

7 July 2023

Climate Change Authority

Lodged electronically

To whom it may concern,

Climateworks Centre welcomes the opportunity to respond to the Climate Change Authority's (the Authority) consultation on *Setting, tracking and achieving Australia's emissions reduction targets*. Climateworks specialises in accelerated climate transitions for Australia, Southeast Asia and the Pacific in line with a 1.5 degrees Celsius limit. An independent not-for-profit working within the Monash Sustainable Development Institute, it was co-founded by philanthropy and Monash University.

Submission summary

Australia has major opportunities in a net zero global economy from its renewable energy and mineral resources. However, Australia's current high emissions intensity means that there are many challenges to transform the economy and reach net zero emissions. Climateworks research shows that solutions are available for emissions reductions in all sectors.

Climateworks recommends the Authority take a backcasting approach – a focus on how to achieve the end goal of a vibrant net zero economy in line with a 1.5 degree limit. Key to this will be providing agencies and stakeholders with credible pathways to this goal.

Climateworks recommends enhancements to the Authority's Strategic Framework – importantly through an objective to achieve net zero emissions domestically in line with 1.5°C, positioning Australia as a leader in a net zero global economy. We also highlight work that could inform setting up systems that track policy impacts and Australia's progress towards net zero.

Climateworks supports the Authority's advice last year for the Australian Government to produce a detailed long-term strategy for emissions reductions. We recommend this long-term strategy includes sectoral emissions reduction pathways for one or more scenarios in line with a 1.5°C limit. We further recommend that the long-term strategy on emissions reductions sets out the overarching architecture (governance, institutions, and information systems) including a comprehensive policy suite to drive the necessary transformation of the Australian economy.

Climateworks recommends the Authority advises the government to set whole-of-economy targets in line with a least-cost pathway for a 1.5°C limit. This would include a 2035 target as part of the next nationally determined contribution (NDC). We also advice on an update to the current NDC - including a stronger 2030 target and an earlier net zero date. We recommend that advice on targets includes consideration of diplomatic priorities, trade links and investment attraction.

Climateworks is currently updating our scenario analysis of least-cost pathways, but our previous work with CSIRO suggests an appropriate level would be around 75 per cent by 2030, with net zero emissions achieved by 2035 (Climateworks Centre 2020).

Climateworks recommends advice to legislate national targets with and on other sectoral or location-specific targets or goals set in regulations. These other targets are important to ensure effective transformation of key sectors in line with Australia's full obligations under the Paris Agreement. We highlight energy performance, transport and buildings as areas that would benefit from regulated targets or goals.

We further recommend a periodic and transparent process for reviewing targets and tracking progress, including any targets set through regulation or those used as indicators of progress.

We suggest the Authority, or equivalent independent institution, develop and hold whole-of economy and sectoral pathways for Australia under a range of scenarios for a 1.5°C limit. We recommend these include the emissions impacts of energy exports. Our detailed submission provides further advice and specific recommendations about setting and use of sectoral pathways.

Within the establishment of a governance and information architecture, Climateworks notes the importance of independent and reliable data and information platforms to create coordinated and coherent action. We recommend various areas where the government can play an important role, including developing sectoral emissions pathways and establishing information platforms and data. For example, changes to the National Greenhouse and Energy Reporting scheme during its review can improve this foundational piece of Australia's information architecture.

Climateworks has many years of experience looking at the role of nature-based solutions and the land sector as part of Australia's transformation to a net zero economy. We note that the potential for markets in this area is only part of the picture. We recommend work on a roadmap for nature-based solutions to drive large-scale change. Climateworks recommends a set of principles to underpin the Authority's advice as part of the review of the Carbon Farming Initiative legislation, and any future advice on offsets. Principles include the integrity of offset creation, schemes and use, the optimisation of co-benefits and reduction of perverse outcomes, and constraints on long-term sustainability.

Based on our experience working with corporates, we make recommendations on how the Authority can advise government on its role to support corporate action, particularly through the development of sectoral pathways and resolving other data gaps. Support for companies to disclose and track Scope 3 emissions is an area where additional government work would be particularly useful.

Thank you for taking the time to consider our submission. We would welcome an opportunity to brief your team if you would like to explore our responses in further detail.

Yours sincerely,

Anna Malos
Country Lead, Australia,
Climateworks Centre
anna.malos@climateworkscentre.org

Detailed Climateworks submission

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Australia's major challenges and opportunities in a net zero future

This section relates to question 12 a. *What are the risks and opportunities for households, business, workers and communities affected by the transition?* And 13. *What is the role for Government in reducing these risks and assisting households, business, workers and communities to realise the opportunities?*

Australia's governments have recognised that the future lies in making the most of the country's vast renewable energy and mineral resources. These are well matched to the demands of the net zero global economy. Australia's economy remains relatively high emissions compared to other G20 countries, although it has been decoupling growth from greenhouse gas emissions.

Recommendation:

Climateworks Centre recommends the Authority advises government to:

- Take a mission-oriented approach to climate action that makes the most of Australia's opportunities in the future global economy, where the task is to transform the economy by backcasting from a goal of net zero emissions in line with 1.5°C.
- Commit to produce a detailed long-term emissions reduction strategy to reach this goal that is presented publicly by COP30 in 2025, or at the time Australia submits its second NDC with a 2035 target.
- Ensure that the long-term strategy puts in place the overarching architecture (governance, institutions, information systems and policies) to drive the necessary transformation of the Australian economy
- Set out by mid-2024 the policy suite that can exceed the current 2030 target and by COP30 the policy suite and implementation timeline for Australia's second NDC.

Risks of inaction

Australia can mitigate many risks by supporting action in line with the Paris Agreement on climate.

Australia has a strong vested interest in ensuring that the world acts. Australia is particularly exposed to physical risks from climate change because of existing extreme weather risks, such as floods, droughts, heatwaves and storms. Since the Paris Agreement in 2015, research has shown that each increment of temperature rise has significant consequences for the frequency and severity of extreme weather events. As the Executive Director of UNEP says 'every fraction of a degree matters' (Chestney 2022).

The world's investors are recognising that neither business-as-usual nor incremental change are enough to protect the world from major climate change. This means that the financial and business environment is changing rapidly. Failure to transform the economy would expose Australia, its businesses, workers, households and communities to transitional risk from climate change. Transition risks are those associated with the extensive policy, legal, technology, and market changes that are inevitable as the world addresses mitigation and adaptation requirements related to climate change. The mitigation requirements will cover the reduction of greenhouse gas emissions and transition to renewable energy (FSB 2017). Governments can play multiple roles to support organisations and communities to manage and adapt to the internal and external pace of change during the transition to a net zero economy.

Economic benefits of reaching net zero emissions

Australia has the ability to achieve a net zero economy and should focus on the wide-ranging benefits and economic opportunities this could create.

The Australian Government is committed to transform Australia into a renewable superpower (Austrade 2023). This is supported by all state and territory governments. All significant political parties support making the most of Australia's clean energy resources.

Australia's high-emissions economy and fossil fuel exports mean it faces a major challenge to make the most of the opportunities available. In its favour, Australia has comparative advantages well beyond its natural resources that are well suited to the new global economy.

Australia's governance and financial structures are well respected globally. Its economic strength is based on transparent and trusted legal and governance systems, with well-established rights. Australia's goods and services are considered high quality and often receive a premium because of this reputation. To maintain markets and such a premium in a global net zero economy there will need to be major changes – for companies, workers, communities and governments.

Rapid action in line with a 1.5°C limit creates benefits

Australia's vulnerabilities and resources mean there are more advantages than disadvantages from climate action in line with a 1.5°C limit.

All Australia's governments have set a goal to reach net zero emissions by or before 2050.¹ Physical science dictates that further net emissions of greenhouse gases to the atmosphere results in further warming. Global warming is driven primarily by cumulative emissions over time, rather than annual emissions. This means the world has a given 'carbon budget' to spend before a particular temperature increase limit is likely to be breached. The most important greenhouse gas, carbon dioxide, persists in the atmosphere for hundreds of years, so the sooner net zero is reached the less the climate will change. Cumulative emissions being the important factor also means that Paris-alignment is about the shape of the trajectory to net zero as well as when zero emissions are reached.

Australia's vulnerability to climate change means that it is in Australia's interest for the world to take rapid and strong action to reduce emissions. Limiting global warming to 1.5 degrees Celsius by 2100 is theoretically possible but the window of opportunity is closing (IPCC 2022a). Climateworks analysis with CSIRO have shown that there are still pathways for the Australian economy to reach net zero emissions in line with 1.5 degrees.

More frequent and severe weather events caused by delayed action will increase the costs associated with disaster response for governments and local communities. Households and businesses will also be impacted by the availability and affordability of insurance as pointed out in the report commissioned by the Insurance Council of Australia to the McKell Institute (The McKell Institute 2022). The loss and damage of natural ecosystems is also a threat, as many regions in Australia are already at very high risk and beyond adaptation limits (IPCC 2022b).

There is economic advantage to moving quickly in order to capture market share in the net zero global economy. But Australia will have to move fast. Other countries – including the US, China and members of the EU – are already taking rapid action and investing more strongly in the economic transformation needed. And in what can seem like a paradox, aiming higher can make change more possible – because key actors in the system recognise that they will have to go beyond incremental change.

As mentioned, the Australian Government recognises the imperative of economic transformation. It also recognises the diplomatic importance of Australia acting on climate change given the

¹ Tasmania legislated net zero target 2030, Victoria legislated net zero target 2045, ACT legislated net zero target 2045, WA intends to legislate net zero target 2050, NSW intends to legislate net zero target 2050, SA, Qld, and NT all have net zero by 2050 targets.

vulnerabilities in the Asia-Pacific region.

Australian governments are uniquely positioned to meet these challenges

Climateworks agrees with Mariana Mazzucato that governments can act ‘to define the grand challenges of the times and to set missions to solve them in partnership with business’ (Mazzucato 2021). This mission approach includes a focus on the end goal – in this case deep and rapid emissions reductions in line with Australia’s fair share of climate action. Climateworks recommends action to ensure Australia can reach net zero or beyond and at a pace that is in line with 1.5°C. Setting this as Australia’s end goal will create coherence, enabling policymakers to support greater innovation and collaboration across sectors and coordinate efforts for greater societal benefit.

