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Setting, tracking and achieving Australia's emissions reduction targets

Submission to the Climate Change Authority

Thank you for the opportunity to present IEEFA's submission to this consultation

Regards

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Submitted via email

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Question 1 - What actions and enablers beyond those identified in the Strategic Framework could help Australia progress towards a prosperous and resilient net zero future? What are your highest priorities?

Question 12 - What factors should the Authority consider when developing sectoral decarbonisation pathways?

Australia needs national energy pathways

We cannot look at solutions separately, and focus only on sectoral pathways, we need an integrated approach to our energy strategy and national energy pathways to guide policy and investments decisions. The attached report goes through this issue in detail, and below is its executive summary.

"The Australian government has made a clear commitment to the global goal of limiting global warming below 1.5°C. To support this objective, Australia has set emissions reduction and renewable electricity generation targets. However, it has no comprehensive plan for how it will achieve those targets, and some internal inconsistencies between different government objectives are creating confusion when it comes to implementation.

"In the absence of a comprehensive plan, the Australian Energy Market Operator's (AEMO) scenarios are used by many to support planning and investment decisions. However, the scenario presented as most likely only meets some but not all of the government's objectives and doesn't meet Victoria's emissions reduction targets. Its electricity and gas scenarios also materially contradict each other, and AEMO's choice of assumptions has been questioned by clean energy investors. The current piecemeal approach appears to prioritise supply-side solutions over demand-side solutions, and does not sufficiently analyse the potential impact and value of distributed resources.

"Australia needs 1.5°C national energy pathways that look at the energy transition in an integrated way across fuel types, sectors and solutions. The pathways should investigate a wide range of possible outcomes – clearly identifying where solutions are preferable, and exploring alternatives where large amounts of uncertainty exist. The pathways should support planning decisions, and make recommendations on which new supply projects are essential, on timelines for phasing out key infrastructure assets, and on priority usage for scarce resources. This should include both domestic energy requirements as well as export-focused projects."[1]

[1] IEEFA. Australia needs 1.5C aligned national energy pathways. June 2023.

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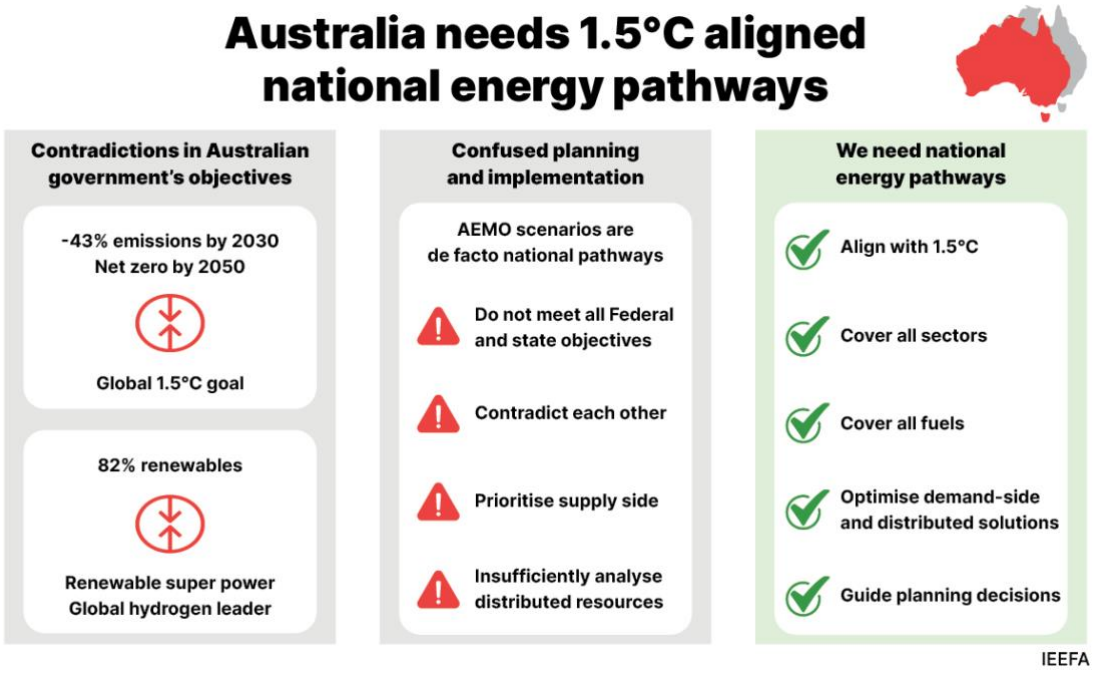

Question 21 - What do you see as the strengths and weaknesses of the NGER scheme? How could it be improved?

Question 22 - What aspects of methane measurement, reporting and verification should the Authority focus on as part of the NGER review?

Australia needs to assess and address methane emissions appropriately

The International Energy Agency (IEA) published estimates of actual methane emissions by country for 2022. These estimates are based on "all publicly reported, credible sources where data has become available", which includes emissions detected by satellites.[2]

Official national inventory figures stop at 2021, and are not available for 2022, but the national greenhouse gas inventory quarterly updates show that methane emissions in 2022 were the same as in 2021 at 121 million tonnes of CO_2 equivalent ($MtCO_2e$). Energy fugitive emissions in 2022 are also estimated to be very similar to 2021 levels at 48.9 $MtCO_2e$ compared with 49.7 $MtCO_2e$.[3] The table below compares the IEA's estimates for Australia's methane emissions for 2022 with the national inventory figures for 2021.

The IEA estimates that methane emissions from the energy sector in Australia are about 76% higher than the national inventory data (Table 1**Table *1***). The discrepancy corresponds to about

[2] International Energy Agency (IEA). Global methane tracker. Documentation – 2023 version. February 2023. Page 8.
[3] Australian Government, Department of Climate Change, Energy, the Environment and Water (DCCEEW). National greenhouse gas inventory quarterly update: December 2022 – data sources. 2023.

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27 $MtCO_2e$ of underreported emissions in Australia's national inventory.[4] This is more than 5% of today's emissions.[5]

Table 1 - Comparison of methane emissions estimates by IEA (2022) with National inventory emissions data (2021) - in kilotonnes

Sector	IEA estimates[6]	National inventory data[7]	Underestimation
Energy	2,232	1,265	+76%
Other	3,311	3,105	+7%
Total	5,544	4,370	+27%

It is critical to correct these underestimates as soon as possible, in particular in the context of the declining cap set on Australia's largest industrial emitters as part of the Safeguard Mechanism.[8] Not correcting it promptly could result in the cap being exceeded by existing fossil fuel extraction projects, with no space for new industrial developments. New technologies such as satellite measurements can help improve methane emissions assessments.[9]

With such a strong contribution to national emissions, it will also be important for Australia to develop a plan to address those emissions. For example, the United States gave new authorities to the EPA to reduce methane emissions coming from the oil and gas sector. The new Methane Emissions Reduction Program includes some financial and technical assistance as well as a waste emissions charge for methane from facilities that report more than 25,000 tCO_2e per year. "Waste emissions charge starts at $900 per metric ton for emissions reported in 2024, increasing to $1,200 for 2025 emissions, and $1,500 for emissions years 2026-on."[10] This is equivalent to A$45/$tCO_2e$ in 2024, A$60/$tCO_2e$ in 2025, and A$/76$tCO_2e$ in 2026 onwards.

Question 16 - What do you see as the challenges and opportunities from a phase out of fossil fuel production? What should the Government consider when determining a plan for the phase out of fossil fuels?

Question 28 - What role should governments and users of offsets have in ensuring demand-side integrity?

[4] Based on 35.4 MtCO2e of reported methane emissions in the national inventory in 2021. Source: DCCEEW. Australia's National Greenhouse Accounts. Paris Agreement inventory.
[5] Australia's emissions in 2021 were 464.8 MtCO2e. Source: DCCEEW. Australia's National Greenhouse Accounts. Paris Agreement inventory.
[6] IEA. Methane Tracker Database. 2023.
[7] DCCEEW. Australia's National Greenhouse Accounts. Paris Agreement inventory.
[8] DCCEEW. Safeguard Mechanism Reforms factsheet. May 2023. Page 1.
[9] IEA. Understanding methane emissions. Satellites are providing a major boost to our understanding of emissions. 2023.
[10] United States Environmental Protection Agency. Methane Emissions Reduction Program.

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Decommissioning and transferred emissions risks need to be addressed to avoid a disorderly transition

Proper care should be taken to ensure an orderly phase out of fossil fuel production. Particularly significant risks exist around the management of transferred emissions and of rehabilitation / decommissioning costs.

A recent analysis by IEEFA showed that rehabilitation provisions need to be regularly reviewed to account for changes in context:

"In its 2022 Annual Report, BHP disclosed that a review of its coking coal mine lives resulted in it recognising that the end of its operations 'may be earlier than previously anticipated'. This led to an increase in rehabilitation provision of approximately US$750 million.

