

# **SUPERPOWERING-UP: Accelerating the electrification & decarbonisation of the Pilbara**

is key to unlocking Australia's green export ambitions

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An analysis of current energy demand in the Pilbara, and the need for common user electricity infrastructure to accelerate electrification and decarbonisation at speed and scale, leveraging Australia's opportunity to lead globally on zero-emissions value-added industries of the future.



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## About Climate Energy Finance

**Climate Energy Finance (CEF)** is an Australian based, philanthropically funded think tank established in 2022 that works pro-bono in the public interest on mobilising capital at the speed and scale needed to accelerate decarbonisation and the energy transition consistent with the climate science.

We conduct research and analyses on global financial issues related to the energy transition from fossil fuels to clean energy, as well as the implications for the Australian economy, with a key focus on the threats and opportunities for Australian investments, regional employment and value-added exports. Beyond Australia, CEF's geographic focus is the greater Asian region as the priority destination for Australian exports, particularly India and China. CEF also examines convergence of technology trends in power, transport, mining and industry in accelerating decarbonisation. CEF is independent, works with partners in the corporate and finance sector, NGOs, government and the climate movement.

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### Acknowledgements

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## Foreword - Dr Alan Finkel

**28 July 2024**

This Climate Energy Finance report by Tim Buckley and Matt Pollard on electrifying and decarbonising the Pilbara is welcome because it addresses the necessary preconditions to achieving ambitious national goals arising from the global clean energy transition.

One goal is to rapidly decarbonise our domestic economy. In this, we are far behind other countries. In the absence of land use offsets, by the end of 2023, Australia's emissions were only 2.5% down on the 2005 baseline.<sup>1</sup>

The other goal is to become an electrostate of the future, a green energy superpower exporting decarbonised, value-added products that will simultaneously be export income earners for Australia and contribute to global decarbonisation. In this, too, we see other countries making faster progress than Australia, despite our ambitious intentions.

Much must be done to speed up the deployment of solar and wind power in the Pilbara and its use to economically decarbonise the mining of our existing exports, and produce value-added, decarbonised derivatives. The CEF report identifies many of the essentials that governments can implement, and opportunities for government to facilitate co-investment and collaboration between our resource majors and global sector leaders on important projects in the Pilbara, so that Australia will be able to compete efficiently with other countries.

If the recommendations in this report are implemented, they will help build international demand for our value-added products and ensure the necessary domestic and international finance is forthcoming. This would be an excellent outcome, but in the meantime, we must focus on supply-side incentives to ensure that we are internationally competitive in export-oriented green metals. As identified in this CEF report, part of the supply-side focus should be investment in common user infrastructure for the electricity grid, and part should be initiatives such as co-location of renewable energy generation with green metals refining, to reduce the size of the challenge ahead in expanding the electricity grid in the Pilbara.

The consequences of acting too slowly or inefficiently will be severe. The international competition will be fierce. Brazil, South Africa and other countries can dig and ship their iron ore to countries in the Middle East that will use their low-cost, zero-emissions electricity to convert the crude iron ore into refined green iron. If we follow a business-as-usual trajectory, we will not just suffer from stagnation. Worse, we will suffer from a decline in our mineral resources exports at the same time that our fossil fuel exports will start a slow but terminal decline. This is a major risk to Australia's economic security.

This CEF report makes many important recommendations. First, and foremost in the context of the impact on land use required for transmission lines and solar and wind farms, is to work closely with Traditional Custodians of the land. From my own visits to the Pilbara, it is clear that the Traditional Custodians want to work with developers for mutual benefit.

Possibly the biggest problem is that our regulatory systems at the state and commonwealth levels are too complex, unbalanced, and slow. We need the kinds of changes recommended in this report, including the Overriding Public Interest (OPI) requirement adopted in Europe.

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<sup>1</sup> DCCEEW, [National Greenhouse Gas Inventory Quarterly](#), accessed 28 July 2024

Under the European Directive on Renewable Energy promulgated in October 2023, regulators and courts must ensure that the time taken to approve solar, wind, storage and transmission projects in designated areas, akin to what in Australia we call Renewable Energy Zones, will not exceed 12 months.<sup>2</sup> For offshore wind projects, the approval time must not exceed 24 months. To ensure these rapid approvals, the regulators and the courts must take into account the Overriding Public Interest (OPI).

The OPI is a powerful concept, requiring that global climate benefits must be taken into account. For impacts on biodiversity, developers now must take the whole population of a species into consideration instead of individual animals. Australia's main national environmental protection derives from the Environment Protection and Biodiversity Conservation (EPBC) Act.<sup>3</sup> However, the EPBC Act gives no consideration to global biodiversity even if it would clearly benefit from the project under review.

The application of OPI has already proven effective in expediting several projects entangled in legal disputes in Germany. Projects are winning court cases they used to lose. France, Portugal, and Austria have followed suit by incorporating OPI into their legal frameworks.<sup>4</sup>

In the absence of national adoption of an OPI consideration, perhaps the Western Australian government could incorporate an OPI consideration into its Green Energy Approvals Initiative announced in December 2022, which aims to reduce approval times for job-creating green energy projects through creating a dedicated environmental assessment team and dedicated major projects facilitation team.<sup>5</sup>

I commend this CEF report for consideration by the Western Australian Government and the mining industry in Western Australia. Further, there are many observations and suggestions in this important report that will be of relevance to other states in Australia.

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<sup>2</sup> EU, [Directive \(EU\) 2023/2413 of the European Parliament and of the Council](#), 18 October 2023

<sup>3</sup> DCCEEW, [Environment Protection and Biodiversity Conservation \(EPBC\) Act](#), accessed 28 July 2024

<sup>4</sup> Wind Europe, [Wind Energy Permitting is Improving but Governments Still Have Work to Do](#), 08 February 2024

<sup>5</sup> WA Gov, [Green Energy Approvals Initiative](#), 07 May 2024

## Key Recommendations

### *To all stakeholders in the energy transition:*

**Recommendation 1.** Centre social licence and **First Nations equity participation** in the decarbonisation of the Pilbara by prioritising close consultation and agreement with First Nations peoples on energy infrastructure plans, investments and deployments in the region, ensuring self-determination, consent and return of benefits to communities. Funding support should be embedded to underpin this engagement.

**Recommendation 2.** Australia and the WA Government must accelerate approval processes and procedures if we are to achieve our national emissions reduction requirements under the Paris Agreement and renewable energy targets. Building on the momentum of WA's Green Energy Approvals Initiative, CEF recommends the introduction of **Overriding Public Interest** principles into the environmental approvals processes for renewable energy, infrastructure, storage and green manufacturing projects, building on the merits of its use in the European Union.

### *To the Federal Government:*

**Recommendation 3.** Urgently prioritise Western Australia's Pilbara region for strategic national-interest public investment to crowd-in private patient capital into **common-user infrastructure** (CUI) and renewables-powered green metals refining, critical minerals processing and cleantech manufacturing under the Net Zero Transformation and Economic Security and Resilience Streams of the **Future Made in Australia** initiative. This will leverage Australia's comparative advantages in the region and the Pilbara's pivotal role in resources decarbonisation, key to securing our economic prosperity and path to net zero as global decarbonisation accelerates.

**Recommendation 4.** Work with the Western Australian government to urgently deploy the **\$3bn Clean Energy Finance Corporation (CEFC) concessional financing committed to WA in August 2023 under the Rewiring the Nation** program to unlock private capital financing of a Pilbara CUI. (Refer Recommendation 12 to the WA Government, below.)

**Recommendation 5.** Cap the federal **Fuel Tax Credit Scheme** at A\$50m pa per consolidated group to remove this massive headwind to decarbonisation of mining machinery and vehicles, raising A\$14bn by 2030, and entirely reinvest the proceeds in a special purpose fund to incentivise miners to electrify mobile equipment used in extraction and transportation.

**Recommendation 6.** As part of the 2024-25 MYEFO, implement a \$10bn **Green Iron Production Tax Incentive** to catalyse Australia's time-critical, once-in-a-century opportunity to leverage the historic global dominance of Pilbara iron ore into leadership in the future-facing, decarbonised iron and steelmaking industry.

**Recommendation 7.** As part of the **Future Made in Australia's** core pillar of unlocking green metals opportunities, build on the \$22bn of budget support in the 2024-25

budget to further boost demand-side incentives for first movers in decarbonising and value-adding resources onshore with a focus on the Pilbara; leveraging the **Hydrogen Headstart Program** to provide capital support for domestic renewable energy-based metals refining in low-emission industrial precincts, incentivising industry buy-in to common user infrastructure.

**Recommendation 8.** Strongly advocate for an international green premium price signal for trade in decarbonised products, principally an **Asian Carbon Border Adjustment Mechanism (CBAM)**, a key geopolitical priority that will play to Australia’s comparative advantages in renewables-powered processing of mineral, metals, energy transition materials and green iron including in the Pilbara, and accelerate investment into these opportunities, including fostering public-private partnerships with Australia’s key resources trading partners.

**Recommendation 9.** Hasten Australia’s pivot from its legacy zero value-add, dig-and-ship export mentality by **mandating resource value-adding pre-export**, replicating Indonesia’s lead. Stipulating that foreign interests’ access to our minerals and metals is contingent on investment into onshore refining, processing and manufacture, with priority access for renewables-powered value-adding. This will help attract global cleantech leaders to partner on Australian energy transformation, embed decarbonisation into Pilbara exports, and capture cleantech value chains here.

**Recommendation 10.** Continue to target opportunities for and help facilitate **co-investment and collaboration** with the WA Government, resources majors and global sector leaders on strategically important projects in the Pilbara – principally CUI, to unlock a critical mass of renewables investments – leveraging public-private partnerships and inbound foreign direct investment.

***To the WA State Government:***

**Recommendation 11.** Prioritise the development of a comprehensive single **Common-User Grid Infrastructure Plan** in the expanded Pilbara region, to mandate state-owned Horizon Power’s strategic vision to decarbonise and interconnect the Pilbara grid; and drive implementation of the plan in the near term, in collaboration with its Federal counterparts and key industry stakeholders including the mining majors operating in the region.

**Recommendation 12.** To unlock the \$3bn of CEFC concessional financing committed to WA in August 2023 by the Fed Gov't under its RtN program, work with the **Pilbara Industry Roundtable** to urgently identify priority projects integrating CUI and deploying renewable capacity. Further delay is compromising the critically-needed acceleration of decarbonisation in the Pilbara. The CEFC’s strategic public interest capital will de-risk and crowd-in further private capital, accelerating development of Pilbara CUI and connection of inland regional load centres to WA’s existing coastal North West Interconnected System (NWIS).

**Recommendation 13.** Legislate WA’s **Climate Change Bill 2023** to drive an urgent acceleration across the state and across industry sectors of its lagging emissions reduction efforts – which now undermine our national climate and transition

objectives – supported by interim targets for 2035 and beyond plus sector decarbonisation pathways, incentivising investment into energy decarbonisation technologies, infrastructure and zero-emission industries. CEF strongly advocates that WA develop a whole of government approach to protect critical export industries as world trade decarbonises in alignment with the climate science.

***To Pilbara mining & energy majors:***

**Recommendation 14.** Bring together their globally leading financial and technological corporate power into a **robust and sustained Pilbara-wide industry collaboration on common-user energy infrastructure in the region**, leveraging their collective strengths to expedite deployment to their mutual benefit. This should build on engagement in the Pilbara Industry Roundtable convened by the WA Government. APA and/or BP (via AREH) are well positioned to lead on aggregating-up existing grid transmission and generation into a comprehensive common-user infrastructure. This should also be a top priority of the FMIA and the Net Zero Economy Authority.

**Recommendation 15.** Rapidly deploy their balance sheets' firepower to **credibly invest into accelerated decarbonisation plans in their Pilbara operations tied to science-aligned emissions targets**. While BP (via its majority-owned AREH), APA and Fortescue are leading, BHP and Woodside are failing to adequately respond to the material risks of the climate crisis, looming regulatory penalties for carbon-intensive production, and the opportunities to invest at speed and scale into energy transformation. Rio Tinto can do more to extend its leadership on energy supply decarbonisation elsewhere to its Pilbara concerns, as it is doing in aluminium.

**Recommendation 16.** Leverage the deep political influence of their job creation, royalties and corporate tax profiles to **demand greater climate and energy policy ambition from the WA Government** – currently the laggard amongst the states – as their shareholders are increasingly demanding from them. This boost in ambition needs to be on a scale commensurate with both the climate challenge and the immense economic opportunities of an accelerated transition in the Pilbara region.



## Key Findings

*It is CEF's view that a single common-user grid infrastructure in the greater Pilbara is the principal catalyst to accelerate regional decarbonisation in the engine room of Australia's resources industry, and unlock >\$50-100bn of new investment in renewable energy generation and firming, grid transmission and value-added refining of critical minerals, strategic metals and energy transition materials – key drivers of Australia's sustained economic prosperity in a decarbonising world.*

*Failure to act now to decarbonise and electrify the Pilbara puts at risk Australia's biggest single export opportunity – to potentially double our iron ore exports to \$250bn pa by producing green iron.*

1. **The Pilbara region in Western Australia (WA) underpins Australia's economic strength. It is the powerhouse of Australia's resources export industry, the global leader in the production and export of iron ore – Australia's #1 export commodity – and has world-scale reserves of critical minerals including lithium, strategic metals and energy transition materials.**

Decarbonising energy demand in non-fossil fuel mining and refining in the Pilbara is a critical enabler of Australia's strategic ambition to remake itself as a green exports superpower in the emerging net-zero world economy. This is a growing imperative as fossil fuels enter terminal decline globally, and carbon pricing mechanisms such as CBAMs proliferate, signalling we must accelerate our investment pivot away from our increasingly risky exposure as a legacy top 3 global petrostate.

2. **Currently, to power their mobile equipment operations in the Pilbara, the mining majors burn a massive 2.4bn litres pa of heavily subsidised, imported diesel – a high-emissions fossil fuel – and rely on fossil gas for stationary energy.**

CEF's new modelling in this report reveals that replacing just the current fossil fuel use in the Pilbara would require 16.66 terawatt hours (TWh) pa of electricity, equivalent to 7.8% of Australia's National Electricity Market (NEM). This could and should be supplied by locally-generated, zero-emissions firmed renewable energy. However, the Pilbara currently sources only 2% of its electricity from renewables. Fragmented corporate energy production and grid transmission structures undermine progress on comprehensive energy supply decarbonisation in the region.

3. **Common-user electricity infrastructure in the Pilbara would enable multiple stakeholders to efficiently and cost-effectively electrify and decarbonise their operations.**

This is key to reducing the 'Pilbara premium' – i.e. the capital-intensive logistical barriers of remoteness, and associated materials, transport and labour costs – and ameliorate commercial disincentives to the shift to clean energy, accelerating investment into green exports. Delivered effectively, common-user infrastructure will best support the future economic growth of the Pilbara in a net zero global economy: lowering the total capital investment required to power the region's industrial energy demand with green electricity, mitigating risk, minimising duplication of transmission networks, and

integrating existing disaggregated grid and generation infrastructure ‘islands’ into a coordinated whole, while unlocking the development of green energy precincts to turbocharge regional decarbonisation.

4. **Australia has the potential and scale to dominate in green iron, but absent timely action on energy supply decarbonisation in the Pilbara underpinned by common-user infrastructure, we risk forgoing this once-in-a-century opportunity.**

The world is in an energy system transformation race to the top, dominated by China’s overwhelming cleantech leadership, with the \$US1tn Inflation Reduction Act putting the US in the race and comparable programs in other global economies. The only future-facing industry sector in which China does not yet lead is green iron and steel. Green iron is Australia’s #1 emerging export opportunity. Likewise, Australia has globally-significant potential in green hydrogen, green ammonia, and renewables-powered value-adding of our critical minerals and metals reserves, many of which are concentrated in the Pilbara – if we act at speed to decarbonise mining and refining across our resources supply chains and prioritise partnerships with our key trade partners and global cleantech industry leaders to expedite this opportunity.

5. **A buildout of enabling common-user infrastructure and associated rapid deployment of world-scale firmed renewables projects in the Pilbara should be an urgent, top-tier strategic national-interest policy and investment priority for industry, government, regulatory and investment stakeholders.**

There is a transformative, nation-building opportunity for collaborative planning, investment and delivery of a CUI from the mining and energy majors, the WA Government, and the Albanese Government under its landmark energy transition frameworks and programs, including Rewiring the Nation, the Capacity Investment Scheme (CIS) and the Net Zero Economy Authority (NZEa), as well as its flagship Future Made in Australia Act (FMIA). At Federal level, the development of enabling infrastructure in the Pilbara to support accelerated electrification and renewables deployment is a core pillar of the Net-Zero Transformation and Economic Resilience and Security Streams of the FMIA.

### *Value of Australian and WA resource export industries*

1. Australia’s economic strength has been underpinned by our world-leading commodity exports, with iron ore, our #1 export, contributing massive revenues to WA and Federal coffers.
2. In 2022-23, Australia exported 895Mt of iron ore, representing ~27% of all resource and energy exports and 55% of metal and mineral exports, and generating

\$124bn in revenue. Mining royalties to the WA Government exceeded \$11bn, with iron ore accounting for over 83%. Lithium is the second largest commodity royalty, generating \$910m over 2022-23. WA royalties are forecast to generate \$31.4bn from 2023-24 to 2026-27, \$24.7bn from iron ore and \$2.5bn from lithium.

3. As our trade partners increasingly penalise carbon-intensive imports by implementing CBAMs and other carbon pricing, if Australia is to

continue to reap the vast economic returns of its global resources leadership, remain competitive, and lock in future prosperity, it must act now to embody decarbonisation in its resources exports, moving beyond our 'dig-and-ship', fossil-fuel-centred economy to process energy transition materials onshore using zero-emissions power. Energy system transformation in the Pilbara is pivotal to this goal.

### *Decarbonisation initiatives of Pilbara mining majors*

1. Rio Tinto has made dramatic progress in underwriting decarbonised electricity supply across Australasia over 1H CY2024 in its aluminium division. To broaden this progress, we see significant investment opportunities for Rio in the Pilbara. Firmed renewable energy PPAs and electrification of Rio's mine and rail haulage fleet are key strategies, but state and federal support is needed, such as a green iron production tax credit and capex support from the Rewiring the Nation program. Resolution of First Nations' requirement for equity participation is also key.
2. Fortescue (FMG) has led on investing in opportunities for Australia in a decarbonised world, including electrification of heavy industry and hard-to-abate sectors, with the most ambitious decarbonisation objectives across the Pilbara. FMG targets real zero emissions from terrestrial iron ore operations (Scope 1 and 2) by 2030, as well as a net zero Scope 3 target by 2040. Real zero requires FMG to implement a pathway that eliminates fossil fuel use and precludes the use of offsets to meet emissions reduction requirements. Individually, FMG has committed US\$6.2bn to remove carbon from its operations within the Pilbara by 2030, with ~90% of emission solutions identified, as part of its ambitious 2030 scope 1 and 2 real zero emissions target. But a Pilbara-wide industry collaboration would be much more effective, leveraging our mining majors' collective strengths and placing Australian miners at the cutting edge globally.
3. The majority BP-owned Australian Renewable Energy Hub (AREH), which targets 26GW of firmed solar and onshore wind to power green hydrogen and ammonia production, has the potential to provide the basis of common-user firmed renewable energy infrastructure on the massive scale required to fully decarbonise the Pilbara's mining, fertiliser and value-adding operations over the coming 1-2 decades. BP has the financial and technical skills required and a credible record of delivery, with industry likely to prefer a private global major to lead over a public sector institution. The AREH is key to BP's shift from fossil fuels and its plans to invest up to \$98bn in renewables, hydrogen, biofuels, and electric mobility by 2030 on its path to net-zero by 2050 or earlier.
4. APA Group currently has the largest portfolio of operating renewable energy generation and storage projects in the Pilbara, and one of the largest development pipelines outside of the AREH across the Pilbara. Its 2023 \$1.8bn acquisition of Alinta Energy Pilbara puts APA in

the box seat alongside BP's AREH to aggregate up existing grid transmission and generation into a comprehensive common-user infrastructure with the capacity to accelerate electrification and decarbonisation in the short term, ahead of the widespread adoption of world-leading EV mine and rail haulage equipment and the further expansion of electricity sector decarbonisation to power production and processing pre-export.

5. BHP, on the other hand, is doing too much talking-the-talk of energy transition, and nowhere near enough walking-the-walk, particularly compared to its Pilbara competitors, led by Fortescue. For example, while BHP has stated that the integration of renewables to decarbonise electricity demand across its iron ore operations is a priority this decade, unfortunately for Australia, BHP chose to start this investment process in Chile, a clear case of taking advantage of Australia's domestic diesel fuel subsidy to delay action. It is also expanding its gas generation capacity in the Pilbara, kicking the decarbonisation can down the road. There is a climate emergency, and Australia desperately needs the 'Big Australian' to lead by example and leverage its brilliant balance sheet to lean into the massive opportunities in decarbonisation, including green iron exports.

### *Investment into value-adding renewables deployments in the Pilbara*

1. In February 2024, the Federal and WA Governments finalised a \$140m

funding agreement to develop a hydrogen hub in the Pilbara, designed to be a major centre for hydrogen production and export of resources embedding decarbonisation, with the potential to become an international gateway to Australian-made green iron. The \$70m Federal Government share is part of the broader \$526m Regional Hydrogen Hubs Program, which will crowd-in significant private capital to establish hubs for green hydrogen in key industrial regions nationally.

2. POSCO, South Korea's largest steelmaker and the 7th largest globally, announced in September 2023 its proposal for a large-scale iron ore processing facility at Port Hedland Green Steel (PHGS), to be developed with Taiwan's China Steel and Japan's Marubeni. The value-added processing facility would consist of a pelletisation and HBI (Hot Briquette Iron) plant, with capacity in Stage 1 to process 3-3.5Mtpa of iron ore into ~2Mtpa of HBI. POSCO plans to develop the plant as a 4-stage operation, culminating in a production capacity of 12Mtpa of value-added, low emissions iron metal, for a total \$27bn investment, with thousands of jobs during construction and 400 ongoing.
3. Yara Pilbara Fertilisers (YPF) on the Burrup Peninsula is one of the largest ammonia production facilities in the world, with an average production of 840,000tpa of liquified ammonia representing ~5% of the global market, exporting to Korea, Indonesia and other Southeast Asian markets. ENGIE and Mitsui are developing the renewable hydrogen Yuri Project to provide

low-emission hydrogen feedstock into Yara Pilbara's operations. The first phase of the Yuri Project, a 10MW electrolyser powered by 18MW of solar PV and an 8MW/8MWh BESS, targets completion in 2024, producing 640tpa of renewable hydrogen. Total capital investment is \$87m, supported by a \$47m grant from ARENA's Renewable Hydrogen Development Fund.

### *Domestic & international decarbonisation policy*

1. WA is the resource export engine of Australia, including highly-polluting methane gas in the form of LNG. Entrenched fossil fuel vested interests means WA is a massive decarbonisation policy laggard compared to the other states. This is a significant headwind to seizing our enormous value-added opportunities to export embodied decarbonisation and permanently eliminate our reliance on subsidised imported diesel fuel. As of 2021, QLD, NSW and VIC achieved emissions reductions of -29%, -18% and -32% against 2005 levels, while WA emissions increased by 4%. The key driver in this growth of WA's emissions profile has been the combustion of fossil fuels. WA is also the only state not to set an interim emissions reduction target for 2030. WA needs an approach that supports and matches the ambition, speed and scale of the clean industry and renewables policies packages of other states and the Federal Government. The prevailing lack of policy ambition and credibility to address climate change at the state level jeopardises Australia's Federal climate targets and undermines Australia's national energy transition objectives.
2. The WA state-owned Horizon Power, the state's regional and remote energy provider, has articulated a clear strategic vision to decarbonise the WA grid. The Pilbara accounts for the majority of Horizon Power's emissions portfolio. It plans to leverage the roll-off of power purchasing agreements (PPAs) across the NWIS and microgrids that have historically relied on gas power when these expire across 2029-30, moving to renewables and BESS. Particularly in light of the 50% decline over 2024 in solar module and battery pack export prices from China, this creates an immense opportunity for long-term wind and solar PPAs firmed by BESS. Horizon also plans to develop transmission corridors for third-party renewables and storage projects, de-risking large-scale renewable projects through diversification of customer networks, minimising the risk of stranded assets from a concentrated, isolated off-take agreement. But Horizon needs a significantly clearer mandate from the recalcitrant WA Government in the form of a single common-user grid infrastructure plan in the expanded Pilbara region.
3. Likewise, BHP, Rio and gas giant Woodside Energy need to step up with credible decarbonisation policies and action plans backed with significantly enhanced investment, responding to increased shareholder activism as climate laggard majors are increasingly held to account, and exert pressure on

the WA government to boost its transition ambition.

4. Federally, Australia has made significant progress on electricity system transformation and economy-wide decarbonisation under the Albanese government, including in the resources and energy industry sectors. Policy and investment programs and frameworks designed to accelerate Australia's energy and economic transition, including the CIS, the Safeguard Mechanism reforms, the Climate Change Act 2023, the National Reconstruction Fund (NRF), the expanded Hydrogen Headstart Program, the Future Made in Australia Act and the NZEA all represent significant steps forward. This is coupled with the upscaling of financial capital in Northern Australia Infrastructure Facility (NAIF), Export Finance Australia (EFA), CEFC and the NRF. There is the opportunity also to look to models in other economies to further enhance our transition policy and investment frameworks, such as the Indonesian government's mandate that its resources be value-added pre-export as a precondition of foreign access to and investment in its critical minerals and strategic metals.
5. To leverage our time-critical world-leading opportunity in green resource supply chains, Australia must now develop a policy response at speed and scale to the risks and opportunities of carbon pricing mechanisms in global trade. June 2024 saw US Climate Envoy John Podesta advocate for the US to impose carbon import taxes on high-emissions export nations, noting embedded emissions are not yet priced in global trade. This follows the EU CBAM going live in October 2023. By the end of 2025 we expect China's National Development and Reform Commission (NDRC) to expand the largest ETS in the world (by volume) to cover 7-8 heavy industry sectors across China.
6. A price on carbon emissions in global or Asian trade is exactly the signal that Australian resources majors need to commercially incentivise the shift to green iron, green aluminium and lithium hydroxide, and value-adding of Australian critical minerals and strategic metals. Australia should now strongly advocate for an Asian CBAM, complemented by ambitious strategic national-interest industry support to renewables-powered onshore value-adding of our resources exports, enabling us to capture the resulting green premium.

