLE 5: EMISSIONS-REDUCTION COMMITMENTS AND ACTIVITIES

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
Centennial Coal	Coal	-	> Production efficiencies realised from real-time data from underground mining > Conveyor belt monitoring application resulting contributing to higher productivity. > Real-time data and analytics platform or Performance Monitoring Centre (PMC) based on real-time equipment monitoring using sensors extract maximum operational efficiency. > Installation of a two MW solar facility at Airly, along with another small installation in Lake Macquarie region. > Solar farms as well as pumped hydro projects will be researched and considered as part of site rehabilitation option studies. > At Mandalong, the installation of an 8MW gas engine facility to generate electricity will utilise waste methane that is drawn from the coal seam and now preparing to install gas engines. > Upgraded management system able to fully extract and flare gas, greatly reducing the quantum of greenhouse gas emissions. > Continue to lead industry research into viable methane emissions mitigation strategies > Involvement in research and development into ventilation air methane (VAM).	
Peabody Australia	Coal	-	> Attempt to maximise resource recovery and conserve energy. > Strive to advance recycling and waste management programs and apply efficient mining practices.	> Invested approximately $315 million in global partnerships and projects to advance HELE and CCUS technologies in the U.S., Australia and China. > Peabody is a participant in the Carbon Capture Coalition, co-chair of the Carbon Utilization Research Council, founding member of LETA and Global Carbon Capture and Storage Institute.