Ensuring that Australia’s economic system can rapidly and successfully transform to maximise the opportunities and address the challenges will be complex. Climateworks sees a key role for government to ensure the structural architecture of the economy harnesses the power of its companies, markets and communities to transform. In our view, governments have the ability to set and adjust powerful system dynamics that can enable this transformation including:

- governance frameworks and institutions that set rules and house information
- formal rules including policy, legislation and regulation, and the interconnections with social norms
- information flows, structures and platforms
- defining targets, and incorporating the emissions reduction goal into the objectives and purpose of legislation.

Climateworks supports the Authority’s advice last year for the Australian Government to produce a detailed long-term strategy for emissions reductions.² We view this strategy as the most effective place to set out the overarching architecture – governance, policies, information platforms – along with how the economy needs to transform and the role of the government.

The government has committed to consider the 2030 target as a floor not a ceiling included statements by Minister Bowen when the Climate Change Act went through parliament. Climateworks support this approach. Exceeding the current 2030 target, and achieving future targets will require new policies. Setting out expectations for this policy suite would increase confidence about the government’s commitments and about how the economy will transform. We therefore recommend timelines for announcing a policy suite and the long-term strategy.

Climateworks notes the importance of independent and reliable data and information platforms to inform actors in the system and create coordinated and coherent action. In our view there are multiple areas where government is best suited to lead on what is needed. We discuss these information gaps that are restricting economic transformation in section ‘The role for government in the transition’.

² In the first annual progress report, the Climate Change Authority said: ‘The Government can ‘light the way’ to net zero with a long-term strategy for emissions reductions—a strategy that sets expectations for when, how, and by how much, emissions should be reduced across different sectors of the economy. Everyone in Australia must be on a path to net zero, but not necessarily the same path. And a new era of Commonwealth, state and territory and local government cooperation can support the most efficient and effective outcomes. Climate change will need to be at the forefront of all government decision-making if we are to overcome barriers to meeting Australia’s targets.’ (Climate Change Authority 2022)

Achieving rapid and comprehensive decarbonisation

In 2020 Climateworks scenario analysis showed that Australia can decarbonise deeply – reaching net zero by 2035.

Decarbonisation Futures: Solutions, actions and benchmarks for a net zero emissions Australia (Climateworks Centre 2020) explores a set of alternative scenarios on how Australia can reach net zero emissions. The report and its underpinning economic modelling provide guidance on whole-of-economy and sector-level emissions trajectories for Australia that align with the Paris Agreement. The emissions reductions shown by two scenarios are provided in table 1. The report showed that Australia can immediately accelerate deployment of mature and demonstration zero-emissions solutions, including renewable energy and electric vehicles, in sectors such as electricity, transport and buildings (Climateworks Centre 2020). This is discussed further in section x Australia can decarbonise across all sectors.

Table 1: Level of emissions reductions as percentage below 2005 levels, or net zero emissions (carbon dioxide equivalents).

Decarbonisation Futures modelling	1.5°C scenario		2°C scenario ³	
	2030	2035	2030	2050
Whole-of-economy	74%	Net zero	53%	Net zero
Whole-of-economy excluding negative emissions ⁴	55%	73%	47%	84%

Source: Trajectories for Paris-aligned⁵ scenarios presented in Climateworks' Decarbonisation Futures (Climateworks Centre 2020). Climateworks selected a carbon budget for Australia based on the approach suggested in the Garnaut review and further developed by the Authority (Climate Change Authority 2014)⁶.

Emissions targets act as a guide to the broader economy for coherent action across sectors and different actors. They provide a market signal for long-term investment and the phasing in, or out, of various technologies and policies. It is important to set targets that drive towards the overall goal of ensuring Australia's economy is transformed to reach net zero emissions in line with the 1.5°C goal of the Paris Agreement.

Australia's 2035 target

Australia's 2035 reductions target should be in line with a 1.5°C carbon budget for Australia.

This section relates to question 9. *What do you think Australia's 2035 target should be and why?*

Recommendation:

³ The 2°C scenario is the '2C Innovate' scenario from Decarbonisation Futures.

⁴ The whole of economy figures negative emissions exclude industrial carbon capture and storage, negative emissions in the AusTIMES forestry and logging sector, and additional negative emissions from carbon forestry to approximate absolute emissions reductions.

⁵ The 1.5°C scenario was assessed against a budget of 7.0 GtCO₂e for 2015–2050, based on a 50 per cent probability of limiting the temperature rise to 1.5°C, and the 2°C scenario was assessed against a budget of 14.0 GtCO₂e for 2015–2050, based on a 67 per cent probability of limiting the temperature rise to 2 degrees.

⁶ This is a 'contraction and convergence approach' that reflects Australia's need to transition from its current high emissions and its status as a highly developed country which has the economic strength to transition. Other approaches include ones where Australia's historical emissions have already more than equalled its fair share of a global carbon budget.

Climateworks recommends the Authority advises government to set a 2035 emissions target that is in line with credible pathways to achieve net zero emissions and keep temperature rise below 1.5°C. Climateworks' *Decarbonisation Futures* 1.5°C scenario from 2020, suggests this target would be net zero by 2035.

The Paris Agreement is a legal framework with the goal to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. Countries have recognised the importance of aiming for the more ambitious temperature limit of the global goal given growing scientific evidence on the risks of further global warming as discussed in the section on *Risks of inaction*. Under the agreement countries submit nationally determined contributions (NDCs) towards this goal every five years. Each set of targets is to be more ambitious than the last, with the next set of NDCs to include emissions reduction targets for 2035. Countries' submissions will follow the a global stocktake under Paris Agreement rules that will determine if current action is in line with the global goal. The results of the stocktake are expected in 2024, with submitting targets to follow in 2025.

Climateworks' modelled 1.5°C-aligned scenario in *Decarbonisation Futures* reaches net zero emissions around 2035. The potential to achieve net zero by the mid-2030s is confirmed by recent Climateworks modelling in support of CSIRO's work on the Australian Energy Market Operator's Integrated System Plan (Reedman et al. 2022). The finding that 1.5°C-alignment reaches net zero emissions by mid to late 2030s for Australia is also backed by recent independent analysis from leading climate scientists and IPCC authors Meinshausen and Nicholls (Meinshausen and Nicholls 2023), commissioned by WWF-Australia.

Australia's 2030 and net zero targets

Australia's current 2030 emissions reduction target should be strengthened to avoid steeper reductions after 2030 and increasing costs.

Recommendation: In addition to a 2035 target in line with the Paris Agreement, Climateworks Centre recommends that the Authority's advice includes the that:

- The Australian Government reviews and strengthens its 2030 emissions reduction target to get on track to keep temperature rise below 1.5°C. A stronger 2030 target will enable Australia to reach an appropriate contribution to the Paris goal in a more cost-effective way. Climateworks recommends that the government updates its NDC to reflect this stronger 2030 target.
- The Australian Government reviews, strengthens and legislates its long-term net zero target to be in line with a cost-effective pathway with a 1.5°C limit and updates its NDC to reflect this stronger long-term target.
- Targets in Australia's NDC are backed by evidence that demonstrates their alignment with limiting global warming to 1.5°C.

Australia's current NDC includes a target for 2030 of 43 per cent below 2005 levels. Climateworks' 1.5°C scenario in *Decarbonisation Futures* shows a least-cost pathway reaches 74 per cent emissions reduction by 2030 below 2005 levels. Analysis by Meinshausen and Nicholls for a trajectory in line with a limit of 1.5°C reaches a 67 per cent reduction in 2030 (Meinshausen and Nicholls 2023). These assessments of the emissions reductions required to be aligned with the are substantially stronger than Australia's current 2030 NDC. Other analysis has also included that Australia's 2030 target is not yet sufficiently ambitious (Climate Action Tracker 2022). Current global action has also been assessed as insufficient (United Nations Environment Programme 2022). In addition to the submission of the next set of NDCs, countries have been asked to increase the ambition of their current pledges.

If Australia does not strengthen its emissions reductions over the next decade, cumulative emissions will be larger in the near term. As a result, Australia would need significantly steeper reductions post-2030 and an earlier net zero emissions date to stay within a 1.5°C carbon budget. Delaying

action in this way is not in line with our analysis of the most cost-effective ways to reach net zero emissions.

A more ambitious long-term emissions reduction target is in Australia's interest

According to Climateworks analysis, Australia's current long-term emissions reduction target of net zero by 2050 is also not yet compatible with a 1.5°C carbon budget – see table 1. This is reinforced by the work of Climate Analytics (Climate Action Tracker 2022) and by Meinhausen and Nicholls (Meinshausen and Nicholls 2023). In our view, it is in Australia's interests, economically, diplomatically and for the benefit of communities, to strengthen the long-term target. This is discussed further in the section on *Australia's major challenges and opportunities in a net zero future*.

The five-yearly processes of the Paris Agreement include periodic reviews. Climateworks argues it is effective to set in place periodic reviews to reassess appropriate emissions reduction trajectories and pathways. This is discussed further in the section on *Defining sectoral pathways and their importance*.

Climateworks is currently in the process of reviewing and upgrading its modelled Paris-aligned scenarios and, in the second half of 2023, will be publishing updated implications for 2030 and 2035 targets in line with 1.5°C and well-below 2°C.

Australia can decarbonise across all sectors

Australia currently has a high-emissions economy, although this is already changing. It is the 15th highest country for total emissions, the highest emitting OECD country on a per person basis and the fifth highest emitting OECD country on a per unit of GDP basis for 2019 data (ClimateWatch 2023).

Australia can achieve deep emissions reductions in most sectors of the economy, with Climateworks modelling showing that, for a least-cost transition to net zero, different economic sectors need to decarbonise at different rates. Significant emissions reductions can be achieved in most sectors before 2035 using known technologies alongside major changes in energy infrastructure. New technologies already in development will enable further reductions in the longer term. Increased carbon sequestration – especially through domestic nature-based solutions – allows Australia to reach net zero emissions in line with a 1.5°C emissions budget.

The transition to a near-zero emissions electricity system is one of the biggest opportunities to reduce emissions in Australia. In our Decarbonisation Futures analysis (*Climateworks Centre 2020*), by 2030 there is a 63–64 per cent decrease in electricity emissions from 2020 levels in the 2°C scenario, and a 73 per cent decrease in the 1.5°C scenario. Renewable energy is also a key enabler of emissions reduction in other sectors in the least-cost pathways. A rapid increase in renewables capacity and storage enables rapid fuel switching to electricity in the buildings sector and a more gradual transition in the transport sector.