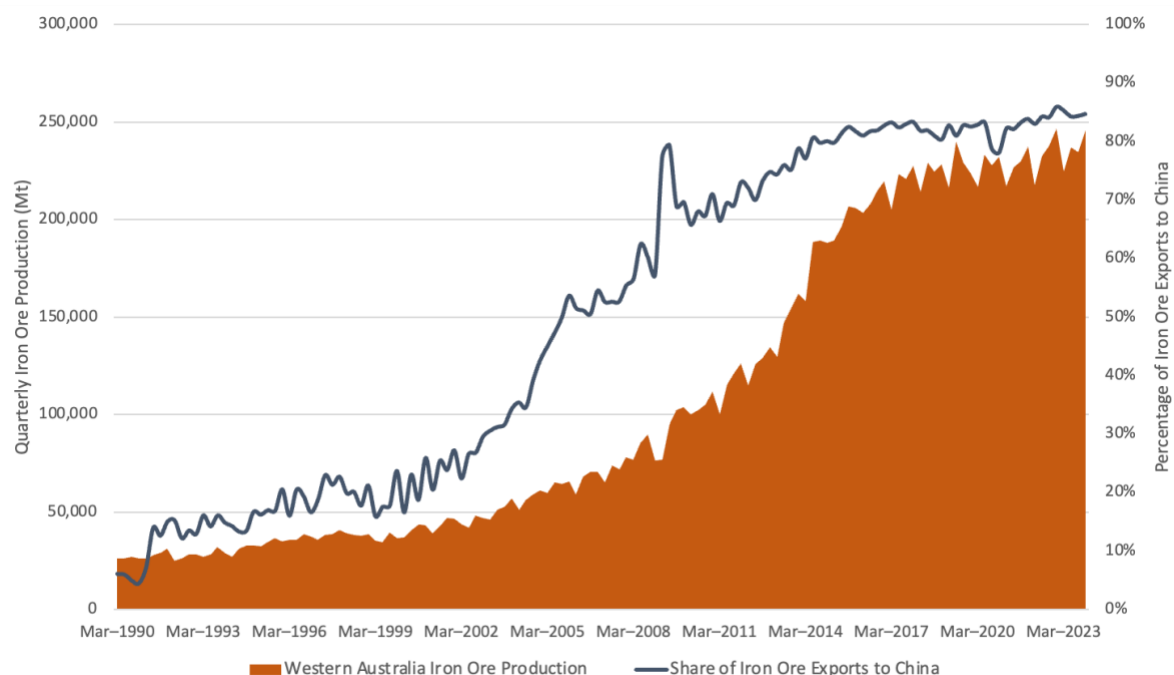
## Section 1. Critical Importance of the Australian and WA Resource Export Industry

*Australia's economic strength has been underpinned by our world leading commodity exports, with iron ore #1, which in turn contributes massively to the WA and Federal Government's budget coffers, both royalties and corporate tax. But for too long Australia has pursued a 'dig-and-ship' zero value-add strategy for our resources. With the growing headwind to Australia's top 3 global fossil fuel export exposure, we need a strategy to value-add by embodying decarbonisation in refining pre-export.*

Australia's resource and energy sector is one the largest contributors to the nation's gross domestic product (GDP), and has been a key driver in economic growth. In 2023, the mining sector accounted for ~13.4% of GDP, employing 300,000 people across Australia. In 2023-24, total energy and resource exports generated \$417bn, with non-fossil fuel resources generating the majority share, at \$237bn.<sup>6</sup>

The iron ore industry has become the powerhouse of Australia's economy, as Australia's largest export commodity in both volume and earnings. In 2022-23, Australia exported 895Mt of iron ore, generating \$124bn in export revenue. Iron ore represents ~55% of metal and mineral exports.

**Figure 1.1: Growth in WA Quarterly Iron Ore Production**



Source: Resources and Energy Quarterly March 2024 <sup>7</sup>

China is the largest global importer of iron ore, and Australia's largest resource trading partner. In 2022-23, over 84% of Australia's iron ore production was imported by China. From March 1990 to March 2024, Australia has exported over 13.9 billion tonnes of iron ore, generating over \$1.35 trillion (nominal) in cumulative export earnings since 1990.

<sup>6</sup> Aus Government, [Resources and Energy Quarterly June 2024](#), 01 July 2024

<sup>7</sup> DCCEEW, [Resources and Energy Quarterly March 2024](#), 28 March 2024

Lithium extraction has also rapidly scaled to become a major contributor to the nation's export earnings, with lithium the 6<sup>th</sup> most valuable resource and energy export commodity in 2022-23 across Australia, outpacing copper, alumina and aluminium. In 2022-23, lithium shipments of 3.3Mt contributed to \$20bn of export earnings. Australia is the world's largest producer of lithium, accounting for 50% of annual lithium extraction globally in 2022-23, with over 98% of Australia's lithium exports being imported by China.

The vast majority of iron ore and lithium exports are from Western Australia, with an even greater concentration to the central Pilbara region of WA. The resource industry of WA has been a primary driver of the state's economic growth. In 2022-23, royalties to the WA State Government exceeded \$11bn, with iron ore royalties accounting for over 83%. Lithium has rapidly become the second largest commodity royalty, generating \$910m over 2022-23.<sup>8</sup> Following the December 2023 WA Government budget update, royalties are forecast to generate \$31.4bn from 2023-24 to 2026-27, with \$24.7bn and \$2.5bn from iron ore and lithium respectively.

**Figure 1.2: WA Royalties Forecast in 2023-24 Budget Update**

	2023-24 Mid-Year Budget Update						
	2021-22	2022-23	2023-24	2023-24	2024-25	2025-26	2026-27
	Actual	Actual	Budget	Update	Update	Update	Update
	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Royalty Income</b>	<b>11,091</b>	<b>11,158</b>	<b>7,982</b>	<b>10,701</b>	<b>7,130</b>	<b>6,931</b>	<b>6,649</b>
Iron ore	9,917	9,285	5,972	8,970	5,426	5,225	5,074
Share of Iron Ore Royalties	89%	83%	75%	84%	76%	75%	76%
Lithium	261	910	928	681	628	648	585
Other	912	964	1,081	1,049	1,076	1,058	990
<b>Key Assumptions</b>							
Exchange rate \$US/\$A (US cents)	73	67	68	65	69	71	72
Iron ore price (CFR, \$US per tonne)	138	112	74	104	66	66	66
Iron ore volumes (million dry tonnes)	845	861	865	867	885	898	890

Source: WA 2023-24 Budget Update

The Pilbara region is critical to Australia's historical economic growth and prosperity. Australia's number one national interest opportunity is to respond to the global reshaping of supply chains and safeguard and expand our mining industries as the world's addiction to fossil fuels enter into terminal decline in a decarbonised global economy.

The immediate opportunity for Australia is to 'embody decarbonisation' in our exports by using our abundant renewable energy to power mining and processing our industrial sectors, value-adding our mining industry pre-export to extend our competitive advantage in the global market as countries are shifting to energy and industry policies that increasingly place a price on carbon, particularly in global trade.

We target the development of an Asian CBAM as a logical extension of the EU CBAM now in place. Whilst iron ore is the largest export resource for Australia, both in value and volume, Australia remains heavily exposed to climate risks given our large fossil fuel export reliance.

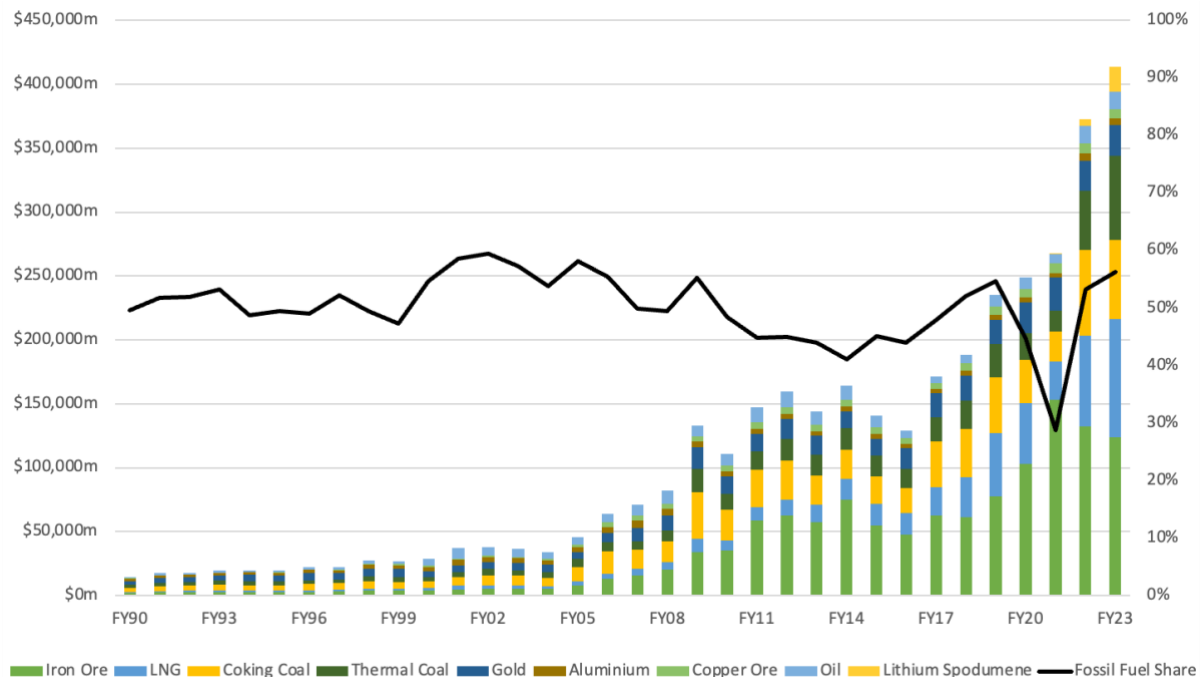
Liquefied Natural Gas (LNG) is the second largest energy and resource export of Australia, exporting to Australia's top 3 trading partners: China, Japan and South Korea. In FY23, LNG exports reached 82Mt, \$92bn in export earnings, with Japan the no.1 destination.

<sup>8</sup> WA Government, [WA 2023-24 Budget Update](#), 19 December 2023



Thermal coal export earnings reached a record year in FY23, generating \$65.5bn from 182Mt, largely to Japan. Metallurgical (coking) coal exports hit 165Mt in FY23, generating \$61.9bn, the second-largest earnings from coking coal in Australia's history.<sup>9</sup> Combined, fossil fuel exports generated \$233bn in export revenues over FY23, accounting for 56% of all energy and resource exports. This is a major long term strategic threat to Australia's economic strength as the world belatedly responds to the climate science.

**Figure 1.3: Historical Export Earnings and Share of Fossil Fuels**



Source: Resources and Energy Quarterly

Figure 1.4 shows that with the ongoing strength of the Chinese economy, Australia's commodity exposure has become significantly more concentrated on North Asia over the last decade, at nearly 80% of total exports. India provides a new area of diversification.

Australia's largest trading partners, and their respective fossil fuel energy-intensive industries, have recognised the importance of mobilising capital at speed and scale to achieve the global goal of net zero by 2050.

On 10 February 2023, Japan's Cabinet approved the Green Transformation (GX) Policy, a 10-year roadmap of Japan's decarbonisation strategy in order to achieve its Nationally Determined Contribution (NDC) of 46% emissions reduction by 2030, and carbon neutrality by 2050.<sup>10</sup> Japan's GX Roadmap is the transformation of the entire economic and social system from an economy and industrial structure dependent on fossil fuels to 'structures driven by clean energy' – driving economic growth through emissions mitigation.<sup>11</sup> The GX Roadmap aims to achieve JPY 150 trillion (~ US\$1 trillion) of public and private capital investment into decarbonisation and clean energy industries. The roadmap also targets

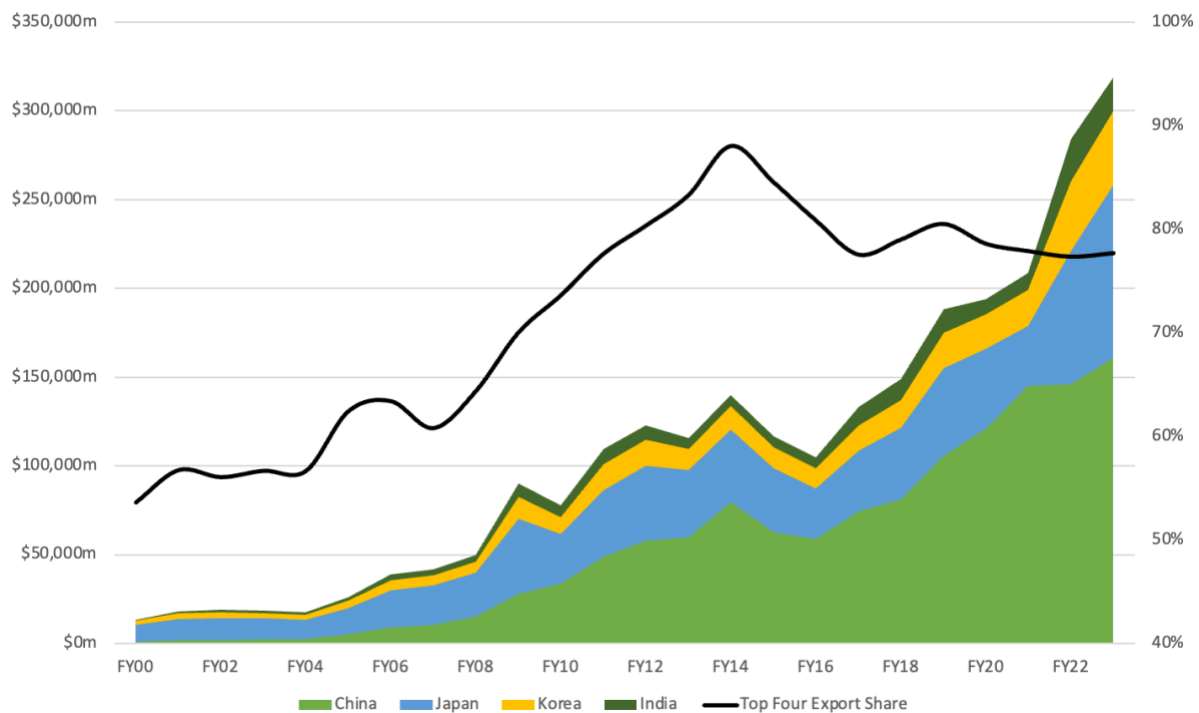
<sup>9</sup> OCE, [Resources and Energy Quarterly March 2024](#), 28 March 2024

<sup>10</sup> International Carbon Action Partnership, [Japan's Cabinet Approves Policy Roadmap Including Plans for National ETS](#), 22 February 2023

<sup>11</sup> GR Japan, [Overview of Japan's Green Transformation \(GX\)](#), January 2023

carbon pricing mechanisms via an emissions trading scheme (GX-ETS) for high-emission sectors, and the introduction of a carbon levy for fossil fuel importers, with the price on carbon gradually ratcheting up to increase investment into clean energy sources that mitigate reliance on fossil fuels.

**Figure 1.4: Australia's Commodity Export Earnings from our Top 4 Importers**



Source: Resources and Energy Quarterly

19 March 2024 saw **South Korea's** financial institutions pledge to provide 420 trillion won (US\$313bn) in policy loans through 2030 to finance projects that will accelerate Korea's pathway to achieving its 40% NDC emissions reduction target by 2030, relative to 2018.<sup>12</sup> The green fund would be delivered by Korea Development Bank, Export-Import Bank of Korea, Industrial Bank of Korea and Korea Credit Guarantee Fund. The increase in transition financing would provide 60 trillion won (US\$45bn) annually, a 67% rise from the 5-year average according to South Korea's Financial Services Commission.

May 2024 saw South Korea's Ministry of Trade, Industry and Energy announce a new energy plan that involves a dramatic reduction in reliance on coal (from 33% in 2024 to 10% in 2038) and LNG (from 28% to 11%), and an increase in reliance on nuclear (31% in 2024 to 36% by 2038), renewables (7% to 33%) and hydrogen and ammonia imports (0% to 6%).<sup>13</sup>

The energy transition will result in a fundamental reshaping of global supply chains, most directly in global energy flows, but across most commodities as well, plus a strategic realignment of refining and manufacturing, including profound changes to the global auto market. Given the continued rise in energy and electricity generation as a proportion of manufacturing and refining costs, and the growing range of policies to explicitly price in carbon emissions globally, heavy industries will potentially see a shift away from co-locating with demand centres using historically lower-cost imported high-emission fossil fuels (i.e.

<sup>12</sup> Bloomberg, [South Korea Finance Sector Pledges \\$313 Billion in Green Funding](#), 19 March 2024

<sup>13</sup> S&P Global, [Korea to sharply reduce LNG's share in power mix by 2038, boost nuclear role](#), 31 May 2024

coal, LNG, oil) to co-locating energy-intensive industries with regions with abundant low-cost, zero emissions renewable resources.

This scenario underpins a redirection of global financing flows, especially through export credit agencies and import-export banks, but also with a growing list of formal oil and gas financing exclusions, with 2 of the top 3 EU banks introducing new policies in May 2024.<sup>14 15</sup> This builds on the vast build-up of coal finance exclusions seen over the last five years.

Australia has a once-in-a-century opportunity to pivot and capture a greater share of value-add across energy and resource industries, leveraging public-private partnerships and inbound foreign direct investment from global sector leaders. The expansion of commodity refining and midstream production capacity onshore in strategic regions and industrial hubs provides the necessary diversification of energy load centres required for large-scale third-party investors in renewable energy generation and storage.

The decarbonisation of Australia's resources industry is an imperative for Australia in order to maintain and expand its world-leading positions as a Tier 1 supplier of strategic metals and critical minerals that are vital to the global energy transition.

The embedding of decarbonisation in our resource industries critical to the growth of clean energy technologies is a vital component to the Federal Government's Future Made in Australia, aligning economic incentives with broader national interest objectives.

The development of enabling infrastructure in the Pilbara to support accelerated electrification and growth of renewable energy, is a core pillar to both the Net-Zero Transformation Stream and the Economic Resilience and Security Stream of the FMIA.

As other key global exporters globally shift capital at speed and scale to develop green, value-added refining industries, Australia's strategic metal exports, principally iron ore and aluminium, must move faster and larger.

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<sup>14</sup> Reclaim Finance, [BNP Paribas says no to bonds in the oil and gas sector](#), 14 May 2024

<sup>15</sup> Reclaim Finance, [Crédit Agricole: a step towards ending non-earmarked bonds for the oil and gas sector?](#), 23 May 2024

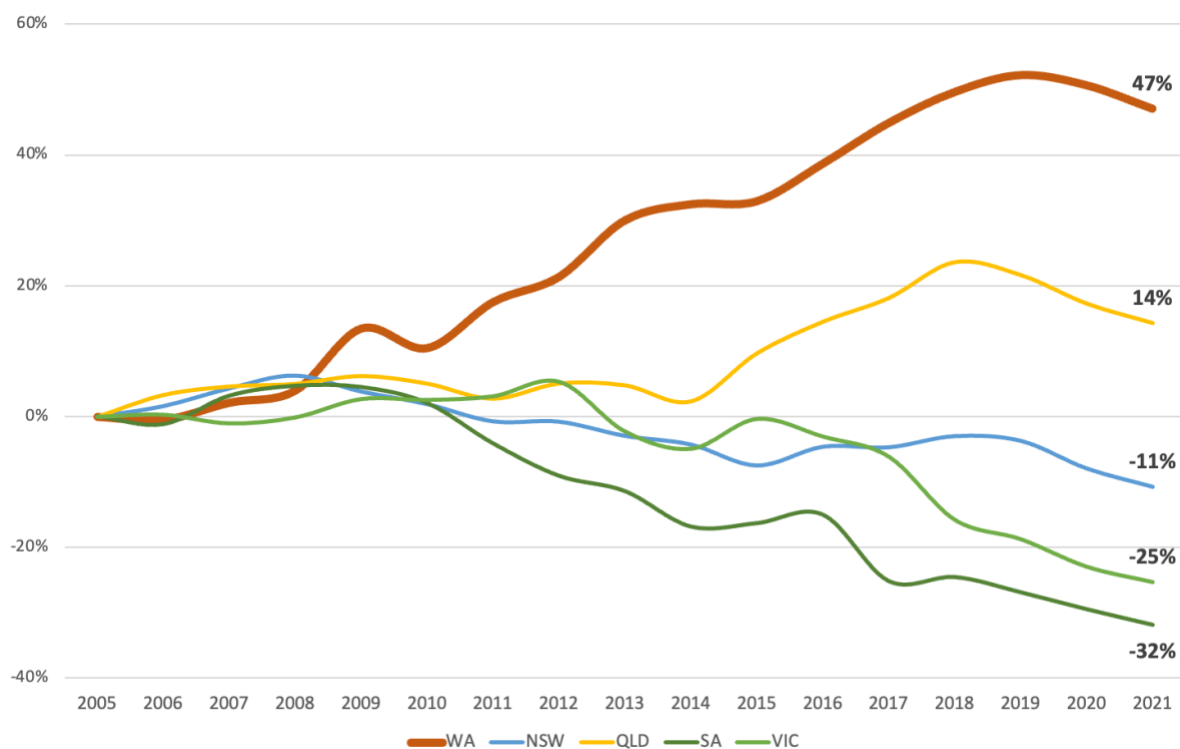
## Section 1.1. WA Emissions from Fuel Combustion

*West Australia is the resource export engine of Australia, including LNG. While this is providing strong economic growth, the entrenched fossil fuel vested interests mean WA is a massive decarbonisation laggard compared to its State peers in Eastern Australia. This is undermining Australia’s national objectives, and creates a significant policy headwind to seizing the enormous value-added opportunities from exporting embodied decarbonisation and permanently cutting our reliance on subsidised, imported diesel fuel.*

As of 2021, Australia’s four main emitting, energy- and industry-intensive states including QLD (140Mt, 30%), NSW (132Mt, 28%), WA (80Mt, 17%) and VIC (80Mt, 17%) account for 93% of total Australia CO<sub>2</sub>-e emissions.<sup>16</sup> As of 2021, QLD, NSW and VIC have achieved emissions reductions of -29%, -18% and -32% against baseload emissions recorded in 2005.

In contrast, WA is the **only state to see its emissions increasing, with a 4% rise to 2021.**<sup>17</sup> WA now accounts for 17% of Australia’s emissions. WA is also the only state not to set an interim emissions reduction target for 2030. The key driver in the growth of WA’s emissions profile has been the combustion of fossil fuels. Since 2005, WA’s annual fuel combustion emissions have risen 47% to 69 Mt CO<sub>2</sub>-e, representing 86% of the state’s total net emissions in 2021.<sup>18</sup>

**Figure 1.5: Growth in State Emissions from Fuel Combustion from 2005 Base Level**



Source: DCCEEW Australia’s National Greenhouse Accounts

<sup>16</sup> DCCEEW, [Australia’s National Greenhouse Accounts – Emissions by State and Territory](#), 2021

<sup>17</sup> Note: NT’s emissions have also increased from 12Mt to 14Mt over the same period, however they account for just 3% of national emissions. This report focuses on the nation’s largest industry-intensive regions.

<sup>18</sup> DCCEEW, [Australia’s National Greenhouse Accounts – Emissions by State and Territory](#), 2021

Our over-reliance on high-emission fossil fuels to power our industries has been spurred on by the continued subsidisation of imported petrol and diesel to our largest industrial emitters. The **Fuel Tax Credit Scheme (FTC Scheme)** exempts companies from the taxation placed on liquid fuels, i.e. diesel (through excise and customs duties), when consuming fuel in off-road applications – e.g. mobile diesel equipment used in mining. Tax concessions via rebates are the largest component of Federal Government and public subsidisation of fossil fuels in Australia, primarily for the consumption of diesel. Over 86% of support was given in the form of Federal tax concessions. Since the establishment of the Fuel Tax Act of 2006, in which the current form of the FTC Scheme was introduced, the Federal Government has provided over \$95bn in fuel tax credits.<sup>19</sup>

The mining industry is by far the largest beneficiary of the FTC Scheme. In FY22, mining accounted for 47% of all receipts from the FTC Scheme. The continued subsidisation of imported liquid fossil fuels has enabled a systematic overdependence on financial support even in the face of record high profit margins in Australia’s iron ore and coal export industries. This undermines Australia’s energy security even as it remains a headwind to our country’s decarbonisation commitments, particularly contradicting the Albanese Government’s new strategic vision of a FMIA (refer Appendix 1).

The fuel excise placed on liquid fuels essentially operates as an indirect price on carbon that factors in the negative externalities (i.e. environmental, climate and health impacts) from the release of carbon dioxide into the atmosphere through burning fossil fuels. However, the entities accountable for the largest emitting facilities and operations have been exempted for 60 years from responsibility, while taxpayers across Australia pay.

This subsidy distorts market dynamics in the resources industry, delaying the transition to electrification of diesel-based mobile mining equipment. CEF’s analysis on the FTC Scheme details the opportunities to reform the subsidy to catalyse a decarbonisation tailwind.<sup>20</sup>

As the world decarbonises, it is imperative Australia recognises the risks and hypocrisy of exporting commodities critical to achieving global net zero that are extracted and transported using high-emission fossil fuels. The global energy transition represents a fundamental reshaping of global energy and resource security, and marks a value shift to utilising low-emissions energy. This requires a global overhaul and revaluation of supply chains for key input materials required to produce zero-emission technologies. Fiscal signals need to align with the policy vision, not contradict and undermine it.

The global transformation represents an incredible opportunity cost and risk to Australia if our mining sector continues to ‘dig and ship’, using high-emissions imported diesel and methane gas as the critical energy sources underpinning our economic powerhouse - the iron ore industry. On the upside, the transition presents a once-in-a-century opportunity for Australia to emerge as an export superpower in low-emissions, value-added commodities, in which decarbonisation is embedded across the value-chain. With our abundance of minerals and metals, Australia is uniquely well positioned to leverage our world-leading renewable energy resources and ability to co-locate large-scale renewables generation to decarbonise our mining and refining industrial sectors, maximising our competitive advantage in the emerging net zero world economy.

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<sup>19</sup> ATO, [Taxation Statistics Excise – Table 4](#), 7 August 2022

<sup>20</sup> CEF, [Fuel Tax Credit Scheme and Heavy Haulage EV Manufacturing in Australia](#), 11 September 2023

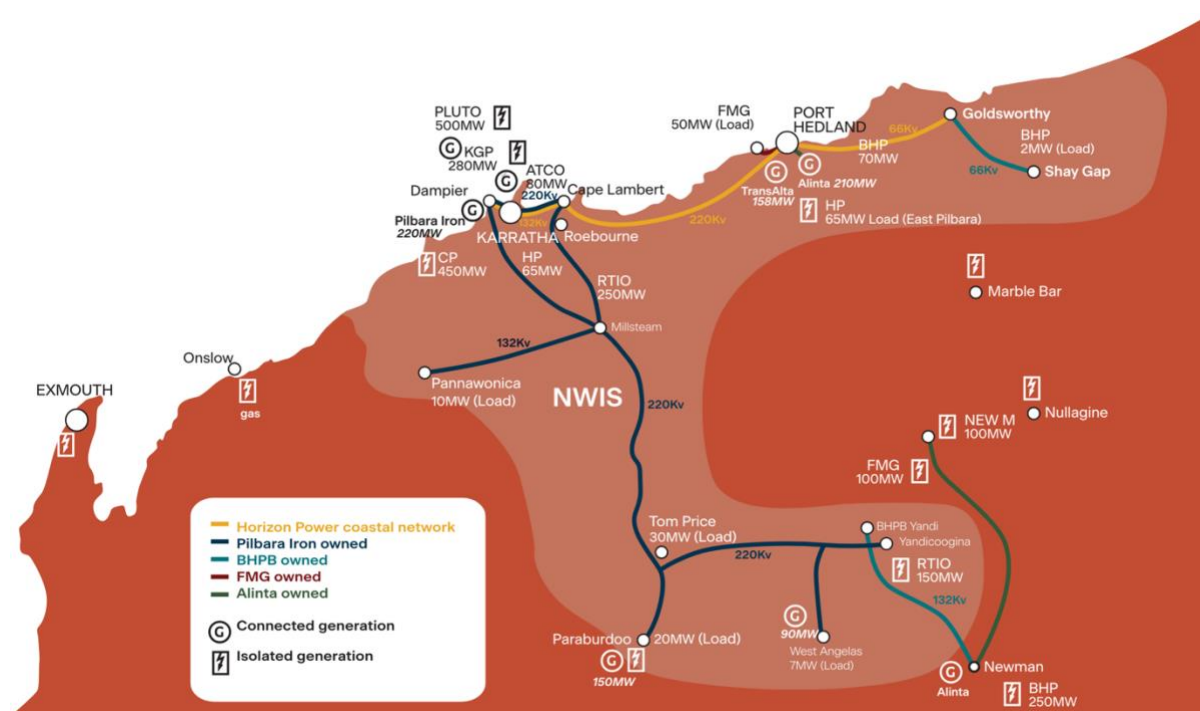
## Section 2. Pilbara Emissions Sources and Reduction Pathways

*CEF sees a massive >\$50-100bn investment opportunity over the coming decade in driving electrification and decarbonisation in the Pilbara. But the current fragmented individual corporate energy and grid structures undermines progress. A common user grid infrastructure approach is needed to accelerate investments, possibly led by APA Group or BP's AREH (refer sections 8 & 9). The Pilbara currently only sources a pathetic 2% of electricity from renewables.*

The North West Interconnected System (NWIS) is a network of independent electricity networks across the Pilbara, delivering electricity to regional towns and a number of industrial load centres and resource facilities. Electricity networks across the Pilbara are largely fragmented, with only a tiny proportion of electricity generated from clean energy sources – currently accounting for approximately 3% of generation.<sup>21</sup>

The NWIS infrastructure comprises integrated transmission and generation infrastructure owned and operated by Rio Tinto, APA (assets acquired from Alinta Energy), and Horizon Power, the WA State Government Trading Enterprise (GTE) operating as WA's regional and remote energy provider. The NWIS provides a local grid network for Port Hedland and Karratha, hosting large industrial hubs including the Pilbara iron ore port operations, as well as methane gas extraction and processing on the Burrup Peninsula, alongside one of the world's largest operating ammonia plants. The regional connection owned by Rio Tinto (Pilbara Iron) services small regional towns including Pannawonica, Tom Price and Paraburdoe, and the islanded inland APA network servicing the town of Newman, as illustrated in Figure 2.1.