[15] With metallurgical coal under Metals & Mining and thermal coal under Coal

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
Whitehaven Coal	Coal	-	> Work with key partners to develop innovative solutions to reduce energy consumption. In FY19, worked with Hitachi and Cummins to update engines on fleets. > At Maules Creek Mine, reducing fuel consumption of rear dump trucks, along with the potential for similar modifications to our other truck fleets. > Considers significant additional investment in Carbon Capture Utilisation and Storage (CCUS) technologies. > Invest in technology to reduce carbon emissions through LETA with projects including demonstrating Ventilation Air Methane capture technology to manage fugitive emissions from coal mines.	> Invest in technology to reduce carbon emissions through LETA, including the Carbon Transport and Storage Company CCUS project
Yancoal Australia	Coal	-	> Identify and implement emissions and energy efficiency opportunities where appropriate > Participant of the NSW Energy Savings Scheme and looking to roll this program out at Yancoal's other NSW assets. > Supporting High Efficiency Low Emissions technologies (HELE) through various industry and policy initiatives and membership of LETA. > Replacement of electric shovels with higher efficiency models, the installation of variable speed drivers, the replacement of compressors with higher efficiency ones and leak elimination, transformer overhauls, and energy management education program to foster awareness and behavioural change.	> Actively support the development of technologies aimed at reducing the emissions intensity of downstream activities, including supporting the research and continued development and installation of high efficiency, low emissions technologies in coal fired power stations. > Supporting innovation and investment in Carbon Capture and Storage (CCS).
Glencore Australia	Coal & Oil	- Absolute 40 per cent reduction of total emissions (Scope 1, 2 and 3) by 2035 on 2019 levels. - Ambition to achieve: net zero total emissions by 2050.	> Participating in ICMM's climate change working group, which identifies opportunities to reduce GHG emissions across its membership. > 2015-2020 strategic priority: Ongoing operational efficiency improvements to reduce energy usage. > The Mining and Metals Blockchain Initiative will explore the building of a blockchain platform to address increasing efficiency. > Renewable energy sources deliver 12.5 per cent of total energy needs (2018: 11.7 per cent). > In Australia, use of coal seam gas from mines to supplement power generation at a number of assets. > In Australia, have flares installed at those underground coal mines with the necessary supply and concentration of methane. > McArthur River Mine is revegetating disturbed land potentially saving 70,000 tonnes CO2e each year.	> Address scope 3 emissions through investing in metals portfolio, reducing coal production and support deployment of low emission technologies. > Working with customers to identify opportunities to progress the implementation of CCUS and reduce emissions.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
			> The wholly-owned subsidiary, Carbon Transport and Storage Corporation (CTSCo), is continuing to progress of its CCS project in Queensland's Surat Basin with a final investment decision on major infrastructure scheduled for 2020.	
Alcoa Australian	Metals & Mining	- Reduce GHG emission intensity by 30 percent by 2025 and 50 percent by 2030 from a 2015 baseline.	> Set and monitor energy-efficiency targets for each location and develop an implementation roadmap, accounting for process variations from facility to facility > SMART manufacturing platform in smelters, program and hardware changes, heat transfer efficiency, maintenance improvements > Investing in R&D to improve energy efficiency in aluminium smelting > Connected 5 percent of 2019 annual incentive compensation to carbon dioxide emission reductions through process upgrades and improved energy efficiency. > Recycle aluminium in casting and rolling operations, using both internal and purchased scrap. > For alumina refining, examining the use of solar energy to power the calcination process and solar gas reforming > Increase use of low-impact energy sources by incorporating carbon exposure costs in our economic models > ELYSIS™ joint venture technology that eliminates all direct GHG emissions from the traditional smelting process > Restoring 121 hectares of forest	> Closed-loop processes in place with customers, where aluminium scrap from their operations is returned for reuse. > Recycling efforts extend beyond own operations to include partnerships with established recycling initiatives. > Offering commercial licenses in 2024 for ELYSIS™ joint venture technology that eliminates all direct GHG emissions from the traditional smelting process. > Developing greener products to help our customers deliver more sustainable products to society (such as SUSTANA)
Anglo American Australia	Metals & Mining	- Target of achieving carbon neutrality across our operations (Scopes 1 and 2) before 2040 and are aiming to have eight assets carbon neutral by 2030. - Reduce net GHG emissions by 30 per cent by 2030. - Aiming to deliver zero carbon shipping by 2050.	> Achieve a 30per cent improvement in energy efficiency by 2030 against the 2016 baseline" (SR p.37) (site level targets are being established) > Several new [FutureSmart Mining] technologies are aimed at targeting the metal or mineral more precisely, with much less energy intensity > Implementing bulk sorting and developing new comminution technologies that fragment particles using 30per cent less energy than conventional means. > Worked with vehicle suppliers on upgrading the engine-management systems of large dump-truck fleets, helping to reduce our fuel consumption by 4 per cent. > Switching to low-carbon energy sourcing and increasing the role of renewables in energy mix. > Undertaken an assessment of options for increasing the use of renewable energy	> Committed to reducing Scope 3 emissions and for shipping, working with groups such as the Global Maritime Forum's "Getting to Zero" coalition, aiming to deliver zero carbon shipping by 2050. > Work in partnership with customers who are committed to transitioning to low carbon steel production, particularly by developing technologies to reduce and/or capture carbon emissions.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
			> In Moranbah North, Grosvenor and Capcoal metallurgical coal operations capture waste methane for power generation, increasing this capacity to 140 MW, by reducing low concentrations of methane emissions in ventilation air. > Working with experts from universities in Canada and Australia to test different mineral carbonation technologies	
BlueScope Steel	Metals & Mining	- Achieve 12 per cent reduction in Scope 1 and Scope 2 GHG emissions intensity for steelmaking sites by 2030.	> Leading role in establishment of Net Zero Steel Pathway Methodology Project and future focus in Climate scenario analysis refresh to consider implications of net zero ambitions for the sector and for BlueScope > BlueScope's Western Sydney Service Centre has increased the efficiency of its hot air recovery fan and oven exhaust system > Manufacturing processes are optimised to minimise use of resources, reduce waste and re-use or convert waste materials into other valuable products. > Monitor material efficiency as a measure for effective waste management in steelmaking. > In FY2020, 46 per cent of BlueScope's raw steel production originated from recovered and recycled scrap steel, with 98 per cent materials efficiency achieved this year. > Power Purchasing Agreement with the Finley Solar Farm equates to 20 per cent of the external electricity demand of Australian operations. > Partnered with the CO2CRC to explore potential pathways for reducing greenhouse gas emissions in steel production through carbon capture and storage (CCS) and carbon capture and utilisation (CCU).	> In FY2020, 46 per cent of BlueScope's raw steel production originated from recovered and recycled scrap steel, with 98 per cent materials efficiency
Fortescue Metals Group	Metals & Mining	- Goal to achieve net zero operational emissions by 2040 - Reduce Scope 1 and 2 emissions from existing operations by 26 per cent from 2020 levels by 2030. - Support the IMO targets (reducing CO2 -e emissions per transport work, as an average across international shipping by at least 40 per cent by 2030, pursuing efforts towards 70 per cent by 2050	> Improve the efficiency of mine site power generation > Continue the rollout of Autonomous Haulage System (AHS) at the Christmas Creek and Cloudbreak mine sites which increases productivity by approximately 30 per cent > Relocatable conveyor at Cloudbreak resulting in a displacement of haul trucks and associated diesel fuel usage and related emissions. >Invested in energy efficient equipment to reduce power consumption by approximately 30 per cent in comparison to conventional magnetite processing. > Energy Strategy includes investment in renewable and low emissions energy sources > US$700 million investment in the Pilbara Energy Connect (PEC) project.	> Engaging with customers on opportunities to reduce their emissions from iron and steel making in the following areas: deep-bed sintering, magnetite concentrate product > Initiated partnerships to investigate the potential to use our ore in downstream processing with hydrogen as a fuel source either directly as a reductant or as a method to generate electricity > Investigated the use of liquid natural gas as a main engine fuel to meet IMO targets in conjunction with complementary technology > Commenced an initiative to develop a 'next generation vessel' that includes the use of lower emission fuels.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
		from 2008 levels) and working closely with shipping partners and other relevant industry participants to develop and implement strategies that will deliver on these targets.	> US$450 million Pilbara Generation Project comprising 150MW of gas fired generation together with 150MW of solar photovoltaic (PV) generation and large-scale battery storage. > PEC project and the Chichester Solar Gas Hybrid Project will deliver 25 to 30 per cent of stationary energy requirements from solar power. >Investigating green hydrogen as a fuel source for future power generation. >Worked closely with mobile fleet Original Equipment Manufacturers (OEMs) and fuel suppliers to discuss goal to be diesel free by 2030 and identify how we can support them to accelerate innovation. >Working with vehicle manufacturers to maximise opportunities to use hydrogen as a fuel source for mining vehicles and equipment. > Investigate mechanisms to offset emissions. > Use of offsets will be consistent with the mitigation hierarchy to avoid, reduce and offset emissions. Offsetting will only be used to abate residual emissions where economically viable decarbonisation opportunities and technologies are unavailable.	> Entering into an agreement with ATCO Australia to explore the deployment of hydrogen vehicle fuelling infrastructure in WA >Plans to build more than 235 gigawatts (GW) of renewable capacity, mostly wind and solar, to eventually produce green hydrogen.
GFG Alliance (Liberty Primary Metals)	Metals & Mining	- The GFG Alliance has ambition to become carbon neutral by 2030	> Increase the efficiency of co-generation of power at the Whyalla Steelworks by using heat and processed gases from steelmaking to generate electricity. > LED high bay lights have recently been used to replace sodium and metal halide globes in the manufacturing and warehousing areas of LIBERTY Steel's Newcastle Wire Mill. > GFG's Cultana solar farm in Australia will offset 492,000 tonnes of carbon dioxide annually. Mission to bring 1GW of renewable energy online, meeting GFG's operational needs with the surplus providing an opportunity to make renewable energy available to more Australian homes and businesses. Feed power to the upgraded steelworks as part of the Whyalla Transformation Plan. > Use of electric arc furnaces (EAF) in steelmaking a significant part of GFG's GreenSteel strategy. > Plans to transition its integrated steelworks at Whyalla: plans for a sophisticated EAF – utilising cutting edge technology for energy optimisation. > The new DRI plant will be fed by Natural Gas, later transitioning to green hydrogen produced from GFG's own renewable energy projects including Cultana. > A proportion of mine gas from Tahmoor is captured and converted into electricity.	> Actively promotes steel reuse and recycling; in FY19, GFG Alliance produced around 1.2 Mtpa of steel from recycled steel.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
Newcrest Mining	Metals & Mining	- GHG intensity target of a 30 per cent reduction in GHG emissions intensity per tonne of ore treated by 2030, against the 2018 baseline.	> Focus on opportunities to improve energy efficiency to reduce energy used. > Pursued several initiatives in FY19 helping to reduce GHG emissions by reducing power usage and demand, including coarse ore flotation, autoclave partial oxidation, oxygen storage bullet, ore sorting. > Assess options to increase use of renewable power and low emission energy technologies to reduce our GHG emissions intensity. > Cadia is exploring options for on-site power generation using solar energy. > Exploring opportunities for liquefied natural gas to replace heavy fuel oil.	
Rio Tinto	Metals & Mining	- Ambition to reach net zero emissions across our operations by 2050. - 2030 targets to reduce emissions intensity by 30 per cent and absolute emissions by 15 per cent from 2018 levels (or approximately 4.8mt CO2e).	> Taking action to improve both productivity and efficiency. > Expanding output from the Pilbara operations while introducing next-generation technologies to deliver greater efficiency. > Range of solar and wind solutions – supported by large-scale storage batteries – under investment proposal and planned for near-term execution - Pilbara solar and battery storage project. > Increasing the share of renewable electricity more broadly will be central to the decarbonisation strategy to 2030. > Projects already identified for funding in 2020 include low carbon vehicle. > Exploring electrification of mining equipment and mobile fleet. > Exploring use of hydrogen or other renewable electricity-powered plasma technologies to decarbonise the heat requirements in alumina refineries. > Progressing the ELYSIS joint venture - developing inert anode technology > Adhere to the four principles WBCSD and Nature4Climate recommend for any investment in Natural Climate Solutions (NCS).	> Work with customers throughout the value chain to provide technical support to improve the efficiency of their refineries and smelters. > Continue to focus on commercial partnerships to support emissions reductions as new technologies become available. > Goods sold for applications that conserve energy, enable lower carbon electricity generation and reduce avoidable emissions > ELYSIS technology intended both for retrofitting existing smelters and for building new installations. > Participates in industry-level lifecycle inventories and supports the development of downstream customer lifecycle assessments.
South32	Metals & Mining	- Commitment to achieve net zero emissions from operations by 2050 - FY21 Scope 1 target to maintain emissions at or below FY15 baseline	> Gas drainage system improvement efficiency project at Illawarra Metallurgical Coal > Invested in energy efficiency initiatives for operations. > Energy recovery unit creates efficiency by sourcing energy from furnace off-gas at TEMCO. > Focused decarbonisation studies at Worsley Alumina on energy efficiencies. > Continue to integrate renewable energy into portfolio, with the commissioning of a three MW solar farm at Cannington during FY19.	> Efforts to reduce emissions across our value chain through individual engagement, industry initiatives and research and development. > Closely engage with customers ensuring that products are used in the most efficient way. > Participate in product stewardship initiatives and customer surveys.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
			> Buy hydro-generated electricity for TEMCO in Australia. > Looking into PPAs involving renewable energy project partnerships. > Joined forced with 13 major suppliers of mining equipment to create the Cleaner Safer Vehicles (ICSV) initiative programme which aims to introduce GHG-free surface mining vehicles by 2040, minimise the operational impact of diesel exhaust by 2025. > Use of sustainably sourced biomass at Worsley Alumina. > Progressing a study that aims to build flexibility into our fuel and energy supply mix, while reducing the operation's emissions. > View carbon offsets as a complementary mechanism to support decarbonisation, particularly where decarbonisation alternatives remain undeveloped, or not technically or economically feasible. > Developing ACCUs at Illawarra Metallurgical Coal involving installing and operating additional flaring devices to capture and combust waste methane from the mine. > Gas drainage system improvement efficiency project in execution - captured methane is either flared or directed to third party to generate power. > Redesigned air monitoring programs enabling improvement in operational management of fugitive emissions. > Completed a pre-feasibility study for Appin North Goaf Drainage and Flaring projects, and advanced studies on Ventilation Air Methane (VAM) capture and utilisation at Illawarra Metallurgical Coal.	> Explored opportunities to partner directly with customers across steel and aluminium supply chain to reduce overall emissions and collaborate on new technologies. > Support for the HILT CRC presents additional decarbonisation partnership opportunities across the value chain.
BHP	Metals, Mining, Coal, Oil & Gas	- Goal of achieving net zero operational emissions by 2050 - By FY2022, maintain total operational GHG emissions at or below FY2017 levels - Reduce operational GHG emissions by at least 30 per cent from FY2020 levels by FY2030. - Support industry with 30 per cent emissions intensity reduction in integrated	> Five-year Climate Investment Program (US$400m) with a potential focus area (applied now in operated assets) in energy efficiency > Western Australia Iron Ore (WAIO) introduced a specialised rubber compound reducing energy demand of conveyor systems by up to 15 per cent > WAIO continues to evaluate a range of options to decarbonise operations, including the greater integration of renewable sources of electricity. > Establishment of renewable PPAs across some Australian operations. > Currently trialling the use of light electric vehicles at Olympic Dam > Studying the potential role of zero emissions fuels like green hydrogen in mining operations. > Over the past five years, the emissions intensity of iron ore production at WAIO assets fallen by 11 per cent by partly switching to electricity. > Electrification and diesel displacement in mining operations	> Continue engagement and technical collaboration with customers in the steel sector to drive the most efficient utilisation of BHP's products. > Partner with leading steel mills and other stakeholders to accelerate the development and commercialisation of technologies that support greater efficiency and emissions reductions in the integrated steelmaking route. > Expect to achieve Scope 3 goal through optimising voyages, chartering choices, alternative fuel requirements. > Consider alternative steel-making pathways > Working in partnership with others across our value chain to accelerate the