Climateworks' analysis for the Australian Industry Energy Transitions Initiative (Industry Energy Transition 2019) also shows the importance of increased renewable energy and storage capacity, and other changes to energy use. Consultation with industry participants and techno-economic modelling showed that some of the highest impact solutions involve electrification of processes to reduce emissions directly from operations (known as scope 1). In some industries, renewable hydrogen is also expected to play an important role in the future. In the 1.5°C scenario, industry sector emissions from the direct combustion of fossil fuels decrease by 77 per cent by 2035 from 2020 levels. In the same scenario, industry sector process emissions decrease by 81 per cent by 2035, through solutions such as feedstock switching, reduction in leakages and venting, and substitution of chemical processes, as well as carbon capture and storage in some industries (along with robust monitoring and regulation). These outcomes require strong, coordinated action to develop and deploy abatement technologies.

Energy efficiency and good energy management across all sectors also play a critical role in decreasing the cost required to meet our energy needs with renewable energy. Recent modelling by CSIRO and Climateworks (commissioned by AEMO) found that energy efficiency provides significant benefits across all scenarios, even in scenario narratives that assume it has a more restricted role (Reedman et al. 2022). In the future, flexible hydrogen production for use by heavy industry could play a load balancing role, scaling up when variable renewables are most available. Materials, process and energy efficiency are critical to cost-effectiveness in industry decarbonisation pathways.

In buildings, energy needs can be reduced with technologies that are already commercially available, such as electric heat pumps and smart technologies to reduce peak demand. The construction of buildings with low energy requirements and renovations to existing buildings to improve insulation and draught-sealing improve energy performance and reduce costs.

In transport, switching to electric vehicles and alternative modes of transport are key to emissions reductions. Australia could reduce electricity demand by enabling greater active transport and mode switching to public transport. Thinking beyond technology switching, reducing the need to travel by planning where people live and work, and how we make it possible to access what is needed, will reduce demand.

Nature-based solutions such as improved land management and afforestation will continue to play a role. However, the limits to the sequestration potential of land-based options means these can only be a small part of the pathway to net zero emissions, especially considering that land-based sequestration may compete with agriculture in some instances or over-stretch water resources. However, it can also play a role in building resilience and addressing biodiversity loss if designed appropriately. Nature-based solutions are discussed further in the *Investment in Nature Based Solutions* section of the submission.

Nature-based solutions and geological sequestration will be necessary to counterbalance the residual emissions in sectors that are harder to decarbonise. However, emissions abatement should be prioritised over removals given negative sequestration will not be sufficiently available unless there is substantial and rapid decarbonisation. In the future, direct air capture may have potential, though it is currently very expensive and has recently been described by the UNFCCC (2023) as ‘technologically and economically unproven, especially at scale’.

The role for government in the transition

Recommendation:

Climateworks recommends the Authority advises government on:

- how to incorporate the emissions reduction goal more effectively into the objectives and purpose of legislation, building on the foundation created through the Climate Change Consequential Amendments Act 2022
 - information frameworks for high-quality disclosure for emissions both in and outside of government.
-

Governments around the world are reviewing their approach to climate change. They recognise that meeting the objectives of the Paris Agreement will require new, stronger and more comprehensive approaches to climate governance (Averchenkova, Fankhauser, and Finnegan 2018).

In, we outlined the challenge for government to ensure Australia has a vibrant, net zero economy. Our view is that governments have the ability to set and adjust powerful system dynamics to transform the economy. There is clear benefit from a comprehensive policy suite that sets the formal rules for the economy. We also urge the Authority to recognise the importance of government action around the information architecture, governance frameworks and institutions that set rules and house information. Changes to government processes – including around the budget, fiscal rules, finance processes and procurement – can create leverage through creating an appropriate economic architecture. Advice around these processes will help ensure the Australian Government creates maximum benefit from its declared intention to achieve a net zero public sector by 2030 and to act as a leader in the transformation of our economy.

Governance and information architecture to support decarbonisation

Australia has an excellent foundation to create the information architecture that can support economic transformation, but there are weaknesses in some areas.

Australia already has good information requirements and frameworks to build the information architecture that governments, businesses, investors and communities will need to make effective decisions and transform the economy. These include:

- robust emissions inventories and projections
- reporting for major emitters and energy users through the NGER scheme
- a statutory requirement to:
 - track progress towards the achievement of Australia's targets
 - assess and report on the emissions reduction impact of policies.

Climateworks welcomes proposals to create better environmental information beyond climate impacts and emissions including through Environment Information Australia. We see value in the Authority identifying how the government can create systems that integrate these aspects. Climateworks has developed a natural capital measurement catalogue that an open resource that presents metrics and methods for the measurement of natural capital assets, flows of services or benefits, and organisational impacts or dependencies on nature which can inform the development of appropriate indicators. We welcome further discussions with the Authority on these aspects

The Authority has already been tasked with additional duties that Climateworks sees as important to support development of the information architecture that is crucial for an effective, fair and economically efficient transformation of the economy. We highlight the value of:

- longer term emissions projections
- scenario-based emissions reduction pathways – whole-of-economy and sectoral

- an assessment of the gaps between pathways and projections – nationally and by sector – in order to inform the work of:
 - federal, state and territory governments
 - other major non-state actors, including corporates, investors and major cities
- the implications for the likely changes to technologies, skills, workforces and supply chains shown by the sectoral pathways analysis
- comprehensive policy toolkit guided by the gap analysis and sectoral pathways
- an ongoing assessment of policy effectiveness.

Climateworks has previously recommended additional areas where government can integrate the emissions reduction goal into the objectives and purpose of a range of legislation and regulation and improve policy coherence and effectiveness (Climateworks Centre 2023a). Government highlighted the potential for further changes of this nature when the Climate Change Act and its consequential amendments were passed through parliament. We therefore recommend that the Authority assesses additional areas to integrate Australia's emissions reduction targets in legislation or regulation in this manner.

During our work with stakeholders in the business and the investor community Climateworks has identified key gaps in the availability and transparency of information and data sets. Climateworks therefore recommends that the Authority explores these gaps and advises on information frameworks for high quality disclosure for emissions both in and outside of government. We suggest this advice considers how best to ensure effective support for the following:

- government reporting as an entity in line with climate risk disclosure requirements
- corporate reporting for scopes 1, 2 and 3 (respectively: direct emissions, emissions from grid connected electricity use and other indirect emissions)
- credible transition plans
- data and the information platforms to support companies to disclose and track scope 3 emissions in a robust and transparent manner.

We discuss these aspects further in the sector on *Corporate action to support decarbonisation*.

The role of legislation, regulation and guidance

Relates to question 7. *When is it appropriate for the Government to regulate something?*

Climateworks highlights three ways to set targets that create differing a balance between strength of signal and flexibility:

- Legislation. This creates the strongest signal and is most appropriate where there is confidence that the level of the target is likely to remain appropriate; for example, whole-of-economy emissions reduction targets. The degree to which a legislated target will force changes in the economy will depend on the suite of policies that sit behind it.
- Regulation. Regulated targets provide a very clear signal, but can provide greater flexibility to respond to changing circumstances. Where a regulated target is attached to a market mechanism, for example the Renewable Energy Target, it can create a very strong market signal.
- Indicators and criteria for funding allow guidance on whether objectives are being met and to see whether actual changes are on track with desired transformations.

Government regulation is a useful tool to guide the economy and create investor and business confidence in the direction of change.

Regulation is a powerful tool that governments can deploy to effectively, efficiently and fairly drive change. Regulation is particularly helpful in order to:

- Provide necessary frameworks and rules to achieve a desired goal or objective. Such frameworks and rules provide market and community confidence and enable decision-making and planning focused on the end-goal. This helps unlock innovation, investment and workforce development to meet the goals. In this instance the objective would be the long- and medium-term legislated emissions reduction targets and the goal a net zero emissions economy in line with limiting warming to 1.5°C. Such regulation could include sectoral or technology specific targets. We discuss this further in the section on *Additional targets*.
- Establish the institutional infrastructure required to drive successful, coordinated transition in line with these targets. Examples include institutions to support innovation and commercialisation of new technologies such as CEFC and ARENA, and the national Net Zero Authority.
- Require consideration of climate change and alignment with emission reduction targets in government investment and decision making under delegated authority. Examples include the alignment of government spending through the investment mandate of the National Reconstruction Fund and criteria for the Powering the Regions fund.
- Create a 'level playing field' through setting standards aligned to the achievement of emissions reduction targets. This ensures that market leaders are not disadvantaged by having a high standard product in a situation where they cannot charge a premium. It also ensures that high emissions are not locked-in to the economy through technologies where there are already emissions alternatives. We discuss recommended examples in buildings, transport and energy performance in section on *Additional targets*.
- Setting timelines for the phase-out of activities that are incompatible with emission reduction targets, enabling timely redirection of investment into alternative technologies. Such timelines also provide guidance and a signal to help transform supply chains, workforce capabilities etc.

The role of the Climate Change Authority to support government

This section relates broadly to 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?* which is also answered in the section *Additional guidance for the Authority's Strategic Framework*.

Recommendation: Climateworks recommends the Authority acts beyond its explicit statutory duties in order it meets the broader objectives of its governing Acts. We therefore recommend the Authority provides advice that:

- Sets out the appropriate architecture for governance and information to guide the net zero transformation.
 - Highlights the importance of 1.5°C aligned emissions trajectories and sector pathways, and suggests how these should be created and reviewed periodically, including which independent institution should develop and hold them if not the Authority.
 - Specifies the additional information platforms and data that will allow the government and others to make informed decisions and assess progress against these pathways and the required economic transformation.
-

The Climate Change Act 2022 enshrined new duties for the Climate Change Authority (the Authority) (*Climate Change Act 2022*) building on the duties and principles established under the Climate Change Authority Act (*Climate Change Authority Act 2011*). These Acts place the Authority front and centre of ensuring the government can meet its goals to reach net zero and act in line with the Paris Agreement.

Climateworks is of the view that the objective of the Authority is to ensure that the Australian Government understands the full ramifications of the challenge. The Authority's advice should therefore encompass what the government should be aiming for and what the structural system architecture to deliver the necessary transformations could look like. The creation of a detailed long-term emissions reduction strategy will support this objective and should set out clearly how Australia will reach net zero emissions in line with the Paris Agreement.