**Figure 2.1: Indicative Map of NWIS and Off-grid Generation**



Source: Horizon Power, map is indicative only. Note: Alinta's network is now APA Group.

<sup>21</sup> WA Government, [Climate Action – Connecting Renewables in the Pilbara](#)

The NWIS has a government-appointed Independent System Operator, **Pilbara ISO Co**, responsible for maintaining and improving the security of the electrical grid, facilitating network coordination and connection, and for grid planning. Pilbara ISO Co's board consists of an independent chair, government director, and a member director from the NWIS shareholders: APA, Rio Tinto and Horizon Power. A detailed map of the NWIS, including generation, transmission and distribution networks, substations, load centres, and ownership can be found in Appendix 3.

Gas-fired power plants account for the majority of electricity generation in the NWIS. Figure 2.2 outlines the large-scale power generators currently operating within the Pilbara, and the associated emissions reported to the Clean Energy Regulator.

**Figure 2.2: NWIS Grid-connected Generation Facilities and Iron Ore Off-grid Facilities**

Facility	Company	Fuel	Generation GJ	Generation MWh	Scope 1 Emissions tonnes CO <sub>2</sub> -e
Yurralyi Maya Power Station	Rio Tinto	Gas	2,382,821	661,895	388,022
Port Hedland Power Station	APA Energy Pilbara	Gas	1,660,858	461,349	352,397
Paraburdoo Power Station	Rio Tinto	Gas	1,948,865	541,351	270,649
South Hedland Power Station	TransAlta	Gas	1,996,427	554,563	270,158
West Angelas Power Station	Rio Tinto	Gas	1,442,442	400,678	211,291
Cape Lambert Power Station	Rio Tinto	Gas	840,097	233,360	141,935
Karratha Power Station	ATCO Australia	Gas	367,529	102,091	76,416
<b>Total NWIS-Connected Generation</b>			<b>10,639,039</b>	<b>2,955,287</b>	<b>1,710,868</b>
Newman Power Station	APA Energy Pilbara	Gas	2,874,237	798,399	379,196
Yarnima Power Station	BHP	Gas	2,815,536	782,093	336,179
Solomon Power Station	Fortescue	Gas	1,194,901	331,917	206,715
<b>Total Off-Grid Generation from Power Stations</b>			<b>6,884,674</b>	<b>1,912,409</b>	<b>922,090</b>
<b>Total Gas-Fired Generation from NWIS and Off-grid Pilbara Iron Ore</b>			<b>17,523,713</b>	<b>4,867,696</b>	<b>2,632,958</b>

Source: Clean Energy Regulator <sup>22</sup>

APA currently operates the only large-scale renewable energy project in the Pilbara in FY23, the 60MW Chichester Solar Farm (detailed in Section 8). The Chichester Solar Farm provides a significant portion of the day-time energy demand of Fortescue's Chichester hub, which encompasses its Cloudbreak and Christmas Creek iron ore mining operations. In FY23, the farm generated ~145 GWh of clean electricity. In comparison to the broader large-scale generation of the NWIS, only ~2.8% of energy produced across the Pilbara was renewable, excluding any energy generated from residential rooftop solar.

A core constraint to the widespread electrification and deployment of renewable energy across the Pilbara is the majority of large-emitting facilities operate independent of the NWIS, making grid integration and balancing problematic absent a common user structure. Mobile imported diesel and methane gas-based off-grid power stations are the largest emissions sources within the Pilbara. Appendix 2 lists in detail the FY23 emissions of facilities operating within the Pilbara that are captured by the Federal Government's Safeguard Mechanism.

<sup>22</sup> CER, [Electricity Sector Emissions and Generation Data 2022-23](#), 4 April 2024

The Pilbara hosts **32 Safeguard facilities** in 2022-23, totalling **19.1 Mt CO<sub>2</sub>-e** reported Scope 1 emissions. The Pilbara accounted for 15% of all Safeguard facilities across Australia, and were responsible for 14% of emissions captured under the Mechanism.<sup>23</sup>

Given the nature of the Safeguard Mechanism, all facility emissions are direct Scope 1 emissions, including electricity generated and consumed off-grid, with iron ore mining Scope 1 emissions primarily driven by power generation from fuel combusted by mobile diesel equipment in, i.e. excavators, haul trucks, locomotives, as well as on-site and/or islanded gas/distillate power stations. Emissions from ammonia production and methane gas facilities are largely due to the fuel combustion from on-site gas baseload power stations, and methane used during the hydrogen production process.

The Safeguard Mechanism should be a driving force for the decarbonisation of industrial Scope 1 emissions across the Pilbara. To accelerate the transition, the source of energy should shift from direct Scope 1 emissions (i.e. diesel), to energy supplied via grid-connection, i.e. Scope 2 emissions, which are easier to decarbonise using intermittent renewable energy pooled across an increasingly diversified fleet. The electrification of mobile diesel equipment, the largest emissions source across inland Pilbara, will require significant restructuring and build-out of new firm renewable capacity to power the intense energy demands of 24/7 mining operations and replace reliance on high emissions expensive imported diesel, as well as significant capital investment in EV haulage and loco equipment.

Thus, the **coordinated and rapid development of common user infrastructure** and integration of load centres to the NWIS is a critical step to developing a North WA electricity market, where large-scale renewables can be deployed at both greater speed and scale but also lower cost as supply chains are established relative to one-off bespoke solutions. This all would enable capital by de-risking projects through diversified long-term off-take agreements secured by global mining majors with pristine balance sheets.

On 26 July 2023, the **Pilbara Industry Roundtable**, whose members operate WA's largest energy-intensive industrial facilities, reached a consensus to address key market constraints and bottlenecks to unlocking the energy transition across the Pilbara.<sup>24</sup> The Roundtable was established in August 2022 by the Hon. Bill Johnston, with its purpose to address the unique challenges and opportunities of the clean energy transformation in the Pilbara and, in recognising the collective challenge of decarbonisation, to explore the development of common user infrastructure to underpin the renewable energy transformation.

The July 2023 Roundtable supported the development and progression of:<sup>25</sup>

- New common user electricity infrastructure to support increasing penetration of renewable energy and decarbonisation,
- The Pilbara electricity regulatory regime to evolve to support the energy transition and agreement to participate in the consultation process,
- Updating existing land tenure guidance for common user infrastructure with key Government agencies,

<sup>23</sup> CER, [Safeguard Mechanism Facility Data 2022-23](#), 28 March 2024

<sup>24</sup> The Pilbara Roundtable's members include Alinta Energy, ATCO, BHP, BP, FMG, Horizon Power, Macquarie Group, Pilbara ISO Co, Rio Tinto, Roy Hill, Woodside, and the Chamber of Minerals and Energy of WA

<sup>25</sup> WA Government, [Pilbara Industry Roundtable Communiqué](#), 26 July 2023



- The rights to self-determination and financial independence of Aboriginal people as a core outworking of the development of any electricity infrastructure to realise opportunities from the clean energy transformation.

The electrification of current energy demand would create an initial market signal for the scale of renewables required to transition beyond the current methane gas and diesel load, and to facilitate the creation of new value-added zero-emissions industries of the future in the Pilbara. However, for the Pilbara to become a global-scale renewable energy generation and green industry hub, the long-term development of value-added facilities, including green ammonia/ammonia nitrate, iron ore beneficiation and green iron, and lithium refining, connected to a high-capacity, integrated NWIS, is required to provide sufficient diversification and de-risking for renewable energy developers to prioritise the Pilbara over NEM states.

Additionally, building out the social infrastructure and housing capacity to sustainably provide for a significantly expanded local workforce is an urgent requirement, as is increased First Nations equity participation. This is outside the scope of this CEF report. An international price signal (e.g. an Asian CBAM) incentivising embodied decarbonisation pre-export is also required (refer Section 13).

## Section 3. CEF Model of Decarbonised Electricity Demand in the Pilbara

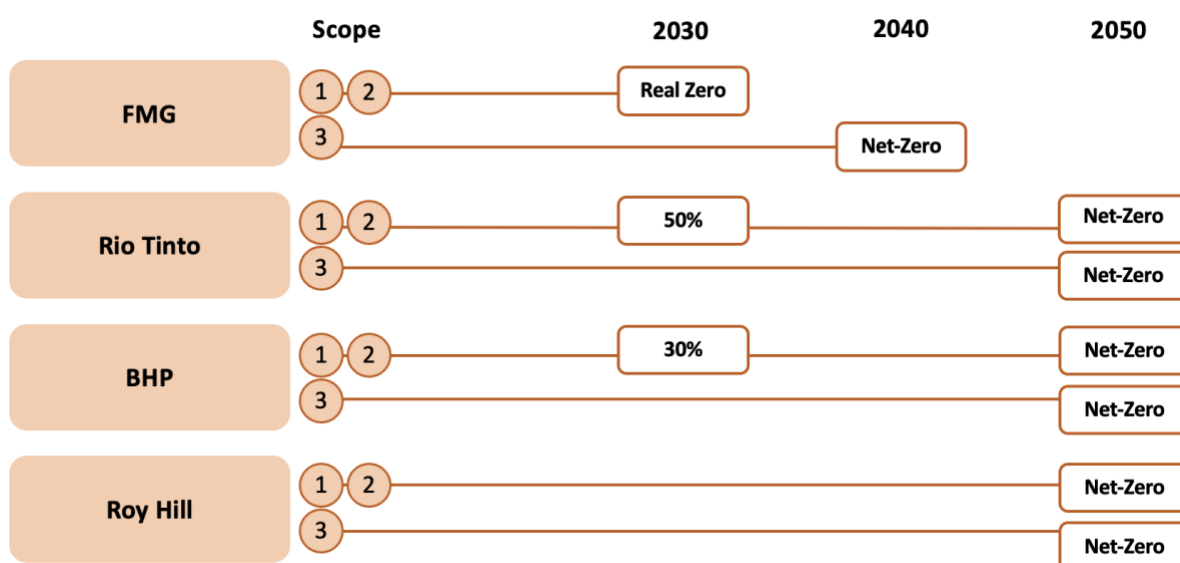
*The mining majors burn 2.4bn litres pa of subsidised high emissions imported diesel in the Pilbara. Replacing just the current fossil fuel use in the Pilbara would require 16.66TWh pa of electricity, which could progressively be supplied by local zero-emissions firmed renewables. CEF notes the massive 'Pilbara Premium' capex headwind.*

As mentioned in Section 11.2, the Safeguard Mechanism provides a detailed breakdown of the energy demand of major facilities in the current NWIS, as well as the off-grid gas power stations supplying regional demand from iron ore operations. As displayed in Figure 2.2, the energy supplied into the NWIS in FY23 was calculated at 4,868TWh, excluding rooftop solar.<sup>26</sup>

Almost 100% of the energy demand in the Pilbara currently is sourced from methane gas, used in a combination of gas turbines and reciprocating engines in gas power stations (GPS), with imported diesel used in mobile mining equipment i.e. haul trucks, excavators, locomotives, ancillary equipment, etc.

Given the critical need to align with the climate science, and the commitment from all miners across WA to achieve net zero by 2050 or sooner, the accelerated electrification of diesel and diversification away from methane gas is required. FMG is rapidly working to develop solutions to introduce and accelerate the maturity of electric replacements for its diesel fleet, given its nation-leading target of real zero operational emissions by 2030, and net zero Scope 3 emissions by 2040. In addition to net zero by 2050, Rio Tinto has an interim company-wide target of 50% operational emissions reduction by 2030, and BHP a 30% interim reduction target by 2030. Hancock Prospecting's Roy Hill currently does not have any interim decarbonisation pathways in place, but is required to achieve net zero in an orderly transition by 2050 under the WA Environmental Protection Authority (EPA).

**Figure 3.1: WA Iron Ore Emissions Reduction Pathways**



<sup>26</sup> CER, [Electricity Sector Emissions and Generation Data 2022-23](#), 04 April 2024

Rio Tinto's energy demand from diesel (equity-basis) was reported to be 32.6 PJ in FY23, accounting for ~68% of the group's total Pilbara energy demand. Similarly, BHP's (equity-basis) energy demand from diesel was calculated at 26.4 PJ, accounting for 76% of total energy demand. FMG's diesel use is the highest proportion of the 3 major iron ore operators in the Pilbara, accounting for 78% (24.4 PJ) in FY23. On an equity basis, the majors burn an estimated 2,162 million litres annually, and currently consume ~2,437 million litres across their total (100% share) operational footprint, as shown in Figure 3.2.

**Figure 3.2: Diesel Consumption in Major Pilbara Iron Ore Operations**

<b>Equitable Diesel Use - terajoules (TJ)</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>FY23</b>	<b>Equity Share</b>	<b>FY23 Total</b>
RIO	29,787	29,787	31,206	32,624	85%	38,563
BHP	27,000	26,900	26,000	26,400	85%	31,059
FMG	24,743	27,020	24,472	24,434	100%	24,434
<b>Total</b>	<b>81,530</b>	<b>83,707</b>	<b>81,678</b>	<b>83,458</b>		<b>94,055</b>
<b>Equitable Diesel Use - megalitres (ML)</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>FY23</b>	<b>Equity Share</b>	<b>FY23 Total</b>
RIO	772	772	808	845	85%	999
BHP	699	697	674	684	85%	805
FMG	641	700	634	633	100%	633
<b>Total</b>	<b>2,112</b>	<b>2,169</b>	<b>2,116</b>	<b>2,162</b>		<b>2,437</b>

Source: Company Accounts, CEF Calculations

In order to measure the energy generation needed from non-combustible renewable sources (i.e. wind, solar, and batteries) to power electrified mining equipment, it is critical to factor in an equivalence to fossil fuels. Non-combustible renewables generate electricity by converting kinetic energy, e.g. from solar radiation, into electricity without combustion. As such, heat losses as a result of energy conversion are negligible, and are a product of how efficiently the generation technology can extract and transmit the energy.

Primary energy of combustion fuels, including methane gas and diesel, are measured based on their intrinsic heat value and physical volume ('energy in'), as opposed to the amount of useful energy upon combustion.<sup>27</sup> Fossil fuel electricity generation and internal combustion engines are inherently inefficient, with a high percentage of the fuel's potential energy not converted to kinetic or electrical energy, but lost to heat. Globally, energy users report their energy demand as input-equivalent, meaning diesel and methane gas consumption reported in their energy profile includes the energy lost to heat as part of the combustion phase of energy generation.

The Energy Institute's Annual Statistical Review of World Energy is a leading data analysis of global energy production and consumption.<sup>28</sup> The Review compares non-fossil fuel energy sources on an 'input-equivalent' basis, based on the equivalent amount of fossil fuel input required to generate the same amount of energy in a standard thermal power plant. As fossil fuel energy generators become more efficient over time, the energy efficiency factor improves. Energy Institute's current average efficiency factor for thermal generation is 40.7%.

<sup>27</sup> US EIA, [EIA Offers Two Approaches to Compare Renewable Electricity Generation with Other Sources](#), 22 August 2019

<sup>28</sup> Energy Institute, [Statistical Review of World Energy](#), 2023, , previously published for over 70 years by BP

To gain a more specific fossil fuel equivalent factor for the Pilbara, the average heat rate of gas power stations and internal combustion engines used in CEF's model is based upon historical heat values sourced from the US Energy Information Administration (EIA)<sup>29</sup>, and compared against heat rates for new capacity reported by Australian Energy Market Operator (AEMO) and Aurecon.

The heat rate is the ratio of thermal energy consumed in fuel over the electrical energy generated. Using the specific heat rate of the fossil fuel and combustion technology, the energy efficiency is measured as the thermal conversion factor of electricity (3,600 kJ/kWh) over the heat rate of the energy source. Average approximate heat rate and efficiency factors for fossil fuel energy sources used in CEF's modelling were sourced from the US EIA. CEF's forecast energy demand from an electrified grid and transition from diesel to EVs is detailed in Appendix 5.

Using the equity-basis, input-equivalent energy and emissions data published by WA's largest iron ore companies, the useful energy was calculated and extrapolated to identify the underlying energy demand for the electrification of the Pilbara's full iron ore production capacity.

As shown in Figure 3.3, the combined energy demand from an electrified NWIS, as well as the energy demand from electrifying Pilbara iron ore's fossil fuel demand, is an estimated **16,658 GWh** annually (16.66TWh), equivalent to ~ 7.8% of the NEM, or 77% of the SWIS.

**Figure 3.3: Estimated Electricity Required for Decarbonised Pilbara Iron Ore / NWIS - FY23**

Energy Source	Company	Fuel	Primary Energy GJ	Efficiency Factor	Energy Output GJ	Energy Output GWh
Yurralyi Maya Power Station	Rio Tinto	Gas	5,304,588	45%	2,382,821	662
Port Hedland Power Station	APA Energy Pilbara	Gas	3,697,369	45%	1,660,858	461
Paraburdoo Power Station	Rio Tinto	Gas	4,338,524	45%	1,948,865	541
South Hedland Power Station	TransAlta	Gas	4,444,406	45%	1,996,427	555
West Angelas Power Station	Rio Tinto	Gas	3,211,135	45%	1,442,442	401
Cape Lambert Power Station	Rio Tinto	Gas	1,870,207	45%	840,097	233
Karratha Power Station	ATCO Australia	Gas	818,186	45%	367,529	102
Newman Power Station	APA Energy Pilbara	Gas	6,398,569	45%	2,874,237	798
Yarnima Power Station	BHP	Gas	6,267,890	45%	2,815,536	782
Solomon Power Station	Fortescue	Gas	2,660,065	45%	1,194,901	332
Chichester Solar Farm	APA Energy Pilbara	Solar			524,520	146
Diesel Consumption	BHP	Diesel	26,400,000	33%	8,598,480	2,388
Diesel Consumption	RIO	Diesel	32,600,000	33%	10,617,820	2,949
Diesel Consumption	FMG	Diesel	24,400,000	33%	7,947,080	2,208
Remaining Diesel Consumption	Others	Diesel	19,562,963	33%	6,371,657	1,770
Electricity Demand from EVs	BHP	EV		80%	10,748,100	2,986
Electricity Demand from EVs	RIO	EV		80%	13,272,275	3,687
Electricity Demand from EVs	FMG	EV		80%	9,933,850	2,759
Electricity Demand from EVs	Others	EV		80%	7,964,571	2,212
Total Energy Demand from Stationary Power					18,048,226	5,013
Total Energy Demand from Electrified Mobility					41,918,796	11,644
<b>Total Estimated Electricity Load from an Electrified Grid Powering Pilbara Iron Ore and NWIS</b>					<b>59,967,022</b>	<b>16,658</b>

*Source: Company Accounts, Safeguard Mechanism, CEF Calculations Methodology in Appendix*

<sup>29</sup> US EIA, [Table 8.2. Average Tested Heat Rates by Prime Mover and Energy Source](#), 2022

To decarbonise the future electricity demand in the Pilbara will require significant investment into renewable energy, zero-emissions battery storage, and gas firming capacity to power the difference.

The 100MWac Merredin Solar Farm, located ~260 km east of Perth, is currently the largest operating solar system in WA, and was developed by Risen Energy, a China-based solar PV manufacturer and developer. The capital cost of the 100 MW project, including the construction of the associated grid connection and substation, is estimated at \$160m, translating to an estimated capital cost of \$1,600/kW.<sup>30</sup>

On 01 February 2021, BHP announced the signing of a 10-year PPA for up to 50% of the electricity demand from its Kwinana nickel refinery from the Merredin Solar Farm, the largest renewable offtake agreement in WA.<sup>31</sup> In FY23, Merredin generated 266 GWh of electricity to BHP, with an annual capacity factor of 30.4%.<sup>32</sup> Following ramp up in FY21, Merredin has averaged a 30.2% capacity factor over the past 3-years.

The Merredin Solar Farm was completed in 2H2019. The CSIRO GenCost 2018 report estimated the capital cost of large-scale solar PV at \$1,574/kW.<sup>33</sup> The cost premium in the SWIS is similar to that of the NEM states in which the GenCost reports model capital requirements for generation technologies.

The Pilbara, however, carries a significant locational capex premium, due to the logistics and additional transport costs associated with material, as well as tight local labour markets and the high costs associated with additional workforce.

APA Group currently has the largest portfolio of operating renewable energy generation and storage projects in the Pilbara, and one of the largest development pipelines outside of the Australian Renewable Energy Hub across the Pilbara.

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<sup>30</sup> Stellata, [Electricity Generation License Application: Merredin Solar Farm](#), October 2017

<sup>31</sup> BHP, [Nickel West Kwinana Refinery to Reduce Emissions from Electricity Use by Up to 50%](#), 01 February 2021

<sup>32</sup> OpenNEM, [Merredin Solar Farm](#)

<sup>33</sup> CSIRO, [2018 GenCost Report Appendix Tables](#)

## Section 4. Accelerating Renewables in the Pilbara

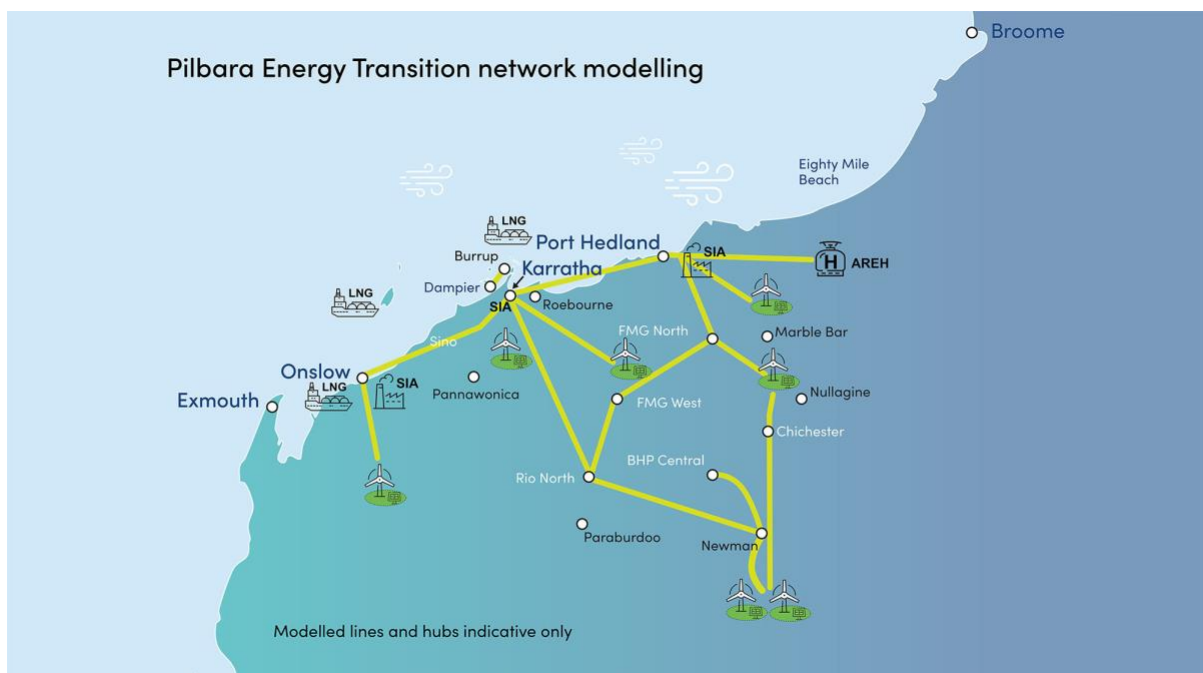
*Horizon Power has articulated a clear strategic vision to decarbonise the WA grid, but needs a significantly clearer mandate from the climate laggard WA Government. A concerted move to adopt a single common user grid infrastructure plan in the expanded Pilbara region would be a catalyst to accelerate decarbonisation and unlock >\$50-100bn of new investment across the state, both in generation, grid and value-added refineries.*

### Section 4.1. Common User Electricity Infrastructure

Delivered effectively, it is Climate Energy Finance’s view that common user electricity infrastructure will best support the future economic growth of the Pilbara in a global decarbonised economy, as required by the Safeguard Mechanism, as well as lowering the total capital investment required to power the region’s energy demand with green electricity through increased competition, minimising duplication of high-voltage transmission networks and more efficient allocation of land resources.

It is clear that decarbonising the Pilbara will be capital intensive, and will carry a ‘Pilbara premium’ when compared with equivalent infrastructure projects on the East coast of Australia. Common user transmission and firming infrastructure allows capacity of renewable energy generation to be shared across multiple load centres. As part of the WA Government’s Pilbara Energy Transition Plan (PET), WA is beginning to recognise the critical importance of shared infrastructure to enable development of a larger network in the Pilbara, which will facilitate the acceleration towards electrification and subsequent decarbonisation of emissions-intensive industries in the Pilbara. An indicative model of the proposed expansion of the NWIS to regional Pilbara is highlighted below in Figure 4.1.

**Figure 4.1: Pilbara Energy Transition Plan**



Source: WA Government <sup>34</sup>

<sup>34</sup> WA Government, [Pilbara Energy Transition Plan](#), updated 04 July 2024

An early-stage development of the PET is to connect the largest renewable energy hub proposal in the Pilbara to that of the existing high-voltage, state-owned electricity network in Port Hedland, the Pilbara Green Link. Green Link involves the development of 550km of high-voltage 330kV transmission lines to connect Horizon Power's existing infrastructure in Port Hedland with the Australian Renewable Energy Hub (AREH) and other proposed large-scale renewable projects (see Figure 4.1).

On 03 July 2024, Horizon Power engaged GHD to undertake preliminary engineering for the proposed Pilbara Green Link project, the construction of common user transmission infrastructure to support and accelerate the decarbonisation of the Pilbara's electricity system.<sup>35</sup>

As part of the PET, the WA Government has begun consultation on reforming regulatory processes in the NWIS. The current Pilbara Network Rules (PNR) were designed around a power system based predominantly on dispatchable thermal generation comprising gas turbines.<sup>36</sup> The decarbonisation of the Pilbara will require significant reform of the PNR to enable and support efficient and timely decarbonisation of the Pilbara electricity system.

Common use transmission:<sup>37</sup>

- Enables more renewable energy to be used, thereby limiting the impact of climate change
- Involves the sharing infrastructure will limit impact on country by avoiding duplication
- Enables efficient and competitive access to renewable electricity, promotes investment and creates jobs.

As Gilbert + Tobin have advocated for common user infrastructure, it is the cornerstone of collaborative development in the energy and resources sector, offering an opportunity to accelerate the penetration of green electrons, at a globally competitive economic scale, and at more commercially attractive prices due to the time and cost efficiencies obtained through shared investment in capital-intensive infrastructure.<sup>38</sup>

The social license to operate is critical for electrification and decarbonisation projects, minimising the impact on the environment during construction, and ensuring benefit sharing and inclusion of Traditional Owners and stakeholders that are impacted by the necessary investments required to achieve net zero in the Pilbara. Common user infrastructure allows resources to be pooled, and vegetation impacts to be minimised, as well as establishes a collaborative structure that enables First Nation's involvement.