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
		steelmaking, with widespread adoption post 2030 - Support 40 per cent emissions intensity reduction of BHP-chartered shipping of products	> BHP has formed a Green Hydrogen Consortium with Anglo American, Fortescue and Hatch to look at ways to collectively help to eliminate obstacles to the adoption of green hydrogen technologies and encourage innovative application in the resources sector and other heavy industries. > Investing in research, development and trial projects with partners, such as the CSIRO and the University of San Diego regarding reducing fugitive methane emissions. > Includes offsets as an element of climate change strategy > Continue to consider opportunities and support research and development of technologies for hard-to-abate fugitive emissions > REDD+ strategy includes investments in reforestation, afforestation and 'blue' carbon.	development of technologies with the potential to reduce emissions from the processing and use of our products. > Investigating use of Carbon capture and storage (CCS) > Signed a memorandum of understanding (MOU) with world leading steel producer, China Baowu, with the intention to invest up to US$35 million, to collaborate on technical solutions to utilise low carbon fuel sources such as hydrogen injection in the blast furnace, and explore other low emission options in support of China Baowu and the steel industry's low carbon transformation and green development goals.
Chevron Australia	Oil & Gas	- Target to lower oil net GHG intensity by 5-10 per cent, gas net GHG intensity by 2-5 per cent, upstream flaring GHG emission intensity by 25-30 per cent and upstream methane emission intensity by 20-25 per cent from 2016 to 2023.	> Identifying and implementing emissions reduction opportunities at major capital projects, including use of the latest technologies in subsea production, natural gas processing, waste heat recovery. > Plans to generate more than 500 MW of its existing and future electricity demand from renewable sources. The projects will be focused on powering Chevron's operations around various locations including Western Australia. > Chevron has invested approximately $1 billion in CCUS projects, including the Gorgon CCS project - one of the world's largest integrated CCS facilities. > Project injects up to 4 million tonnes of reservoir CO_2 each year, reducing emissions from the Gorgon Project by approximately 40 percent and reduce over 100 million tonnes over the life of the project. > Since 2013, Chevron has reduced flaring and associated emissions by 22 percent. > Developed internal country specific plans to minimise gas flaring.	> Wheatstone Project is helping provide access cleaner energy in the community of Onslow through a solar and natural gas powered microgrid. > Together with the WA State Government, Chevron and its Joint Venture Participants have invested in a pilot program that will see Onslow become home to Australia's largest distributed energy resource microgrid. > Sells renewable diesel—R99— to commercial customers. > Distribute diesel fuel containing between 6 and 20 percent renewable diesel. > Collaborate with CalBio to provide renewable transport fuels. > Evaluate potential feedstocks such as algae, woods, grasses and trees that can be used as cleaner sources of fuel in the future.
ConocoPhillips Australia	Oil & Gas	- Ambition to reduce our operational greenhouse gas (GHG) emissions to net-zero by 2050.	> Measures and reports energy intensity performance. > Research and development of a multilateral well technology pilot that reduces emissions intensity and operating costs. > Investments in energy efficiency, R&D, pilot demonstration	> Engagement campaign to educate suppliers about climate change. > Engage with suppliers on the environmental and social aspects of their operations and supply chains through each