For government and the Authority to meet their statutory duties under relevant acts, Climateworks sees particular value in ensuring a high level of transparency around information frameworks and data for tracking emissions reductions, policy impact, and projections. Australia already has robust emissions data and projections with data released regularly. The obligation to track the emissions reduction impacts of policy is, however, newly legislated and builds on the Authority's existing duties to review specific policies.

Climateworks suggests that the Authority sets the framework for policy assessment but delegates to the departments the responsibility for assessing the effectiveness and impacts of their own policies. The Authority would remain responsible to provide support and overall oversight – akin to an audit function. These assessments would include the impact of all relevant policies on emissions reductions and the impact beyond emissions reductions of climate policies. We would note that the Authority may need to have a more direct role initially, until systems to track progress and assess policy assessments are mainstreamed across relevant departments.

Climateworks notes that our recommendations may require the Authority to be provided with additional resources, particularly if it is tasked with developing and holding emissions reduction trajectories and pathways at the whole-of-economy and sectoral level. We discuss this further in the section on the *Importance of defining pathways*.

Climateworks also sees value in improving the information and data held about corporate emissions and their plans, and thinks that the Authority could support this improvement through their work. We discuss this in the sections on *Corporate action to support decarbonisation* and on the NGER scheme.

Climateworks also sees that there are a number of areas in which there is insufficient information and a lack of specific data. This creates barriers to the systemic change necessary to underpin economic transformation. Climateworks suggests the Authority identifies these information and data gaps and proposes solutions to strengthen the information architecture. This is likely to include the frameworks for the data, potential data sources and institutional homes for the data. The Authority would then track the creation of the required data and systems, while the data itself may be held by departments, agencies or independent entities as considered appropriate.

Additional guidance for the Authority's Strategic Framework

This section addresses the 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?*

Recommendation:

Climateworks recommends the Authority's Strategic Framework includes an overarching objective to achieve net zero emissions domestically in line with 1.5°C and to position Australia as a leader in a net zero global economy. We recommend that the Strategic Framework is modified slightly and includes additional enablers and actions.

Climateworks places high importance on the role of governments to identify overarching system-level solutions and levers and put in place appropriate interventions. The actions and enablers identified in the Strategic Framework provide perspective to advise on this to enable Australia's transition to net zero. Climateworks recommends 10 additions and refinements to make the Strategic Framework more effective:

1. That the Authority's Strategic Framework be linked to an overarching objective: to achieve net zero emissions domestically in line with 1.5°C and to position Australia as a leader in a net zero global economy.

This clear objective would provide a focus for assessing policy and implementation.

2. Include targets as an enabler.

As discussed in section on *Australia's targets*, setting clear long- and medium-term targets – both at the national level, and for specific sectors and locations is a critical enabler of action within both the public and private sector. Targets are more effective when they are backed by evidence (such as modelling) and are supported by transparent reporting of progress. By providing a clear objective and signal of government intent, targets support backcasting from an end-goal in decision-making (rather than incremental change) and innovation.

3. Amend the role of 'Deploy technology solutions' within the framework.

Deploying technology solutions at scale is not a discrete action category, but rather a preferred approach across many of the actions. Our *Decarbonisation Futures* scenarios demonstrate that Australia can achieve an emissions reduction trajectory in line with 1.5°C using known technologies.

'Deploy known solutions' could also apply to enablers where effective policy and financing mechanisms, international standards etc are already known and can be readily adapted to the Australian context.

4. Specify transition of Australia's electricity supply to renewable sources and the need to increase supply to support rapid electrification in end-use sectors and to enable net zero exports (including energy exports).

The supply of renewable electricity enables zero emissions electrification of transport, buildings and industry. Our modelling undertaken for *Decarbonisation Futures* (Climateworks Centre 2020) and subsequently for Australian Industry ETI (Australian Industry ETI 2023) suggests a doubling increase in electricity supply will be needed by 2050 to enable 1.5°C decarbonisation of the Australian economy. The electricity supply will need to increase further still, if Australia wants to increase clean energy exports (directly, or via green hydrogen), or exports of energy-intensive goods.

5. Reconsider the term 'efficient production' and include efficiencies beyond production.

Efficiency in productive sectors such as industry and agriculture is fundamental to least-cost pathways of decarbonisation. However, energy efficiency to reduce demand in other end-use sectors such as buildings and transport as well as shifting energy demand to respond to supply are as important in order to increase feasibility and reduce the cost of the energy transition. Climateworks notes that more efficient energy demand can bring significant additional benefits – for example, energy-efficient homes bring cost of living and health benefits to households.

6. Ensure that 'Sequester the residual' has an explicit focus on nature-based solutions that carry additional benefits to nature and community.

This should include enhancing and protecting existing carbon sinks (land-based and oceanic) as well as increased deployment of nature-based solutions to sequester carbon-dioxide that provide biodiversity or landscape restoration benefits on public and private land while taking due consideration of agricultural production.

7. Add 'Coordination' as an enabler.

Coordination between actors in different sectors and harmonisation of policies and incentives across different jurisdictions is crucial to unlock the scale and pace of emissions reduction required to transition the Australian economy to net zero emissions. Our recent work on Renewable Energy Industrial Precincts (REIPs) highlights collaboration between industrial actors, government and community. This is shown to be an essential factor for the successful development and implementation of cost-effective regional transition roadmaps (Climateworks Centre 2023c). Similarly, our work has identified that Australian cities need clear governance mechanisms and collaboration across all levels of government to achieve net zero emissions. This could extend from an individual precinct to metropolitan-level partnerships. Task forces which encompass multi-level governance can coordinate resources and regulations, which pave the way for more effective local action to achieve net zero.

8. Add 'Transition support' to the enabler 'Manage risks'.

Supporting communities disproportionately affected by the transition to net zero will be essential to maintain community support for rapid transition, as well as to mitigate localised social and economic impacts. Key to this will be consultation to understand issues at the local level and guide decision-making.

9. Include 'Government leadership' as an enabler.

Governments are significant actors in the economy and can lead in the implementation of best practice in reducing scope 1, 2 and 3 emissions through setting targets coherent with 1.5°C pathways and making achieving these targets guides or criteria in all decision-making, purchasing and contracting.

10. Note role of government in leveraging private investment within the 'Investment' enabler.

Direct government investment through co-financing options stimulates private investment through reducing investment risk, and helps overcome first-mover disadvantage – bringing forward and increasing private investment in emissions

reduction solutions.

Climateworks' priorities for transformations needed this decade

Climateworks' view is that there are four critical transformations needed this decade for Australia to be ready for the global net zero economy:

- **Governance for 1.5**
Alignment with 1.5°C is embedded in governance settings, decision-making and reporting across public and private sectors.
- **Near zero emissions energy supply**
Deployment of renewable energy sources and other technologies at scale to reach near zero emissions electricity in the 2030s to enable decarbonisation and mass electrification of whole economies, including phase-out of fossil fuels.
- **Efficient net zero emissions demand and production**
Mass deployment of energy efficiency and energy management solutions to optimise energy demand across economies. Decarbonisation of supply chains through shifting demand and production from emissions-intensive to low-carbon technologies, products and supporting infrastructure, including creation of new industries.
- **Nature as a climate solution**
Protecting and growing resilient carbon sinks to optimise nature-based solutions while enhancing our natural environment.

Our highest priority is ensuring that the necessary momentum and governance architecture are in place within the next three years to drive emissions reduction action at the speed and scale required to achieve these transformations.

By 2025, success would look like:

- Federal, state and territory governments have clear medium- and long-term emissions reduction targets in line with 1.5°C, with aligned policies and spending.
- Corporates and financial institutions with the highest emissions footprints are disclosing quality climate and nature risk reporting and net zero transition plans, and investing in 1.5°C in supply chains – enabled by mandatory corporate reporting.
- Integrated energy planning and investment decisions drive near zero emissions energy generation by 2035 and increase generation, storage and demand-management at a scale that allows decarbonisation of the Australian economy and enables future renewable energy export opportunities.
- High-emitting Australian industries, including heavy industry and agriculture, are transforming from high emissions to net zero products and supply chains.
- Net zero transition of Australia's biggest industrial regions and major cities is planned and implementation is underway.
- Australia is on track to implementing zero carbon ready building standards for both residential and commercial buildings by 2030 and policy and finance settings are in place to support mass retrofitting of Australia's existing building stock.
- Electric vehicle uptake is fast accelerating and federal, state and territory governments have net zero transport strategies.
- Nature-based solutions with integrity are being implemented at scale on public and private land and at sea.

Drawing on more than a decade of research and engagement in climate solutions, we have identified specific levers and solutions to drive sustainable system level change. We look forward to further engagement with the Authority on our ideas.

Priorities with the Authority's Strategic Framework

The scale of change needed to transition the Australian economy to net zero aligned with 1.5°C, and the rapidly shrinking window of time available to act, necessitates that all actions and enablers within this framework (including our additional recommendations and suggestions) are required. Our focus is

not on which actions or enablers are of higher priority, but how to best coordinate and sequence them to ensure a rapid, sustainable and successful transition to net zero.

- Target setting enables this coordination and sequencing by clearly defining the goal, and interim benchmarks to achieve it.
- Decarbonisation pathways to limit global warming to 1.5°C at the whole-of-economy and sectoral level provide the basis to identify the sequencing of actions that will be least cost and create the required pace and scale of change. They guide investment and policies, development of workforce capabilities and the infrastructure pipeline required.
- Assessment of action against long-term targets helps ensure that Australia can avoid 'locking out' potential for more rapid emissions reduction or economic opportunities from the global transition, or 'locking in' long-lived high-emissions infrastructure or incremental change, rather than the transformational changes required.
- Our modelling demonstrates that strong and early uptake of energy efficiency and renewable electricity can reduce the cost of the transition, maximise the emissions reduction benefits of electrification, and enable fuel switching to zero emissions energy sources and feedstocks (such as green hydrogen) in the industry sector.
- Coordination of action across sectors will require new approaches, policy alignment and financing. A place-based approach to decarbonisation (for example, for industrial regions and urban centres) can leverage efficiencies, reduce costs and support communities.

Defining sectoral pathways and their importance

This section relates to the following questions:

12. *What factors should the Authority consider when developing sectoral decarbonisation pathways? a. What are the risks and opportunities for households, business, workers and communities affected by the transition? b. Are there supply chain pressure points?*

13. *What is the role for Government in reducing these risks and assisting households, business, workers and communities to realise the opportunities?*

Recommendation:

Climateworks recommends that economic and emissions analysis, including by the Authority and elsewhere in government, includes 1.5°C aligned scenarios. We recommend sectoral trajectories and pathways in line with 1.5°C are used by the Authority to guide their advice to government.