As the Superpower Institute outlines, regions with the greatest potential for efficient, large-scale green metals production usually lack adequate transmission and infrastructure for transporting and storing inputs such as green hydrogen. It is not profitable for a single

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<sup>35</sup> GHD, [GHD to Deliver Preliminary Engineering for Pilbara Green Link](#), 03 July 2024

<sup>36</sup> WA Government, [Evolution of the Pilbara Network Rules Working Group](#), updated 08 July 2024

<sup>37</sup> WA Government, [Pilbara Energy Transition Roundtable 2](#), 14 June 2024

<sup>38</sup> Gilbert + Tobin, [Unlocking Green Energy: Infrastructure Sharing in WA's Pilbara Region](#), 13 May 2024

private entity to provide these at an efficient scale, and many of the benefits of increased regional economic activity cannot be captured by a single entity.<sup>39</sup>

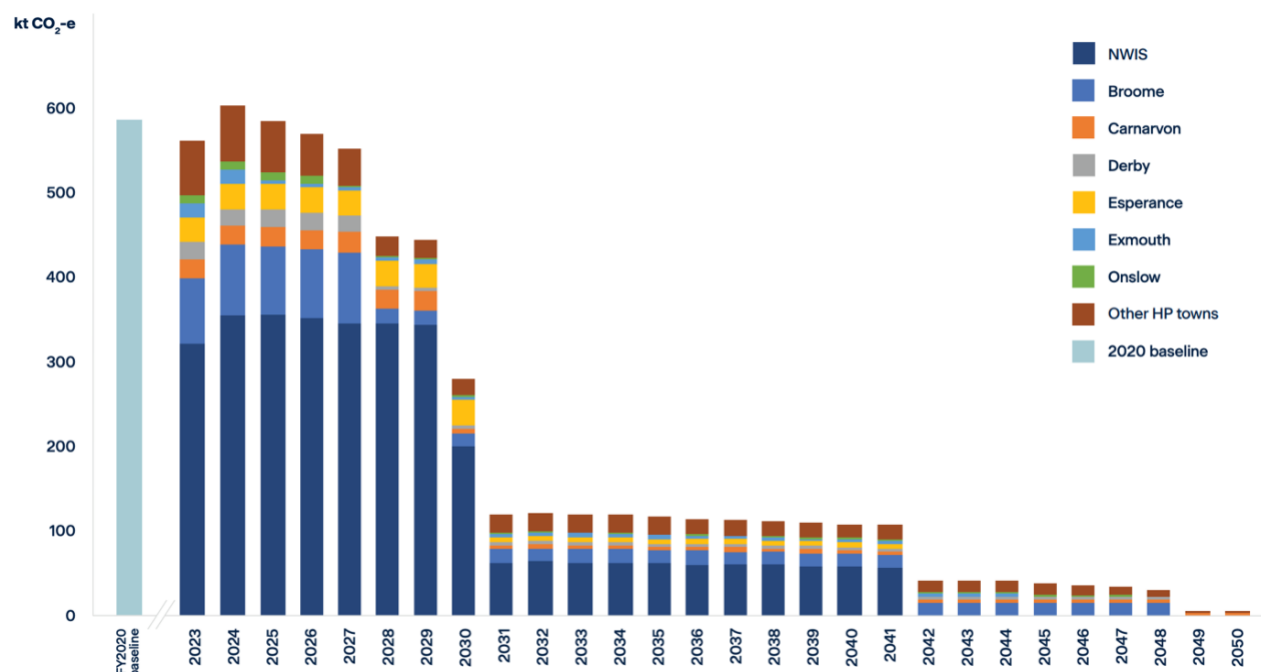
Climate Energy Finance sees the development of a domestic, value-added green iron industry as critical to the Federal Government’s landmark FMIA, and core to the FMIA’s Net Zero Transformation Stream and Economic Resilience and Security Stream. As part of the FMIA’s National Interest Framework, clear community benefit principles and First Nations capacity building and benefit sharing are principal conditions on Australia’s restructuring to a value-added, embodied decarbonisation resources superpower.

It is imperative for Australia to accelerate the construction of the enabling renewable energy infrastructure to support the sufficient energy and hydrogen requirements of a domestic green metals industry at scale. By leveraging public-private partnerships in common user electricity infrastructure, led by state-owned Horizon Power, Australia can embed Traditional Owner engagement, consultation and inclusion in a future made in Australia, and minimise the direct effects on Country that electrification will have.

## Section 4.2. Horizon Power

Horizon Power is committed to supporting the WA Government’s net zero by 2050 pledge, and Horizon’s interim 80% emissions reduction by 2030 target. As part of a multi-faceted approach, Horizon plans to leverage the roll-off of PPAs across the NWIS and microgrids that have historically relied on gas power stations, to high penetration renewable and BESS systems.

**Figure 4.2: Horizon Power Modelling of Emissions Reduction from End of Term PPAs**



Source: Horizon Power Annual Report 2022-23<sup>40</sup>

<sup>39</sup> Superpower Institute, [Submission to Unlocking Green Metals Opportunities for a FMIA](#), July 2024

<sup>40</sup> Horizon Power, [Annual Report 2022-23](#), 8 September 2023



The Pilbara accounts for the majority of Horizon Power's emissions portfolio. However, the majority of PPAs from industrial users expire across 2029-30. Particularly in light of the 50% decline over 2024 in solar module and battery pack export prices from China, this creates an immense opportunity for new connections and long-term PPAs to be constructed with wind and solar generation, coupled with grid-firming battery systems, and to leverage the existing gas baseload capacity to provide firming power through the energy transition.

A second pillar of Horizon Power's decarbonisation pathway is to develop transmission corridors for third-party renewable generation and storage projects. By facilitating the development of common user transmission infrastructure, Horizon Power provides the mechanism for future projects to de-risk large-scale renewable projects through the diversification of its customer network, minimising the risk of stranded assets from a concentrated, isolated off-take agreement.

Large enterprise customers in the Pilbara contributed to ~ 40% of Horizon Power's total revenue in FY23, delivered via Horizon's retail business and operation of its regulated network in the NWIS. Horizon Power has made it clear these customers are seeking renewable energy options.<sup>41</sup>

In the 2024-25 WA State budget, Horizon Power was allocated \$148m to support the development of common user electricity infrastructure in the NWIS, subject to Traditional Owner negotiations.<sup>42</sup>

Horizon Power is working to connect isolated networks and power generation to the NWIS, and to demonstrate the benefits of reliability and security of common user infrastructure to decarbonise key industrial hubs and facilities across the Pilbara.

Horizon Power is progressing the industrial decarbonisation of the Burrup Peninsula, with the development of a common user transmission infrastructure extension to connect Maitland Strategic Industrial Estate and the Burrup Strategic Industrial Area. This would involve the construction of 7km of 132kV overhead transmission to connect the Dampier Substation with the Burrup Strategic Industrial Area.<sup>43</sup>

Additionally, Horizon Power is working closely with Woodside, the operator of Burrup Island's Pluto LNG facility, to decarbonise its operations on the peninsula. The current development involves the connection of a 50MW solar farm located in the Maitland Strategic Industrial Estate to Pluto LNG.

### **Section 4.3. Reforming Approvals Processes to Accelerate Deployment and Overriding Public Interest**

A significant hurdle to new renewable energy projects in WA is the environmental and planning approvals process, with bottlenecks creating extensive delays in approvals, trapping actual and potential investment.

This is likely to be exacerbated by the increasing volume of project proposals. In 2024, the EPA will publish the highest number of assessment reports in a decade, and this is

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<sup>41</sup> WA Government, [2024-25 Budget Statements, Paper No.2 - Volume 2](#), 09 May 2024

<sup>42</sup> WA Government, [2024-25 Budget Statements, Paper No.2 - Volume 2](#), 09 May 2024

<sup>43</sup> Horizon Power, [Preliminary Documentation for Burrup Common User Transmission Infrastructure](#), 06 March 2024

anticipated to grow further in 2025 with an expected 30-35 assessment reports to be published.

Under the existing EPA Act 1986's Environmental Impact Assessment Procedures Manual, the EPA sets a **minimum** 40–58-week target timeframe for assessments. However, the Chamber of Commerce and Industry of WA estimated the average timeframe for major WA resources projects to receive environmental approvals is closer to 3-4 years, with other approvals unable to be progressed during an environmental impact assessment.<sup>44</sup>

In 2023, the WA Government commissioned a review of its environmental approvals processes and procedures. The Vogel-McFerran Review published 39 recommendations, for streamlining and accelerating approvals, all of which have been either accepted or noted by the Government.<sup>45</sup>

Notable recommendations included:

- 14(b): evaluate EP Act's utility in directing the EPA to prepare an assessment report to the Minister within a certain time frame for projects of State significance,
- 27(a): amending s41(3) of the EP Act to allow other Decision Making Authorities to issue approvals in parallel with the EPA's assessment,
- 38: limiting assessment of projects subject to the Commonwealth Safeguard Mechanism to meeting its statutory responsibilities while avoiding unnecessary duplication.

In December 2022, the WA State Government announced a \$22.5m investment to reduce approval times for job-creating green energy projects, consisting of dedicated environmental assessment teams and dedicated major projects facilitation teams under the **Green Energy Approvals Initiative**.<sup>46</sup>

CEF supports the decision of the WA Government made in November 2023, under the Green Energy Approvals Initiative, which addresses recommendation 27(a) of the Review, by enabling the leasing of Crown lands to renewable energy proponents **while** their proposal is being assessed by the EPA through an exemption of an order under the EP Act.<sup>47</sup>

As part of the Initiative, approval timelines will be accelerated for:

- renewable energy generation
- renewable hydrogen manufacturing
- lithium mining
- critical minerals processing
- construction, manufacturing and/or recycling of renewable energy products
- energy storage i.e. batteries and pumped hydro,
- **electricity transmission infrastructure** - infrastructure that is predominantly servicing the transmission of electricity generated by green energy sources.

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<sup>44</sup> Gilbert + Tobin, [WA Environmental Approval Reforms: Answer to Project Proponents' Prayers?](#), 12 April 2024

<sup>45</sup> WA Gov, [Vogel-McFerran Independent Review of WA Environmental Approvals Processes and Procedures](#), December 2023

<sup>46</sup> WA Gov, [Green Energy Approvals Initiative](#), 07 May 2024

<sup>47</sup> WA Gov, [Cutting Green Tape to Support Renewable Energy Projects in WA](#), 16 November 2023

We now urge the WA and Federal Governments to prioritise regulatory reform measures like the Green Energy Approvals Initiative to address remaining bottlenecks.

One such model is the strategic directive established in 2023 in the European Union to integrate **Overriding Public Interest (OPI)** measures into its permits and approvals processes to fast-track the development of renewable energy and associated infrastructure investments.

In the EU, as in Australia, lengthy administrative permit-granting procedures are one of the key barriers to investment in renewable energy projects and their related infrastructure. Those barriers include the complexity of the applicable rules for site selection and administrative authorisations for such projects, the complexity and duration of the assessment of the environmental impact, and related energy networks, grid-connection problems, constraints on adapting technology specifications during the permit-granting procedure, and staffing problems of the permit-granting authorities.

To accelerate the deployment of such projects, rules which simplify and shorten permit-granting procedures are necessary, taking into account the broad public acceptance of renewable energy.

This was highlighted in the EU following Russia's invasion of Ukraine. After the unprecedented reduction of methane gas exports from the Russian Federation to EU Member States, and the former's weaponisation of its fossil fuel supplies, the EU implemented an Emergency Regulation on Permitting, laying down a framework to accelerate the deployment of renewable energy to minimise Member States' exposure to high and volatile fossil fuel prices, which were causing economic and social hardship.<sup>48</sup>

Following this streamlining, Germany permitted 7.5GW of new projects, 70% higher than in 2022, and significantly higher than the average 2GW of approvals in 2017-19. Spain permitted 3GW of new projects in 2023, also up 70% from 2022, and well above the previous years which were consistently below 1GW. Likewise, France and the United Kingdom, Greece and Belgium's approvals all increased from the year prior.<sup>49</sup>

Building on the measures introduced in December 2022, the EU introduced a new Directive to promote renewable energy deployment in the context of the European Green Deal. The key elements of the Directive, framed around the concept of overriding public interest, included that:<sup>50</sup>

- By 21 February 2024, until climate neutrality is achieved, Member States shall ensure that, in the permit-granting procedure, the planning, construction and operation of renewable energy plants, the connection of such plants to the grid, **the related grid itself**, and storage assets are presumed as being in the **overriding public interest** and serving public health and safety when balancing legal interests in individual cases.
- Member States must ensure that the permit-granting procedure shall not exceed 12 months for renewable projects in renewables acceleration areas, and not exceed 2

<sup>48</sup> EU, [Directive \(EU\) 2022/2577 Council Regulation](#), 22 December 2022

<sup>49</sup> Wind Europe, [Wind Energy Permitting is Improving but Governments Still Have Work to Do](#), 08 February 2024

<sup>50</sup> EU, [Directive \(EU\) 2023/2413 of the European Parliament and of the Council](#), 18 October 2023

years in the case of offshore renewable energy projects. For renewable energy projects outside renewable acceleration areas, the permit-granting procedure shall not exceed 2 years, and in the case of offshore renewable energy projects, shall not exceed 3 years.

Overriding public interest applies when projects are challenged in court. Crucially, it reconfirms and clearly defines which permits need to be provided within the updated timelines. For impacts on biodiversity, developers must now take the whole population of a species into consideration, instead of solely focussing on the direct local impacts.

In addition, the Directive requires Member State governments to digitise their permitting procedures, further aiding streamlining.

If Australia is to achieve its emissions reduction and renewable energy ambitions, it is imperative the Federal and State Governments implement reforms to existing planning and approval processes and procedures to expedite the rollout of large-scale projects that work in Australia's overriding public interest to accelerate our energy transition.

As outlined in Section 1, the Pilbara is critical to the economic security and resilience of WA and of Australia. As the global economy decarbonises, Australia must decarbonise its strategic industries of the future to remain competitive in zero-emission global markets. Expedited renewables and grid approvals are central to this objective.

It is CEF's view that the update to the EU permitting process incorporating overriding public interest as a central consideration in determining approvals should be applied in the Australian and WA context.

CEF recommends the introduction of overriding public interest principles into environmental approval regulations and processes for renewable energy, infrastructure, storage and green manufacturing projects.

Further, CEF recommends a review of the Federal Environmental Protection and Biodiversity Conservation Act 1999 (EPBC) to reduce local focus and include consideration of the global benefit from approving large-scale renewable energy projects, including the benefits of limiting GHG emissions on global biodiversity and environmental preservation.

#### **Section 4.4. First Nations Involvement in Infrastructure**

Resourcing First Nations, through their representative institutions, is crucial for the investment certainty needed for the myriad renewable energy and critical minerals projects Australia requires to achieve its net zero targets. Proponents and investors currently face considerable delays and various legal, financial and reputational risks due to barriers to First Nations' meaningful engagement, including risks to cultural heritage, concerns about environmental impacts, and contention over the social licence to operate.<sup>51</sup>

Net Zero Australia estimates that ~43% of new renewable energy and transmission infrastructure in Australia would need to be sited on the Indigenous Estate, that is, land that has been purchased, vested, reserved for or leased on behalf of an Aboriginal land trust. Likewise, the Centre for Social Responsibility in Mining estimates that ~58% of critical

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<sup>51</sup> NNTC, [Submission 31: Submission to the Senate Economics Legislation Committee: Future Made in Australia Bills](#), 2024

minerals projects will be located in areas where First Nations communities have a legal right to negotiate (and ~80% if native title claims are included).

Prescribed Bodies Corporate (PBCs) are the representative corporations through which native title holders do business with governments and project proponents on matters concerning their Country. Currently, there are over 269 PBCs across Australia that hold legal rights and interests to almost 50% of Australia's land and waters, many of which severely undercapitalised.

60% of PBCs are classified as small (less than \$100,000 in gross operating income) with many having little to no income, assets and employees. Consequently, many PBCs do not have the capacity to effectively engage with project proponents, including access to legal, financial and technical expertise needed to participate in negotiations and ultimately provide their Free, Prior and Informed Consent (FPIC).

Across WA, there are 229 Indigenous Land Use Agreements (ILUAs) with Native Title holders for the access, use, mining and development of infrastructure.<sup>52</sup> However, Professor Peter Yu AM, Vice President (First Nations) at the Australian National University, has highlighted the serious limitations of existing ILUAs in delivering benefits to First Nations people, noting that "There has to be a modernisation of the existing agreements given that exploration and mining, more than 80% is going to happen on Aboriginal land. The historical agreements haven't delivered the equity, desired results and outcomes to improve the health and wellbeing of the Aboriginal communities."<sup>53</sup>

First Nations equity involvement, potentially through free equity carry agreements (in which First Nations people are provided equity without contributing financially, receiving a percentage of the profits made from the project), can assist with more expeditious decarbonisation of the Pilbara, and aid in the de-risking and acceleration of approvals processes for new renewable energy projects and infrastructure investments.

A case in point is the partnership of ACEN Renewables and the Yindibarndi Aboriginal Corporation (YAC) (100% owned by Yindjibarndi people through the Yindjibarndi Wealth Trust), to develop a partnership agreement and the Yindjibarndi Energy Corporation (YEC), in which the YAC owns 25% and 25-50% equity in all projects under the partnership.<sup>54</sup>

In June 2024, the WA Government fast-track approved the 150MW Pilbara solar farm under development by YAC, the first project to receive approval under the WA's Green Energy Approvals Initiative.<sup>55</sup>

Whilst benefit sharing through equity participation is critical, this should be complemented by broader benefit sharing principles, which may include agreements on employment opportunities, business opportunities and energy security, forged via meaningful consultation and engagement with First Nations communities.<sup>56</sup>

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<sup>52</sup> National Native Title Tribunal, [Register of Indigenous Land Use Agreements](#), accessed 29 July 2024

<sup>53</sup> Capital Brief, [Prominent Indigenous Academic Wants a First Nations Seat at the Future Made in Australia table](#), 23 July 2024

<sup>54</sup> FNCEN, [Yindjibarndi Renewable Energy Project](#)

<sup>55</sup> RenewEconomy, [Approval Fast Tracked for First of Huge Solar and Wind Farms to Power Giant Iron Ore Mines](#), 16 June 2024

<sup>56</sup> ANU, [Clean Energy Agreement Making on First Nations Land](#), 2021

Climate Energy Finance endorses the transformative work of the First Nations Clean Energy Network (FNCEN) in ensuring a just energy transition, driven by community-owned clean energy projects and equitable arrangements for benefit sharing from large-scale renewable projects on First Nations lands.

Given the limited connectivity of electricity infrastructure and low renewable energy penetration in the Pilbara, the region offers an opportunity to showcase the incredible mutual benefits for industry, government, First Nations, and the environment on inclusive economic development approaches in the energy transition, establishing best practice in First Nations involvement and co-development for Australia.

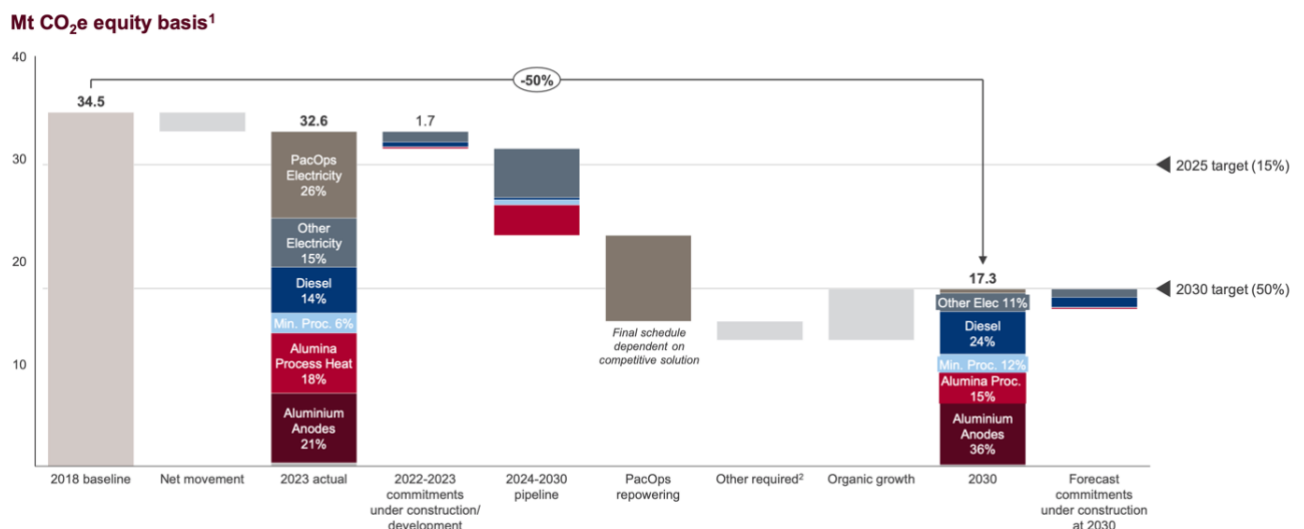
## Section 5. Rio Tinto West Australia Iron Ore

*Rio Tinto has made dramatic progress in investing in and underwriting decarbonisation projects across Australasia over 1HCY2024 in its Aluminium Division. To broaden this progress, we see significant investment opportunities for Rio Tinto and its suppliers in the Pilbara. Firmed renewable energy PPAs and electrification of Rio's mine and rail haulage fleet are key strategies, but are undermined by the high upfront capital costs, the 'Pilbara Premium' and the headwind of the diesel fuel rebate. Federal and WA Government support is needed, such as a green iron production tax credit and the Rewiring the Nation grid capex support, plus resolution of the First Nations' need for equity participation.*

Rio Tinto has committed to achieving net zero by 2050, as well as to interim targets of Scope 1 and 2 emissions reduction by 15% by 2025 and 50% by 2030 relative to a 2018 baseline. In 2023, Rio Tinto emitted 32.6Mt CO<sub>2</sub>-e in its operations, an inappreciable 0.3% reduction from the group's 2022 emissions, and a 5.5% reduction relative to 2018.<sup>57</sup>

Australia accounts for 19.2Mt CO<sub>2</sub>-e, or 59%, of Rio Tinto's global operational emissions, primarily from its Pacific Aluminium operations in Queensland. 3.2Mt, or 10%, of total emissions were a product of Rio Tinto's iron ore operations in the Pilbara, with the combustion of imported diesel used in the extraction and transport of ore accounting for the majority of emissions.

**Figure 5.1: RIO Emissions Reduction Pathway to 2030**



Source: Rio Tinto<sup>58</sup>

Rio Tinto's decarbonisation capex guidance is estimated at \$5-6bn by 2030 to achieve its 2030 interim emissions reduction target. In 2023, Rio Tinto's total decarbonisation spend reached \$425m, up 42% from the year prior. However, only \$130m of capital was allocated to capex and investments, with the remainder a combination of opex (\$234m) and renewable energy certificates and offsets (\$61m). Of Rio Tinto's 6 overall decarbonisation pathways, only \$38m was allocated to the transition away from imported diesel. The

<sup>57</sup> Rio Tinto, [Climate Change Report 2023](#), 21 February 2024

<sup>58</sup> Rio Tinto, [2023 Full Year Results Presentation](#), 21 February 2024

significant component of Rio Tinto's decarbonisation pathway to 2030 is the electrification of its Pacific Aluminium operations.

Whilst Rio Tinto's global aluminium operations far exceed its WA iron ore operations, the vast majority are Scope 2 emissions, importing electricity from the NEM. The PacOps Repowering plan, however, perfectly highlights the critical importance of a distributed, integrated electricity system in decarbonising large load centres, and facilitating the development of large-scale renewables.

On 24 January 2024, Rio Tinto signed a 25-year PPA for 100% of electricity generated by Australia's largest solar project in development, the 1.1 GW Upper Calliope Solar Farm.<sup>59</sup> Power from the farm would be sufficient to abate up to 1.8Mtpa of Scope 2 carbon emissions.

On 21 February 2024, Rio Tinto signed a 25-year PPA for the 1.4 GW Bungaban Wind Farm under development by Windlab.<sup>60</sup> The off-take agreement would take 80% of the electricity generated by Bungaban to power Rio's Gladstone operations. Together with the Upper Calliope PPA, the combined 2.2 GW of renewables would have the potential to abate up to 5Mtpa of carbon emissions from Gladstone, effectively providing a path to halving the total operational emissions of Pacific Aluminium in 2023.

March 2023 saw Rio Tinto's majority owned Tomago aluminium refinery north of Newcastle in NSW launch a request for proposals for one of Australia's largest wind and solar tenders.<sup>61</sup>

May 2024 saw Rio Tinto's New Zealand Aluminium Smelter (NZAS) and Meridian Energy announce the signing of a landmark conditional 20-year extension of their electricity supply agreement for NZAS's Tiwai Point aluminium smelter. A globally significant maximum of 800GWh of demand response available in any given year, with an average of 400GWh per annum over the 20-year term of the contract, provides a strong economic incentive for the smelter to modulate demand consistent with the weather and hence electricity supply situation, enabling continued decarbonisation of the NZ electricity grid beyond its current 90% levels, and building in a mutually beneficial reward for NZAS to provide 'dry-year' relief in the event of a prolonged drought.<sup>62</sup> NZAS's carbon emissions are 2 tonnes per tonne of aluminium, versus the global average of 13 tonnes, making this a world leading green aluminium export facility.

We note these globally significant investments in its Australasian aluminium operations provide a clear commitment by Rio Tinto in delivering on its decarbonisation objectives.

Given the acceleration of renewable capacity to power Rio's Gladstone, Newcastle and New Zealand footprints, the decarbonisation of Rio Tinto's Pilbara operations at speed and scale is now of critical importance to both the group's shareholder commitments and long-term operability, as well as to the state of WA and the Federal Government in achieving nationally determined contribution targets.

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<sup>59</sup> Rio Tinto, [Rio Tinto to Drive Development of Australia's Largest Solar Farm at Gladstone](#), 24 January 2024

<sup>60</sup> Rio Tinto, [Rio Tinto Signs Australia's Biggest Renewable Power Deal As it Works to Repower its Gladstone Operations](#), 21 February 2024

<sup>61</sup> Newcastle Herald, [Tomago Aluminium seeks massive renewable energy supply for smelter](#), 21 March 2024

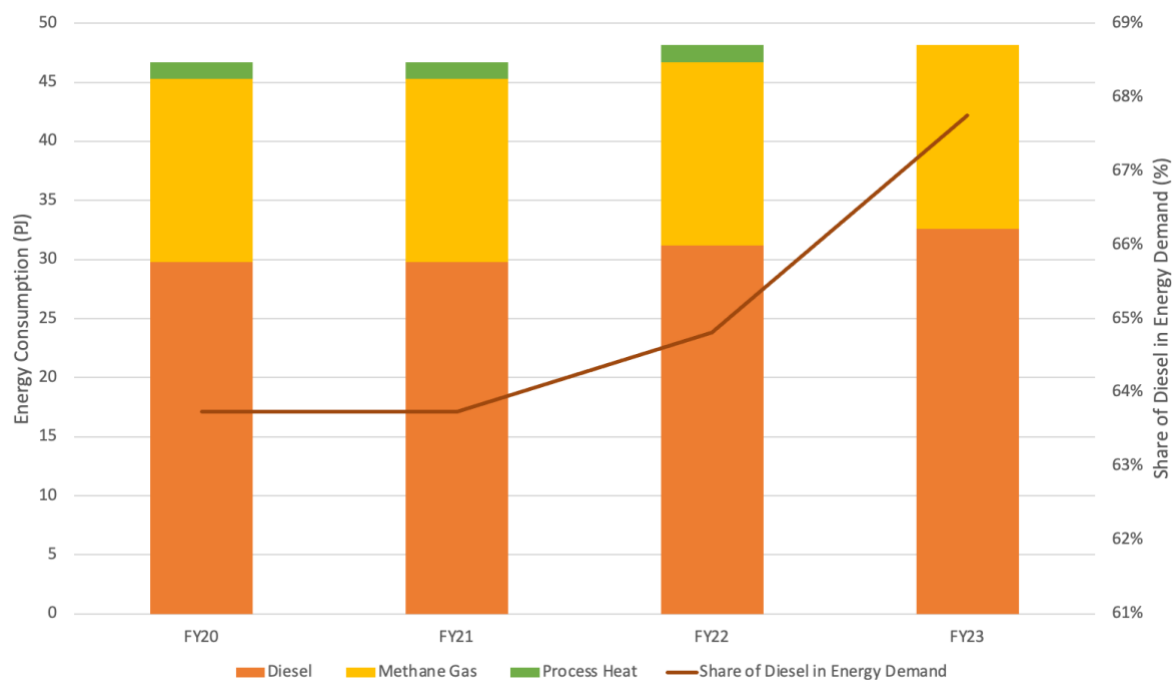
<sup>62</sup> Meridian Energy NZ, [Meridian and NZAS Sign Long Term Contracts](#), 31 May 2024



Rio is the largest producer of iron ore in Australia, and thus the largest energy user and emitter in the Pilbara's resources industry. Rio's Pilbara operations are one of the largest micro-grids in the world, with 500MW of methane gas-fired electricity capacity across four power stations, connected by a ~1,000km transmission network. Rio Tinto spends \$100-200m annually to purchase and transfer methane gas to power its Pilbara's electricity demand.