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
		- Reduce GHG emissions intensity by 35-45 per cent by 2030 from a Jan. 1, 2017 baseline.	> Reducing emissions, including fugitive emissions - a key aspect of Global Onshore Well Management Principles. > Standard operating procedures to detect and repair leaks, including Audio-visual-olfactory (AVO) inspections, Leak detection and repair (LDAR), a periodic voluntary fugitive monitoring program using forward-looking infrared (FLIR) cameras to enhance LDAR. > Measures and reports methane emissions intensity. > Measures and reports flaring volume. > Reduced flaring by utilising closed-loop completions, central gas gathering systems, vapor recovery units, directing condensate to sales pipelines and improving uptime through operational excellence (a major focus for all operating facilities). > Voluntary offsetting through West Arnhem Land Fire Abatement (WALFA) Project.	step of the procurement process, from supplier prequalification through supplier performance evaluation, including communicating expectations and priorities and identifying opportunities for improvement and collaboration related to climate issues, including energy use, GHG management and environmental supply chain risks. > Prioritise and track progress through the Stakeholder Engagement Action Plan - relates to value chain ranging from drilling to production to sales.
ExxonMobil Australia	Oil & Gas	-	> Processes to improve energy efficiency and mitigate emissions including setting tailored objectives at the business, site and equipment level, supported by key performance metrics. > Interests in approximately 5,400 megawatts of cogeneration (producing electricity while capturing useful heat or steam for industrial processes) capacity in more than 100 installations around the world. > In chemical business, advanced efficiency technologies and techniques reduced net equity GHG intensity by nearly 4 per cent since 2013. > Targeting research in equipment design, advanced separations, catalysts and process configurations to develop energy-efficient manufacturing. > Reports energy intensity. > Pursuing technologies to enhance existing operations and developing alternative energy solutions with lower-carbon intensity. > Large-scale purchases of renewable electricity to power operational facilities > 40 percent of cumulative CO2 captured. > Maintain a working interest in more than one-fifth of the world's total carbon capture capacity. > In 2018, captured approximately 7 million metric tons of CO2 for storage. > Agreements with companies, such as Global Thermostat, which is working on technology that pulls CO2 molecules directly from the air,	> Supplying products that help consumers reduce their emissions, such as natural gas, premium lubricants and fuels, lightweight materials and special tire liners. > Targeting the technical capability to produce 10,000 barrels of algae biofuels per day by 2025. > Researching to make carbon-capture technology more economic for hydrogen production, progressing advanced biofuels for transportation and chemicals. > Expanding the supply of cleaner-burning natural gas. > Enhance carbonate fuel cell technology for the purpose of capturing CO2 from power plants and industrial facilities. > ExxonMobil is working with OGCI members to reduce the members' collective average intensity of methane emissions from oil and natural gas production to a target of 0.25 per cent by 2025 vs 2017. > Developing alternative energy solutions with lower-carbon intensity, including researching breakthroughs that make carbon-capture technology more economic for power generation, industrial applications