"Thermal coal producers are particularly exposed to earlier-than-anticipated mine closure, due to the structural decline of thermal coal in the global energy transition. Mine closure plans should be regularly reviewed – including capturing current trends in unit cost inflation and the impacts of climate change. Given the increased severity of intense weather events such as flooding, as predicted by the CSIRO and others, mine closure plans should be stress-tested to account for climate change. What was considered an appropriate closure requirement in historical mining approvals may be insufficient in today's environment.

"A 2020 survey of mining leaders – developed in conjunction with consultants SRK Consulting and Turner and Townsend – indicated that in Australia, if leaders felt that climate change would change closure requirements, only 12% felt that miners and regulators were prepared for those changes. It also confirmed (84% of respondents) that adequate capital for closure was set aside only half the time.

"The NSW state government should also take the opportunity to test their assumptions. NSW holds just A$3.3 billion in environmental bonds, compared with A$12.3 billion held by the Queensland state government. In February 2023, a report by Hunter Renewal tabled that over the next 20 years, 17 mine closures are scheduled to deliver over 130,000 hectares of mine-owned land to new uses in the NSW Hunter Valley alone."[11]

A recent analysis by the Columbia Center on Sustainable Investment showed that the sale of fossil fuel assets by large energy companies could lead to issues. The global study showed that "the companies that buy these assets are sometimes governed by less rigorous reporting requirements and subject to less public scrutiny than the supermajors, further removing the assets sold and their emissions from public scrutiny".[12] They found that "on average, sold assets demonstrated higher post-sale emissions intensities, which indicates that they operated less efficiently". They also identified that "fossil fuel assets sold by the super majors may move to companies with worse track records in environmental and other matters".[13] The buying

[11] IEEFA. Australian coal miners should think carefully about what they do with their inflated cash balances. March 2023
[12] Columbia Centre on Sustainable Investment. Transferred emissions are still emissions. May 2023. Page 5.
[13] Ibid. Pages 5-6.

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companies may also have less strong balance sheets to meet rehabilitation and decommissioning costs.

These issues need to be considered as several of Australia's largest mining and energy companies are selling off their assets. For example, BHP recently sold a series of coal and metallurgical mines, as well as its entire oil and gas division.[14] Rio Tinto also sold all of its coal mines.[15]

Australia should ensure it does not develop unnecessary energy export projects

Australia's exported emissions are about 2.5 times higher than its domestic emissions.[16] This means Australia cannot ignore its exported emissions in its contribution to the global efforts to limit global warming to 1.5°C.

The science is now clear on what is required to limit global warming to 1.5°C. Both the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC) state that new developments in oil and gas are incompatible with the global goal of 1.5°C with no/low overshoot.

The IPCC stated in its latest Synthesis Report that not only is there no space for new fossil fuel developments but existing assets will need to be retired early: "Projected cumulative future CO_2 emissions over the lifetime of existing fossil fuel infrastructure without additional abatement exceed the total cumulative net CO_2 emissions in pathways that limit warming to 1.5°C (>50%) with no or limited overshoot. They are approximately equal to total cumulative net CO_2 emissions in pathways that limit warming to 2°C with a likelihood of 83%."[17]

The IEA developed a Net Zero Emissions by 2050 scenario, which shows that no new oil and gas projects are required if the world is to reach net zero by 2050: "Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway."[18]

An update of the scenario stated that investments made since its initial release were already putting the 1.5°C objective at risk: "Recent investment in fossil fuel infrastructure not included in our 2021 NZE Scenario would result in 25 Gt [gigatonnes] of emissions if run to the end of its lifetime (around 5% of the remaining carbon budget for 1.5°C)."[19]

Recent analysis estimated that the emissions associated with the 116 new fossil fuel projects currently proposed for development would create about 4,823 $MtCO_2e$ of emissions.[20] These projects would make a significant contribution above the global 1.5°C budget.

In addition, many of those projects are likely to be unnecessary – not meeting any required international demand. IEEFA's Global LNG Outlook 2023-2027 shows that a tidal wave of new

[14] The Sydney Morning Herald. BHP set to sell more Australian coal mines as profit falls. February 2023.
[15] Rio Tinto. Rio Tinto completes sale of remaining coal assets. 2018.
[16] Climate Analytics. Evaluating the significance of Australia's global fossil fuel carbon footprint. July 2019. Page 2.
[17] IPCC. AR6 Synthesis Report – Longer Report. 2023. Page 24.
[18] IEA. Net Zero by 2050: A Roadmap for the Global Energy Sector. May 2021. Page 21.
[19] IEA. An updated roadmap to Net Zero Emissions by 2050. 2022.
[20] The Australia Institute. Emissions from the 116 proposed coal and gas projects would swamp the reductions from the safeguard mechanism. March 2023.

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LNG projects will come online globally, starting mid-2025. As a result, "liquefaction projects targeting in-service after 2026 may be entering a much smaller demand pool than bullish market forecasts anticipate".[21] Demand for many of those projects is uncertain, with for example large, uncontracted volumes expected from Qatar.[22]

It is critical that Australia limits its export-focused energy projects to those that are essential to meet international energy demand, and that it does not develop projects which will unnecessarily overextend the global carbon budget.

Australia should end the issuance of new offshore exploration permits for oil and gas producers

There is a long lead time from discovery to development of new oil and gas fields that can span decades. For example, the Scarborough gas field in the Carnarvon Basin offshore Western Australia, which is being developed by Woodside Energy,[23] was discovered in 1979,[24] 44 years ago. Given the clear guidance that new developments in oil and gas are incompatible with the global goal of 1.5°C, and the extensive list of oil and gas projects already under consideration,[25] it is IEEFA's opinion that any new exploration is likely to be a wasteful exercise.

Exploration is usually accompanied by work programmes such as seismic surveys to look for hydrocarbons. Ending the issue of exploration permits and the subsequent seismic blasting would be of benefit to coastal areas. The impact of seismic testing is of great concern to Australia's fishing industry, with the majority of submitters to an Australian senate inquiry arguing seismic sound negatively affects fisheries and the marine environment.[26]

Ending the issuance of permits is unlikely to cause great disturbance to oil and gas companies. Oil and gas industry expenditure on offshore exploration of $387 million in 2022 was the lowest annual spend since 1991, when $342 million was spent, and is down more than 88% since 2014.[27] This is unlikely to be caused by a lack of funds, given the record oil and gas prices of the past few years, which created windfall profits for the sector.

The budget allocated to Geoscience Australia and other government agencies associated with gathering data and administrating new exploration licences could be redirected to greater efforts to develop critical mineral resources required for the energy transition in Australia.

[21] IEEFA. Global LNG Outlook 2023-2027. Page 5.
[22] Columbia Center on Global Energy Policy. Qatar's Contract Quandary. 26 April 2023.
[23] Woodside Energy. Scarborough Gas Project and Pluto Train 2 website.
[24] Woodside Energy. Scarborough Offshore Project Proposal. February 2020. Page 104.
[25] Australian Government Department of Industry, Science and Resources. Resources and energy major projects: 2022 – data. December 2022.
[26] The Australian Senate Environment and Communications References Committee. Making waves: The impact of seismic testing on fisheries and the marine environment. June 2021. Page 13.
[27] IEEFA calculations based on: Australian Bureau of Statistics (ABS). Mineral and Petroleum Exploration, Australia. Table 6a. March 2023, released 5 June 2023.

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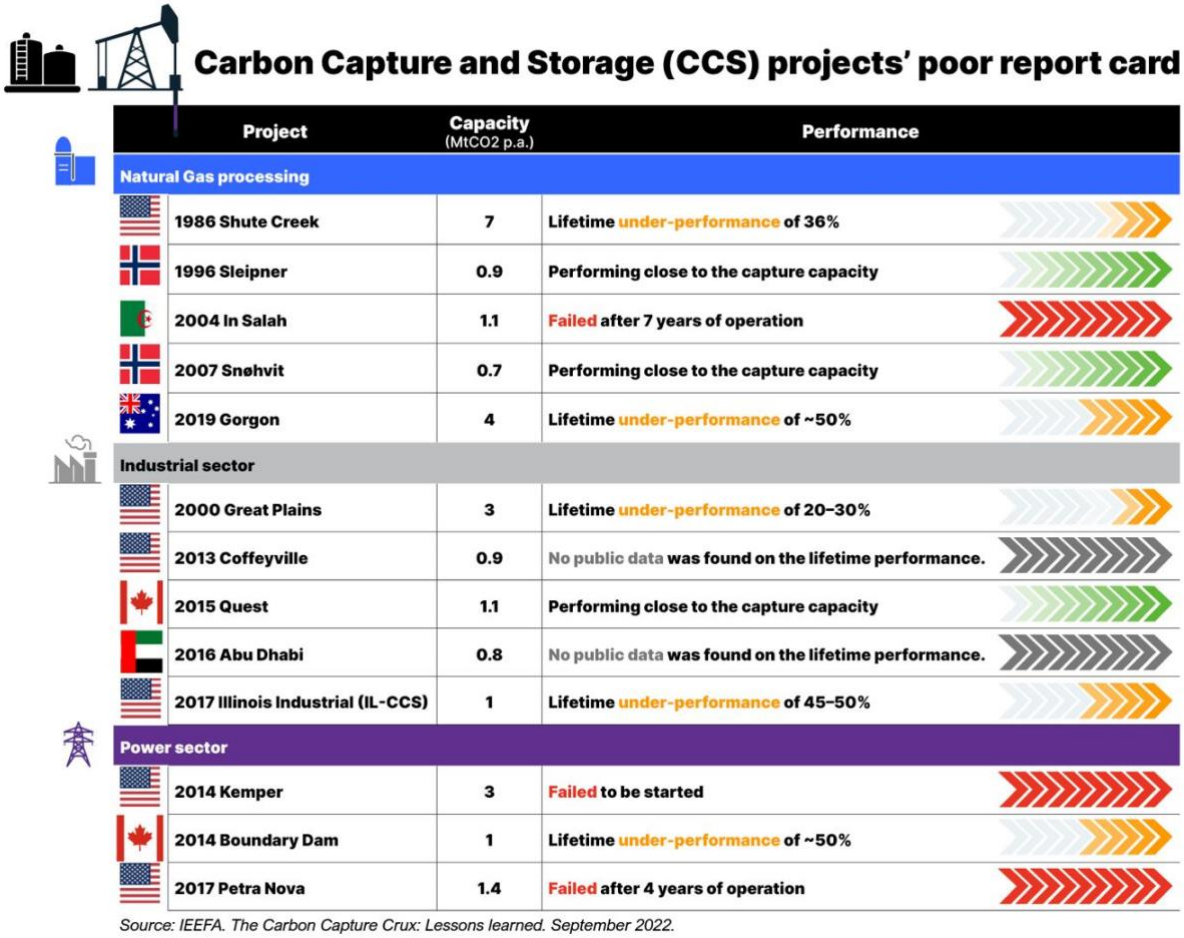
New fossil fuel projects shouldn't rely on CCS and carbon credits to reduce their emissions