Across managed operations, Rio Tinto uses around 700 haul trucks, 350 locomotives, 300 loaders, 250 dozers, 150 excavators and 100 graders. In 2023, Rio Tinto consumed ~32.6 PJ of diesel to power its mobile equipment, equivalent to ~**850 million litres** of diesel.

**Figure 5.2: RIO Energy Consumption from Pilbara Iron Ore Operations**



Source: Company Accounts

Note: Rio Tinto Financial Year is from 1-January to 31-December

Rio has confirmed that the long-term solution to transitioning away from fossil diesel use in mining and transport equipment is electrification. It will commence trials for electrified haulage solutions with Caterpillar in late 2024, followed by Komatsu trials. It has also confirmed that it does not plan for any meaningful emissions reductions of its imported diesel use in the short-term, given the challenges and timeframes associated with full-scale deployment of electrification, and the ongoing diesel subsidy that discourages action.

In 2024, Rio cited the significant role that the Fuel Tax Credit Scheme plays in disincentivising decarbonisation, confirming it will continue to maximise the benefits of the subsidy and noting the 'tax credits received by Rio Tinto will decline in-line with the reduction of diesel used'.<sup>63</sup>

<sup>63</sup> Rio Tinto, [Transitioning our Diesel Fleet](#), 2024

## Rio Tinto Renewable Capacity

In October 2021, Rio announced its target to deploy 1GW of wind and solar power in the Pilbara.<sup>64</sup> The renewable capacity would abate ~1Mtpa of CO<sub>2</sub>-e from Pilbara operations, sufficient to replace its methane gas capacity and to support the early electrification of mobile mining equipment.

The full electrification of Rio Tinto Pilbara, including trucks, equipment and rail, would require further GW-scale renewables, with Rio estimating in November 2022 that complete decarbonisation would require up to 3GW of installed renewables.<sup>65</sup>

In August 2022, Rio commissioned its first renewables project in the Pilbara, the 34MW Gudai-Darri Solar Farm. The farm would be able to supply all of Gudai-Darri mine's electricity demand during peak solar generation, and ~65% of the mine's average electricity demand.

In November 2022, Rio announced plans to invest a further \$600m into renewable energy assets in the Pilbara.<sup>66</sup> The capital would fund the construction of two 100MW solar farms, as well as 200MWh of on-grid battery storage by 2026.

In October 2023, it announced a partnership with Yindjibarndi Energy Corporation (YEC) to explore collaborative opportunities for renewable projects.<sup>67</sup> The Partnership may include the joint development of capacity in YEC's 50MW Stage 1 plan for wind, solar and battery storage in the Pilbara.

As of February 2024, Rio states it has 1.3GW of renewable project studies underway across multiple locations.<sup>68</sup> It remains committed to building 1 GW of renewable energy capacity, however, due to the extended timeline of mining fleet electrification, Rio Tinto estimates that only 6-700 MW of renewable capacity will be required by 2030.<sup>69</sup>

On 15 July 2024, Rio announced an agreement with Ngarluma Aboriginal Corporation (NAC) to pursue the development of an 80MW solar farm on Ngarluma Country, near Karratha, to supply renewable electricity to Rio's Pilbara operations via its independent transmission infrastructure.<sup>70</sup> It is expected the solar farm will be collated with Rio's existing Yurralyi Maya gas power station, with the potential to displace up to 11% of Rio's current methane gas demand used in electricity.

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<sup>64</sup> Rio Tinto, [Rio Tinto to Strengthen Performance, Decarbonise and Grow](#), 20 October 2021

<sup>65</sup> Rio Tinto, [Rio Tinto Plans Further Investment in Renewable Energy in the Pilbara](#), 30 November 2022

<sup>66</sup> Rio Tinto, [Rio Tinto Plans Further Investment in Renewable Energy in the Pilbara](#), 30 November 2022

<sup>67</sup> Rio Tinto, [Rio Tinto and Yindjibarndi Energy Sign Pilbara Renewables MoU](#), 20 October 2023

<sup>68</sup> Rio Tinto, [Climate Change Report 2023](#), 21 February 2024

<sup>69</sup> Rio Tinto, [Climate Change Report 2023](#), 21 February 2024

<sup>70</sup> Rio Tinto, [Ngarluma and Rio Tinto to Progress Renewable Energy Project](#), 15 July 2024

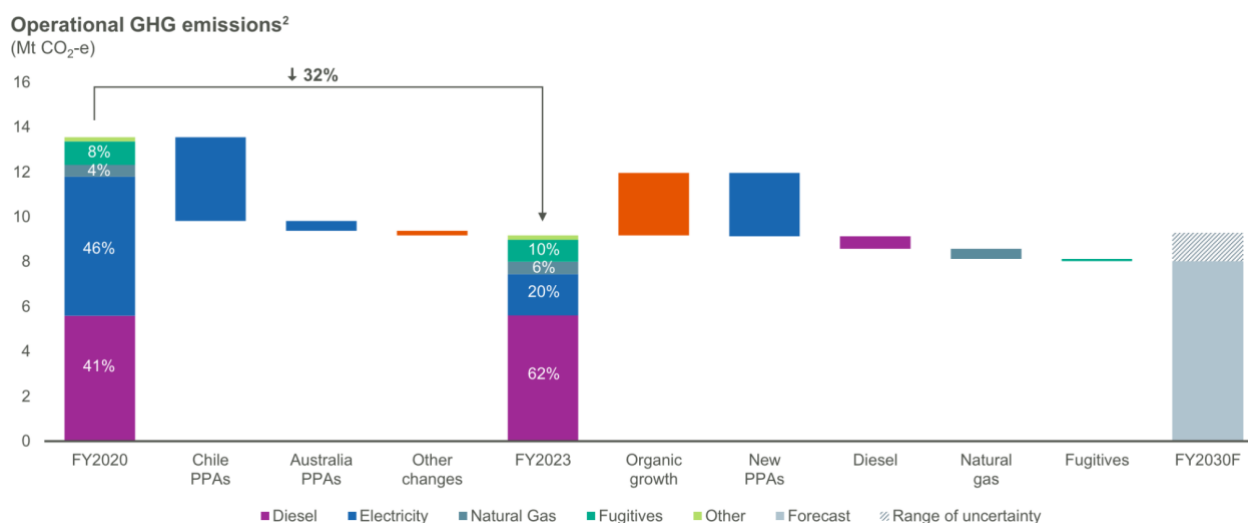
## Section 6. BHP Iron Ore

*Particularly compared to its Pilbara competitors at Rio Tinto and Fortescue, BHP is doing too much talking-the-talk of energy transition, and nowhere near enough walking-the-walk. There is a climate emergency, and Australia desperately needs the 'Big Australian' to lead by example and leverage its brilliant balance sheet to lean into the massive opportunities in decarbonisation, particularly HBI and then longer term from green iron exports.*

BHP has the second largest footprint of iron ore operations across the Pilbara, behind Rio Tinto. Across its consolidated operations, BHP has committed to achieving net zero operational (Scope 1 and 2) and supply chain (Scope 3) emissions by 2050, and an interim target of 30% operational emissions reduction by FY30 relative to FY20.

In FY23, BHP recorded operational emissions at 9.8Mt CO<sub>2</sub>-e, a **32.8% reduction** from FY20 in continued operations (i.e. excluding divested activities). In order to maintain emissions under its interim target, and given organic growth and expansion driving up baseline emissions, BHP expects to spend US\$4bn on global operational decarbonisation from FY24 to FY30, an annual capital allocation between US\$250m to US\$950m over the next five years.<sup>71</sup>

**Figure 6.1: BHP Operational GHG Emissions Reduction Plan to 2030**



Source: BHP <sup>72</sup>

BHP's Pilbara infrastructure includes an integrated system of four processing hubs and six open-cut mines, connected by over 1,000km of rail networks from inland mining operations to its port system in Port Hedland. WA Iron Ore (WAIO) consumes ~34.6 PJ of energy annually, with the bulk of energy demand from mobile diesel equipment. In FY23, 26.4 PJ, or 76%, of WAIO's energy demand was diesel, translating to ~**684 million litres**.

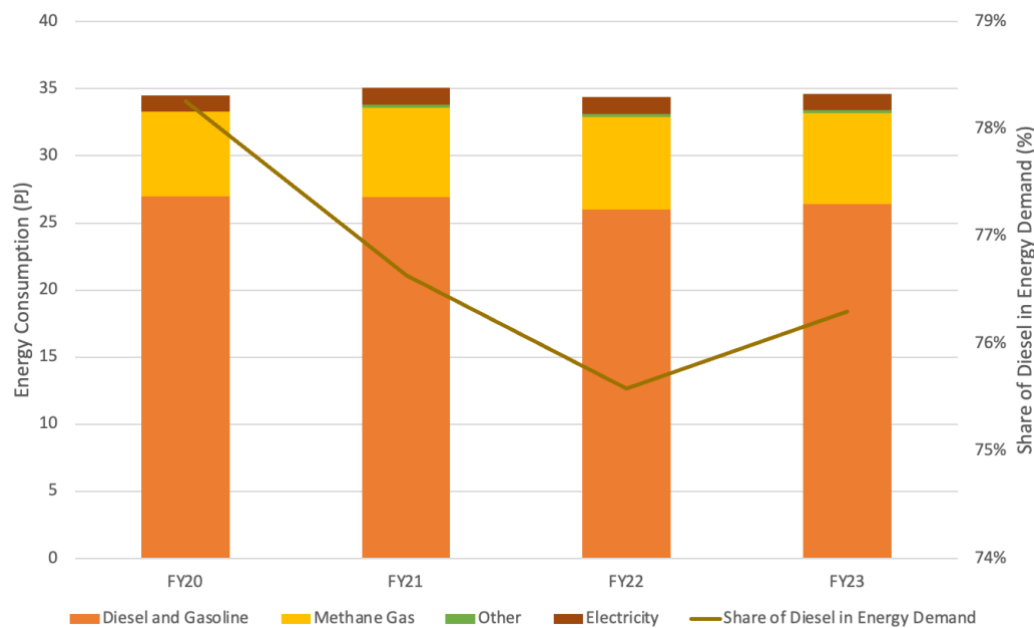
Across BHP's Australian operations, including WAIO, as well as BMA coal operations in Queensland, Olympic Dam Copper in South Australia, and Nickel West in WA, BHP consumes

<sup>71</sup> BHP, [Annual Report 2023](#), 22 August 2023

<sup>72</sup> BHP, [Decarbonisation: Strategy and Progress](#), 26 June 2024

~1.85 billion litres of diesel per annum. In Australia, BHP has deployed ~ 550 haul trucks, 180 locomotives, 50 excavators, and ~650 ancillary mobile equipment and machinery.<sup>73</sup>

**Figure 6.2: BHP Energy Consumption from Pilbara Iron Ore Operations**



Source: Company Accounts

BHP's Pilbara mining operations are not connected to the NWIS, operating on diesel and electricity generated entirely on BHP's own micro-grid. BHP's port operations are powered by an off-take agreement with APA's Port Hedland Power Station. Currently, BHP's inland electricity demand is supported by the Yarnima Power Station. In 2022-23, the Clean Energy Regulator reported Yarnima Power Station produced 782GWh of electricity.<sup>74</sup>

Yarnima Power Station has a current generation capacity of 154MW, comprising 119MW of gas generation (CCGT) and 35MW of diesel generation. In April 2024, BHP made a submission to the EPA requesting to expand the Yarnima by 120MW through the addition of gas reciprocating engines (GREs), which would raise total fossil fuel generation capacity to 274MW. However, BHP has noted the addition would allow for the phase-out of Yarnima's 35MW of diesel generation, meaning the total expanded operational capacity would be 239MW.<sup>75</sup>

Yarnima is the lowest emissions intensity of all large-scale fossil fuel generation across the Pilbara, averaging 0.46 tonne CO<sub>2</sub>-e/MWh, 12% less intensive than the second lowest emission-intensity generator, South Hedland Power Station operated by TransAlta.<sup>76</sup> The capacity expansion would result in a total 11.8Mt of CO<sub>2</sub>-e emissions over the 25-year operating life of the GREs. However, between 2027 and 2052, this would result in a net

<sup>73</sup> BHP, [Decarbonisation: Strategy and Progress](#), 26 June 2024

<sup>74</sup> CER, [Greenhouse and Energy Information by Designated Generation Facility 2022-23](#), 21 March 2024

<sup>75</sup> AFR, [BHP Tied to Gas Until 2053 as Power Need Swells on Electric Fleet](#), 17 April 2024

<sup>76</sup> EPA, [BHP YPS Stage 4 Environmental Review Document](#), 02 April 2024

3.1Mt reduction in total emissions from the level that would have been produced by continued diesel power supply at Yarnima.<sup>77</sup>

Power demand across BHP Pilbara operations is forecast to increase from ~150MW currently to ~1GW by 2040, primarily driven by the increase in iron ore production and the electrification of BHP's rail and mining fleet.<sup>78</sup> This would result in a ~7x rise in load requirements within BHP's islanded network.

Whilst Yarnima is currently the lowest emissions-intensive gas-fired power station operating in the Pilbara, BHP's fossil fuel energy generation expansion is still a step in the wrong direction. This explains why BHP has had to say its pathway to net zero by 2050 will not be linear, with emissions set to rise between 2024 and 2030 as its operations expand, kicking the required acceleration in zero-emissions generation capacity-building down the road.

### BHP Renewable Capacity

While BHP has stated that the integration of renewables to decarbonise electricity demand across its iron ore operations is a priority this decade, unfortunately for Australia, BHP chose to start this investment process in Chile, a clear outworking of the FTC subsidy headwind. BHP estimates with the displacement of diesel with electricity, a further 900MW of power will be required by 2040, primarily from renewable sources.

BHP's GHG Management Plan submitted to the WA EPA includes a step change buildout of up to 200MW wind power, up to 200MW of solar power, and 150MW of battery energy storage to a total of **up to** 500 MW of new firming renewable capacity by 2030.<sup>79</sup> In January, it was reported BHP issued a Request for Proposals (RFP) for renewable energy and energy storage projects in the Pilbara.<sup>80</sup> It confirmed that it was open to all options for renewable penetration in its operations, from long-term off-take agreements to in-house development.

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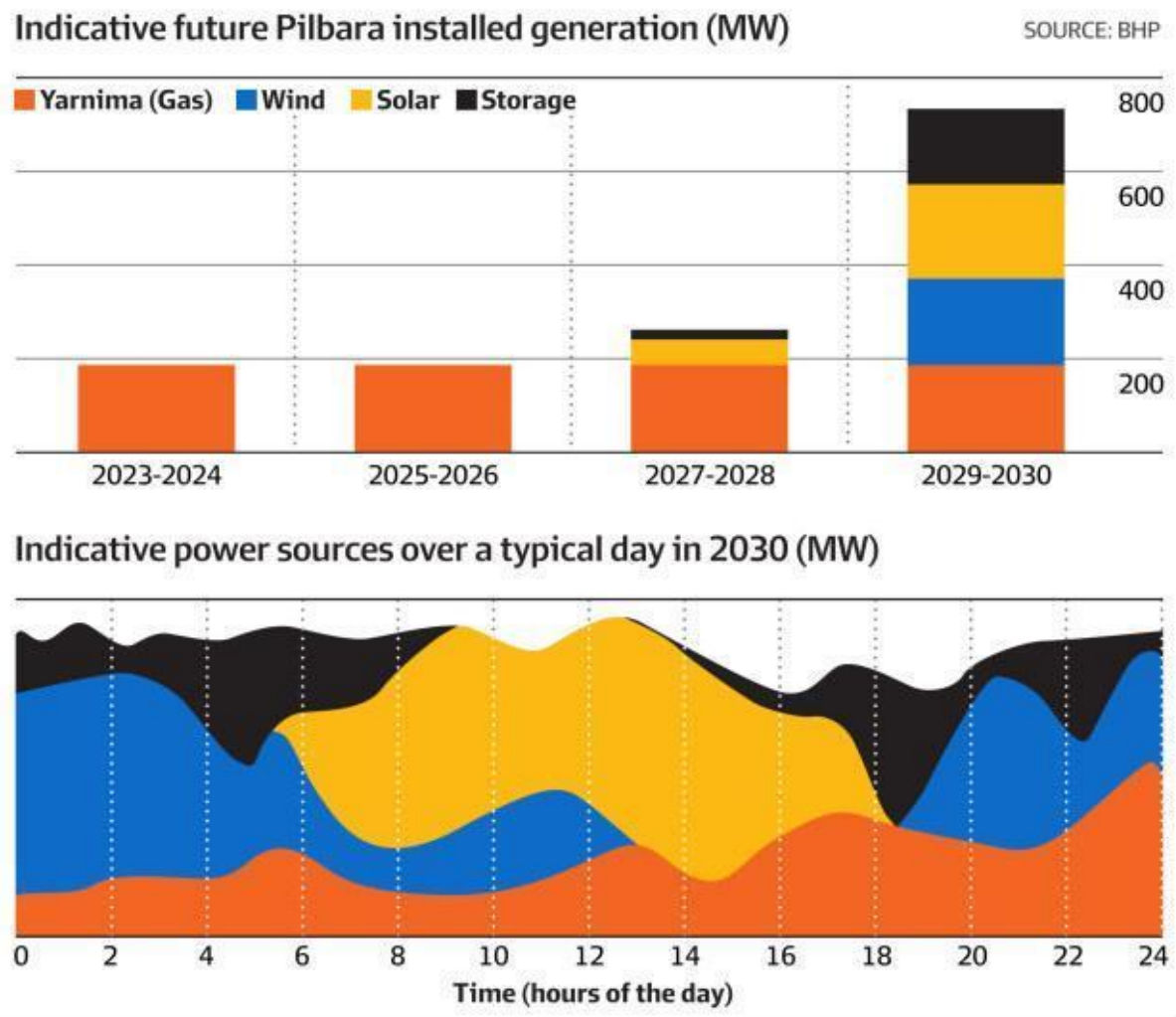
<sup>77</sup> EPA, [BHP YPS Stage 4 Environmental Review Document](#), 02 April 2024

<sup>78</sup> EPA, [BHP YPS Stage 4 Environmental Review Document](#), 02 April 2024

<sup>79</sup> EPA, [BHP Pilbara Regional GHG Management Plan](#), 18 December 2023

<sup>80</sup> Renew Economy, [BHP Begins Search for Half a GW of Wind, Solar and Batteries for Pilbara Mines](#), 22 Jan 2024

Figure 6.3: BHP Indicative Future Pilbara Electricity Generation Capacity



Source: AFR <sup>81</sup>

Across its global operations, BHP has primarily leveraged long-term PPAs for increasing renewable penetration. BHP's largest PPAs are to decarbonise electricity demand in Chilean copper operations. Two PPAs with Enel (15-years) and Colbun (10-years) across Escondida and Pampa Norte (which include Spence and Cerro Colorado mines), with a combined 6-6.6 TWh per annum supply of renewable electricity have effectively eliminated Scope 2 emissions from BHP's Chilean portfolio.

Escondida's 20 PJ annual electricity demand produced 0 Scope 2 emissions in FY23, down from 720kt CO<sub>2</sub>-e a year prior. The additional energy from the joint PPAs will supply an estimated 91% of Spence FY24's power demand with renewables. In FY23, Pampa Norte's Scope 2 emissions dropped to 30kt CO<sub>2</sub>-e, an 82% reduction from FY22.<sup>82</sup>

<sup>81</sup> AFR, [BHP Issues RFP to Electrify the Pilbara](#), 21 January 2024

<sup>82</sup> BHP, [ESG Standards and Databook 2023](#)

## Section 7. FMG Iron Ore

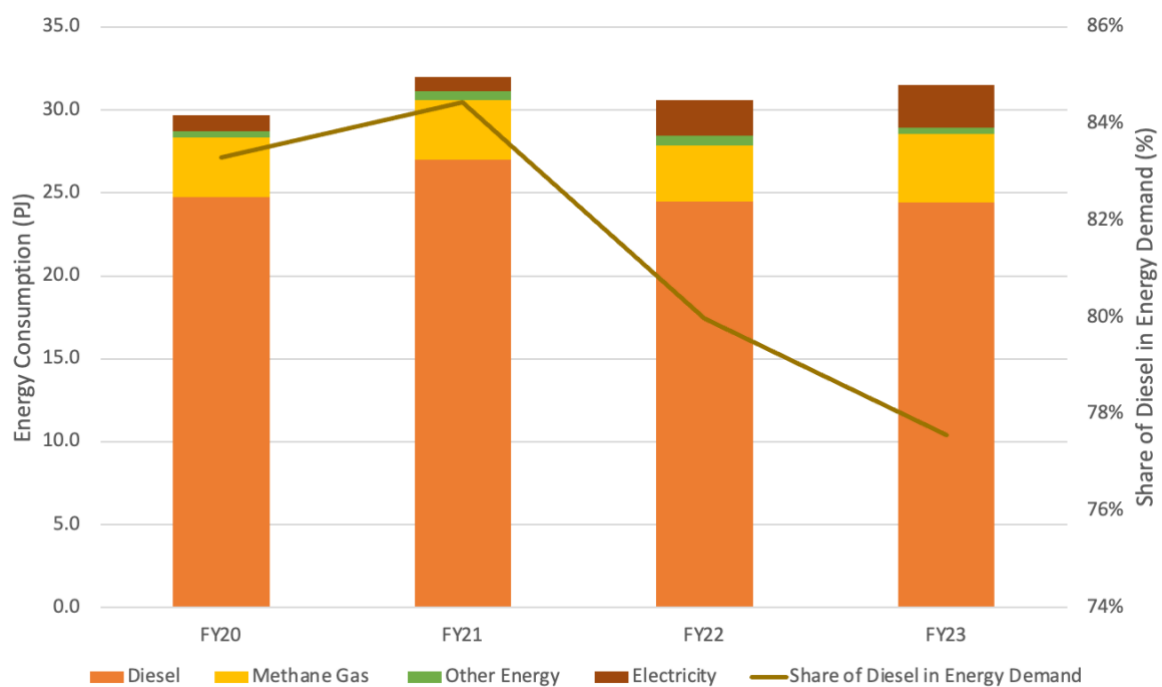
*Fortescue (FMG) is a world leading mining major embracing the imperative to invest in the opportunities for Australia in a decarbonised world. FMG has committed to invest US\$6.2bn by 2030 as part of its ambitious scope 1 & 2 real zero emissions target for 2030. But a Pilbara-wide industry collaboration would be much more effective, and could place Australian miners at the cutting edge globally. This should be a top priority of the Future Made in Australia and Net Zero Economic Authority.*

FMG is leading the charge towards electrification of heavy industries and hard-to-abate sectors across Australia, with the most ambitious decarbonisation objectives across the Pilbara. FMG has a decarbonisation objective of real zero emissions from terrestrial iron ore operations (Scope 1 and 2) by 2030, as well as a net zero Scope 3 target by 2040. Real zero requires FMG to implement a pathway that eliminates fossil fuel use and precludes the use of offsets to meet emissions reduction requirements.

FMG has a costed plan of US\$6.2bn to remove carbon from its operations within the Pilbara, with ~90% of emission solutions identified. From FY24, FMG will no longer purchase voluntary carbon offsets unless required by law, with offsets shown to be plagued with extensive concerns about quality, lack of additionality and their ability to deliver real and permanent reductions in emissions.<sup>83</sup>

In FY23, FMG's operational emissions were 2.55Mt CO<sub>2</sub>-e, with emissions primarily generated from mobile diesel used in machinery during ore extraction and transportation, as well as methane gas used in stationary energy to power the off-grid Solomon Power Station.

**Figure 7.1: FMG Energy Consumption from Pilbara Iron Ore Operations**



Source: Company Accounts

<sup>83</sup> FMG, [FY23 Climate Change Report](#)

In FY23, diesel accounted for 78% of FMG's entire operational energy demand, consuming **633 million litres** (24.4 PJ) - Figure 7.1.<sup>84</sup>

The transition to electrification of mobile diesel and the shift from gas baseload power to firmed renewables is critical to achieving FMG's climate targets. The realisation of FMG's real zero pathway will save 2.29 billion litres of high-emission, imported diesel and 31 million gigajoules of methane gas by 2030.

In FY23, Fortescue made a number of advances in zero-emission replacement technologies for mobile diesel equipment, including:

- Testing of its first battery electric haul truck, Roadrunner, at Christmas Creek.
- The development of a dual-fuel ammonia-powered locomotive prototype, to undergo field testing and mainline trials.
- Establishing an MoU with China Baowu, the largest steelmaker in the world, to explore developing and accelerating green steel technologies.
- A commitment to eliminating voluntary carbon offsets for operational emissions from FY24 onwards to focus on direct solutions to reducing fossil fuel use.

### FMG Renewable Capacity

In line with its industry leading commitment to achieving real zero operational emissions by 2030, FMG is leading the charge in developing the necessary scale of infrastructure and renewable capacity to electrify its mobile diesel fleet and phase-out gas generation from the Solomon Power Station.

As previously outlined, the core bottleneck and constraint to deploying renewables at speed and scale is the disaggregated collection of islanded networks. FMG's **Pilbara Energy Connect** (PEC) project is the connection of FMG's inland mining operations to the NWIS via Port Hedland, a major infrastructure investment that facilitates the connection of multiple gigawatts of renewables to power FMG.

In FY23, FMG completed the transmission infrastructure for PEC, connecting Solomon to Iron Bridge and Port Hedland (green and light blue network in Figure 7.2). In addition, the Board approved a US\$373m infrastructure investment to connect Eliwana, Cloudbreak and Christmas Creek, estimated to be complete by FY25-26 (dark blue in Figure 12).

In an investor presentation in October 2023, FMG outlined a renewable capacity infrastructure that would host over 1GW of solar capacity, ~1GW of wind capacity, as well as ~4GWh of battery storage.<sup>85</sup> Renewables would power FMG's entire inland operations through the PEC project, with over 750km of high-voltage transmission lines.