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
			and Mosaic Materials, which is using porous solids, known as metal-organic frameworks, to separate CO2 from air or flue gas. > Reduce flaring, venting and fugitive emissions in our operations. > Support the Methane Guiding Principles for reducing methane emissions across the natural gas value chain. > Implemented structured leak detection and repair programs, which use optical natural gas imaging cameras to identify leaks for prompt repair, and replacement of high-bleed, pneumatic devices with lower-emission technology.	advancing fundamental knowledge and capabilities with organisations strategically.
Inpex Australia	Oil & Gas	- Participate in the Japan Business Federation's (Nippon Keidanren) 'Commitment to a Lower Carbon Society Plan' as a member of the Japan Petroleum Development Association (JPDA). - Support JPDA achieve a 5 per cent emissions reduction from the fiscal 2005 level by 2020 and a 28 per cent reduction from the fiscal 2013 level by 2030.	> Design facilities with high energy efficiency and follow through maintenance plan to improve energy efficiency on a routine basis. > Corporate procedure for assessment of energy efficiency and GHG management during the project execution process. > Announced "Vision 2040" which targets renewable energy portfolio up to 10 per cent of our total business portfolio by 2040. > Consider the potential of solar power generation for projects established in sunbelt regions of the world that receive high amounts of sunshine. > Develop CO2 related technologies for the practical application of CCS and those related to CCUS, invested $10 million in carbon capture and storage evaluation and studies > Investing $34 million in a Northern Territory savanna fire management program to reduce GHG emissions. - Plantation of 1.4 million drought-resistant Mallee trees near Ravensthorpe and Albany in Western Australia's south in a reforestation (bio sequestration) assessment project. > Actions to manage methane emissions of the Ichythys LNG Project include selection of equipment/facility that avoids methane leaks, regular inspection for leaks, vent gas recovery and recycling and zero routine flaring during normal operations. > Collect and report statistics on methane fugitives from domestic and overseas business sites, construction of an aggregation and reporting framework for methane loss. > Operating with zero flaring, venting and leaks in the operating of natural gas processing. > Pledged to select and design our equipment to minimise fugitive methane emissions and to incorporate a robust leak detection and repair program.	> Promote development of natural gas as an energy source for customers as the low carbon energy option for customers. > Action plan to produce products and services that contribute to building electricity, hydrogen and methane value chains through: - conducting joint industry-academia research into a Sustainable Carbon-Cycle System that converts carbon dioxide to methane for reuse as an energy source. - participating in the Research Association of Artificial Photosynthetic Chemical Process (ARPChem), a joint industry-academia-government project that uses hydrogen produced from sunlight and water using photocatalysts with the aim of manufacturing core chemical products from carbon dioxide, and promoting development of artificial photosynthesis technologies. > Included climate change in supplier selection / management mechanism on 100 per cent of suppliers. > Action plan for practical application of carbon capture and storage to target Scope 3 emissions. > Tracking emissions from LNG carriers.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
			> Overarching corporate policy for no operational venting or flaring at facilities.	
Santos	Oil & Gas	- 2040 target: Scope 1 and 2 absolute emissions net-zero. - Reduce Scope 1 and 2 absolute emissions by 26-30 per cent by 2030 (2020 baseline). - Actively work with customers to reduce their Scope 1 and 2 emissions by more than 1mtCO2e per year by 2030. - Reduce emissions by more than 5 per cent across current operations in the Cooper Basin and Queensland by 2025.	> Reducing emissions through more efficient power generation at Devil Creek in Western Australia. > First time for an upstream oil and gas company to access ACCUs through the Emissions Reduction Fund's electricity and fuel efficiency methodology. > Heat-energy recovery system at Moomba and a range of other efficiency projects across operations which have reduced fuel gas usage by over four terajoules per day in 2019. > Solar and battery conversion of oil well pumps in the Cooper Basin, installation of a solar photovoltaic power generation system at the Port Bonython hydrocarbon processing plan. > Pilot pump at the Hobbes-1 oil well at Limestone Creek has been operating on solar power since August 2018. Identified a further 56 wells that can benefit from this solution > Santos and GLNG have sanctioned a project to convert five of GLNG's gas turbine compressors in Roma and Fairview to electric motor drive compressors. > Actively pursuing carbon capture and storage. > Currently in the design phase of the 1.7 million tonne per annum Moomba Carbon Capture and Storage (CCS) Project. > Established the Energy Solutions team in 2017 to focus on reducing fuel gas, flaring and venting to enable more sales gas. > Engaged CSIRO to undertake initial field monitoring across its operated onshore assets, including measuring background levels of methane, investigating fluxes and identifying sources of elevated methane level. > Leak detection practices undertaken. > Commenced a concept study on a hydrogen future for the Cooper Basin.	> Commenced a concept study on a hydrogen future for the Cooper Basin. > Testing CCS in the Cooper and Eromanga basins which have injection potential of 20 million tonnes of CO2 per annum for more than 50 years – one per cent of the two billion tonnes of global reduction needed from CCS by 2040 - projects that could not only reduce own emissions but provide an important storage hub for other sources of carbon in Australia.
Shell	Oil & Gas	- Ambition to be net zero on all the emissions from the manufacture of products by 2050 at the latest. - Reducing the Net Carbon Footprint of the energy	> Work continuously to improve the energy efficiency of assets, including monitoring electricity use, making equipment more efficient through regular and smart scheduling of maintenance. > Company requires projects and facilities that produce more than 50,000 tonnes of GHG emissions a year to have a GHG and energy management plan in place.	> Strategy to reduce the Net Carbon Footprint, mainly by increasing the proportion of lower-carbon products such as natural gas, biofuels, electricity and hydrogen in the mix of products sold to customers.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
		products Shell sells to its customers by around 65 per cent by 2050 (increased from around 50 per cent), and by around 30 per cent by 2035 (increased from around 20 per cent) relative to the 2016 baseline. - In 2020, set a Net Carbon Footprint target for 2022 of 3-4 per cent lower than our 2016 Net Carbon Footprint of 79 grams of CO2 equivalent per megajoule. - Maintain methane emissions intensity below 0.2 per cent by 2025.	> Reports on energy intensity performance and verify effect of measures implemented. > Seeking opportunities to use renewable energy sources and using more solar power at sites. > Policy to reduce flaring and venting to as low a level as is reasonably practical and a signatory of the World Bank's Zero Routine Flaring by 2030 initiative. > At a Shell-operated QGC site in Australia improvements resulted in less methane venting into the atmosphere during work. > Improved controls, and monthly flaring rates at Prelude fell by more than 60 per cent. > Reports methane emissions performance by source (flaring, venting, fugitive, combustion). > Reports upstream flaring. > Increased use of detection and repair programmes at gas production sites to reduce leaks of methane. > Support the direct regulation of methane when regulation is efficient, effective and encourages innovation. > Investing in ways to mitigate emissions through CCS (25 per cent interest in Gorgon CCS project), or by planting and protecting natural ecosystems. > In Australia, the Shell-operated QGC natural gas producer in Central Queensland manages the 10,000-hectare Valkyrie property to offset our carbon emissions.	> Helping Petroleum Development Oman save energy and reduce CO2 emissions and gas flaring. > Developing new technologies that create more durable, sustainable and energy-efficient roads. > Shell V-Power petrol and diesel and Shell Helix engine oil increase engine efficiency by burning more cleanly. For heavy-duty vehicles, Shell Rimula engine lubricants help heavy duty diesel engines reduce friction to improve fuel economy. > Growing the New Energies business with investments in low carbon technologies, including biofuels, electric vehicle charging and wind power. > Shell's renewable electricity is certified by Renewable Energy Guarantees of Origin, which means that all the electricity customers buy is matched with the equivalent number of units from 100 per cent renewable sources. > Building industrial-scale solar project in Australia designed to generate around 120 megawatts of solar electricity. > Acquired an interest of 49 per cent in ESCO Pacific, one of Australia's most successful solar development and asset management firms. > Bought Sonnen, a German company that provides smart battery storage and innovative energy services, such as virtual power plants. > Biofuels production through the Raízen joint venture. > In 2019, blended more than 10 billion litres of biofuels into their petrol and diesel worldwide. > Shell GTL (gas-to-liquids) fuel is a cleaner-burning alternative to diesel. > Produce cleaner-burning LNG for use as maritime and land transport fuel.