The goal of the Paris Agreement is to strive to limit global warming to 1.5°C and international finance, including the Glasgow Financial Alliance on Net Zero, is moving to use this as the standard for investment. Climateworks therefore recommends all economic and emissions modelling by the Authority and government should include at least one 1.5°C scenario. Climateworks' view is that sectoral pathways should be based upon credible evidence and informed by diverse perspectives.

While the Paris Agreement uses a national boundary approach to account for greenhouse gas emissions, Climateworks recognises the importance of also understanding how Australia's exports contribute more broadly to global emissions. We discuss the importance of including assessment of the international emissions impacts of energy and fossil fuel exports in *Contributions beyond Australia's borders*.

There is no single pathway to net zero emissions; scenarios highlight different pathways to net zero by considering multiple indicators across different categories including policy, businesses, society and technology and differentiating across the maturity of solutions between sectors (Climateworks Centre 2020). Climateworks bases much of our advice on sectoral pathways developed in a partial-equilibrium energy and emissions model that optimises for least-cost technologies across the nation.⁷ Sensitivity analyses are valuable, enabling investigation of specific questions such as supply chain pressure points. We advise that the development of pathways should include consultation with stakeholders, who can inform inputs into the model and provide feedback on early findings. Sectoral pathways should also be updated regularly to take into account changes in available technologies and other solutions and their costs.

Sectoral emissions trajectories show the quantitative reduction in emissions required at a sectoral level to achieve an emissions reduction goal and show the different pace of change by sector. These emissions trajectories are typically presented as either a line chart or timeline showing the sectoral emissions reductions at certain time periods. They are useful to set sectoral targets that align with a least-cost trajectory for the whole-of-economy.

Sectoral pathways show a robust, evidence-based view on the sequence and timing of technologies, behaviours, economic shifts and other actions needed to reduce emissions at a sector level. When developed as part of energy and emissions modelling, pathways show the least-cost trajectory to a given goal and the changes that underpin this. Sectoral pathways can thereby guide decision-makers in government and business to understand how different aspects can contribute to the most cost-effective way to transform the economy. A sectoral pathway can provide information about different aspects of the transformation, such as the rate, sequence and timing of fuel switching and technology implementation in industry. Pathways therefore provide an excellent evidence base to help

⁷ Climateworks welcomes technical discussions about the AusTIMES model, developed with CSIRO. A report on Multi-sectoral energy modelling sets out technical details (Reedman et al 2021).

decision-makers plan, set specific commitments and invest in specific emissions reduction actions. Examples include to assist decisions on the most appropriate sequencing of government and private investment, set technology uptake targets or phase-out targets. Sectoral pathways can guide place-based decisions by increasing confidence that regional and local analysis is coherent with that at the whole-of-economy level. The usefulness of sectoral pathways to inform corporate decarbonisation plans and actions is discussed further in the *Corporate action for decarbonisation* section.

Sectoral trajectories and pathways are effective at providing appropriate guidance to set standards or criteria for potential government interventions. Examples include mandatory corporate disclosure on climate risk, sustainable finance taxonomy and criteria for government spending. When technology-focused sectoral pathways are developed as part of whole-of-economy modelling, they can assist stakeholders to make specific technological investments. This can give confidence to investors, build support for public investment, create social licence for projects, and allow effective long-term planning for what could be needed in the future.

The factors that determine least-cost pathways are not static. Important factors such as technology costs, innovations, community expectations and behaviour and the science around carbon budgets and physical impacts evolve over time. Scenario analysis that depends on inputs and assumptions around these factors therefore also evolves. Pathways should be reviewed regularly against the latest evidence, including changes in the policy context, evolution of technology, and historical progress in emissions reductions against previously modelled scenarios.

Periodic reviews of scenarios analysis and sectoral pathways add to business and investor confidence and effective governance and policy if they are part of a well-understood and transparent. Such reviews would fit with the requirements of the Paris Agreement as discussed in the section on *Australia's 2030 target*.

Whole-of-economy and other targets, including indicators

This section relates to question 20. *What types of targets do you see as important and/or problematic, and why?*

Legislation enhances the signal from key targets

Recommendation:

Climateworks recommends the government legislates all Australia's national targets submitted as part of an NDC under the Paris Agreement through amendments to the Climate Change Act 2022. We strongly support that the government has legislated its existing 2030 and 2050 targets and would extend this to any updated targets.

Whole-of-economy targets provide a clear signal to all parts of the economy which is strengthened when they are set in legislation. This increases the confidence of the market to act in accordance with the targets. The Australian Government's NDC acts as a statement of what Australia considers an appropriate contribution for the emissions reductions required for alignment with Paris goals. It sets the standard by which to assess Australia's ambition and provides accountability to the international community and Australians. Legislation of the relevant targets shows government commitment to meeting those standards. Our recommendation on appropriate levels for Australia's targets is set out in the sections on Australia's 2030 and 2035 targets.

Climateworks sees strong benefits in coordination between federal, state and territory governments to ensure that national and sub-national targets are in line with a cost-effective 1.5°C pathway. The Energy and Climate Ministerial Council provides an effective mechanism for this coordination. Advice by the Authority could strengthen coherence between targets for the different jurisdictions. We also suggest the Climate Change Authority works with the emerging Net Zero Authority to guide work on regional targets to ensure planning and action to decarbonise industrial regions at a precinct level is aligned with long-term national action.

Additional targets provide further signals and can guide necessary changes

Recommendations:

Climateworks recommends the Authority proposes a suite of targets beyond a whole-of economy for sectors and enablers that will be key to transforming the national economy in a cost-effective manner.

Climateworks recommends the following additional targets that would benefit from being set in regulation:

- A goal for a zero-carbon building code for residential and commercial buildings by 2030 at the latest, underpinned by a revised trajectory for Low Energy Buildings.
- A goal and trajectory for light vehicle Fuel Efficiency Standards to reach zero carbon by 2035.
- 2050 and 2030 national energy efficiency targets (in absolute terms), with yearly savings of at least 1 per cent of Australia's overall energy consumption. Climateworks notes that this would require associated national legislation.
- Minimum standards for appliances through the Greenhouse and Energy Minimum Standards in line with energy performance targets in the National Energy Performance Strategy.

Climateworks recommends the government establishes a regular and transparent process for reviewing the suite of sectoral, regional and whole-of-economy targets, to ensure that the suite of targets continues to provide a coherent set of indicators for decarbonisation in line with keeping temperature rise below 1.5°C.

Additional targets can help unlock transformational changes in the economy. Providing guidance through sector-specific and location-specific targets can increase the confidence of decision-makers. These targets can help provide further detail for governments, businesses and investors, to understand what changes and timings align with least-cost pathways. Additional targets can provide a benchmark to assess policies and plans and track progress.

These more granular targets would allow coordination across different sectors. They can provide insight into how changes in different parts of the economy combine to align with the whole-of-economy emissions pathway. They can be powerful as criteria for coherent Paris-aligned action by all government and private sector stakeholders. We therefore recommend that such targets act as guidance for the work of other institutions, including those at the state, territory and regional level.

In the section on Australia's 2030 and 2035 targets we discuss the importance of periodic reviews of progress and ambition in line with expectations of the Paris Agreement. These proposed reviews are to ensure that decisions on the most effective ways to reduce emissions in Australia respond to changing dynamics around technologies and markets. These periodic, transparent reviews would also guide any updates to additional targets and indicators that we set out in this section.

In the section on *The role of legislation, regulation and guidance* we set out why it may not be appropriate to legislate more granular targets. At this level there is greater uncertainty and greater importance of flexibility to adapt to shifting political, social, environmental and economic contexts to ensure that national targets are achieved. Regulation can be a more appropriate mechanism to create the necessary shifts in the economy.

Regulated targets are particularly important for areas where a minimum standard for performance brings additional benefits to society, where consumers have limited ability to demand higher performance in terms of low emissions or energy use, or where current prices restrict the take-up of existing technologies with higher performance. This sits behind our recommended targets for buildings, transport and energy performance that would benefit from being set in regulation.

Additional targets that provide a signal of how different parts of the economy would change on a least-cost pathway can also provide additional guidance to the work of states, territories and local councils to set and implementing their own emissions reduction targets.

Climateworks suggest below further areas where targets to provide additional signals and guidance would be useful. We suggest that the Authority explores with stakeholders additional targets and goals of these kinds and which type of target would be most appropriate:

- Sectoral targets or for enabling conditions – such as targets for levels of renewable energy, storage or demand response – may be appropriate objectives for some aspects of regulation.
- 2030 and 2050 sectoral performance metrics and/or targets for residential buildings, commercial buildings, industry and transport to ensure energy efficiency and emissions reduction targets are met. For example, an annual number of households upgraded to a higher NatHERS rating to reduce energy consumption and emissions in buildings. These would link to existing initiatives and legislation and governance structures – for example building targets should be aligned to the Trajectory for Low Carbon Buildings, in agreement with Building Ministers and Energy Ministers, together with the ABCB.
- Performance measures to track technology uptake for different sectors. For example, in the building sector this could include setting targets for the deployment of insulation, heat pumps etc.

Tracking progress will require quantitative and qualitative measures

This section relates to question 10. *What are some leading indicators of progress towards net zero emissions?*

Recommendation:

Climateworks recommends the Authority establishes indicators that enable quantitative tracking of emissions reductions and policy impacts and for qualitative measures. We recommend including metrics to assess enabling conditions, technology uptake, investment, corporate climate risk disclosure and transition plans.

Climateworks recognises that value of both quantitative and qualitative tracking of progress. Climateworks has tracked progress of historical emissions reductions and projections against emissions reduction pathways (Climateworks Centre 2013) (Climateworks Australia 2018). Our approach includes a backwards look at how economic transformation is progressing and a look forwards to see where more momentum is needed to follow an economically efficient pathway.

Climateworks tracked progress at the whole-of-economy and end-use sector level. We grouped indicators under four pillars of decarbonisation: renewable energy, energy efficiency, fuel switching including electrification, and reducing non-energy emissions (including sequestration). Climateworks chooses to look at emissions from the perspective of real-world sectors – industry, buildings, transport etc – rather than solely in terms of the UNFCCC sources of stationary energy and industrial processes. Our approach is to consider emissions for a sector including the impact of electricity use (scope 2 emissions). We find this gives a clearer picture for business, investors and policymakers. We would welcome discussions with the Authority about the indicators and methodology from our work in this area.