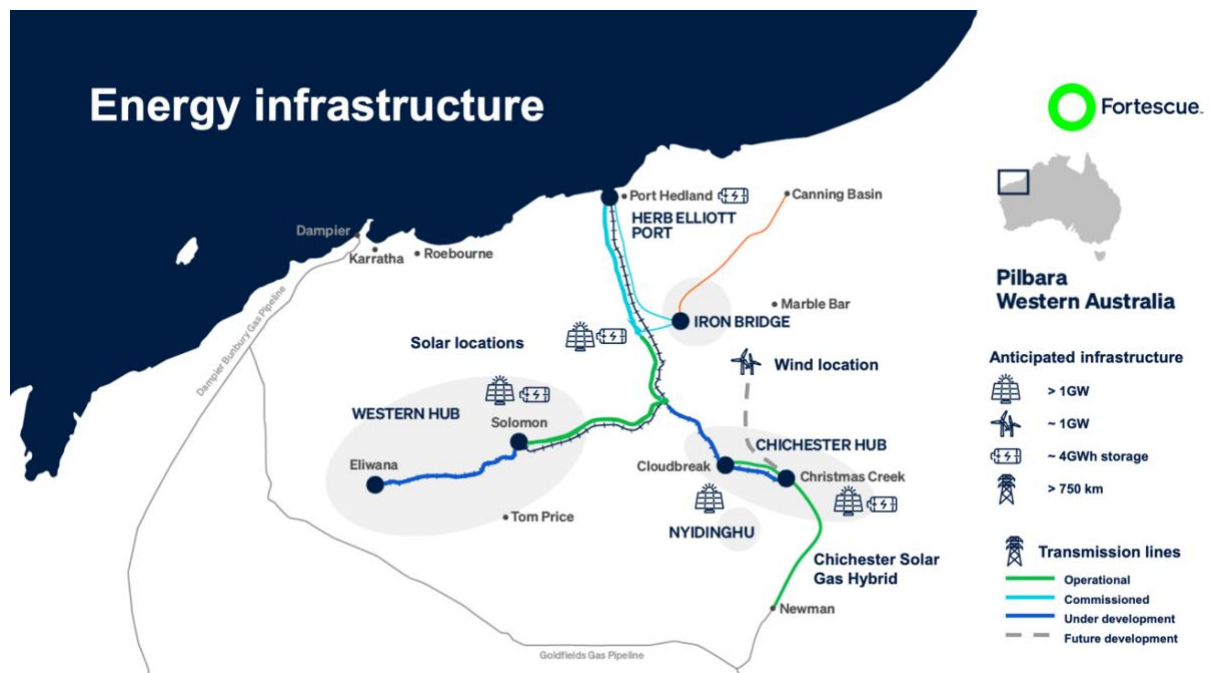
60MW of solar capacity powers FMG's Chichester Hub, built in partnership with APA (originally Alinta Energy) as part of the Chichester Solar Gas Hybrid Project (CSGHP). APA's transmission infrastructure consisted of a 220kV connection from its Newman Power Station to a substation powering Roy Hill mine. As part of the CSGHP, a proportion of gas-fired generation from Newman, in addition to the new 60MW solar farm, would provide power to the Chichester Hub, which includes Cloudbreak and Christmas Creek.

<sup>84</sup> FMG, [FY23 ESG Databook](#)

<sup>85</sup> FMG, [Pilbara Operations Site Tour Presentation](#), 12 October 2023



Figure 7.2: FMG Energy Infrastructure in the Pilbara



Source: FMG <sup>86</sup>

On 15 February 2023, Pacific Energy delivered its largest network-integrated BESS project to FMG, comprising the 26MW North Star BESS and 16MW Solomon BESS.<sup>87</sup> The BESS capacity will provide grid-stability services and charge with energy generated from FMG's 100MW North Star Junction solar farm, which completed construction in October 2023 and is undergoing demand response trials on site.<sup>88</sup>

### Uaroo Renewable Hub

In February 2022, Fortescue submitted an application to the WA EPA to develop the Uaroo Renewable Energy Hub, a mammoth 5.4GW precinct consisting of up to 340 wind turbines and solar arrays, with an associated battery storage system and the potential for localised green hydrogen production.<sup>89</sup> Located ~120km south of Onslow, and 170km west of FMG-operated Eliwana Mine, the proposal would install up to 2,040MW of wind capacity, and up to 3,333MW of solar capacity, alongside a 9,100MWh BESS.

At the time of its announcement, Uaroo would have 2.5x the capacity of the entire rooftop solar capacity of WA, and 9x greater capacity than the state's largest wind farm, Yandin.<sup>90</sup> On 18 October 2023, Fortescue requested that EPA terminate the assessment of the proposed Uaroo Renewable Hub and gave no justification for this massive backward step.<sup>91</sup>

<sup>86</sup> FMG, [Pilbara Operations Site Tour Presentation](#), 12 October 2023

<sup>87</sup> Pacific Energy, [Hybrid Systems Australia Delivers Big Batteries for Fortescue](#), 15 February 2023

<sup>88</sup> FMG, [Climate Transition Plan](#), 20 October 2023

<sup>89</sup> EPA, [Uaroo Renewable Energy Hub](#), 9 February 2022

<sup>90</sup> Renew Economy, [Fortescue Drops Massive Uaroo Renewable Hub as it Reorganises Pilbara Energy Plans](#), 6 November 2023

<sup>91</sup> EPA, [Notice of Decision to Terminate the Assessment](#), 18 October 2023

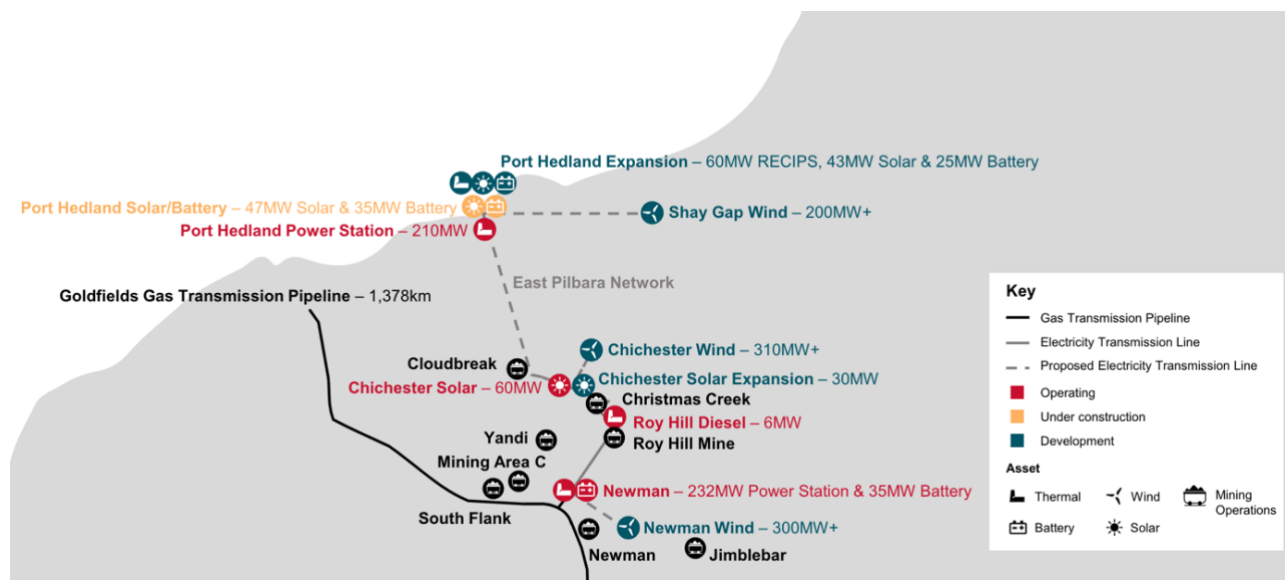
## Section 8. APA Group

*APA Group's 2023 \$1.8bn acquisition of Alinta Energy Pilbara puts APA in the box seat alongside BP's AREH (refer Section 9) to aggregate up the existing grid transmission and generation into a comprehensive common-user infrastructure network that has the capacity to accelerate electrification and decarbonisation now, ahead of the widespread adoption of world-leading EV mine and rail haulage equipment and the rapid expansion of electricity needed to drive onshore refining of critical minerals and strategic metals to embody decarbonisation pre-export.*

In August 2023, APA Group announced the acquisition of Alinta Energy Pilbara, a division of Alinta Energy and parent company of Alinta Duke Energy WA Power Pty Ltd (ADEWAP). ADEWAP was the minority owner and operator of transmission infrastructure in the NWIS, alongside Rio Tinto and Horizon Power, and the gentailer for Port Hedland and Newman Gas Power Stations. On 1 November 2023, APA Group completed the acquisition of 100% of Alinta Energy's Pilbara assets in a \$1.8bn takeover.

Alinta Energy's portfolio consisted of 442MW of operating gas generation, and 11.8% of the 203 TJ/d Goldfields Gas Transmission Pipeline (GGTP) (remaining 88.2% already owned by APA), as well as >200 km of transmission networks, and contracted renewables via the 60MW Chichester solar farm and 35MW of battery storage capacity then under construction in Port Hedland.<sup>92</sup> Alinta Energy's existing infrastructure supported the islanded stationary energy demands of Roy Hill and Fortescue, as well as the port operations of BHP and Fortescue in Port Hedland.

**Figure 8.1: APA Group Pilbara Assets and Development Pipeline**



Source: APA<sup>93</sup>

APA currently has 543MW of generational capacity online. Under construction is the **47MW Port Hedland Solar Farm**, and an associated 35MW BESS, which will be directed into decarbonising port operations for Pilbara's iron ore majors. Following the acquisition of

<sup>92</sup> APA, [Acquisition of Alinta Energy Pilbara and \\$750m Equity Raising](#), 23 August 2023

<sup>93</sup> APA, [Investor Day Presentation](#), 01 November 2023

Alinta Energy Pilbara, APA has an estimated >\$3bn development pipeline of renewable projects, with ~1.6GW of wind, solar and battery storage, largely co-located with future high demand centres from the electrification of mobile diesel equipment in mining.

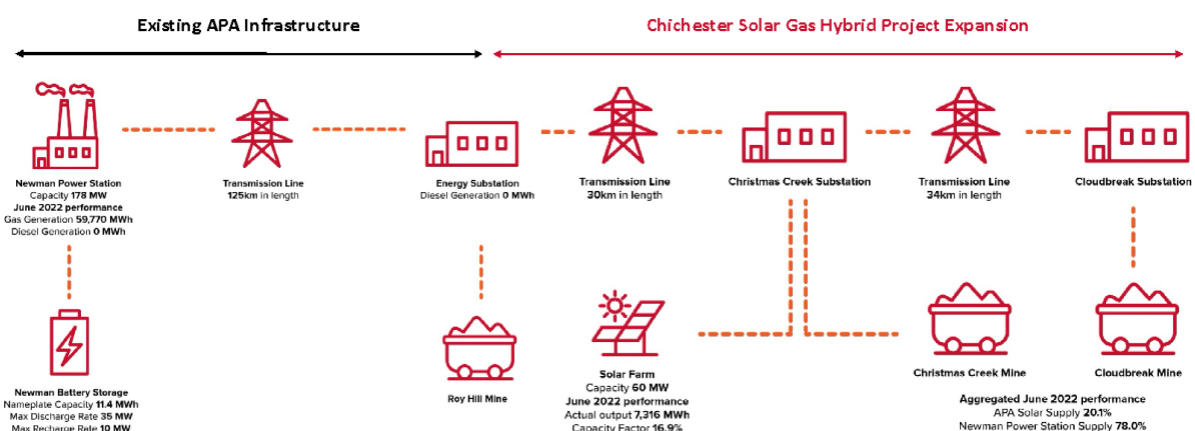
APA's modelling of expected future energy demand from the electrification of mobile imported diesel and the majority replacement of gas-fired electricity generation with renewables forecasts energy demand to increase at a CAGR of 4.6% to 2050, from ~5,000 GWh in 2023, to ~16,700 GWh by 2050. This assumes all mining operations achieve their commitment of net zero by 2050.

Climate Energy Finance supports this forecast, with internal modelling indicating the energy demand from full electrification of diesel and stationary energy will increase load from 5,013 GWh in 2023, supplied from all gas-fired generation in the NWIS, in addition to BHP and APA's islanded hybrid networks, to **16,659 GWh** by 2050. APA forecasts renewable energy generation in the Pilbara to increase ~30x from 2024 to 2040, from ~ 400 GWh in 2024 to 14,800 GWh in 2040, accounting for ~92% of energy demand.

APA now operates the first large-scale renewable electricity generation facility in the Pilbara, the **60MW Chichester Solar Farm**. The Roy Hill mine has been a core customer for APA's 223MW Newman Power Station, requiring ~800 GWh of electricity annually to power the stationary energy requirements of its iron ore operations. Given the proximity of Fortescue's Christmas Creek and Cloudbreak mines in the Chichester Hub, Fortescue partnered with Alinta Energy to extend the transmission network from Roy Hill's substation to Fortescue's eastern operations.

The construction of the now operational **Chichester Solar Gas Hybrid Project (CSGHP)** involved a total of 64km of high-voltage transmission lines to new substations at Christmas Creek and Cloudbreak mines, as well as the construction of the 60MW Chichester Solar Farm. The CSGHP facilitated the phase-out of local diesel generators at Fortescue, and enabled zero-emissions solar energy to power the bulk of Fortescue's daytime electricity demand, firmed by the Newman Power Station and Newman battery. In FY23, CSGHP generated 146GWh of renewable energy to FMG, up 66% from FY22, and it is now supplying over 20% of FMG's entire contracted electricity demand from renewables.

**Figure 8.2: Chichester Solar Gas Hybrid Project**

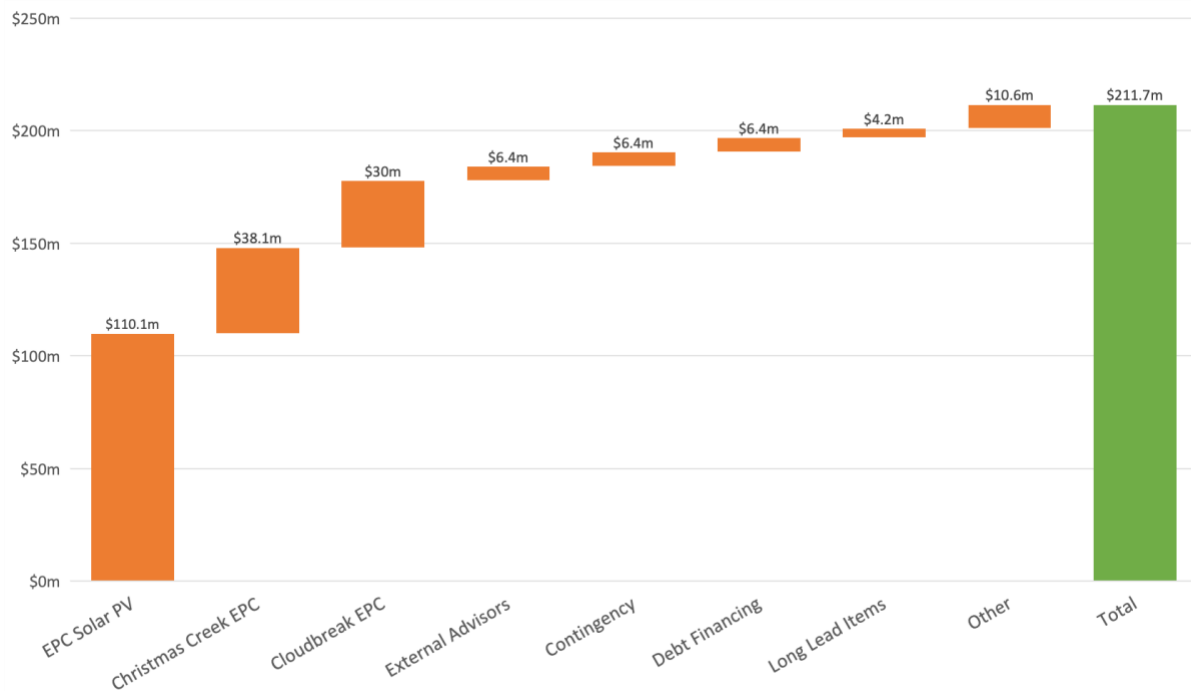


Source: APA Group <sup>94</sup>

<sup>94</sup> APA, [Chichester Solar Gas Hybrid Project](#)

The CSGHP's total capex reached \$211.7m, including the 60MW solar farm, as well as the construction of two transmission line connections and substations at each load centre. This equates to a capex of \$3,528/kW, a 132% cost premium to the 2023 GenCost capital cost for large-scale solar PV of \$1,526/kW. Removing the EPC costs associated with the second grid connection, assuming future builds would have one transmission line to a backbone transmission line, the CSGHP's capital cost without Cloudbreak EPC still equates to \$3,028/kW, a 99% premium to GenCost figures for solar PV.

**Figure 8.3: Capital Cost of Chichester Solar Farm and Associated Infrastructure**



Source: APA Group <sup>95</sup>

Note: Christmas Creek and Cloudbreak EPC refer to transmission lines and substation upgrades

As a result of the Pilbara capex premium observed in CSGHP, APA have now introduced a 60% premium into internal modelling to reflect the increased cost of project delivery in the Pilbara. APA estimate, inclusive of a Pilbara premium, an average capital cost to 2040 of \$1,700/kW for solar PV, \$3,200/kW for wind, and \$2,700/kW for gas reciprocating engines for firming capacity.<sup>96</sup>

In May 2024, APA announced a proposed East Pilbara Network (EPN), comprising an interconnected transmission line from its inland network, that powers Hancock Prospecting and Fortescue operations, to Port Hedland, connecting to Horizon Power's existing network in the NWIS.<sup>97</sup> The integration of APA's islanded network to common user electricity infrastructure, expanding to incorporate third party renewable energy developers, would create substantial synergies and cost efficiencies with Horizon Power's PET that would allow for the electrification and decarbonisation of Pilbara's mining majors at a speed and scale commensurate with its importance to Australia's emissions reduction targets.

<sup>95</sup> APA, [Fortescue Alinta Solar Gas Hybrid Project Lessons Learnt: Design and Construction](#), 13 November 2021

<sup>96</sup> APA, [Pilbara Energy System Investor Site Visit](#), 22 May 2024

<sup>97</sup> APA, [Pilbara Energy System Investor Site Visit](#), 22 May 2024

## Section 9. Australian Renewable Energy Hub (AREH)

*Similar in some respects to APA's positioning, the majority BP owned AREH could provide the common user firmed renewable energy infrastructure of the massive scale required to fully decarbonise all of the Pilbara mining, fertilizer and value-adding operations over the coming 1-2 decades. BP has all the financial and technical skills required and likely the corporate trust in its capacity to deliver, similar to APA. Industry would likely much prefer a private global major to lead this over a government public sector institution.*

The AREH is the largest proposal for renewable generation capacity in Australia, with a planned 26GW of solar and onshore wind power to power a green hydrogen (GH<sub>2</sub>) and ammonia production industry in WA. At full scale, AREH is estimated to produce up to 1.6Mtpa of GH<sub>2</sub>, or up to 9Mtpa of green ammonia.<sup>98</sup> This would abate ~ 17Mtpa of carbon emissions in domestic and export emissions, and 0.5 gigatonnes (Gt) over the project's life.

The AREH was being developed by a consortium of global energy and investment firms, with BP, InterContinental Energy, CWP Global, and Macquarie Group. In March 2024, BP acquired Macquarie's 15% stake, boosting BP's stake to 63.6%.<sup>99</sup> InterContinental Energy maintains its 26.4% interest in the project, alongside a 10% stake from CWP Global.

The project would be located in the northern coastal region of the Pilbara, on a 6,500 square kilometre site east of Port Hedland. The revised proposal of the AREH to the WA EPA includes the construction of up to 1,743 turbines across the development envelope, as well as 18 arrays of Solar PV up to 600MW per array.

**Figure 9.1: Australian Renewable Energy Hub**



Source: bp<sup>100</sup>

<sup>98</sup> Bp, [Australian Renewable Energy Hub](#)

<sup>99</sup> PV Magazine, [bp Increase Stake in 26 GW Australian Renewable Energy Hub](#), 12 March 2024

<sup>100</sup> Bp, [Australian Renewable Energy Hub](#)

The AREH is a part of BP's shift away from fossil fuels, with plans to invest up to \$98bn in renewables, hydrogen, biofuels, and electric mobility by 2030 as part of its pathway to become a net-zero company by 2050 or earlier.<sup>101</sup>

On 07 August 2024, the Federal Department of Industry, Science and Resources (DISR) awarded AREH major project status, recognising the national significance and contribution to future economic growth, employment and a Future Made in Australia that will accelerate Australia's pathway to net zero by 2050.<sup>102</sup>

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<sup>101</sup> PV Magazine, [bp Increase Stake in 26 GW Australian Renewable Energy Hub](#), 14 March 2024

<sup>102</sup> Aus Gov, [Key Projects Awarded Major Project Status](#), 07 August 2024

## Section 10. Driving Investment into Green Hydrogen and Value-added Renewable Deployment Infrastructure

*Building out a common user grid infrastructure and the associated rapid deployment of world scale, firmed renewables projects needs to get moving now. The world is in a energy system transformation race to the top, with the IRA a US\$1trillion public subsidy downpayment to bring the US back into the race against China's growing global cleantech leadership. The one zero emissions industry of the future where China does not already lead is in green iron and green steel. While much has been made about GH2, a prerequisite is the buildout of a massive investment in low cost, firmed renewables. The Pilbara has the potential demand, and the scale required, but is very far from low-cost in zero-emissions energy. This will need to be overcome for the Pilbara to make Australia a green iron superpower.*

A core factor into the deployment of large-scale investment into renewables in the Pilbara is long-term, risk-adjusted returns. For third party renewable energy projects to reach financial close in the Pilbara, projects must be de-risked by diversification of offtake agreements across companies and projects in the green metal refining value chain. Common user electricity infrastructure is a key prerequisite to enabling multiple offtake agreements for projects not co-located with specific mining operations. A second requirement is strong market signals from the state and federal governments, as well as industry for the long-term demand of green electricity.

Climate Energy Finance views the subsidisation of green hydrogen production as a critical driver in establishing green metals refining capacity onshore. As part of our submission to the Federal Government's Green Metals Consultation in July 2024, CEF has recommended the investment of an additional \$10-30bn of capital and direct budget support in the 2024-25 Mid-Year Economic and Fiscal Outlook for green metals refining, building on the Hydrogen Production Tax Incentives introduced in the 2024-25 budget.

The **Hydrogen Production Tax Incentive** will provide a \$2/kg incentive for renewable hydrogen for up to ten years per project, between 2027-28 and 2039-40 for projects that reach financial close by 2030.<sup>103</sup>

The introduction of production-based tax concessions is an established mechanism to encourage first movers, and bridge the cost-differential from early-stage low-emissions hydrogen projects to that of methane gas production methods. The Hydrogen Production Tax Incentive introduced under the FMIA is a significant step forward in ensuring green metals refining is developed onshore, and not exported to regions and markets that have clearer policy directions and financial incentives.

### Section 10.1. US IRA Subsidies for Hydrogen Production

The US IRA includes a range of clean energy tax credits and other provisions to increase domestic renewable energy production. On 22 December 2023, the US Treasury announced proposed regulations for the **Clean Hydrogen Production Tax Credit** (CH PTC) (45V)

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<sup>103</sup> Aus Treasury, [Budget 2024-25: A Future Made in Australia Fact Sheet](#), 14 May 2024

established by the US IRA.<sup>104</sup> The US CH PTC provides a 10-year incentive for the production of hydrogen using renewable energy, with a credit of up to US\$3/kg.

Projects would be required to begin construction by 2033 in order to be eligible to receive the PTC, with the credit structured as a four-tier incentive program, providing the largest incentives for the lowest-emission hydrogen production methods.

Emissions Intensity (kg CO <sub>2</sub> -e / kg H <sub>2</sub> )	Clean Hydrogen PTC ( per kg H <sub>2</sub> )
4 - 2.5	Up to US\$ 0.60
2.5 - 1.5	Up to US\$ 0.75
1.5 - 0.45	Up to US\$ 1.00
Less than 0.45	Up to US\$ 3.00

The CH PTC is able to be stacked with the **Renewable Energy Production Tax Credit (RE PTC)** (45Y), which provides a maximum US\$6.60/MWh tax credit (US\$5.50/MWh base) for projects larger than 1 MW. The coupling of PTC's creates a major economic incentive to produce hydrogen sourced from zero-emissions technologies. Importantly, the CH PTC would not be eligible to be stacked with the Carbon Capture and Sequestration Tax Credit (45Q), directing investment further into the development of green hydrogen capacity.

## Section 10.2. Hydrogen Headstart Program

On 9 May 2023, the Federal Government announced the \$2bn Hydrogen Headstart Program as part of the 2023-24 Budget, designed to scale up the development of Australia's renewable hydrogen industry.<sup>105</sup> On 14 May 2024, as a part of the Future Made in Australia suite of funding measures, the Federal Government announced an additional \$2bn in funding to the Hydrogen Headstart Program, raising total investment to \$4bn.<sup>106</sup>

The Hydrogen Headstart Program is designed to provide a production credit to bridge the gap between the relevant costs of hydrogen production (as well as the conversion to hydrogen derivatives i.e. ammonia), and the ultimate competitive offtake price received from the user of the hydrogen or derivative product. As part of the application process, producers must provide the forecast production cost of the ultimate product, including production, storage, transportation and derivative.

On 21 December 2023, ARENA announced six applicants shortlisted to receive support via the program, representing a cumulative electrolyser capacity of over 3.5 GW across various end uses.<sup>107</sup> As part of the expanded capacity of the Hydrogen Headstart Program, the program needs to be restructured to also directly support large-scale domestic hydrogen users.

<sup>104</sup> US Treasury, [US Department of Treasury, IRS Release Guidance on Hydrogen Production Tax Credit to Drive American Innovation and Strengthen Energy Security](#), 22 December 2023

<sup>105</sup> Aus Treasury, [Hydrogen Headstart to Power New Jobs & Industry](#), 9 May 2023

<sup>106</sup> Treasury, [Budget 2024-25](#), 14 May 2024

<sup>107</sup> ARENA, [Six Shortlisted for \\$2 billion Hydrogen Headstart Funding](#), 21 December 2023



### Section 10.3. Hydrogen Hubs

On 19 February 2024, the Federal and WA Government finalised a \$140m funding agreement to develop a hydrogen hub in the Pilbara, designed to foster a major centre for hydrogen production and export of fuel and resources with embedded decarbonisation, with the potential to become an international gateway to Australian-made green iron.<sup>108</sup>

The \$70m share from the Federal Government is part of the broader \$526m **Regional Hydrogen Hubs Program**, which will crowd-in significant private capital to establish hubs for green hydrogen production in key industrial regions including Kwinana, Gladstone, Townsville, Bell Bay, Port Bonython, and the Hunter. The planned pipeline could enable the production of ~492,000 tonnes annually, sufficient to decarbonise the entire existing ammonia production on the Burrup Peninsula.

### Section 10.4 The Port Hedland Green Steel HBI Proposal

POSCO, South Korea's largest steelmaker, and the 7th largest globally, announced in September 2023 the proposal of a large-scale iron ore processing facility in the Pilbara, **Port Hedland Green Steel (PHGS)**, to be developed by a consortium of POSCO, Taiwan's China Steel and Japan's Marubeni. Located in the Boodarie Strategic Industrial Area (10km south west of Port Hedland), the value-added iron processing plant would consist of a pelletisation and HBI (Hot Briquette Iron) plant, with a Stage 1 processing capacity of 3-3.5Mtpa of iron ore to produce ~2Mtpa of HBI.<sup>109</sup>

POSCO plans to develop the PHGS as a 4-stage operation, culminating in 6 trains of MIDREX Flex HBI furnaces to produce a combined 12Mtpa of value-added, low emissions iron metal. The 4 phases represent a total \$27bn proposed investment into the plant alone, employing thousands of jobs during construction, and generating over 400 ongoing jobs in the Pilbara per train.<sup>110</sup>

### Section 10.5 Yara Pilbara Fertilisers & Project Yuri

Yara Pilbara Fertilisers (YPF) plant on the Burrup Peninsula is one of the largest ammonia production facilities in the world, with an average production of 840,000tpa of liquified ammonia, representing ~5% of the global traded market. Ammonia manufactured at YBF is delivered via pipeline to the Port of Dampier, and exported to Korea, Indonesia and other Southeast Asia markets with Yara International's dedicated ammonia shipping fleet.