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
				> Acquisition of Select Carbon, a specialist company developing carbon farming projects throughout Australia; their ambition involves working with customers to reduce or offset the emissions generated when they use Shell products, such as through the use of carbon credits. > Currently working with partners to understand the methane emissions from non-operated ventures.
Viva Energy	Oil & Gas	-	> Completed a comprehensive energy study at Geelong Refinery which has identified a number of energy efficiency opportunities which have been prioritised into an Energy Masterplan for the refinery for more detailed feasibility assessment in 2020. > In 2019, initiated an energy efficiency review for our Supply Chain facilities. > Early learnings from the current energy efficiency review is that opportunities exist to further increase efficiency through the sub-metering of energy intensive equipment such as the operation of pumps. > In 2019, entered into a joint funding contract with the NSW Department of Planning, Industry and Environment for the implementation of a submetering and optimisation project at Clyde and Gore Bay, which will be carried out in 2020 and expect to leverage similar opportunities across the rest of Supply Chain facilities. > In January 2019, Viva Energy commenced a long-term PPA with Acciona representing approximately a third of the Geelong Refinery's annual electricity needs. > Proposed solar energy farm and battery storage in Geelong Refinery.	> In Queensland, investigating options for the delivery of biodiesel into the market. > In 2019, supported the restart of Just Biodiesel plant in Barnawartha, as well as entering into a three-year domestic offtake agreement to procure biodiesel. > A maximum 5 per cent biodiesel blend was supplied to the retail service station network in Victoria and southern NSW and commissioned the biodiesel infrastructure at Pinkenba Terminal. > LNG regasification terminal at Geelong. > Continue to work with industry groups, airlines and technology providers to explore opportunities on developing a solution for supplying biojet into the market in the medium to long term. > Introduced a new, Very Low Sulphur Fuel Oil (VLSFO), 10ppm sulphur level in gasoline and commenced planning to assess the capability and viability of manufacturing these fuels at Geelong Refinery > Actively seeking opportunities to implement electric vehicle recharging facilities in our retail service station network to support the development of infrastructure and understand customer uptake and behaviour > In November 2019, the Australian government launched its National Hydrogen Strategy, and company has provided input