Whichever approach the Authority takes, indicators tracking the progress and outlook for the energy sector will be essential. There is broad agreement that transforming the production and use of energy is central to all emissions reduction pathways. This is particularly true for a country like Australia that has relatively high energy intensity and energy emissions yet has strong opportunities for change, as discussed in the section *Australia can decarbonise across all sectors*. The importance of the energy sector is recognised at a government level in Australia. This recognition is apparent from the work of the Energy and Climate Change Ministerial Council – climate and energy ministers from federal, state and territory governments – particularly through the National Energy Transformation Partnership.

The Authority may find the International Energy Agency's [Tracking Clean Energy Progress](#) (TCEP) initiative helpful. The TCEP assesses developments for 55 components of the energy system that are critical for clean energy transitions. The assessed components include technologies, infrastructure, sectors, subsectors and cross-cutting strategies.

Climateworks has also qualitatively assessed policy against our emissions reduction pathways and welcome further discussion on any of work on policy analysis and design. We highlight the following examples of other work on policy assessment, the Authority may find informative. The work of the UK Climate Change Committee, including their most recent progress report (Climate Change Committee 2023) given the committee's comparable duties to the Authority. Similarly, the work of the Victorian Government on related statutory duties. Green Alliance, in the UK, tracks current emissions by sector and whether they are covered by policy (or about to be) (Green Alliance 2023).

To supplement these emissions-specific indicators, Climateworks recommends the ongoing monitoring of the following indicators of enabling conditions and accelerants of progress towards net zero emissions:

- Sectoral targets and those for progress of enabling actions – such as levels of renewable energy, storage or demand response where not appropriate for regulation.
- The proportion of ASX-listed and high-emitting companies setting and disclosing credible transition plans in line with 1.5°C pathways. Please see additional information on *Corporate action in support of decarbonisation*.
- Federal, state, and territory government investment, the private investment it has leveraged, and public and private investment in research and development.
- Information on current and projected jobs in different industries, and skill shortages.

- Indicators to track that enabling conditions are changing in the ways needed to underpin transformation – including such things as technology uptake and availability.

To truly understand and act on nature's potential as a climate solution, it is essential that Australia looks beyond carbon and to measure the other benefits that nature-based solutions can deliver. Siloed solutions that only focus on reducing GHGs or sequestering carbon, while ignoring interdependencies, can lead to promotion of strategies which may not be viable or broadly palatable, or have significant negative consequences if they are realised. Quantifying how well nature-based solutions can sequester carbon, improve biodiversity and deliver other natural capital benefits is crucial. Climateworks has developed a natural capital measurement catalogue that an open resource that presents metrics and methods for the measurement of natural capital assets, flows of services or benefits, and organisational impacts or dependencies on nature which can inform the development of appropriate indicators. There is a need to prioritise action on integrative solutions that deliver significant co-benefits for nature (water, biodiversity, air quality etc), which in turn benefit society. We welcome further discussions with the Authority on these aspects

The global transition and Australian action

This section relates to:

- Issues Paper section 3.3. *Contributing beyond Australia's borders*
- Question 5. *What are the other challenges and opportunities the global context presents Australia with in responding to climate change?*

The Australian Government recognises the role of climate policy in capturing the significant economic opportunities presented by the global low-carbon transition. The government has also made climate action a part of its diplomatic and trade relations. However, Australia's interlinked emissions reductions and economic priorities will need further changes in order to create a cohesive climate-centred foreign policy that strengthens the necessary diplomatic, trade and investment linkages.

Recommendation:

Climateworks recommends the Authority's advice to the Minister on future targets, policies and the long-term emissions reduction strategies includes consideration of how diplomatic priorities and work on trade linkages and investment attraction can enhance the leadership role Australia can play on climate action to mutual benefit.

Sustainable finance approaches aligned with key investment and regional partners

Climateworks supports the work of the Australian Treasury on the development of a comprehensive sustainable finance framework, centred around a taxonomy and a risk disclosure framework. We see both these elements as crucial to improve investor decision-making on climate-related risks and opportunities. The implementation of an Australian Sustainable Finance Taxonomy will enhance market transparency on investment activity and entity-level criteria for classifying low-carbon and transition investments. We note the proposals for this work indicate it will be based on the International Sustainability Standards Board's (ISSB). Ensuring that Australia's approach is coordinated with global standards will increase transparency and. We recommend that both these elements integrate recommendations from the Taskforce for Nature-related Financial Disclosure as these develop.

A range of associated activities are already underway to align Australia's developing taxonomy and disclosure framework with key investment and regional partners to ensure interoperability and harmonisation, respectively. However, the Authority could provide advice to improve these activities further, and integrate the work across government departments. Opportunities include:

1. Guidance to DFAT on how to align climate-related development finance decision-making approaches with taxonomy criteria where relevant and appropriate.
2. Guidance on coordination of efforts on alignment between Australia's sustainable finance taxonomy, those in the region, and Australia's approach to Article 6.
3. Increased knowledge sharing of Australian government's decarbonisation pathways to support the alignment of taxonomies. This can help regional investors know what 'good' looks like for Australia, and will also provide transparency on the export implications of energy pathways.

Regional cooperation centred on low-carbon technology

This section relates to question 15. *How could Australia partner with other nations to accelerate global progress towards meeting the Paris Agreement goals?*

As codified in the Paris Agreement, low-carbon technology transfer is vital for driving an accelerated transition. It relies on strong bilateral and multilateral relationships that foster mutually beneficial trade and foreign direct investment terms.

Many of Australia's existing partnerships covering low-carbon technologies and critical minerals are with industrialised countries. An example is the Climate, Critical Minerals and Clean Energy Transformation Compact with the US. However, as highlighted in the section on *Contribution beyond Australia's borders*, there are significant opportunities to establish stronger bilateral partnerships in Southeast Asia supporting the development and transfer of low-carbon technologies and cooperation in the development of appropriate supply chains.

The Australian Government can cooperate with key Southeast Asian partners to define key areas of trade in low-carbon technologies and cooperation on foreign direct investment. The priorities of the Australian Government's trade and development objectives can set the frame for integrated export promotion strategies that take a long-term view to strengthen Australia's competitiveness, and the Australian Government's diplomacy within the region. The latter is both a geostrategic imperative, and an important source of engagement given Australia's aspirations to host COP31.

The Authority can take an active role in advising on:

1. Priority areas for supporting legal and technical cooperation, and capacity building and knowledge sharing efforts.
2. Measures to assure effective technology transfer in accordance with the Paris Agreement.
3. Establishment and convening of the necessary institutional linkages across Australian government departments, agencies and bodies towards effective transfer of low carbon technologies.
4. Assessment of enabling measures, including building on the 2023 OECD Arrangement on Officially Supported Export Credits (OECD 2023), of which Australia is a participant, to improve public and private financial terms and incentives for low-carbon exports.
5. Prioritisation of emerging markets and developing economies in Asia most suited to the Australian Government's objectives for establishing clean technology partnerships.
6. Development of official development assistance financing strategies to support the establishment of these clean partnerships.

Contributions beyond Australia's borders

This section relates to question 16. *What do you see as the challenges and opportunities from a phase-out of fossil fuel production?*

Recommendation:

Climateworks recommends that economic and emissions analysis, including by the Authority and elsewhere in government, includes an assessment of the emissions impacts of energy and fossil fuel exports in terms of their use internationally and their production domestically. We suggest this is categorised by thermal coal, metallurgical coal, and gas exports. Climateworks also recommends that the Authority's policy advice includes interventions to catalyse the roll-out of green hydrogen, beyond the current Hydrogen Headstart program.

The global transition to net zero is an opportunity to position Australia as a renewable superpower and shift away from a reliance on fossil fuels exports.

There is increasing evidence that Australia's current economically significant exports of fossil fuels will decline significantly in the coming years as the world transitions to net zero emissions. The Australian

Government believes fossil fuel exports have already reached a peak (Department of Industry, Science, and Resources 2023). These energy exports result in scope 1 and 2 emissions during extraction, as well as very high scope 3 emissions when the exports create emissions internationally.

Climateworks modelling includes assumptions regarding the prospects for fossil fuel extraction including the impacts of global trade under the relevant scenario, based on the available literature. Climateworks' 1.5°C scenario (Climateworks Centre 2020) suggests metallurgical coal will account for around three-quarters of residual coal production in 2050. The retirement of all domestic coal-fired power generation, a reduction in global thermal coal demand, metal recycling and electric arc furnace steelmaking remove a significant amount of demand for coking coal. The scale and pace of this transition will have impacts on communities, particularly in regions historically associated with fossil fuel extraction and use. Close collaboration between the Authority and the Net Zero Authority will be crucial to coordinate government action and to seize the opportunities available to these regions, while minimising negative impacts.

As stated earlier in this submission, Australia is well placed to become a renewable energy superpower. While the reduced global demand for Australian fossil fuel exports will pose significant economic challenges, Australia has the resources to replace fossil fuel exports with new green export markets – of renewable energy, and products manufactured using renewable energy. Australia has world-leading renewable energy resources, as well as globally significant minerals which are critical to the net zero transition (such as lithium for batteries). Green exports will also help other countries reduce their emissions, and help Australia demonstrate leadership in global emissions reductions. For example, if a major renewable hydrogen export market was established, it could use the infrastructure, human capital and trade networks in Australia that might otherwise feel the impacts of declining fossil fuel production. This could contribute between \$11 and \$26 billion per year to the Australian economy by 2050 and generate over 17,000 new jobs (COAG 2019).

The cost advantages of mature clean energy technologies and the prospect of low-emissions hydrogen are boosted by the Inflation Reduction Act in the United States and Europe's increased push for clean energy (IEA 2022). It is important that Australia continues its support for green hydrogen, beyond the current Hydrogen Headstart program, to be globally competitive in light of the United States and European actions.

Non-domestic emissions

This section relates to question 17. *Should the Authority consider international maritime and aviation emissions in its advice?*

The international maritime and aviation emissions are important considerations for Australia as an island nation, with these emissions tied to the importance to Australia of international trade and travel. The Authority is encouraged to provide guidance on how the Australian Government can offer leadership in schemes established by forums that negotiate rules for international maritime and aviation emissions. Examples of these are the International Civil Aviation Organisation's Carbon Offsetting and Reduction Scheme for International Aviation and the 2023 International Maritime Organisation Greenhouse Gas Strategy.