Last year, IEEFA conducted a review of 13 flagship Carbon Capture and Storage (CCS) projects globally comprising about 55% of the total nominal capture capacity operating worldwide. It found that failed or underperforming projects considerably outnumbered successful experiences (Figure 1).

Figure 1: Performance of Flagship CCS Projects Globally



Source: IEEFA. The Carbon Capture Crux: Lessons learned. September 2022.

A more recent IEEFA analysis of Norway's Sleipner and Snohvit projects, two of the three successful CCS experiences in the review, demonstrated that carbon capture and storage is not without material ongoing risks that may ultimately negate some or all the benefits it seeks to create.[28] "The subsurface areas of Sleipner and Snøhvit are among the most studied geological fields in both oil and gas and CO_2 storage globally. […] Despite the studies, experience and passage of time, the security and stability of the two fields have proven difficult to predict. In 1999, three years into Sleipner's storage operations, CO_2 had already risen from its lower-level injection point to the top extent of the storage formation and into a previously unidentified shallow layer. Injected CO_2 began to accumulate in this top layer in unexpectedly large quantities. Had

[28] IEEFA. Norway's Sleipner and Snøhvit CCS: Industry models or cautionary tales? June 2023. Page 4

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this unknown layer not been fortunate enough to be geologically bounded, stored CO_2 might have escaped.

"At Snøhvit, problems surfaced merely 18 months into injection operations despite detailed pre-operational field assessment and engineering. The targeted storage site demonstrated acute signs of rejecting the CO_2. A geological structure thought to have 18 years' worth of CO_2 storage capacity was indicating less than six months of further usage potential. This unexpected turn of events baffled scientists and engineers while at the same time jeopardizing the viability of more than US$7 billion of investment in field development and natural gas liquefaction infrastructure. Emergency remedial actions and permanent long-term alternatives needed to be, and were, identified on short notice and at great cost."[29]

The troubled track record of CCS and the high risk that storage of CO_2 won't be permanent mean Australia should not rely on it to reduce emissions from new and existing gas projects.

There are also many issues with relying on carbon credits for reducing the emissions associated with new fossil fuel developments. Beyond integrity and permanency concerns of carbon offsets, recent analysis shows that using the land sector to offset fossil fuel emissions is risky. "Fossil fuel emissions have a very long lifetime in the atmosphere. Each tonne of carbon released into the atmosphere is long-lived, with around 40 percent remaining after 100 years, 20-25% remaining after 1,000 years, and up to 20% after 10,000 years. Land-based offsets do not and cannot guarantee such long-term sequestration.[30] […] There is therefore a fundamental difference between directly reducing a source of CO_2 emissions by one tonne, and offsetting that same tonne of CO_2 emissions through sequestration in trees or soil. The direct reduction of emissions does so permanently, whereas the CO_2 that is captured and stored in trees or newly sequestered soil carbon will at some point be released back into the atmosphere."[31] This is particularly concerning given that forest and soil carbon impermanence will be exacerbated by climate change.[32]

The report found that "pathways that limit warming to 1.5°C […] substantially increase carbon sequestration in the terrestrial biosphere while also reducing CO_2 emissions from fossil fuels very rapidly towards zero. In the IPCC 6th Assessment Report, CO_2 emissions excluding negative emissions from CO_2 removal still fall 45% from 2020 to 2030 in 1.5°C compatible pathways that meet sustainability constraints. Carbon removal in these pathways is therefore in addition to ambitious CO_2 emissions reductions. Most of the mitigation in these pathways is emissions reduction rather than emissions removal."[33] With limited potential for land-based carbon sequestration,[34] we should make sure it is not used to offset emissions that should have been reduced in the first place.

[29] IEEFA. Norway's Sleipner and Snøhvit CCS: Industry models or cautionary tales? June 2023. Pages 5-6.
[30] Climate analytics. Why offsets are not a viable alternative to cutting emissions. February 2023. Page 3.
[31] Ibid. Page 14.
[32] Ibid. Pages 14-15.
[33] Ibid. Page 19.
[34] Ibid. Page 3.

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The Australian government should not support new fossil fuel-based projects

In early 2022, then National Party leader and Deputy Prime Minister Barnaby Joyce announced the federal government would provide $2.6 billion to support the Middle Arm Sustainable Development Precinct and associated infrastructure.[35] Upon the return to power of the Labor government, this was changed to a $1.9 billion package to dredge the harbour, upgrade wharves and provide regional logistics.[36] The federal and NT governments have a general working agreement to support efforts to achieve the broad goals of the plan and the initial $1.9 billion commitment.[37] However, a recent IEEFA review of the development plan found many flaws in the project:

"Spearheaded by the Department of Industry, Planning and Logistics (DIPL), the Northern Territory's industrial development plan promises a thriving network of industries including natural gas extraction, liquefied natural gas (LNG) exports, carbon capture and sequestration, mineral refining, advanced manufacturing, and the production of ammonia, urea, methane, ethylene and hydrogen. The goal is to generate an abundant supply of natural gas from the Beetaloo and Barossa gas fields to support LNG exports, domestic electricity needs, and an array of new (and existing) agrichemical and petrochemical companies.

"The Middle Arm Sustainable Development Precinct plan, which promises new industry and substantial infrastructure investment, is flawed. Its market assumptions are overly optimistic; infrastructure needs will stress federal and local budgets; and the plan is misaligned with global efforts to curtail greenhouse gas emissions. The plans for exports, new technologies and new industries face a series of market, infrastructure and technological challenges. Because the Northern Territory is undeveloped, it would take a level of support that the combined balance sheets of Australia's federal government and several corporations cannot afford. A new supply of natural gas is not enough of a financial incentive to offset the costs of new agrichemical and petrochemical facilities, new roads, pipelines, ports, water systems, power plants, housing, schools and community facilities. The remote location puts the hub far away from businesses that can manufacture and service new product lines. The very real possibility exists that the plan will create fiscal imbalances between the states and territories, as well as budget pressures within the Northern Territory.

"The business model underlying the plan is not viable. The development of the gas field relies on hydraulic fracturing (fracking) technology created in the United States. Fracking has been an economic failure even as it has produced an increase in oil and gas production. Investors have lost billions. It has also created water and land controversies resulting in civil penalties and criminal prosecutions. The companies leading the way in the Northern Territory – Santos, Tamboran and Empire Energy – each have strengths but are poorly positioned to take on these financial and logistical risks.

"The plan also runs against Australia's climate strategies. The nation is committed to curbing its carbon emissions. This plan adds a new natural gas field, contradicting international plans to

[35] National Party of Australia. 2022-23 Budget delivers $7.1 billion to turbocharge our regions. 29 March 2022.
[36] Northern Territory. Budget 2023, Budget Paper No. 2: Budget Strategy and Outlook. Page 61. May 2022.
[37] Madeleine King MP, Minister for Northern Australia. Budget 2023-24: Budget promotes energy security and low-carbon future. 9 May 2023.