Company	Sub-sector[15]	Emissions Reduction Target	Operational Activities	Upstream and Downstream Activities
				into as an industry, and will continue to be active in the hydrogen sector going forward.
Woodside Petroleum	Oil & Gas	- Aim to be net zero in our direct emissions by 2050. - Targeting offsetting equity reservoir CO2 across entire portfolio from 2021	> Improve the energy efficiency of operations by 5 per cent in five years, from 2016 to 2020, and a new target of 5 per cent for the following five years. > Delivered 17 energy efficiency improvements across operated asset portfolio including: microgrid technology (lithium-ion battery energy storage system) expected to improve platform energy efficiency by 4 per cent, high-efficiency turbines to reduce fuel usage, recover waste heat energy, integrate electrical power generation across the facility, using seawater to directly cool fluid processing systems, improve performance by cooling inlet air streams, allow plant operators to optimise power generation > Measures and reports on energy efficiency performance across the years. > Aspires to incorporate renewables at their assets. > Integrating electrical power generation across the facility at Pluto Train 2 (WA) > Active electrical heating of flowlines to reduce chemical usage and fuel gas consumption. > Microgrid tech (lithium-ion battery energy storage system) expected to reduce platform's use of fuel gas. > Investing in and intending to be a part of green hydrogen production source. > Commenced a partnership with Greening Australia to undertake large-scale native tree planting projects that will generate quality carbon offsets. > Invested more than A$100m in bio-sequestration across Australia over the past 10 years. > Exploring technologies that use carbon dioxide at scale, including bio-sequestration, methanation, reforming and mineralisation. > Targeting offsetting equity reservoir CO2 across entire portfolio from 2021. > Signatory to World Bank's Zero Flaring by 2030 initiative.	> Diversifying our business into supplying lower- and zero-carbon energy sources for the future. > Partnered with Monash University to support research targeted at Australia's lower-carbon energy sources. > Investing in and intending to be a part of green hydrogen production source.

ASSESSMENT OF EMISSIONS-REDUCTION AMBITION

Table 6 details the assessment of emissions reduction ambition for each of the companies considered by the analysis. This is informed by the assessment of each company's emissions reduction activities that address scope 1 and 2 operational emissions and scope 3 value chain emissions, in addition to the pledges and commitments summarised in Table 5.

This assessment is based on the following criteria:

Net zero target?	Indicates whether an organisation has set a net zero emissions target across its portfolio (Yes), has expressed an aspiration to achieve net zero emissions (Aspiration), has set a net zero target for a portion of its portfolio (Partial), or no information can be found regarding a net zero target (No information).
Aligned interim emissions reduction target?	Indicates whether an organisation has defined an interim emissions reduction target aligned to net zero by 2050 over a period beyond 2020 against a baseline year (Yes/No) or no information can be found regarding an emissions reduction target (No information).
Emissions reductions activities?	Indicates whether an organisation has a commitment or is undertaking activities that will reduce its emissions (Yes) or little to no information can be found regarding an emissions reduction target (No information).