Under the Safeguard Mechanism disclosures, Yara's ammonia plant emitted 1.5Mt CO<sub>2</sub>-e in 2022-23, 8.7% higher than the year prior.<sup>111</sup> Based on its reported emissions profile, CEF estimates YPF consumed ~ 29 PJs of methane gas in FY23 (Figure 10.2). The decarbonisation of ammonia production is a critical step to decarbonising mining and agriculture in Australia, as ammonia is a key component of explosives and fertilisers. Ammonia production is responsible for ~ 2% of emissions globally.<sup>112</sup> The transition from hydrogen produced by

<sup>108</sup> DCCEEW, [Pilbara Hydrogen Hub to Boost Australia's Hydrogen Industry](#), 19 February 2024

<sup>109</sup> EPA, [Port Hedland Green Steel - Stage 1](#), 15 September 2023

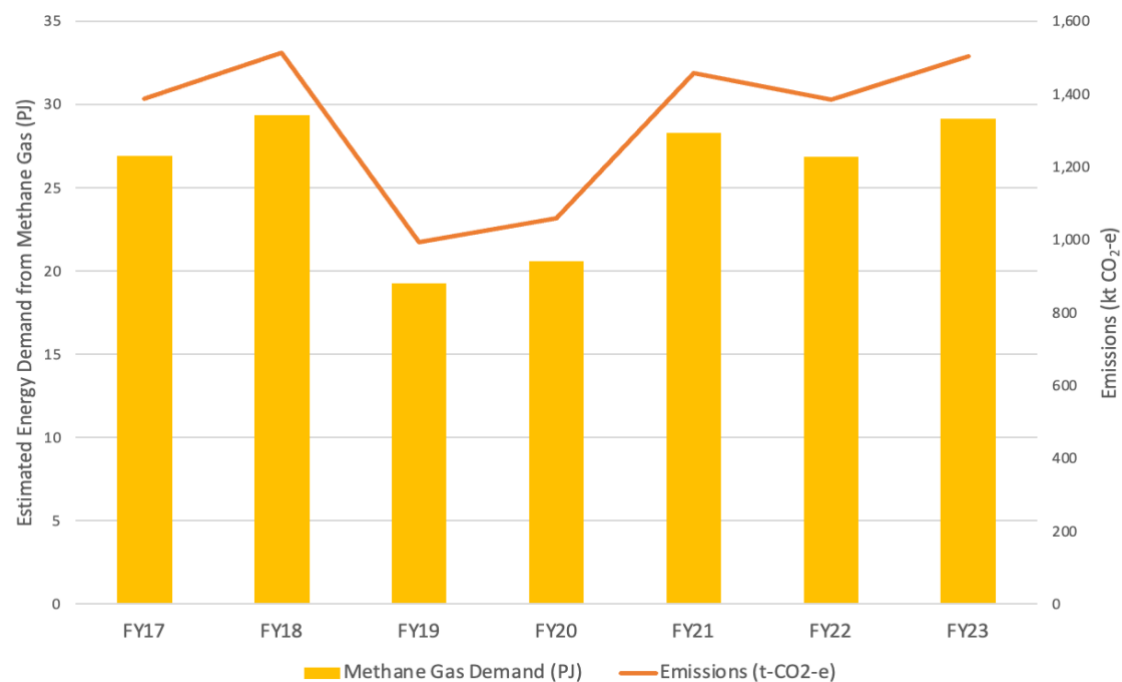
<sup>110</sup> ABC, [Multi-billion-dollar South Korean Investment Could Make Port Hedland a Green Iron Centre](#), 16 December 2023

<sup>111</sup> CER, [Safeguard Facility Reported Emissions Data](#), 28 March 2024

<sup>112</sup> BNEF, [The Case for Low-Carbon Ammonia White Paper](#), 11 January 2024

methane gas in steam methane reformers (SMRs) to renewable-powered electrolysis will require significant investment in renewable energy generation.

**Figure 10.2: YBF Safeguard Facility Emissions Data and Estimated Energy Demand**



Source: Clean Energy Regulator <sup>113</sup>

Establishing common user electricity infrastructure in the Burrup Peninsula is critical to decarbonising one of the Pilbara's largest emissions-intensive industries. Horizon Power's proposal to connect the Burrup Strategic Industrial Area to the NWIS would allow for projects like AREH to power low-emission hydrogen production on the Burrup Peninsula to embed decarbonisation in ammonia products.

This is of urgent concern as the development of Perdaman's \$6bn Pilbara urea plant begins construction, which will produce ~2.3Mtpa of urea (almost sufficient to replace the total imported urea).<sup>114</sup> Perdaman will power its urea plant from Woodside's Scarborough Gas Project, locking in significant growth in state emissions and providing a social license for continued methane gas exploration to service the energy transition for decades to come.

ENGIE and Mitsui are developing an industrial-scale renewable hydrogen project – Project Yuri – to provide low-emission H<sub>2</sub> feedstock into Yara Pilbara's ammonia operations. Yuri consists of a 10MW electrolyser powered by 18MW of solar PV and an 8MW/8MWh BESS.

Construction began in December 2022 and the first phase of the Yuri project is expected to be complete in 2024, producing up to 640tpa of renewable hydrogen.<sup>115</sup> Total capital cost of \$87m, supported by a \$47.5m grant from ARENA's Renewable Hydrogen Development Fund and a \$2m grant from the WA Government's Renewable Hydrogen Fund.<sup>116</sup>

<sup>113</sup> Note: Energy demand assumes emissions are generated from the combustion of methane gas. Conversion figure for methane gas is 51.53 kg CO<sub>2</sub>-e/GJ. Source: DCCEEW National Greenhouse Accounts 2023

<sup>114</sup> WA Government, [Perdaman Breaks Ground on \\$6 Billion Pilbara Urea Project](#), 26 April 2023

<sup>115</sup> ARENA, [ENGIE Project Yuri Phase 0 – 10MW Green Hydrogen for Ammonia in the Pilbara](#), 14 July 2023

<sup>116</sup> ENGIE, [Yuri Renewable Hydrogen to Ammonia Project](#)

## Section 11. Reformed WA State and Federal Climate Change Legislation to Drive the Energy Transition

*Australia has made significant progress under the Albanese government. The Capacity Investment Scheme, the Safeguard Mechanism reforms, the Climate Change Act 2023, the FMIA, The NZEA and the formation of the National Reconstruction Fund all represent significant steps forward. The WA government by comparison is lagging, undermining our national efforts. Likewise, BHP, Rio Tinto and Woodside Energy need to step up and demand WA government action, as their shareholders are demanding of them.*

Currently, WA's emissions reduction strategy is managed by the state's **Environmental Protection Authority (EPA)**. The approval of projects planned and operating in WA is subject to an Environmental Impact Assessment (EIA) process. The EPA requires, at a minimum, for projects to implement credible pathways to net zero by 2050. In April 2023, the EPA introduced new GHG Environmental Factor Guidelines, which increased the level of scrutiny for the GHG emissions of new proposals.<sup>117</sup> Updates included:<sup>118</sup>

- A minimum expectation to achieve net zero by 2050, with a linear emissions reduction trajectory from 2030, at a minimum of 5% reduction pa from 2030,
- An extension of the Guidelines to include Scope 2 GHG management plans for projects with Scope 2 emissions greater than 100,000tpa CO<sub>2</sub>-e,
- The consideration for whether Federal and/or State legislation exceeds the WA EPA's objectives (such as in respect of the Safeguard Mechanism),
- Clarification that offsets are to be used as a last resort only, and will be scrutinised for integrity,
- Requirements for independent best practice review of available measures to avoid or reduce Scope 1 emissions to accompany proposals.

Despite the WA Government not having an interim state-wide emissions reduction target by 2030, the EPA considers the pathway to limiting global warming to 1.5°C above pre-industrial levels as the necessary pathway. As such, the EPA's view is that there should be a deep, substantial and sustained reduction in the state's emissions this decade, and as far as practicable, that WA emissions should reach net zero well before 2050. This guideline however, applies only to new proposals, changes to existing proposals (including expansions), and changes to existing implementation conditions.<sup>119</sup>

CEF strongly advocates that Western Australia develop a whole government approach to address the climate crisis and safeguard our critical export industries as world trade progressively shifts to serve a decarbonised global economy, in alignment with the constraints of climate science. WA needs an approach that supports and matches the ambition, speed and scale of the clean energy industry and renewables policy packages introduced by other States and our Federal Government. Without greater policy ambition and credibility to address climate change at the state level, the current over-reliance on the

<sup>117</sup> EPA, [Guideline GHG Emissions](#), 05 April 2023

<sup>118</sup> Gilbert & Tobin, [New WA EPA Guidance on Greenhouse Gas Emissions](#), 02 June 2023

<sup>119</sup> EPA, [Guideline GHG Emissions](#), 05 April 2023

EPA, of which does not require emissions reduction pathways prior to 2030, jeopardises Australia's Federal climate targets.

In 2022, the Federal Government introduced the **Climate Change Act 2022**, which legislated Australia's commitment to achieving net zero by 2050, as well as an interim national 43% emissions reduction target by 2030, relative to a baseline of 2005.<sup>120</sup>

The Act is designed to advance an effective and progressive response to the rapidly growing threat of climate change, setting out an emissions reduction pathway that would proportionally contribute to the global goal of limiting the increase of global average temperatures well below 2°C above pre-industrial levels, and to pursue efforts that will limit global temperatures to 1.5°C. As a key pillar to achieving the emissions reduction pathways, the Federal Government has committed to reaching 82% renewables by 2030 across Australia's electricity grids.

### Section 11.1. WA Climate Change Bill 2023

On 30 November 2023, the WA Government introduced the **Climate Change Bill 2023** to support and accelerate the reduction of GHG emissions across the state, as well as introduce support for climate adaptation strategies and sectoral decarbonisation pathways.<sup>121</sup>

The Climate Change Bill would provide a legislative framework that promotes transparency and accountability in GHG emissions reduction, as well as provide certainty for investors and industry that the state will undergo an orderly transition to net zero, as well as encourage investment into emissions-reduction technologies, infrastructure and emerging zero-emission industries. The bill will require the introduction of interim emissions reduction targets for each of 2035, 2040, 2045 and 2050.

The legislation of the Climate Change Bill and introduction of **sectoral decarbonisation pathways** for WA's critical fuel and resource industries is an imperative to align the state with Australia's climate and renewables ambition, a shift required to position WA's contribution to climate solutions commensurate with its contributions to Australia's rising emissions and fossil fuel overdependence.

Legislating the Climate Change Bill is critical for the state to achieve net zero, and for the industries vital to the economic growth and prosperity of WA to realise the immense window of opportunity that is presented in the shift to a decarbonised global economy.

The alignment of WA Government energy policy with Federal initiatives like the national emissions reduction target, national renewable target, the Safeguard Mechanism, etc. provides the necessary global market signal that Australia's key export industries will shift to embodied decarbonisation, crowding in foreign investment from key trading partners into future facing value-added projects that will aid in the decarbonisation of our export market economies.

To-date the WA Climate Change Bill 2023 has not been passed into legislation, nor has the WA government taken nearly sufficient credible steps to address the policy targets it has

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<sup>120</sup> Aus Government, [Climate Change Act 2022](#), 12 April 2023

<sup>121</sup> WA Government, [Climate Change Bill 2023 \(no. 139\)](#), 30 November 2023

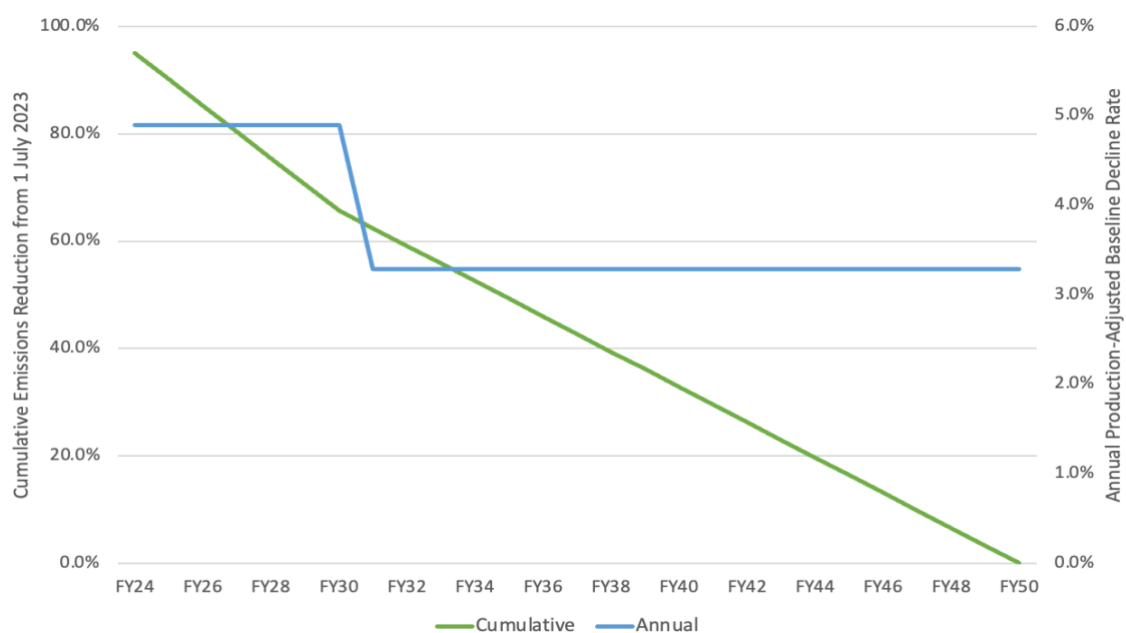
proposed.<sup>122</sup> CEF supports the Australia Institute’s position that the WA Climate Change Bill is an inadequate and inappropriate response to the state’s rising energy emissions, and a major headwind to the Federal Government’s 43% emissions target.<sup>123</sup>

## Section 11.2. The Safeguard Mechanism

The Safeguard Mechanism was first introduced on 1 July 2016, requiring Australia’s highest emitting facilities to keep their emissions below a baseline limit. The Mechanism applies to industrial facilities that emit more than 100,000tpa of CO<sub>2</sub>-e. Of the 219 facilities covered under the Safeguard Mechanism in 2021-22, about a third (72) of all facilities were located in WA. Nearly 52% of WA’s net emissions in 2021 were from facilities covered under the Safeguard Mechanism, of which oil and gas projects represented 45% of covered projects. Iron ore facilities represented 14% of WA covered facilities, behind oil and gas and alumina operations (18%).<sup>124</sup>

The Safeguard Mechanism underwent a significant reform in 2023, with the amendments enforced from 1 July 2023. The previous iteration of the Safeguard Mechanism would set baseline emissions at business-as-usual levels and was entirely ineffective. Although some facility baselines adjusted with annual production, the overall emissions baseline remained relatively consistent over time. Despite the Safeguard Mechanism’s purpose to hold accountable the industrial facilities that contributed significantly to Australia’s emissions, covered facilities’ emissions rose 7% from July 2016 to 2020-21 to 140Mt CO<sub>2</sub>-e, accounting for 28% of the emissions in 2020-21.<sup>125</sup>

**Figure 11.1: Safeguard Mechanism Production-Adjusted Emissions Reduction Pathway**



<sup>122</sup> ABC, [WA has no hope of achieving net zero emissions targets by 2050 without radical change, secret government report finds](#), 18 May 2024

<sup>123</sup> Australia Institute, [Weak WA Climate Change Bill a Blow to National Emissions Target](#), 20 September 2023

<sup>124</sup> WA Government, [Sectoral Emissions Reduction Strategy](#), 30 November 2023

<sup>125</sup> RepuTex, [The Economic Impact of the ALP’s Powering Australia Plan](#), December 2021

The reforms implemented in May 2023 meant covered facilities are now required to deliver a proportional share of Australia's interim climate target to 2030. Net emissions from all covered safeguard facilities must not exceed 100Mt CO<sub>2</sub>-e in 2029-30, and zero from 2049-50.<sup>126</sup> To implement the gradual emissions reduction, baseline emissions ceilings will reduce annually in-line with the nation's commitment to achieving the interim emissions reduction, declining at 4.9% per annum from 2023 to 2030.

The Safeguard Mechanism is supported by the **\$1.9bn Powering the Regions Fund (PRF)**, a subsection of Powering Australia, which provides industry with taxpayer funding to aid in the decarbonisation of trade-exposed industrial facilities covered under the Safeguard Mechanism, accelerating investment into emissions reduction and fossil fuel abatement technologies.<sup>127</sup>

The PRF is designed with specific funding arms, including:

- The **\$600m Safeguard Transformation Stream (STS)** to support trade-exposed Safeguard facilities to invest in low-emissions technologies,
- The **\$400m Industrial Transformation Stream (ITS)** to support the growth of new clean energy industries for existing industrial facilities, i.e. green manufacturing.
- The **\$400m Critical Inputs to Clean Energy Industries** grant to support hard-to-abate sectors in maintaining production during energy transformation, with \$200m to primary steel sector, and \$200m to cement, lime, aluminium and alumina.

As part of the Federal Government's \$20bn **Rewiring the Nation** program, the Clean Energy Finance Corporation (CEFC), in partnership with the Australian Government, will provide **\$3bn** in concessional financing (i.e. soft loans with below-market interest rates, and generally include grace periods) to facilitate major grid upgrades and to unlock future renewable energy precincts within the Pilbara and the NWIS.<sup>128</sup>

### Section 11.3. Capacity Investment Scheme

The Capacity Investment Scheme (CIS) provides a national framework to enable new investment into variable renewable energy generation capacity, as well clean dispatchable capacity (battery storage) to provide firming solutions.

Through the CIS, the Federal Government will provide underwriting for successfully tendered projects, with an agreed revenue floor and ceiling, a mechanism that provides long-term revenue safety-nets that decrease the financial risks for investors and facilitates the build-out of greater capacity where needed.<sup>129</sup>

The CIS involves a series of competitive tenders for generation and storage projects to:

- Deliver an additional 32GW of capacity by 2030, comprising 23GW generation and 9GW clean dispatchable capacity.
- Fill expected reliability gaps as ageing coal power stations exit
- Deliver the Australian Government's 82% renewable electricity by 2030 target.

<sup>126</sup> DCCEEW, [Safeguard Mechanism Reforms](#), May 2023

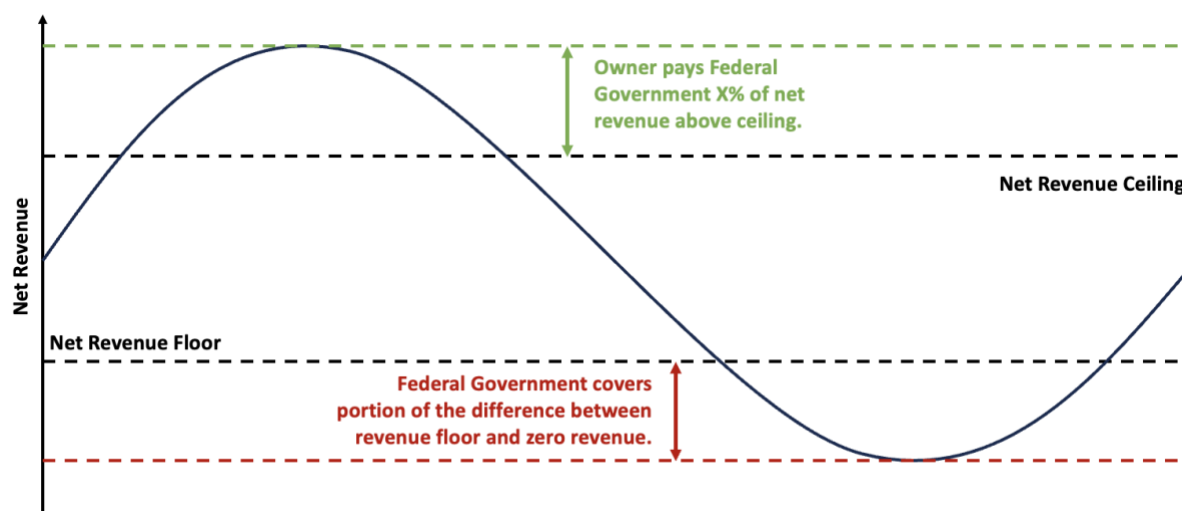
<sup>127</sup> Aus Government, [Annual Climate Change Statement 2023](#), 03 October 2023

<sup>128</sup> Aus Government, [\\$3bn Rewiring the Nation Deal to Power WA Jobs and Growth](#), 29 August 2023

<sup>129</sup> DCCEEW, [Capacity Investment Scheme](#), 28 March 2024

14GW will be rolled out via a guaranteed national tender, with the remaining 18GW delivered through Renewable Energy Transformation Agreements (RETAs).

**Figure 11.2: Illustration of Federal Capacity Investment Scheme**



RETAs will be created through the **National Energy Transformation Partnership (NETP)**, a framework for the Federal Government to collaborate with State and Territory Governments on reforms to transform Australia’s energy system to achieve net zero by 2050.<sup>130</sup> The NETP is designed to maximise the economic opportunities offered by the clean energy transition, and to ensure reliable and affordable electricity to deliver benefits to households, businesses and communities.

June 2024 saw the first 6GW tender launched, and received overwhelming investor interest, with over 40GW of wind and solar proposals registered.<sup>131</sup>

June 2024 also saw AEMO Services launch the CIS’s Wholesale Electricity Market (WEM) - Dispatchable Capacity (Tender 2), which seeks 500 MW of four-hour (2,000 MWh) clean dispatchable capacity.<sup>132</sup>

#### Section 11.4. Clean Energy Finance Corporation and Rewiring the Nation

The CEFC operates as Australia’s ‘green bank’, investing to capture the benefits of the net-zero future, driving the transformation of energy, transport, building, agriculture and manufacturing to harness the economic opportunities of the future. As of the beginning of 2024, the CEFC have committed \$13.2bn across more than 320 large-scale transactions.

In 2022-23, the Australian Government allocated \$19bn to the CEFC to deliver the Rewiring the Nation program, the cornerstone of the Powering Australia Plan.<sup>133</sup> The RTN Fund is designed to enable the energy transition to achieve Australia’s net-zero target, through modernising the NEM and implementing AEMO’s Integrated System’s Plan, as well as to support the rollout of network infrastructure across WA and the Northern Territory.

<sup>130</sup> DCCEEW, [National Energy Transformation Partnership](#), 12 August 2022

<sup>131</sup> RenewEconomy, [Labor swamped with 40 GW of wind and solar bids in first major tender](#), 24 June 2024

<sup>132</sup> AEMO, [Capacity Investment Scheme WEM Clean Dispatchable Tender 2 - WEM Dispatchable](#), 28 June 2024

<sup>133</sup> DCCEEW, [Rewiring the Nation](#), updated 01 February 2024

The mandate of the Fund is to reduce the financing costs of building the required grid electricity infrastructure needed to deliver the energy transition, deployed through co-investment with private and public sector proponents. The rollout of transmission and distribution networks, energy infrastructure to support the development of hydrogen hubs, as well as investment into demand management initiatives.

On 29 August 2023, the Federal Government announced a landmark agreement to deliver up to \$3bn in concessional loans and equity investments, via the CEFC, to expand and upgrade the transmission networks of the SWIS and NWIS.<sup>134</sup> CEF supports the decision by CEFC to commit to working closely with First Nations Australians to understand their reviews on investment and support participation in WA and the Pilbara's energy transformation.

Historically, the CEFC have realised a private sector leverage ratio of 2.93:1, meaning for every \$1 of strategic public capital deployed, it has crowded in \$2.93 of private capital to finance the remaining proportion of future-facing projects. In 2022-23, the CEFC achieved a record private sector leverage of 5.02:1, delivering \$1.9bn across 50 projects with a total transaction value of \$11.7bn.<sup>135</sup>

Along with NAIF, the CEFC's ability to strategically deploy public capital to de-risk project proposals and hence to maximise the crowding-in of private capital at above global average rates must be leveraged to develop the necessary common user infrastructure and connection of inland, regional load centres to the existing coastal NWIS in order to accelerate the development of private renewable energy projects. The construction of common user infrastructure will provide the necessary de-risking through diversification of offtake agreements in-line with the operational life of wind, solar and battery storage projects without the risk of stranded assets.

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<sup>134</sup> Aus Gov, [\\$3 billion Rewiring the Nation Deal to Power WA Jobs and Growth](#), 29 August 2023

<sup>135</sup> CEFC, [2022-23 Annual Report](#), 26 September 2023



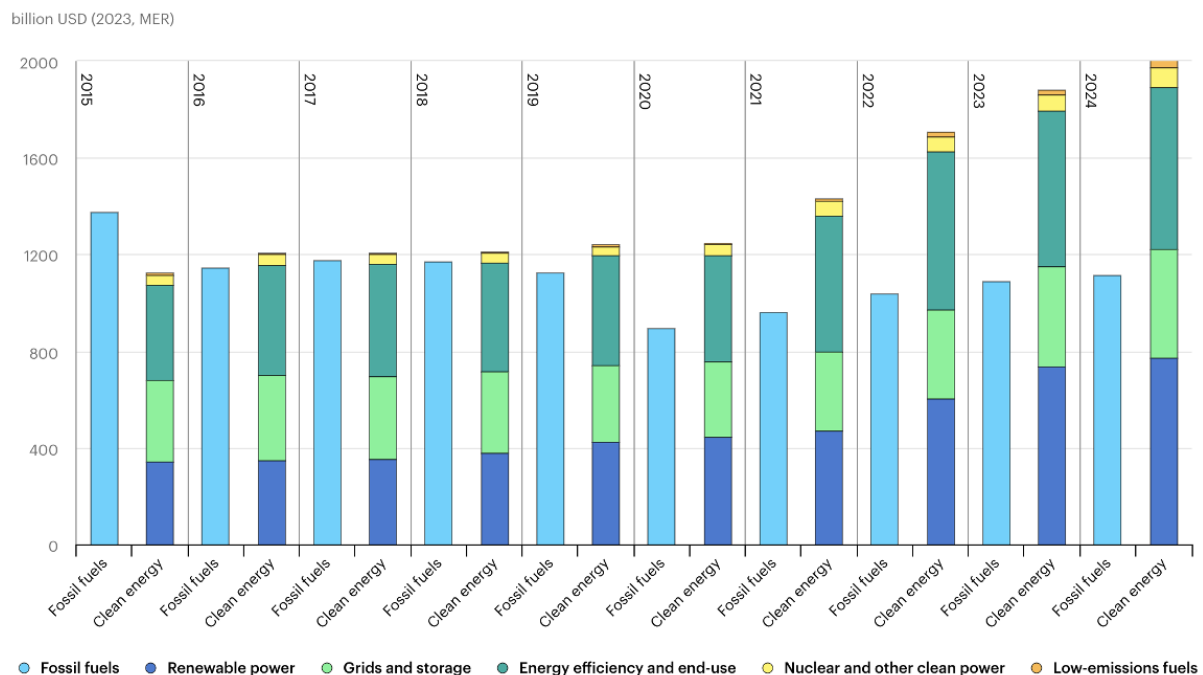
## Section 12. Rapid Growth in Global Cleantech Manufacturing to Drive Down Cost of Electrification

*The world is on track to invest a record US\$2 trillion in cleantech investments in 2024, almost double the annual investment in fossil fuels. This investment is led by China, which is outspending both the US and EU two-to-one.*

In 2024, global annual investment into energy transition technologies reached an all-time high of US\$2 trillion, up 6% from 2023 – Figure 12.1.<sup>136</sup> Investment into new renewable energy projects, including wind and solar hit record highs of US\$771bn in 2024, up 5% from 2023. Investment into solar PV deployment outpaced all other electricity generation technologies for the second consecutive year in 2024, reaching US\$503bn.

Energy transition investments, including both demand and supply-side technologies, outpaced investment into fossil fuels for the fourth consecutive year. In 2024, clean energy investments outweighed fossil fuel spending by 1.8:1, led by China.