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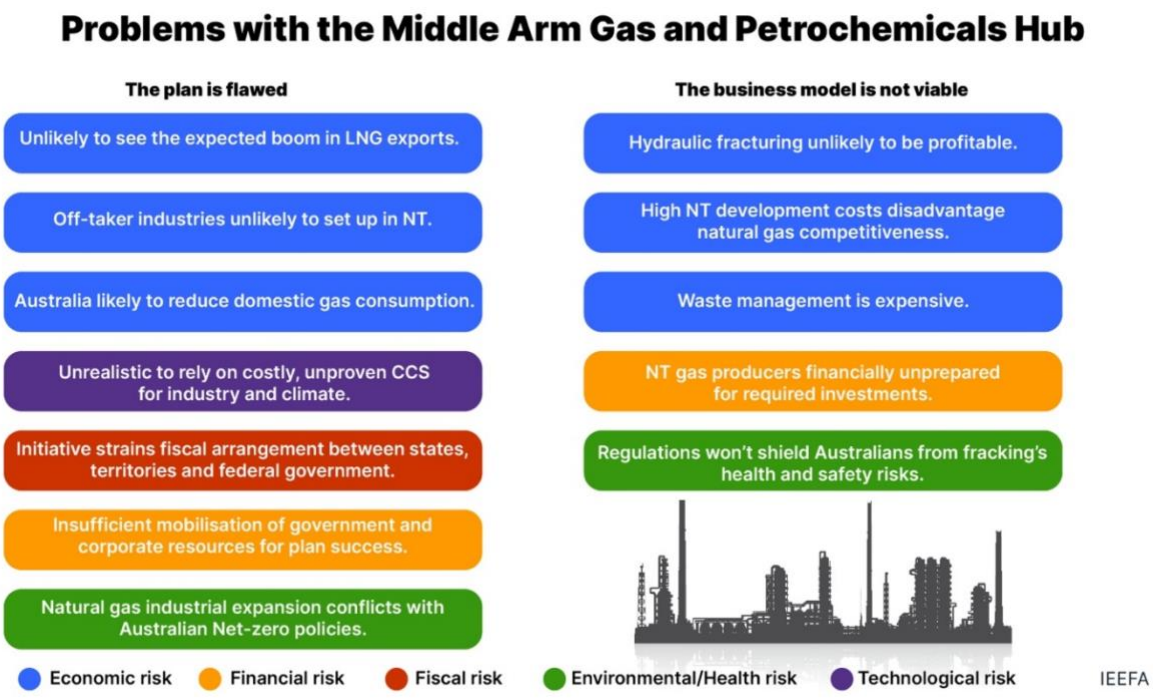
lower the world's greenhouse gas emissions. It also contradicts the many local and national climate solutions in which Australia – its people and businesses – is now engaged.

"This report fundamentally looks at the financial risks to the redevelopment plan. Taken alone, any one of these risks is substantial but could be manageable. Cumulatively, these risks create a daunting set of problems that lower the potential for companies and investors to profit, and constitute a series of red flags to Australia's leadership. The infrastructure needs are vast, and the policy changes must be executed with a level of co-operation and co-ordination that would be extraordinary. Most of the business assumptions in the plan rest on either failed or unproven technological innovations. After rushing headlong with policy and public dollars, the NT government faces a risk that the markets will fail to produce the jobs and profits required to make the plan a success. The failure will be seen in the destruction of public promises and investor dollars."[38]

In IEEFA's opinion, providing such levels of funding for new fossil fuel-based projects is not an effective use of resources for the federal and state governments.

Figure 2: Risks facing the Middle Arm Gas and Petrochemicals Hub



Question 12 - What factors should the Authority consider when developing sectoral decarbonisation pathways?

Question 15 - How could Australia partner with other nations to accelerate global progress towards meeting the Paris Agreement goals?

[38] IEEFA. Middle Arm Gas and Petrochemicals Hub: Combination of Problems Makes It Unprofitable for Business and a Red Flag to the Public. June 2023. Page 4.

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More work is needed to future-proof Australia's iron ore exports

IEEFA recently published two analyses that looked at the opportunities and challenges for the Pilbara amid the accelerating steel technology transition and at unlocking the potential of magnetite ore for Australia's iron and steel transition.

"Australia, and Western Australia's Pilbara region in particular, has long dominated the global iron ore trade, with the world's largest iron ore reserves and more than 50% market share of global exports. The majority of this share is in the form of mid-range quality iron ore, suitable for blast furnace technology that currently dominates steelmaking importing nations like China, Japan and South Korea.

"The steel and iron ore sectors are currently facing a significant decarbonisation challenge and are being urged to eliminate emissions from their processes. One of the most promising alternative technologies for achieving this goal is the deployment of hydrogen-based direct-reduced iron-electric arc furnace (H2DRI-EAF), which requires both green hydrogen and high-quality iron ore."

"A key question for the Pilbara is the practicality of improving the mostly hematite-goethite iron ore reserves in that area to a grade high enough for use in DRI-based [direct reduce iron] steelmaking. Producing DRI/HBI [hot briquetted iron] needs high-quality iron ore with at least 67% iron, while the Pilbara ore's iron content average is closer to 60%. Pilbara ores tend to have higher impurities which, along with the presence of goethite, make it less suitable for DRI-based steelmaking compared to the high-grade output produced by companies such as Vale in Brazil."

"Technology solutions may be part of the answer to the Pilbara ore quality issue. A number of technologies are developing to enable the use of lower-grade ores in DRI-based green steel production."

"Fortescue, in collaboration with Mitsubishi Corporation, Voestalpine and Primetals Technologies, has entered into a Memorandum of Understanding to assess and further develop HYFOR (hydrogen-based fine-ore reduction that does not require pelletising) and Smelter reduction technologies, which could potentially address the issue of Pilbara's lower-grade iron ores. Fortescue also recently claimed a breakthrough and considerable progress in zero-carbon metallics production on a large scale in Western Australia. Fortescue is keen to find green steel technology solutions for its iron ore as it has committed to reach net zero Scope 3 carbon emissions by 2040. In contrast, the other Pilbara majors Rio Tinto and BHP have no measurable Scope 3 emissions targets."

"An increased focus on magnetite iron ore – which is more easily beneficiated to DR-grade – may also be part of the answer although it's far less available in the Pilbara than hematite. Fortescue's new Iron Bridge project in the Pilbara will produce magnetite of DR-grade but will likely be blended into a blast-furnace grade product, at least initially."[39] "Magnetite ores represent 38% of

[39] IEEFA. Opportunities and challenges for the Pilbara amid the accelerating steel technology transition. March 2023.

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Australia's economic demonstrated resources of iron ore, of which 81% are in Western Australia, while only 3% of the states' exports come from magnetite ores."[40]

"To meet carbon emissions targets and manage Scope 3 emissions associated with iron ore mining, Australia should maximise investment in magnetite mines both for domestic use and export."[41]

"Pressure is growing on Australia as other nations are seeking to develop green steel/iron industries. Nippon Steel is considering Brazil as well as Australia, as Brazilian iron ore giant Vale is the key global producer of DR-grade iron ore. Vale aims to triple its high-grade iron ore production to 100 million tonnes by the end of this decade." [42]

It will be important for Australia to proactively address this risk if it doesn't want to lose its leadership in the global iron ore market.

Hydrogen-based steelmaking via DRI and electric arc furnaces (H2DRI-EAF) requires a large supply of green hydrogen made via electrolysis powered by renewable energy. Given that shipping of green hydrogen looks expensive, there should be more focus in Australia on using green hydrogen domestically in sectors where it makes sense to do so, such as steelmaking. Green iron could be shipped cost-effectively to other countries for low-carbon steelmaking in electric arc furnaces and finishing processes instead of freighting both iron ore and hydrogen separately at higher cost.[43]

As such, some major steelmakers (including South-East Asian steelmakers) are considering relocating the ironmaking step process (i.e., H2DRI) to places that have both suitable iron ore and high renewable energy resources (e.g., Australia and Brazil) to support green iron production.[44,45]

Australia needs to act faster to realise its low carbon industry opportunity

Australia has the ambition to become a renewable energy superpower.[46] The government sees our potential for, and leadership, in wind and solar, our reserves of minerals to power the transition to net zero, and leadership in industrial-scale hydrogen as key competitive advantages.[47]

Many analyses have highlighted the economic opportunities involved in the global transition to net zero emissions for Australia. A recent analysis by EY identified in particular iron-making, alumina, refined energy transition metals, and hydrogen as an input to exported products such as green chemical feedstocks, as attractive opportunities.[48]

However, they flag that more work is needed to realise this potential. "This advantage is conditional, not automatic or absolute. While the shift to net zero creates new potential strengths, existing potential weaknesses remain. Australia has no room for complacency and project

[40] IEEFA. Unlocking the potential of magnetite ore for Australia's iron and steel transition. May 2023.
[41] Ibid.
[42] IEEFA. Opportunities and challenges for the Pilbara amid the accelerating steel technology transition. March 2023.
[43] Monash University. Building green hydrogen plants next to green steelworks can boost efficiency and kickstart both industries. 2 June 2023
[44] POSCO. POSCO promotes the preemptive acquisition of low-carbon steel raw materials in Australia. 7 March 2023
[45] Bloomberg. Japan's Top Steelmaker Eyes $700 Million 'Green Steel' Project. 3 March 2023
[46] Australian Government, Australian Trade and Investment Commission. Why Australia – Benchmark Report 2023. Page 2.
[47] Ibid. Pages 33-41.
[48] EY. Seizing Australia's energy superpower opportunities. April 2023. Page 44.