Based on the above criteria, each organisation's emissions reduction ambition was assessed as follows:

★	Fully aligned	The organisation has a target to achieve net zero by 2050 for all of its emissions, supported by a strategy and/or interim targets.
☆	Closely aligned	The organisation has a target to achieve net zero by 2050 for a significant portion of its emissions, supported by a strategy and/or interim targets.
■	Aligned aspiration/pathway	The organisation has expressed an aspiration to achieve net zero by 2050 for all its emissions, or has an interim target aligned to this goal.
▲	Partially aligned	The organisation has a target to achieve net zero by 2050 for a small proportion of its emissions.
●	Not aligned	The organisation has made a commitment, pledge or is undertaking activities that will reduce its emissions but not in alignment with net zero by 2050, or the alignment is unclear due to insufficient information.
o	No emissions reduction targets or activities	The organisation has not disclosed any portfolio emissions reduction targets, commitments or activities.

TABLE 6: ASSESSMENT OF EMISSIONS-REDUCTION AMBITION

Companies	Overall net zero ambition	Scope 1 and 2				Scope 3			
		Net zero ambition	Net zero target?	Aligned interim emissions reduction target?	Emissions reduction activities?	Net zero ambition	Net zero target?	Aligned interim emissions reduction target?	Emissions reduction activities?
Glencore Australia	■	■	Aspiration	Yes	Yes	■	Aspiration	Yes	Yes
Anglo American Australia	▲	★	Yes	Yes	Yes	•	No information	No information	Yes
BHP Group	▲	★	Yes	Yes	Yes	•	No information	No	Yes
Fortescue Metals Group	▲	★	Yes	Yes	Yes	•	No information	No information	Yes
Santos	▲	★	Yes	Yes	Yes	•	No information	No	Yes
South32	▲	★	Yes	No	Yes	•	No information	No information	Yes
ConocoPhillips Australia	▲	■	Aspiration	No	Yes	•	No information	No information	Yes
GFG Alliance (Liberty Primary Metals)	▲	■	Aspiration	No information	Yes	•	No information	No information	Yes

Companies	Overall net zero ambition	Scope 1 and 2				Scope 3			
		Net zero ambition	Net zero target?	Aligned interim emissions reduction target?	Emissions reduction activities?	Net zero ambition	Net zero target?	Aligned interim emissions reduction target?	Emissions reduction activities?
Rio Tinto	▲	■	Aspiration	No	Yes	•	No information	No information	Yes
Shell	▲	■	Aspiration	Yes	Yes	•	No information	No[16]	Yes
Woodside Petroleum	▲	■	Aspiration	No	Yes	•	No information	No information	Yes
Alcoa Australian	•	•	No information	No	Yes	•	No information	No information	Yes
BlueScope Steel	•	•	No information	No	Yes	•	No information	No information	Yes
Chevron Australia	•	•	No information	No	Yes	•	No information	No information	Yes
ExxonMobil Australia	•	•	No information	No information	Yes	•	No information	No information	Yes
Inpex Australia	•	•	No information	No	Yes	•	No information	No information	Yes

[16] Shell has set a target to reduce the emissions intensity (gCO2e/MJ) of its products by 65 per cent by 2050. Comparisons with the International Energy Agency's sector specific decarbonisation trajectories suggest that Shell's target aligns with a level of global warming higher than 2 degrees (TPI 2020). As an intensity target, it does not preclude Shell from increasing fossil fuel production (in parallel to stronger increases in 'greener' activities), thereby increasing associated absolute emissions (Grant 2020). This target is therefore not aligned with net zero.

Companies	Overall net zero ambition	Scope 1 and 2				Scope 3			
		Net zero ambition	Net zero target?	Aligned interim emissions reduction target?	Emissions reduction activities?	Net zero ambition	Net zero target?	Aligned interim emissions reduction target?	Emissions reduction activities?
Peabody Australia	•	•	No information	No information	Yes	•	No information	No information	Yes
Viva Energy Group	•	•	No information	No information	Yes	•	No information	No information	Yes
Yancoal Australia	•	•	No information	No information	Yes	•	No information	No information	Yes
Centennial Coal	•	•	No information	No information	Yes	o	No information	No information	No information
Newcrest Mining	•	•	No information	No	Yes	o	No information	No information	No information
Whitehaven	•	•	No information	No information	Yes	o	No information	No information	No information

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WHAT IS THE NET ZERO MOMENTUM TRACKER?

Reaching net zero emissions is a core action of the Paris Agreement goal to limit global warming to well below 2 degrees Celsius and strive for 1.5 degrees. Many major global companies have incorporated this goal into their business strategies. In Australia, businesses and governments are doing the same, but there is no easily accessible place to assess these commitments, making them difficult to track.

The Net Zero Momentum Tracker tells the story of Australia's growing momentum towards net zero across key sectors in the Australian economy through a series of sector reports supported by an online platform.

WWW.NETZEROTRACKER.ORG

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ClimateWorks Australia is an expert, independent adviser, committed to helping Australia, South East Asia and the Pacific region transition to net zero emissions by 2050. It was co-founded through a partnership between Monash University and The Myer Foundation and works within the Monash Sustainable Development Institute.

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