**Figure 12.1: Global Clean Energy Capital Expenditure (US\$bn)**



Source: IEA

Continued growth in renewable energy deployment is a result of China's world leadership in exporting low-cost, zero-emission technologies to the world, driven by incredible investment at speed and scale in clean energy manufacturing. In 2023, China accounted for over 75% of the US\$200bn investment into clean energy manufacturing, with ~ 95% being directed into solar PV and battery manufacturing.<sup>137</sup> The IEA estimates that ~ 40% of total investments made in 2023 were for manufacturing capacity that will be operational in 2024, and ~ 70% of investments into batteries in 2024.

<sup>136</sup> IEA, [World Energy Investment 2024](#), 06 June 2024

<sup>137</sup> IEA, [Advancing Clean Technology Manufacturing](#), May 2024

## Section 13. A Global Price on Carbon

*June 2024 saw US Climate Envoy John Podesta advocate for the US to impose carbon import taxes on high emissions export nations, noting embedded emissions are not yet priced in global trade. This follows the EU CBAM going live in October 2023. And by the end of 2025 we expect the NDRC to expand the largest ETS in the world (by volume) to cover 7-8 heavy industry sectors across China.*

*A price on carbon emissions in global trade is exactly the signal that Australian mining majors need to commercially incentivise the shift to green iron, green aluminium and lithium hydroxide, and value-adding of Australian critical minerals and strategic metals. We note Indonesia has made significant progress by a political mandate to value-add pre-export. Australia should advocate for an Asian CBAM and similarly require value-adding of our public resources, and provide enabling financial support.*

Across the globe, economies are shifting energy and industry policy to that which factors in a price on carbon, both implicitly and explicitly. Carbon prices are needed to capture and price in the negative externalities associated with carbon emissions, i.e. the burden placed upon the public from diminishing crop yields, health care costs, and the rapidly rising monetary impacts of climate change and the increasing severity and frequency of heat waves and droughts, to flooding and sea level rise. The IEA models in its Net Zero Emissions scenario the developed world having comprehensive carbon prices of US\$250/t by 2050, with major developing countries having a carbon price of ~US\$200/t. While carbon markets globally are expanding with each year, we have a long way to go.

Economists argue that a whole of economy price on carbon emissions is the most effective tool to address the climate crisis,<sup>138</sup> given this would raise huge amounts of tax revenue annually to help finance the US\$4-6 trillion annual cleantech investments required globally to align with a 1.5°C trajectory.

Putting a price on carbon shifts the burden back onto the entity responsible for the carbon emissions. Emissions do not respect international borders. The burden of climate change is placed onto the shoulders of everyone. A credible global price on carbon eliminates the ability for fossil fuel producers to ship emissions offshore free of charge, externalising their cost of doing business, a subsidy that undermines the economic competitiveness of zero emissions alternatives.

There are three main carbon pricing mechanisms, ETS, direct carbon taxes and CBAM.

**Emission Trading Systems (ETS)** – introduces a cap to the level of GHG emissions and allows industries with low emissions to sell additional allowances to larger emitters. The trading system creates a supply and demand market dynamic, with higher demand for allowances driving up the prices the entity must pay to emit. The most effective and significant scheme is the European Union (EU) ETS, which has been in place for several decades, and is progressively expanding beyond the electricity sector to heavy industry, and has credible prices currently averaging €60-100/t and a ratcheting-up over time capacity.

**Carbon Taxes** – an explicit price on carbon with a defined tax rate on GHG emissions or carbon content of fossil fuels. Unlike the dynamic market of an ETS, a carbon price is pre-

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<sup>138</sup> Australian Productivity Commission, [Intergenerational Report 2023](#)

defined, and often has a legislated ratchet-up profile over time e.g. Singapore (S\$25/t), Canada (C\$80/t) and New Zealand (NZ\$50/t).

**Carbon Border Adjustment Mechanisms (CBAM)** – October 2023 saw the EU introduce its transitional CBAM to ensure that the imposition of the carbon price on EU industry doesn't create an unfair advantage for high emissions import alternatives.<sup>139</sup>

As of April 2024, there are 75 carbon taxes and ETSs in operation globally, an increase of two carbon pricing instruments from 2023, the reformed Australian Safeguard Mechanism into an intensity-based ETS, and Hungary's new carbon tax.<sup>140</sup> Carbon pricing mechanisms now cover ~ 24% of global GHG emissions, almost 13 gigatons of CO<sub>2</sub>-e annually.

As of April 2024, there are now 7 carbon pricing mechanisms that are within or exceed the High-Level Commission on Carbon Prices recommended US\$63-127/t range to limit temperature rise to below 2°C, all of which are carbon taxes. The highest ETS price remains the EU ETS, which was dropped below the threshold in 2024.

**Figure 13.1: Price Evolution of Largest ETSs**



Source: World Bank

### Section 13.1. China Emissions Trading Scheme

In September 2020, President Xi Jinping announced that China will “aim to have CO<sub>2</sub> emissions peak before 2030 and achieve carbon neutrality before 2060” (the “dual carbon” goals). A key policy step to deliver on this ambition saw China move from seven regional pilot ETS schemes to a national ETS in July 2021. This ETS was initially imposed just on the electricity sector. Whilst the pricing of the Chinese ETS is still averaging only US\$10/t, by volume this scheme is the largest in the world, covering 40% of China's total energy

<sup>139</sup> EU, [Carbon Border Adjustment Mechanism](#)

<sup>140</sup> World Bank, [State and Trends of Carbon Pricing](#), 21 May 2024

emissions, 4x the EU ETS.<sup>141</sup> Coverage is expected to soon include energy-intensive industrial sectors – including petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper and domestic aviation – which account for another 30% of energy sector emissions.

In 2024, China tightened regulations governing the national ETS. Previously, there were no laws or administrative regulations for the management of emissions trading in China, with the Ministry of Ecology and Environment (MEE) lacking authority, proving difficulty in regulating trading, ensuring quality of reporting and to punish illegal acts. From 1 May 2024, stricter regulations that strengthen state control and crack down on emissions data fabrication will come into effect.<sup>142</sup>

The current national ETS covers 2,257 enterprises from China’s power sector as of the end of 2023. The facilities covered under the ETS emit ~5.1 billion tonnes of CO<sub>2</sub>-e annually.<sup>143</sup>

As of the end of 2023, a total of 440 Mt CO<sub>2</sub>-e of carbon emissions were transacted, with the transaction volume reaching RMB 24.9 billion (US\$3.4bn). However, carbon prices remain relatively low at ~RMB 70-90/t (US\$10-12/t), far below the ~US\$86/t price under the EU ETS.

July 2024 saw MEE issue new rules to tighten the ETS and curb emissions to accelerate the green transition.<sup>144</sup>

### Section 13.2. European ETS and Carbon Border Adjustment Mechanism

In 2005, the European Union established the EU ETS, the world’s first international emissions trading system. The EU ETS operates on the ‘cap and trade’ method, setting a ceiling on total GHG emissions.

As of 1 October 2023, the EU’s CBAM was introduced, with the objective to reduce emissions attached to the production of carbon intensive goods imported into the EU. From 2023 to 2026, the CBAM will apply to imports of energy-intensive industries including iron/steel, cement, fertilisers, aluminium, hydrogen and electricity. The CBAM will be fully operational as of 2026.<sup>145</sup>

The objective of the transitional period (between 2023-2026) is to pilot the reporting mechanism, with importers only having to report embedded GHG emissions in their imports (both Scope 1 and 2), without the need to surrender certificates.<sup>146</sup>

### Section 13.3 US Carbon Tax Imposed on Imports

June 2024 saw US Climate Envoy John Podesta signal a shift in US policy to target imports from ‘dirtier’ countries, stating that “The global trading system doesn’t properly take into

<sup>141</sup> IEA, [Enhancing China’s ETS for Carbon Neutrality: Introducing Auctioning](#), May 2024

<sup>142</sup> SCMP, [China Strengthens State Control on Carbon Emissions Trading](#), 5 February 2024

<sup>143</sup> SCMP, [China Strengthens State Control on Carbon Emissions Trading](#), 5 February 2024

<sup>144</sup> Bloomberg, [China’s new carbon market rules aim to reduce oversupply](#), 2 July 2024

<sup>145</sup> European Commission, [Carbon Border Adjustment Mechanism \(CBAM\)](#), 01 October 2023

<sup>146</sup> EU, [Taxation and Customs Union: Carbon Border Adjustment Mechanism](#)

account the ‘embodied carbon in traded goods.’ This is likely to have bipartisan support, given the anti-China rhetoric on both sides of US politics.<sup>147</sup>

### Section 13.4 Indonesia demands Value-adding pre-export to its Resources

June 2024 saw President Joko Widodo open a US\$1.1bn new battery cell manufacturing factory in Indonesia jointly developed by South Korea’s Hyundai and LG Energy Solutions.<sup>148</sup> Meanwhile China’s CATL and BYD are building new Indonesian battery and EV manufacturing plants, to leverage China Huayou Cobalt and Tsingshan’s massive new nickel refineries. These global cleantech leaders are investing value-adding in Indonesia in response to the edict from the Indonesian government that continued foreign investor access to Indonesia’s world leading critical minerals and strategic metals is contingent on domestic value-adding pre-export.

CEF strongly advocates that Australia pursue a similar national self-interest to ensure we leverage our world leading renewable energy potential to power zero emissions value-adding of our world leading resources pre-export as well. We see the Future Made in Australia Act, the Safeguard Mechanism, the Capacity Investment Scheme and the upscaling of financial capital in NAIF, EFA, CEFC and the NRF as all good steps to de risk and crowd-in private capital to allow Australia to seize a once in a century investment, employment and net export boom, helping the world drive decarbonisation capacities at the speed and scale the climate science dictates.

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<sup>147</sup> FT, [US examines carbon pricing on imports, climate envoy says](#), 1 July 2024

<sup>148</sup> FT, [Hyundai and LG Energy open Indonesia’s first battery cell factory](#), 3 July 2024

## Appendix 1: Future Made in Australia

After a decade of climate and energy transition chaos, inaction, and underinvestment under the luddites of the LNP, Federal Labor have sent a strong message to the world that Australia recognises the future opportunities present from leveraging our comparative advantages in green energy and resources.

On 14 May 2024, the Australian Federal Government released its 2024-25 Budget, in which the Albanese Government delivered its centrepiece **Future Made in Australia** (FMIA) framework, a \$22.7bn strategy to maximise the economic and industrial benefits of the global shift to a net-zero economy, and to secure Australia's place in capturing value and seizing the opportunities present with the global reshaping of energy, industry and supply chain landscape.<sup>149</sup>

As part of the 2024-25 Budget, the Federal Government announced a total \$21bn in new funding initiatives, including:

- **\$7.1bn** to support value-added refining and processing of critical minerals onshore, via a new Critical Minerals Production Tax Incentive;
- **\$8bn** to support the production of green hydrogen, delivered via a \$1.3bn expansion of the Hydrogen Headstart Program and a \$6.7bn Hydrogen Production Tax Incentive;
- **\$1.5bn** additional funding to the Australian Renewable Energy Agency (ARENA) to accelerate core investments into renewable energy and associated technologies;
- **\$1.7bn** directed into the new Future Made in Australia Innovation Fund, administered by ARENA to support commercialisation and demonstration projects in priority sectors;
- **\$1.4bn** to support manufacturing of clean energy technologies, including \$835m to establish the Solar Sunshot program, and \$549m to support battery manufacturing via the new Battery Breakthrough Initiative;
- As well as up to **\$1.2bn** in strategic investments in priority critical mineral projects by the Government's investment vehicles, largely the Critical Minerals Facility and Northern Australia Infrastructure Facility (NAIF).

Targeted, strategic public investment strengthens the alignment of economic incentives with Australia's national interests and crowd-in private investment at scale to develop Australia's priority net-zero economy industries.

The FMIA will direct public capital into opportunities that have (1) lasting competitiveness for Australia in global markets, (2) play a role in securing an orderly path to net zero, (3) build Australia's economic resilience and security, (4) build key sovereign capabilities, as well as to (5) overcome barriers of catalysing private capital into industries that deliver compelling public value.

As such, the FMIA will be structured around a new FMIA **National Interest Framework** (NIF), which categorises projects and opportunities into one of:<sup>150</sup>

<sup>149</sup> Treasury, [Budget 2024-25](#), 14 May 2024

<sup>150</sup> Treasury, [Future Made in Australia National Interest Framework](#), 14 May 2024

- The **Net-Zero Transformation Stream** – industries that will make a significant contribution to the net-zero transition and are expected to have an enduring comparative advantage, and public investment is needed for the sector to make a significant contribution to emissions reduction at an efficient cost.
- The **Economic Resilience and Security Stream** – includes where some level of domestic capability is necessary or efficient to deliver adequate economic resilience and security, and the private sector would not invest in this capability in the absence of public investment.

Within the FMIA NIF, the Australian Government recognises the skills, market information, risk-taking frameworks, agility and flexibility to make necessary and appropriate long-term investments in new markets and technologies. However, there are also circumstances where economic incentives are not aligned with broader national interest objectives.

The FMIA highlights that more direct government intervention may be justified where particular market failures are present, including:

- Where negative externalities from more emissions-intensive production methods are not appropriately priced into global markets, so cleaner production methods that present cost effective abatement opportunities are not able to compete on a level playing field with existing industry. CEF strongly agrees with this, and notes the critical importance for our government to advocate for development of an Asian carbon border adjustment mechanism (CBAM), to leverage and extend the EU scheme.
- Where private industry fails to appropriately price in the required level of economic resilience and security in critical sectors and supply chains, resulting in unacceptable levels of risk to Australia's national interest or broader economy.
- Where technologies that are critical to the net-zero transformation or broader national interest are nascent, and public investment in innovation can generate important learnings that help produce such technologies at a lower cost. These interventions represent positive externalities that early movers cannot internalise in their decision-making. Without government support, clean production methods will remain underinvested, slowing the learning-by-doing process and prolonging the use of more emissions-intensive production processes.

Deliberate and targeted policy shifts to improve the investment climate and address market failures will help the private sector to navigate the risks and challenges posed by changes to the global landscape and build a stronger and more resilient Australian economy for the decarbonised future.

Under the **Net-Zero Transformation Stream**, priority sectors are identified as:

- Industries expected to have a sustained comparative advantage in a net-zero global economy; and
- Public investment is needed for the sector to make a significant contribution to emissions reduction at an efficient cost.

An industry is more likely to qualify for support if the industry:

- Is energy-intensive and capable of substantially reducing its carbon emissions by taking advantage of our abundant renewable energy resources;

- Has output that embodies low carbon emissions and can help contribute to decarbonisation in other areas of the economy;
- Can leverage Australia's highly skilled workforce, using technological improvements to reduce labour intensity;
- Is able to achieve economies of scale in Australia;
- And aligns with international trading partners' current or future needs and is complementary to actions taken by our strategic partners.

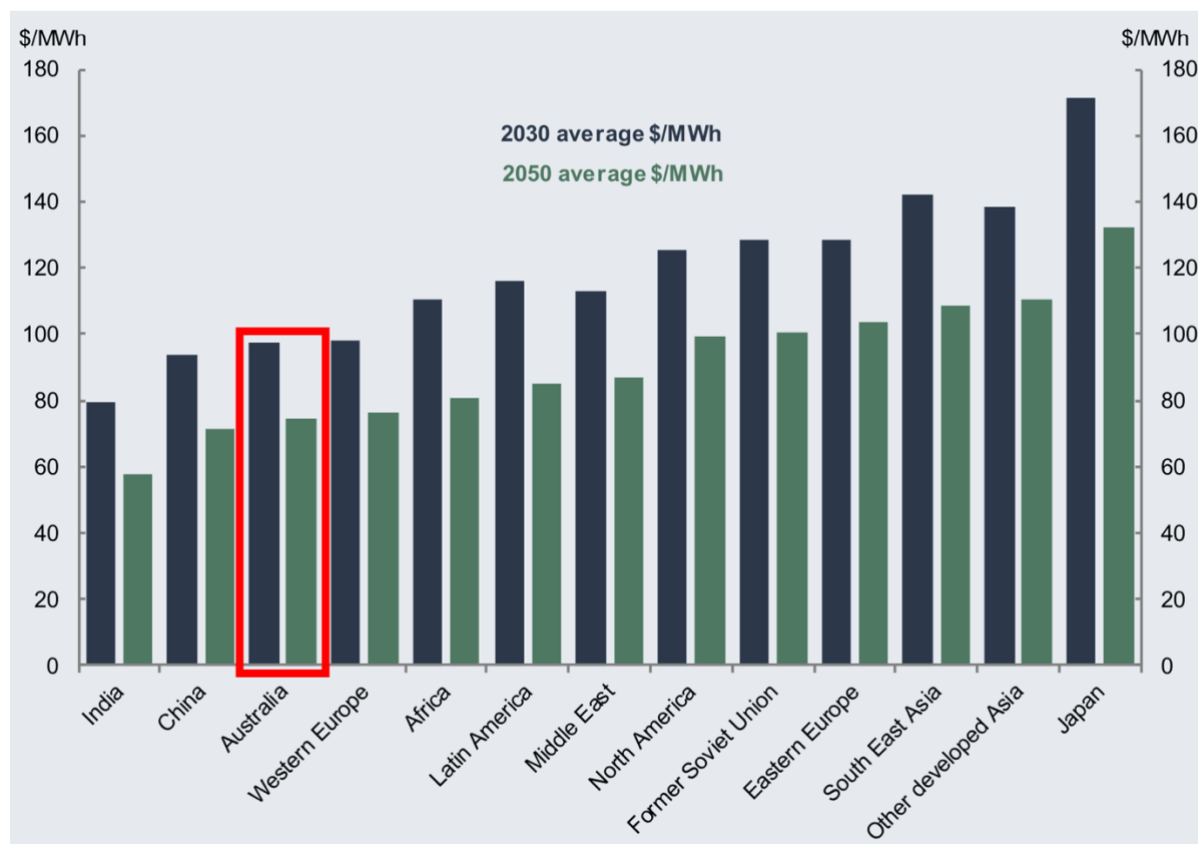
The **Economic Resilience and Security Stream** will identify priority sectors as:

- Some level of domestic capability is a necessary or efficient way to protect the economic resilience and security of Australia, and the private sector will not deliver the necessary investment in the absence of government support.

Consideration under this stream will include:

- The global and domestic concentration of supply and supply chains;
- The vulnerability of supply disruption;
- How critical the industry or product is to our security and resilience; and
- Whether the industry can prevent, absorb, adapt or transform processes to limit the consequences of a shock to our national interests.

**Figure A1.1: Global Renewable Electricity Price Forecast 2030, 2050**



Source: CSIRO <sup>151</sup>

<sup>151</sup> CSIRO, [Comparing and Ranking the Global Cost of Green Industrial Electricity](#), 20 November 2023



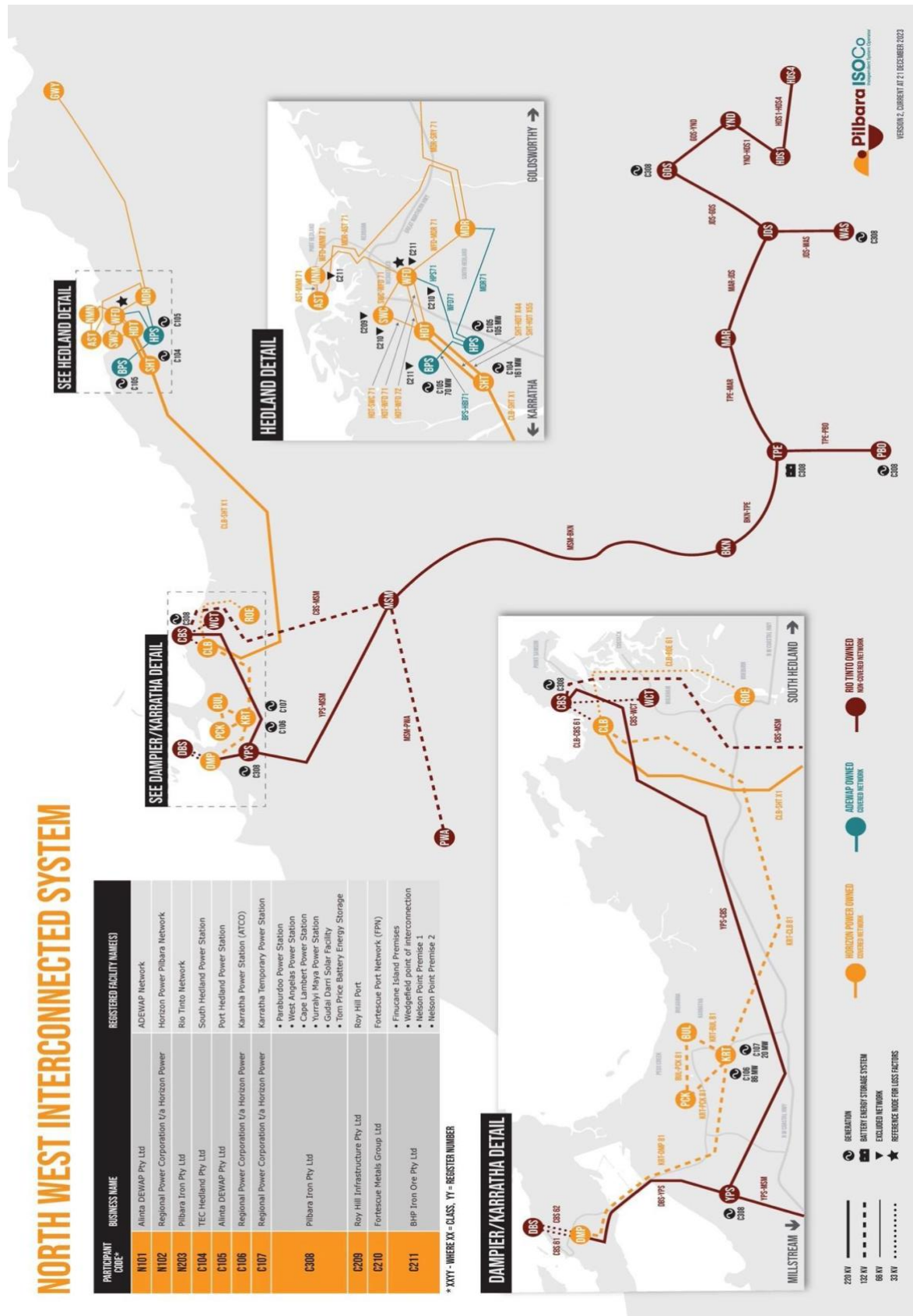
## Appendix 2: Pilbara Facilities in the Safeguard Mechanism

Parent Company	Safeguard Mechanism Facility	FY23 Scope 1 Emissions tonnes CO <sub>2</sub> -e
APA Energy Pilbara	Newman Power Station	379,196
BHP	PRL03 Rail - IOR Facility	566,312
	ARC01 Mining Area C - MNG Facility	470,614
	Yarnima Power Station	336,179
	Jimblebar Mine	306,282
	Newman Operations	294,760
	YAN01 Yandi/Marillana Creek Mine - MNG Facility	111,995
	Sino Iron Project – Cape Preston	1,229,931
	Rail	259,172
Fortescue	Solomon Mine	448,524
	Solomon Power Station	206,715
	Eliwana Mine	173,475
	Christmas Creek Mine	374,494
	Cloudbreak Mine	287,001
Mineral Resources	Wodgina Operations	111,027
Pilbara Minerals	Pilgangoora Operations	101,560
Rio Tinto	West Angelas Mine	292,917
	Mesa A Mine	64,978
	Pilbara Rail Operations	662,419
	Gudai-Darri Mine	121,340
	Brockman 2 / Nammuldi Mines	326,401
	Brockman 4 Mine	239,705
	Tom Price Mine / WTS	188,503
	Yandicoogina Mine	173,685
	Hope Downs 1 Mine	166,780
	Marandoo Mine	155,933
	Paraburdoo Mine	129,483
	Hope Downs 4 Mine	118,259
Roy Hill	Roy Hill Mine	562,307
Woodside	North West Shelf Project	6,935,647
	Pluto LNG	1,839,910
Yara Fertilisers	YPF AMMONIA PLANT	1,503,171
<b>Emissions from Key Pilbara Safeguard Facilities</b>		<b>19,138,675</b>

Source: Clean Energy Regulator <sup>152</sup>

<sup>152</sup> CER, [Safeguard Mechanism Facility Data 2022-23](#), 28 March 2024

# Appendix 3: The North West Interconnected System (NWIS)



## Appendix 4: NWIS System Map Definitions

Name	Area	Facility	Owner
BKN	Regional	Brockman Substation	Rio Tinto
GDS	Regional	Gudai-Darri Substation	Rio Tinto
GWY	Regional	Goldsworthy Substation	Horizon Power
HDS1	Regional	Hope Downs 1 Substation	Rio Tinto
HDS4	Regional	Hope Downs 4 Substation	Rio Tinto
JDS	Regional	Juna Downs Substation	Rio Tinto
MAR	Regional	Marandoo Substation	Rio Tinto
MSM	Regional	Milstream Substation	Rio Tinto
PBO	Regional	Paraburdoo Substation	Rio Tinto
PWA	Regional	Pannawonica Substation	Rio Tinto
TPE	Regional	Tom Price Substation	Rio Tinto
WAS	Regional	West Angelas Power Station	Rio Tinto
YND	Regional	Yandi Substation	Rio Tinto
BUL	Dampier / Karratha	Bulgarra Substation	Horizon Power
CBS	Dampier / Karratha	Cape Lambert Bulk Supply	Rio Tinto
CLB	Dampier / Karratha	Cape Lambert Terminal	Horizon Power
DBS	Dampier / Karratha	Dampier Bulk Supply	Rio Tinto
DMP	Dampier / Karratha	Dampier Substation	Horizon Power
KRT	Dampier / Karratha	Karratha Terminal	Horizon Power
PCK	Dampier / Karratha	Pegs Creek Substation	Horizon Power
ROE	Dampier / Karratha	Roebourne Substation	Horizon Power
WCT	Dampier / Karratha	Wckham Substation	Horizon Power
YPS	Dampier / Karratha	Yurralyi Maya Power Station	Rio Tinto
AST	Port Hedland	Anderson St Substation	Horizon Power
BPS	Port Hedland	Boodarie Power Station	ADEWAP
HDT	Port Hedland	Hedland Terminal	Horizon Power
HPS	Port Hedland	Hedland Power Station	ADEWAP
MDR	Port Hedland	Murdoch Drive Substation	Horizon Power
MNM	Port Hedland	Mount Newman Substation	Horizon Power
SHT	Port Hedland	South Hedland Terminal	Horizon Power
SWC	Port Hedland	South West Creek Substation	Horizon Power
WFD	Port Hedland	Wedgfield Substation	Horizon Power

## Appendix 5: Heat Rate Conversion Factors

Energy Source	Thermal Conversion	Heat Rate	Efficiency Factor
	Btu/kWh	Btu/kWh	%
Gas Power Station	3,412	7,740	44%
Internal Combustion (Diesel)	3,412	10,475	33%

*EIA, CEF Calculations*

# Appendix 6: Burrup Peninsula Common User Grid Extension



<p>Page Size ISO A3</p> <p>0 0.5 1 1.5 2 Kilometres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA2020 Grid: GDA2020 MGA Zone 58</p>			<p>Horizon Power Burrup Expansion Program</p> <p><b>Proposal Location and Development Envelope</b></p>	<p>Project No. 12582802 Revision No. 0 Date 07/11/2022</p>
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**FIGURE 2-1**

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Print date: 07 Nov 2022 - 14:43

Data source: World Topographic Map; Esri; HERE; DeLorme; Fugro; METRIS; USGS  
Language; Subscription; Imagery; Hillshade  
World Hillshade; Esri; Geonames Australia; NASA; NOAA; USGS; Created by: dsmc3

## Appendix 7: Australian Renewable Energy Hub Proposal