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approvals processes, relative capital requirements, and labour costs will continue to be watchpoints for major investments."[49]

With growing competition from other regions, in particular the United States, Canada and the European Union,[50] Australia needs to accelerate its efforts to capture the opportunities created by its natural advantage.

[49] Ibid. Page 8.
[50] Clean Energy Council. Australia at risk of being locked out of global superpower race. March 2023.

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Australia Needs 1.5°C Aligned National Energy Pathways

Lack of a comprehensive energy transition strategy creates confusion among stakeholders

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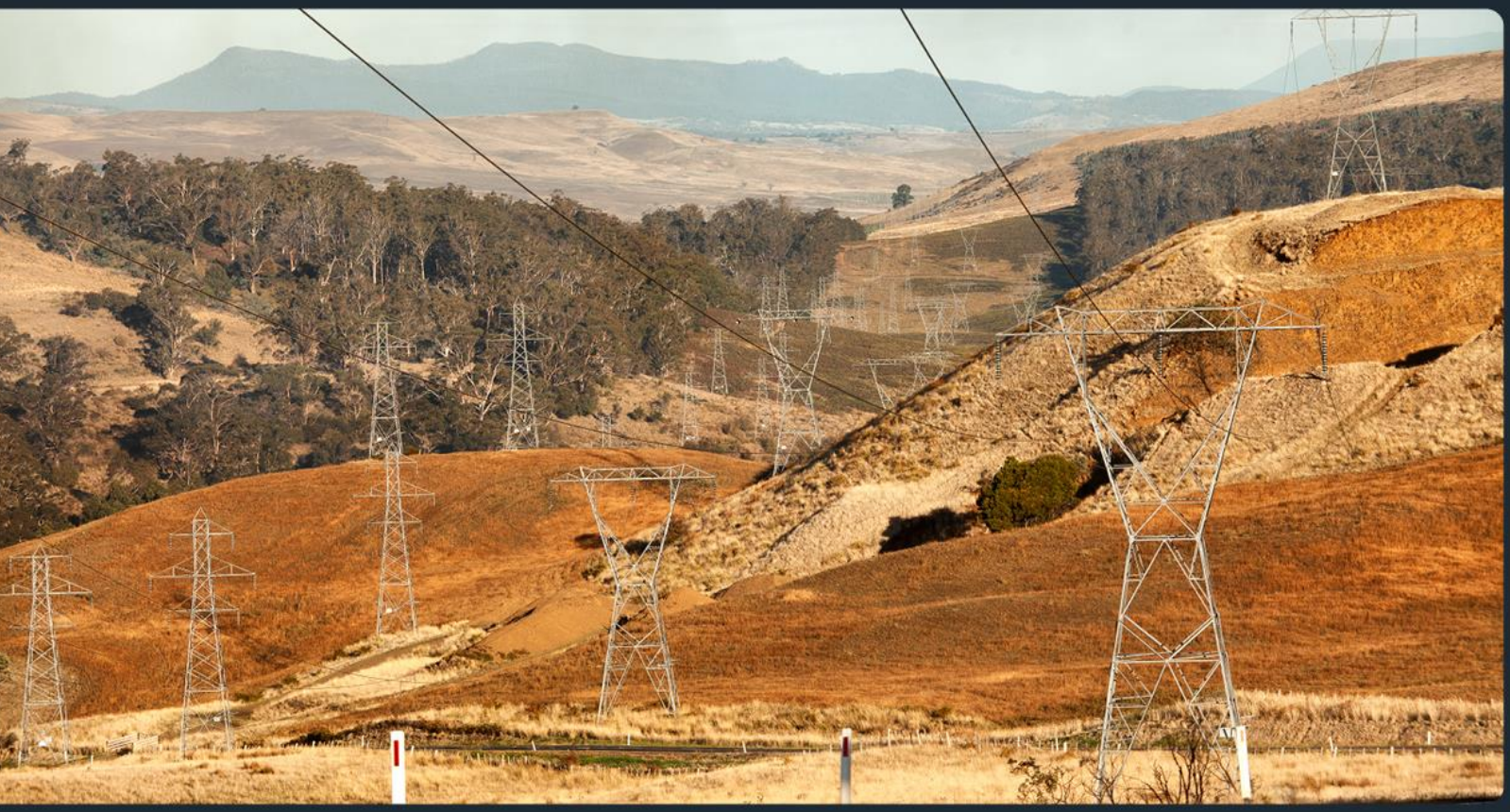

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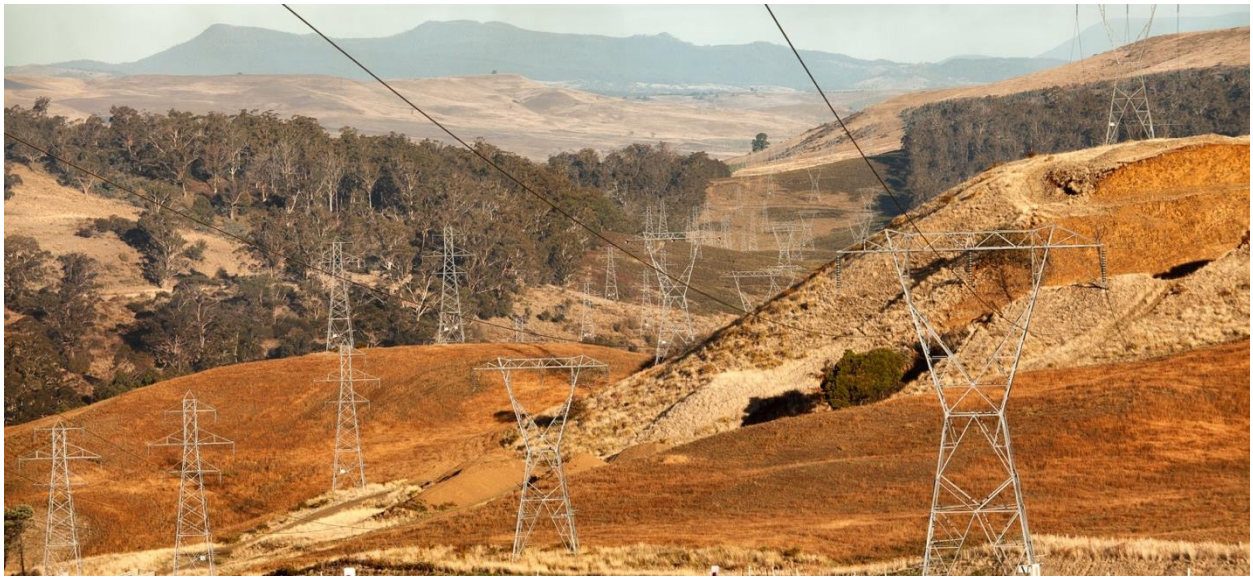
Key Findings

The Australian government has objectives that contradict each other, and lacks a comprehensive plan for how it will achieve its emissions reduction goals.

AEMO's scenarios are used as a de facto plan, but do not meet several of the government's objectives and state targets, and make questionable assumptions and choices.

Australia needs 1.5°C national energy pathways that look at the energy transition in an integrated way across fuel types, sectors and solutions.

In the absence of shared national energy pathways, the left hand of the government doesn't know what the right hand is doing.

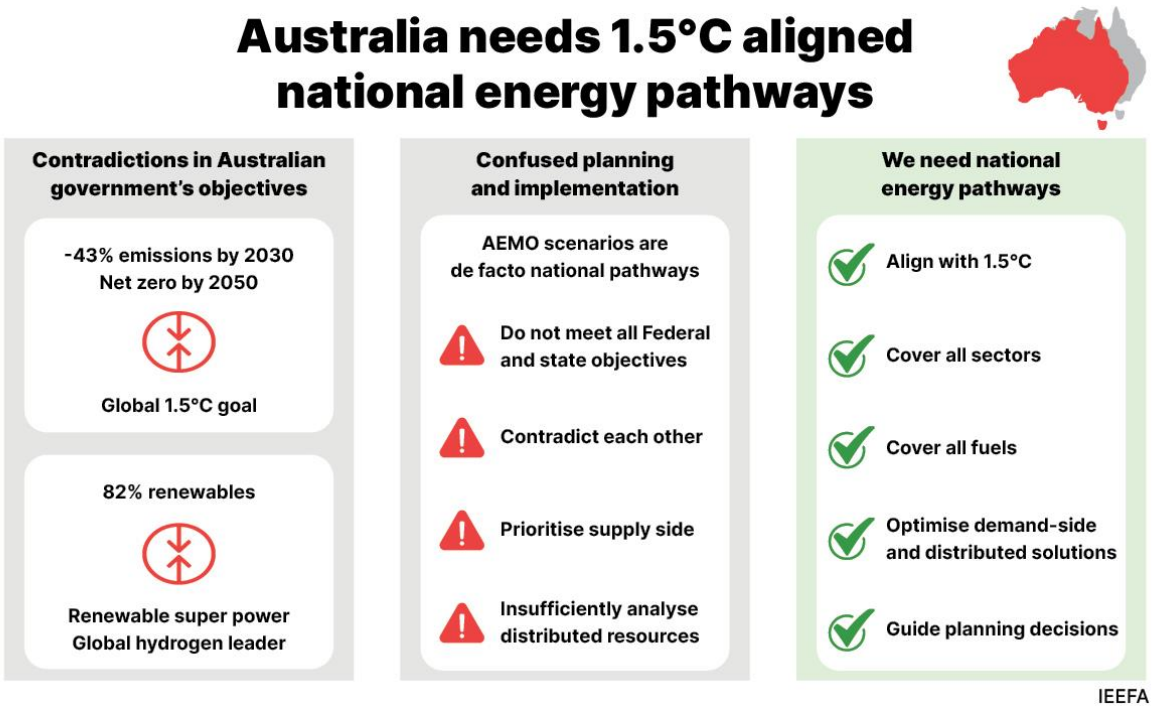


Executive Summary

The Australian government has made a clear commitment to the global goal of limiting global warming below 1.5°C. To support this objective, Australia has set emissions reduction and renewable electricity generation targets. However, it has no comprehensive plan for how it will achieve those targets, and some internal inconsistencies between different government objectives are creating confusion when it comes to implementation.