Corporate action to support decarbonisation aligned with 1.5°C

This section relates to question 6. *What role is there for corporate action to 2030 and beyond?*

Recommendation:

Climateworks highlights the importance for government in setting the information architecture that will catalyse and guide corporate action, and of sectoral emissions pathways held by an independent institution such as the Authority. Climateworks recommends that the Authority:

- provides guidance on how the government can use sectoral emissions pathways within corporate reporting in line with international standards
 - sets out how the government could track disclosure and progress against credible corporate transition plans and suggests appropriate information platforms and institutions
 - advises on the information platforms, institutions and data that would support emerging requirements for corporate and financial reporting on scope 3 emissions.
-

With the majority of Australia's emissions coming from the corporate sector, companies are crucial to Australia's net zero transition. Many Australian corporates are highly exposed to the physical and transitional risks of climate change. With effective and early action, they can instead be well positioned to benefit from the net zero transition. Some corporate leaders are going beyond current policy requirements, capitalising on the financial and reputational opportunities while also addressing the risks of not transitioning. However corporate action is not yet in line with a cost-effective pathway to net zero emissions in line with 1.5°C. Further government action is key.

Information architecture to support and track corporate decarbonisation

As discussed in the sections on *Role for government* and *Role of the Climate Change Authority*, government action to define and establish information architecture can support a coordinated and economically coherent transformation. This is strongly the case for the corporate sector. Government already regulates corporates in order to provide direction and guidance in line with the public good – beyond the needs of individual entities. Consistent guidance and independent information platforms will enable the corporate sector to make better decisions and respond to physical and transitional climate risks and reporting requirements.

Key government action to define and set up the information architecture needed to support corporate climate action includes publishing 1.5°C aligned and internationally comparable trajectories and pathways and information to support investors – both domestically and internationally. Specifically-tailored policy and programs to support the decarbonisation of large corporations including heavy emitters is another important consideration. The guidance would differentiate between businesses varying in sizes and operational sectors and provide detailed recommendations for large and high-emitting companies. Climateworks sees value in the work started through the Clean Energy Regulator to track corporate action against their disclosure reporting and transition plans. We see a useful role for the Authority's to clarify and guide emerging roles for ASIC, APRA and the ACCC in this area.

As part of the broader piece on governance and information architecture, we see the value of the Authority providing advice on systems to ensure corporate climate-related disclosure practices and commitments are in line with the Paris Agreement. This can assist investors and customers to make informed decisions. It is recommended that the Authority supports the government and provides advice on how to set up this process.

Climateworks also notes that government support will be needed for small and medium enterprises (SMEs) to meet any requirements to support scope 3 reporting by large companies. There are good

examples of how SMEs have been supported to have consistent data collection in response to previous requirements, for example around food safety. This support will be important to ensure that all businesses maintain access to premium markets and lower cost finance.

Specifically for the corporate sector, this architecture should include:

- developing and maintaining 1.5°C-aligned emissions trajectories and sector pathways
- defining the data and the regime to transparently track against these trajectories and pathways
- storing and sharing data on progress.

Trajectories and pathways

As outlined earlier in this submission, Climateworks recommends the Authority define credible, science-based 1.5°C-aligned sector-specific and Australia-specific trajectories and pathways to net zero. These trajectories and pathways will be critical to guide corporate decarbonisation strategies and allow corporates to set individual targets, and credible transition plans. Financial institutions, government agencies such as APRA, ASIC and CER and other stakeholders can then use the trajectories and pathways to assess the credibility of the individual corporate targets and implementation plans (along with other indicators of credibility as prescribed by the United Nations High-level Expert Group, Climate Bonds Initiative, Transition Plan Taskforce, Climate Action 100+ and others).

Sector-specific pathways can provide useful information on the rate, sequence and timing of decarbonisation activities such as fuel switching and technology implementation. Therefore, they are a key information source when determining the effective sequencing of government and private investment, and sectoral or technology based targets.

Scenario testing can support the development of resilient strategies as it helps assess the impact of different potential futures for the company. Further information on pathways can be found in the section on *Defining sectoral pathways and their importance*.

Corporate transparency

Government action to support corporate transparency is key to driving and demonstrating progress as well as to responding to international pressure and mandatory regimes. Tracking the progress of the Australian corporate sector will be critical to measuring progress towards Australia's NDC. Climateworks supports the Australian government's efforts towards mandating in law climate disclosures (Climateworks Centre 2023). The International Sustainability Standards Board (ISSB)'s new global standard for climate reporting was published in June 2023 and is expected to come into effect in many jurisdictions in 2024, so Australia risks becoming misaligned with global markets if it does not follow suit. The Australian Accounting Standards Board's current work on the development of climate-related standards is useful progress; however, defining the level of ambition requested in the standard is key.

Climateworks suggests government mandates on transparency should include a requirement to disclose a 1.5°C-aligned transition plan. This has recently been approved by the EU Parliament including proposed penalties for non-compliance (including for foreign companies) and could come into force as soon as 2025 (Segal 2023).

A credible corporate transition plan aligned to 1.5°C should consider the decarbonisation of electricity used, as well as focusing on energy efficiency and electrification. The plan should aim to reduce deforestation, address non-CO₂ emissions and implement offsetting solutions for residual emissions (following the mitigation hierarchy). Strong collaborations between corporate actors and policy is also a key consideration (International Energy Agency 2023).

Storing and sharing on corporate progress

International agencies (UN High-level Expert Group 2022; Climate Bonds Initiative 2018) have highlighted the data points to assess transition plans (credibility indicators). These include:

- publicly disclosed corporate plans
- setting targets to phase out the use of, or investment in, fossil fuels, and scale up renewable energy
- details of corporates' implementation, governance and engagement practices including risks and opportunities
- appropriate use of high-quality offsets, following the mitigation hierarchy
- lobbying and advocacy efforts in line with a 1.5°C-aligned pathway
- setting operating metrics supporting the transition plans
- supporting a just transition
- corporates doing their 'fair share' in relation to developing markets.

Improving corporate climate-related disclosure practices comes along with the need to define and implement effective data storing tools. A wide variety of climate data platforms and solution providers have emerged, and the interoperability (across platforms and solutions) and the standardisation of interfaces are important considerations. For example, the Clean Energy Regulator is considering blockchain for its carbon markets and guarantee of origin solutions (Clean Energy Regulator 2022). The Monetary Authority of Singapore firmly established the use of this data platform (Clean Energy Regulator 2022; Monetary Authority of Singapore 2022). The Authority can help accelerate the wider adoption of appropriate data platforms and solutions throughout government.

As part of the Net Zero Momentum Tracker initiative (Climateworks Centre 2021), Climateworks identified four key principles that demonstrate corporate best-practice in line with 1.5°C:

- a long-term 1.5°C-aligned net zero target
- ambitious interim (short- and medium-term) targets
- addressing all corporate emissions (scopes 1, 2 and 3)
- demonstrable and tangible near-term actions.

Last year, we assessed the ASX200 companies' climate commitments against the first three of these best-practice principles and found almost half of the companies assessed had set a long-term net zero target (Climateworks Centre 2022). However, more than a third of the companies had not yet set any net zero or emissions reduction targets. Setting emissions targets for scope 3 emissions and adopting interim (short- and medium-term) targets – which are essential for Australia's decarbonisation in line with 1.5°C and to stay within its carbon budget – were identified as two key challenging areas for corporates. We found that guidance for corporates on how to calculate and address scope 3 emissions and the setting of appropriate interim targets is needed to align with global best-practice. Some leading large corporates are already addressing their scope 3 emissions demonstrating their ability to influence emissions along their value chain (Climate Leaders Coalition 2022).

It is critical that Australian companies do not lose competitive advantage or access to capital through failure to comply with key market disclosure requirements or an inability to demonstrate sufficient transition progress. Companies need the information to mitigate their local and global reputational and greenwashing risks through comprehensive and credible disclosures.

Government support for large corporates including heavy emitters

Large corporates wield significant influence in Australia's economy and are often well placed to drive transformation sector-wide, especially when there are only a small number of major players. The government can provide guidance and support for corporates – including heavy emitters, large corporations and financial institutions – to increase their level of ambition in line with what is needed to limit global warming to 1.5°C.

As part of the Australian Industry Energy Transitions Initiative, Climateworks recently found that in five of Australia's hardest to abate heavy industry supply chains – which contribute an estimated 25 per cent of Australia's annual emissions and are responsible for 17.3 per cent of Australia's GDP – it is possible to decarbonise in line with limiting warming to 1.5°C with sufficient collaboration and cross-system coordination from business, finance, government and communities (Australian Industry ETI 2023). Strong, effective and coordinated action will be needed to overcome the challenges of establishing a large-scale, cost-competitive, decarbonised energy system; developing and deploying solutions for the transition of existing operations; and integrating systems and infrastructure to effectively decarbonise industry. The Authority can play a leadership role to highlight the importance of this action to the government.

As demonstrated throughout this submission, Climateworks has extensive experience in both developing decarbonisation pathways for Australia and tracking corporate progress against best-practice. We would be happy to explore ways to support the Authority in this work.

Improving information sources through the National Greenhouse and Energy Reporting review

This section relates to question 21. *What do you see as the strengths and weaknesses of the NGER scheme? How could it be improved?*

Recommendation:

Climateworks recommends the Authority provides advice to the government on how to improve the NGER scheme:

- by increasing the transparency of data at a facility level
- bringing in requirements for reporting of scope 3 emissions.

Climateworks notes concerns about the accuracy of methane estimation and reporting and recommends the Authority conducts specific research in this area to inform the NGER review.

Australia has benefited significantly from having a robust facility-level reporting scheme for greenhouse gas emissions and energy use for large emitters. The data gathered has enabled higher quality public policy, progress tracking and public accountability. The scheme reasonably balances quality and comprehensive emissions data capture for scope 1 and 2 from large emitters, without imposing unnecessary reporting requirements. The scheme sets requirements for all major greenhouse gases.