In the absence of a comprehensive plan, the Australian Energy Market Operator's (AEMO) scenarios are used by many to support planning and investment decisions. However, the scenario presented as most likely only meets some but not all of the government's objectives and doesn't meet Victoria's emissions reduction targets. Its electricity and gas scenarios also materially contradict each other, and AEMO's choice of assumptions has been questioned by clean energy investors. The current piecemeal approach appears to prioritise supply-side solutions over demand-side solutions, and does not sufficiently analyse the potential impact and value of distributed resources.

Australia needs 1.5°C national energy pathways that look at the energy transition in an integrated way across fuel types, sectors and solutions. The pathways should investigate a wide range of possible outcomes – clearly identifying where solutions are preferable, and exploring alternatives where large amounts of uncertainty exist. The pathways should support planning decisions, and make recommendations on which new supply projects are essential, on timelines for phasing out key infrastructure assets, and on priority usage for scarce resources. This should include both domestic energy requirements as well as export-focused projects.



Internally inconsistent objectives, and some big areas of uncertainty

A clear commitment to 1.5°C by the Australian government

Australia is a party to the Paris Agreement,[1] a legally binding international treaty on climate change that came into force in November 2016. The objective of the agreement is to "[hold] the increase in the global average temperature to well below 2°C above pre-industrial levels and [pursue] efforts to limit the temperature increase to 1.5°C above pre-industrial levels".[2]

Since then, the UN's Intergovernmental Panel on Climate Change (IPCC) has stressed the importance of the 1.5°C goal, given that "every increment of global warming will intensify multiple and concurrent hazards".[3] In response, G20 leaders, including Australia, recognised the importance of the 1.5°C goal, and committed to accelerating their actions to achieve global net zero emissions by around 2050 in line with this objective.[4] The Australian government also describes the goal of the Paris agreement as limiting global warming to 1.5°C in its 2022 Climate Change Statement.[5]

Emissions reduction targets incompatible with the 1.5°C goal

Australia has now legislated both a net zero emissions target by 2050 and a target to reduce emissions by 43% on 2005 levels by 2030.[6] These targets are inconsistent with the 1.5°C goal.

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The International Energy Agency (IEA) developed a Net Zero Emissions by 2050 scenario, which shows how the global energy sector can achieve an orderly transition to net zero CO2 emissions. It gives a 50% probability of achieving the global goal of 1.5°C with no or low overshoot.[7] This

[1] Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW). International climate action.
[2] United Nations Framework Convention on Climate Change (UNFCCC). The Paris Agreement.
[3] Intergovernmental Panel on Climate Change (IPCC). AR6 Synthesis Report – Headline statements. 2023.
[4] G20. Rome leaders' declaration. October 2021. Page 8.
[5] DCCEEW. Annual Climate Change Statement 2022. 2022. Page 13.
[6] Ibid. Page 14.
[7] International Energy Agency (IEA). Net Zero Emissions by 2050 Scenario (NZE). 2022.

scenario shows that to achieve this goal, global CO2 emissions need to decrease by about 35% by 2030 compared with 2010 and reach net zero by 2050.[8] However, developed economies need to exceed the global average in emissions reductions: reducing by about 60% by 2030 compared with 2010 and reaching net zero by about 2045.[9] For Australia, this would also mean a 60% emissions reduction by 2030 compared with 2005.[10]

The federal government has not published advice on how its climate targets align to particular temperature outcomes. However, multiple studies looking at an Australia-specific 1.5°C carbon budget and trajectory found that Australian emissions would need to decrease emissions by 67-74% by 2030 compared with 2005 and reach net zero emissions by about 2035 to 2038 in order to be aligned with the global 1.5°C goal.[11,12]

Australia's hydrogen ambitions seem misaligned with its electricity sector targets

The Australian government committed to an 82% national renewable electricity target by 2030. Despite not setting a specific target related to hydrogen production, the government has recently restated an ambition to "be a global hydrogen leader by 2030 on both an export basis and for the decarbonization of Australian industries".[13] While the potential for direct hydrogen exports has been questioned due to its physical properties,[14] recent analysis confirms that Australia has a high potential for hydrogen-based exports such as green iron.[15] The government also provided A$2 billion in the 2023-24 budget for the new Hydrogen Headstart program, to accelerate the development of Australia's hydrogen industry in line with its vision of being a Renewable Energy Superpower.[16]

The Australian Energy Market Operator's (AEMO) scenarios suggest that those objectives are at odds with each other. AEMO modelled four future scenarios for the National Energy Market (NEM) as part of its 2022 Integrated System Plan (ISP). The scenario it presents as most likely is *Step Change*.[17] That scenario achieves the government's 82% renewable electricity target by 2030-31.[18]

[8] IEA. Net Zero Emissions by 2050 Scenario (NZE). Figures and data by Chapter – Chapter 2. Figure 2.2. 2022.
[9] Ibid.
[10] IEEFA calculations based on: DCCEEW. Australia's National Greenhouse Accounts. Emissions inventories. Paris Agreement inventory.
[11] Climateworks Australia. Decarbonisation Futures: Solutions, actions and benchmarks for a net zero emissions Australia. March 2020. Pages 13-14.
[12] Climate Resource. Updated assessment of Australia's emission reduction targets and 1.5°C pathways. June 2023. Page 4..
[13] DCCEEW. Australia's National Hydrogen Strategy .
[14] BloombergNEF. Liebreich: The Unbearable Lightness of Hydrogen. December 2022.
[15] EY. Seizing Australia's energy superpower opportunities. April 2023. Page 8.
[16] DCCEEW. Powering Australia.
[17] Australian Energy Market Operator. 2022 Integrated System Plan (ISP). 2022. Page 33.
[18] Ibid. Page 45.

However, it only includes a limited amount of hydrogen produced for domestic decarbonisation purposes, and no hydrogen to support renewable exports.[19] The *Hydrogen Superpower* scenario, the only in which high levels of hydrogen production are targeted at exports (directly or indirectly via green steel production) requires a higher share of renewable electricity by 2030.[20]

Most importantly, AEMO's scenarios show that not only the share of renewables matters, but also their volume. Indeed, the *Hydrogen Superpower* scenario has nearly twice as much large-scale wind and solar capacity by 2030 and four times as much by 2050 as the *Step Change* scenario.[21] Leaving such a vast level of ambiguity on the volume of renewables build-out required to achieve the government's ambitions could create issues when it comes to planning supply chain and other requirements.

Many remaining areas of uncertainty

The government hasn't articulated how it will achieve the 43% emissions reduction target by 2030: what contribution is expected from different sectors and levers, and how it all adds up to a consistent national pathway.[22]

The government hasn't articulated how it will achieve the 43% emissions reduction target by 2030: what contribution is expected from different sectors and levers, and how it all adds up to a consistent national pathway.

The only other sector-specific target adopted by the government is the declining cap on Australia's largest industrial emitters leading to net zero, which was recently added to the Safeguard Mechanism.[23]

The government has expressed its interest in a number of areas without adopting specific targets:

- The country's hydrogen ambition is not accompanied by any target of domestic hydrogen production;

[19] Ibid. Page 31.
[20] Australian Energy Market Operator. 2022 Integrated System Plan (ISP). 2022. Page 45. Figure 16.
[21] IEEFA calculations based on: Australian Energy Market Operator. 2022 Integrated System Plan (ISP). Generation Outlook. 2022.
[22] DCCEEW. Australia's energy strategies and frameworks. National Energy Performance Strategy. 2023.
[23] DCCEEW. Safeguard Mechanism Reforms factsheet. May 2023. Page 2.

- Australia joined the Global Methane Pledge, which aims to reduce global methane emissions by at least 30% below 2020 levels by 2030,[24] but did not specify its domestic methane reduction target;
- The government developed a National Electric Vehicle Strategy but has not set any targets for electric vehicle adoption.[25] It remains to be seen how much clarity the Fuel Efficiency Standard under development will provide on likely electric vehicle uptake;[26]
- The government is developing a National Energy Performance Strategy, which will provide a "national plan to accelerate demand-side action, including energy efficiency and electrification".[27] It is unclear at this stage whether the plan will include targets.[28]

The above programs are piecemeal, and do not provide a coherent unified plan. In the absence of an overarching plan, this creates significant levels of uncertainty for the future trajectory of Australia's energy transition.

A confused and deficient implementation approach

Due to these inconsistencies and areas of uncertainty, Australia does not have a shared national view of how the transition will occur. This is leading to confusion and discrepancies in the advice and decisions of government departments and agencies. To put it simply, the left hand of the government does not know what the right hand is doing.

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AEMO's central scenarios are contradictory and 'not credible'

In the absence of shared national pathways, AEMO scenarios are often referred to by public and private stakeholders as "reference pathways" for planning and investment decisions. Examples include the Australian Energy Regulator (AER), which relies heavily on AEMO's Gas Statement of Opportunities (GSOO) forecasts to set gas network revenue and tariffs (as in Victoria recently

[24] DCCEEW. Australia joins Global Methane Pledge. 23 October 2022.
[25] DCCEEW. The National Electric Vehicle Strategy. 2023. Page 34.
[26] DCCEEW. Reducing transport emissions.
[27] DCCEEW. National Energy Performance Strategy.
[28] DCCEEW. National Energy Performance Strategy – Consultation paper. November 2022. Page 7.

for AusNet,[29] Multinet[30] and AGN[31]), state governments, which often seek to align their own energy planning to AEMO's scenarios (with examples from New South Wales,[32] Victoria[33] and Queensland[34]), and national energy planning initiatives such as CSIRO's Renewable Energy Storage Roadmap.[35]

The primary purpose of AEMO's forecasts is to support their ESOO and GSOO publications for short-term decision making in electricity and gas markets, alongside the long-term ISP. The ISP was established as a planning tool for the national transmission grid under the National Electricity Law.[36] However, today it is being applied much more broadly, "informing market participants, investors, policy decision makers and consumers".[37] AEMO presents these forecasts as the "most comprehensive and robust analysis of the future electricity needs of the NEM".[38] Yet, rather than being guided by the government, the likelihood of scenarios is rated by a panel of energy industry stakeholders.[39]

In its 2023 GSOO, AEMO presents a scenario (*Orchestrated Step Change*) aligned with 1.8°C, and misaligned with the government's hydrogen ambitions as most likely in its electricity and gas forecasts.[40] This most likely gas scenario also does not meet Victoria's legislated emissions reduction targets from 2035.[41] This is particularly problematic for projections in the buildings sector, given that Victoria represents more than 60% of Australia's gas use in buildings.[42] Despite this inconsistency,

[29] AER. Final Decision: AusNet Gas Services Gas distribution access arrangement 1 July 2023 to 30 June 2028. Attachment 12 - Demand. June 2023. Page 7.
[30] AER. Final Decision: Multinet Gas Networks Gas distribution access arrangement 1 July 2023 to 30 June 2028. Attachment 12 - Demand. June 2023. Page 7.
[31] AER. Final Decision: Australian Gas Networks (Victoria & Albury) Gas distribution access arrangement 1 July 2023 to 30 June 2028. Attachment 12 - Demand. June 2023. Page 6.
[32] NSW Office of Energy and Climate Change. NSW Electricity Infrastructure Roadmap benefits modelling report. June 2023. Page 17.
[33] Victorian government, Department of Environment, Land, Water and Planning. Victorian electricity sector renewable energy transition: Energy market modelling report. October 2022. Page 6.
[34] Queensland government, Queensland Energy and Jobs Plan. Queensland SuperGrid Infrastructure Blueprint: Optimal energy infrastructure pathway for the Queensland Energy and Jobs Plan. September 2022. Page 8.
[35] CSIRO. Renewable Energy Storage Roadmap. Page viii. March 2023.
[36] South Australian government. National Electricity (South Australia) Act 1996. Page 110.
[37] AEMO. 2022 Integrated System Plan (ISP) website. 2022.
[38] AEMO. 2022 Integrated System Plan (ISP). 2022. Page 21.
[39] South Australian government. National Electricity (South Australia) Act 1996. Page 33.
[40] AEMO. 2023 Gas Statement of Opportunities (GSOO). 2023. Page 18.
[41] AEMO. Draft 2023 Inputs, Assumptions and Scenarios Report. December 2022. Page 28.
[42] IEEFA calculations based on: DCCEEW. Australian Energy Update 2022. Table F. September 2022.

these forecasts have recently been used by the AER to forecast revenues and set consumer tariffs for Victoria's gas distribution networks for the next five years (AusNet,[43] Multinet[44] and AGN[45]).

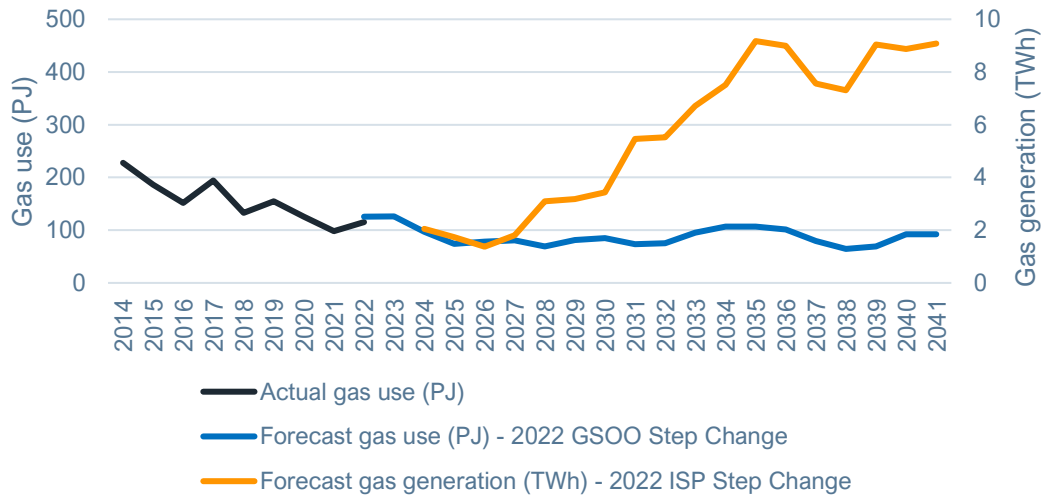
Clean energy investors have questioned the assumption choices behind the only 1.5°C aligned scenario modelling by AEMO, and have developed an alternative scenario that they consider to be more "practical and commercially credible".[46]

> **AEMO's GSOO presents widely different forecasts for gas use in electricity generation than its electricity roadmap.**

In addition, AEMO's GSOO presents widely different forecasts for gas use in electricity generation in the most likely scenario than its ISP. The former decreases significantly to 2050 while the other increases materially (Figure 1). The GSOO is meant to guide decisions about future gas supply needs.[47] However, the government seems to be referring to the ISP's forecast of increasing gas generation to inform its decisions regarding gas developments. Federal Climate Change and Energy Minister Chris Bowen said that as the share of renewables sources shifts towards the government's 82% target by 2030, the remaining 18 per cent of power "will increasingly be focused on gas".[48]

[43] AER. Final Decision: AusNet Gas Services Gas distribution access arrangement 1 July 2023 to 30 June 2028. Attachment 12 - Demand. June 2023. Page 11.
[44] AER. Final Decision: Multinet Gas Networks Gas distribution access arrangement 1 July 2023 to 30 June 2028. Attachment 12 - Demand. June 2023. Page 10.
[45] AER. Final Decision: Australian Gas Networks (Victoria & Albury) Gas distribution access arrangement 1 July 2023 to 30 June 2028. Attachment 12 - Demand. June 2023. Page 10.
[46] Clean Energy Investor Group (CEIG) and Baringa Partners. Decarbonising Australia: Accelerating our energy transition with a credible 1.5°C scenario. April 2023. Page 4.
[47] AEMO. Gas Statement of Opportunities.
[48] Australian Financial Review. Bowen defends need for future gas supply as Labor pushes Greens. 13 March 2023.

Figure 1: Comparison of GSOO's gas use for electricity generation forecast with ISP's gas generation forecast



Sources: AEMO 2023 Gas Statement of Opportunities and 2022 Integrated System Plan

An unjustified focus on supply-side solutions

Several agencies consider a few demand scenarios, and then look at how the supply can meet the gap, rather than looking at what would be an optimum approach to manage both the supply and demand sides of the equation. In the 2023 GSOO, AEMO concluded that all future scenarios "forecast the long-term need for additional supply".[49] In its review of the supply-demand outlook, the Australian Competition and Consumer Commission (ACCC) accepts AEMO's GSOO's central scenario's demand forecast, and therefore uniquely looks at supply-side solutions to fill the gas supply gap.[50]

IEEFA's submission to AEMO on updates to the ISP methodology[51] emphasised the need for better optimisation of demand-side and supply-side solutions in its electricity scenarios. Our recent gas supply gap analysis also showed that faster and stronger demand-side action could fill the gas supply gap and avoid the need to develop new costly and emissions intensive gas fields. It showed that making small adjustments to the demand-side actions included in AEMO's 2023 GSOO *Green Energy Exports (1.5°C)* scenario could eradicate the gas supply gap for the next two decades. "Accelerating action to improve energy efficiency and electrification in buildings could eradicate the

[49] AEMO. 2023 Gas statement of opportunities for central and eastern Australia. March 2023. Page 4.
[50] ACCC. Gas inquiry 2017-2030. Interim update on east coast gas supply-demand outlook for 2023. March 2023. Page 3.
[51] IEEFA. Response to AEMO consultation on updates to the ISP Methodology. May 2023

gas supply gaps for the next decade while also alleviating the cost of living crisis for households. […] The rest of the gas supply gap could be filled by a small increase in industrial gas demand reduction, well within the identified technological and economic potential." [52]

Both the IEA and the IPCC state that new developments in oil and gas are incompatible with the global goal of 1.5°C with no/low overshoot.[53,54] Limiting new gas developments as much as possible by prioritising demand-side action is therefore crucial to achieving the global climate goals.

Investments in energy efficiency in particular deliver multiple benefits. For consumers, these include cost reductions[55] as well as improved health outcomes.[56] Demand-side activities also typically create more jobs than supply-side activities.[57]

More emphasis should be put on demand-side solutions before concluding for the need for more supply. In its recent review of Australia's energy policy, the IEA highlighted that recent improvements in energy efficiency slowed down to about 1.9% per year, and that they should be increased to 4.2% a year until 2030 to align with the global IEA Net Zero roadmap.[58]

More work needed on distributed solutions

The potential impact and value of Distributed Energy Resources (DER) is also underanalysed in AEMO's ISP.

Our recent analysis of the potential impact of saturation DER shows that it could dramatically change the shape of electricity markets and networks. It also shows that not only does the uptake of DER matter for the outcome, but also the associated regulatory settings. For example, the outcome is wildly different whether battery trading was allowed or not.[59]

> **Our recent analysis of the potential impact of saturation DER shows that it could dramatically change the shape of electricity markets and networks.**

The analysis recommends that "we need energy system and market planning to better understand

[52] IEEFA. Australia can and should eradicate its gas supply gap – but not with more gas. April 2023.
[53] IPCC. AR6 Synthesis Report – Longer Report. 2023. Page 24.
[54] IEA. Net Zero by 2050: A Roadmap for the Global Energy Sector. May 2021. Page 21.
[55] IEA. Energy Efficiency 2022. Page 76.
[56] IEA. Capturing the multiple benefits of energy efficiency. 2014. Pages 21-22.
[57] H. Garrett-Peltier. Green versus brown: Comparing the employment impacts of energy efficiency, renewable energy, and fossil fuels using an input-output model. February 2017.
[58] IEA. Australia 2023 - Energy policy review. April 2023. Page 12.
[59] IEEFA. Household solar and storage will dramatically change the shape of electricity markets and networks. April 2023.

the implications of high levels of DER on the need for large-scale generation and storage."[60] In particular, the ISP scenarios should consider an equivalent range of divergence in DER settings as they do for large-scale renewables.

It would be valuable to test the impact of different DER uptake settings while holding other parameters constant. This would help understand the specific impact of DER solutions.

AEMO recently shared its intention to test more DER sensitivities around its most likely scenario, but those seem to be focused on under-investment or reduced orchestration rather than looking at how DER could most effectively support the transition.[61]

The need for 1.5°C aligned national energy pathways

There is a need for 1.5°C-aligned national energy pathways to guide government policy and planning across organisations and departments, and inform private investment decisions.

What good national energy pathways would do

Based on what was discussed in the previous section, some key characteristics of national energy pathways should be that they:

- align with the government's objective to keep global warming below 1.5°C;
- meet all federal and state government targets;
- are internally consistent;
- reflect a reasonable contribution of energy emissions towards the economy-wide objective;
- consider electricity and fuels transitions in an integrated way;
- consider both demand and supply side solutions, and;
- consider both large scale and distributed solutions.

The pathways should investigate a wide range of possible outcomes, and clearly identify where solutions are preferable in terms of economic, consumer, environmental and feasibility criteria. They should also explore alternative scenarios where large amounts of uncertainty exist.

> **The pathways should investigate a wide range of possible outcomes, and clearly identify where solutions are preferable in terms of economic, consumer, environmental and feasibility criteria.**

[60] IEEFA. Household solar and storage will dramatically change the shape of electricity markets and networks. April 2023.
[61] AEMO. Inputs, Assumptions and Scenarios webinar. 18 June 2023.

The pathways need to support planning decisions by public and private actors. As such they should provide recommendations on:

- what new supply is essential to meet domestic energy needs, and what new supply could or should be avoided through demand-side measures;
- timelines for phasing out key infrastructure assets such as gas networks and large thermal generation plants;
- what would be the priority usage of scarce resources such as green hydrogen, talent and parts for renewable electricity generation, storage and transmission and distribution assets, and;
- what is needed to ensure any new export markets (e.g. renewable electricity, green hydrogen, green iron) does not impede the domestic energy transition.

The pathways should include an outlook for Australia's energy exports

The pathways should also develop a shared view on the international energy transition and the implications for the future demand for our energy and mineral exports. This would help develop recommendations on what export-focused projects are likely to be unnecessary.

IEEFA's Global LNG Outlook 2023-2027 shows that a tidal wave of new LNG projects will come online globally starting mid-2025. As a result, "liquefaction projects targeting in-service after 2026 may be entering a much smaller demand pool than bullish market forecasts anticipate".[62] Demand for many of those projects is uncertain, with large, uncontracted volumes expected from Qatar.[63]

Avoiding the development of unnecessary coal and gas fields in Australia will help avoid large volumes of emissions,[64] improving our chances to meet the objectives of the Paris Agreement and lowering the emissions reduction pressure on other domestic industries.[65]

> **Avoiding the development of unnecessary coal and gas fields in Australia will help avoid large volumes of emissions**

[62] IEEFA. Global LNG Outlook 2023-2027. Page 5.
[63] Columbia Center on Global Energy Policy. Qatar's Contract Quandary. 26 April 2023.
[64] The Australia Institute. Emissions from the 116 proposed coal and gas projects would swamp the reductions from the safeguard mechanism. March 2023.
[65] DCCEEW. Safeguard Mechanism Reforms factsheet. May 2023. Page 2.

Other countries have successfully implemented national energy pathways and strategies

Germany is an example of a country that embarked early on an integrated and long-term strategy for its energy system. "In late 2010, Germany initiated the Energiewende, a major plan for making its energy system more efficient, supplied mainly by renewable energy sources. The country has adopted a strategy for an energy pathway to 2050, which includes an accelerated phase-out of nuclear power by 2022."[66] Their plan also includes medium- and long-term targets in all sectors of the economy.[67]

China's latest five-year plan on Renewable Energy Development (2021-2025) "emphasizes the link between China's climate commitments, energy transition, and energy supply security; establishes detailed targets for primary energy mix, power generation rate, electrification rate, and more".[68]

France has a Multiannual Energy Plan (MEP) which is a "comprehensive strategy which covers all aspects of energy policy and all forms of energy. Citizens, local authorities, consumers and companies operating in the transport and energy sectors have all been closely involved in the drafting of this plan ... This MEP is consistent with the national low-carbon strategy adopted in October 2015, and is a vital tool for the implementation of the Paris Climate Agreement."[69] It sets out the country's energy objectives and targets for various sectors, including electricity, heating and transportation.[70]

Conclusion

There are too many inconsistencies and gaps in the current government's climate and energy plan. This leads to confusion when it comes to planning and implementation.

Australia needs 1.5°C national energy pathways that look at the energy transition in an integrated way across fuel types, sectors and solutions. The pathways should investigate a wide range of possible outcomes – clearly identifying where solutions are preferable, and exploring alternatives where large amounts of uncertainty exist. The pathways should support planning decisions, and make recommendations on which new supply projects are essential, on timelines for phasing out key infrastructure assets, and on priority usage for scarce resources. This should include both domestic energy requirements as well as export-focused projects. We can learn from other countries' experience when it comes to developing and implementing effective national energy pathways.

[66] IEA. Germany.
[67] Agora Energiewende. Q1 What is the German Energiewende? September 2022.
[68] Energy Foundation China. China's 14th Five-Year Plans on Renewable Energy Development and Modern Energy System. September 2022.
[69] Ministere de la Transition Ecologique et Solidaire. The Multiannual Energy Plan. Page 1.
[70] Ibid. Page 2.

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About the Authors

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Amandine is a recognised expert in net zero emissions transitions across the economy. She led the development of the first domestic net zero emissions pathway for Australia and subsequent updates, which are considered to be the reference for Paris-aligned pathways and used by business, finance and government organisations. She has worked with and advised many organisations on the strategy, investment and risk implications of the energy transition.

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