However, as the need for high-quality, transparent data increases, the NGER scheme should be improved:

- Increasing the transparency of data at a facility level – allowing for greater accountability and enhancing the utility of NGER data in government policy making, policy analysis and impact tracking.
- Requiring reporting of scope 3 emissions. This could be phased in over time as robust data sets are developed. Climateworks recommends that the scope 3 impacts of fossil fuels, separated by upstream and downstream emissions and by domestic and exported use, are an early priority because of the scale of emissions they represent.

Climateworks suggests that the Authority also review the benefits and phasing of wider inclusion of scope 3 emissions. This would support the development of standard methodologies for assessing scope 3 emissions in Australia, the ability of corporates to include scope 3 emissions in disclosure reporting and activities to verify corporate transition plans, as discussed in the section on *Corporate action to support decarbonisation*.

Improving reporting on methane emissions

This section relates to question 22. What aspects of methane measurement, reporting and verification should the Authority focus on as part of the NGER review?

Methane is a very powerful greenhouse gas, although it has a relatively short life in the atmosphere. This means that action to reduce emissions over the next 10 to 15 years can have a very beneficial impact to reduce global warming. However, there is currently a lack of community confidence over the robustness and accuracy of methane reporting.

Recent estimates from the IEA indicate Australia⁸ is currently significantly underestimating methane emissions (IEA 2023). The IEA estimates that methane emissions from the energy sector in Australia are about 76 per cent higher than the national inventory data. It is critical to correct these

⁸Australia's national greenhouse gas inventory quarterly updates show that methane emissions in 2022 were the same as in 2021 at 121 million tonnes of CO₂ equivalent (MtCO₂e). Energy fugitive emissions in 2022 are also estimated to be very similar to 2021 levels at 48.9 MtCO₂e compared with 49.7 MtCO₂e (DCCEEW n.d.).

underestimates as soon as possible. In the context of the declining cap set under the revised Safeguard Mechanism, incorrectly accounting for emissions from fossil fuel extraction projects may mean that the cap is exceeded by those existing projects with no room for new industrial participants.

Climateworks recommends that the Authority conducts research to underpin advice on measures to boost the integrity and transparency of methane emission reporting during the NGER review. We suggest this would include a review of the latest methane detection technology. The Rocky Mountain Institute (Bylsma et al. 2023) found that existing and soon-to-be-launched satellite technologies enable the rapid detection, location, and quantifying of large industrial point sources of methane.

Maintaining integrity in the land sector

This section relates to questions

24. How could the CFI, ERF and NGERs be improved in the context of the Paris Agreement era?
25. Following adoption of the Chubb Review recommendations, what concerns about ACCU integrity remain?
26. What are the risks to integrity that should be buffered against?
28. What role should governments and users of offsets have in ensuring demand-side integrity?

Recommendation:

Climateworks notes the Authority is due to advise government regarding on the Carbon Farming Initiative and Emissions Reduction Fund and policy impacts including around Australian Carbon Credit Units. Climateworks recommends that the Authority considers five aspects for this advice:

- integrity of the how the scheme is operating overall
- integrity of how offsets are created
- integrity of how offsets can be used
- co-benefits and risks of perverse outcomes from offset projects
- analysis of long-term potential for production and use of offsets.

Climateworks provides further details of what these considerations might cover.

There is extensive literature and research related to the principles of offsets integrity. Climateworks is currently examining this in detail and would welcome further discussions with the Authority about our findings and how this relates to our work. Here we outline five aspects that can underpin what Climateworks sees as the key principles to ensure that offsets are created and used in a way that underpins Australia's transformation to a net zero economy. Climateworks notes that there is not yet confidence in the capacity of carbon sequestration from nature-based or geological projects. We therefore recommend that the Authority undertakes further research and analysis on long-term projections for the creation of carbon units. The integrity of domestic carbon offsets schemes and use by Australian entities of domestic or international credits will be crucial for Australia's involvement in any international article 6 measures as part of the Paris Agreement.

Integrity of offset scheme or mechanism

Australian Carbon Credit Units, legislated under the Carbon Farming Initiative, is Australia's formal offset scheme. Organisations with compliance obligations are allowed to use these units in place of required emissions reductions, for example to cover obligations under the Safeguard Mechanism. Organisations, particularly companies, also voluntarily choose to buy offsets to demonstrate they are taking action to address the impact of their emissions. Integrity and rigour is essential within these schemes to maintain confidence that the creation and use of carbon offsets is credible. It is therefore important that these schemes have effective governance, independent verification, robust methodologies, and ensure there is no double counting of emissions reductions or removals. Transparency and public availability of information is crucial to confidence in the schemes. Electronic tracking and digital access can contribute to this.

Integrity of offset creation

Addressing integrity of offset creation includes issues such as ensuring offsets represent additional activities, represent permanent changes – or have measure to address possible reversals. Issues beyond quantitative emissions reductions include how unit creation includes non-climate impacts so consultation with indigenous peoples and local communities will be important parts of integrity, as well as appropriate health and safety and human rights dimensions.

Integrity of offset use

Climateworks advocates for high-quality disclosure of climate risk and transition plans as set out in the section on *Corporate action to support decarbonisation*. Climateworks works with the corporate sector and training on credible transition plans that demonstrate their path to net zero emissions in line with the Paris Agreement, and reporting demonstrate high-integrity use of offsets. Climateworks advocates for credible transition plan that:

- follow the mitigation hierarchy to first avoid emissions and reduce emissions, before using offsets to counterbalance any residual emissions
- quantify emissions and show alignment with science-based transition pathways and targets consistent with the Paris Agreement, including appropriate and ambitious near- and medium-term targets to show how the mitigation hierarchy will be applied
- provide detailed information on the plans and strategies adopted to achieve stated targets, including the current and expected use of high-quality carbon credits
- only use high-integrity carbon offsets that are certified by a high-integrity offset scheme to compensate for residual emissions.

Co-benefits and risks of perverse outcomes

Projects that create nature-based carbon units will be on land that could have alternative uses. These projects have the potential to create either co-benefits beyond climate impacts – including for biodiversity, water management, physical climate change impacts, and in some cases agricultural production. However, projects also have the potential to have negative impacts. Climateworks sees addressing these issues and aiming to optimise between climate impacts and broader goals – for instance those set as Sustainable Development Goals – as central to integrity in carbon offset schemes and the use of offsets. We also see the importance of explicitly addressing harm minimisation. We see taking a risk management approach as key to addressing the potential for perverse outcomes such that different units might be treated differently.

International carbon markets

This section relates to question 30. *What role should international carbon markets have in Australia?*

Climateworks has not studied the impact of including international carbon credits. However, we note that our energy and emissions analyses undertaken since 2015 show that net zero emissions can be reached without the use of international offsets for a range of 1.5°C and 2°C scenarios.

To achieve Australia's emissions reduction objectives, voluntary cooperation under Article 6 is central when considering internationally dependent measures. Australia's updated NDC has not explicitly confirmed the adoption of Article 6 carbon market approaches. However, the establishment of the Indo-Pacific Offsets Scheme might confirm Australia's intention to pursue the generation of internationally transferred mitigation outcomes with regional partners to meet NDC commitments (World Bank, p.47). Progress to cooperation will be a key means by which Australia can demonstrate commitment to Pacific Island Forum countries ahead of a potential Australian COP.

Investment in nature-based solutions

Recommendation:

Climateworks recommends the Authority advises that the Department for Climate Change, Energy, Environment and Water and the Department for Agriculture, Food and Forestry develop a roadmap for promoting nature-based solutions. A roadmap would help the government increase carbon sequestration while taking account of other environmental co-benefits and minimising trade-offs. A roadmap would help align the wide range of market and non-market mechanisms that are required to promote nature-based solutions at the scale needed.

There is growing attention on scaling-up nature-based solutions. Nature-based solutions (2022) hold the potential to achieve emissions reductions and carbon sequestration among and alongside productive land activities. As nature-based solutions gain popularity, there is a need for critical reflection on how they are financed as this has important implications for their implementation. Australian government leadership is needed to drive strategic planning and investment in nature-based solutions. Increasingly, federal and state governments in Australia seek private finance to fund nature-based solutions, by creating markets for ecosystem services. As such ideas develop, and the Task Force for Nature-related Financial Disclosure gains momentum, we see the value of further work to enable transparent and robust tracking of changes to natural capital. We suggest that the Authority would have an important role to progress such work for Australia – given its work to date and its role in the development of sectoral pathways.

Innovative financing mechanisms to increase the flow of private finance to nature-based solutions could play an important role in scaling this approach. However, while a range of mechanisms to channel finance for investments in nature is required, there are risks and pitfalls in efforts to scale market-based mechanisms for nature-based solutions. Calls for scaling-up natural capital markets should also be balanced with alternative modes of government finance such as fiscal policy measures.

A roadmap that looks broadly at how to channel government funding and attract private funding for nature-based solutions would be helpful. We would highlight the Nature Based Solution Roadmap developed for the US as a useful source of information (White House Council on Environmental Quality, White House Office of Science and Technology Policy, and White House Domestic Climate Policy Office 2022).

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Appendix: List of recommendations

In this submission Climateworks Centre recommends the following:

The Authority advises government to:

- Take a mission-oriented approach to climate action that makes the most of Australia's opportunities in the future global economy, where the task is to transform the economy by backcasting from a goal of net zero emissions in line with 1.5°C.
- Commit this year to produce a detailed long-term emissions reduction strategy to reach this goal that is presented publicly by COP30 in 2025, or at the time Australia submits its second NDC with a 2035 target.
- Ensure that the long-term strategy puts in place the overarching architecture (governance, institutions, information systems and policies) to drive the necessary transformation of the Australian economy
- Set out by mid-2024 the policy suite that can exceed the current 2030 target and by COP30 the policy suite and implementation timeline for Australia's second NDC.

The Authority advises government to set a 2035 emissions target that is in line with credible pathways to achieve net zero emissions and keep temperature rise below 1.5°C. Climateworks' *Decarbonisation Futures* 1.5°C scenario from 2020, suggests this target would be net zero by 2035.

In addition to a 2035 target in line with the Paris Agreement, that the Authority's advice includes the that:

- The Australian Government reviews and strengthens its 2030 emissions reduction target to get on track to keep temperature rise below 1.5°C. A stronger 2030 target will enable Australia to reach an appropriate contribution to the Paris goal in a more cost-effective way. Climateworks recommends that the government updates its NDC to reflect this stronger 2030 target.
- The Australian Government reviews, strengthens and legislates its long-term net zero target to be in line with a cost-effective pathway with a 1.5°C limit and updates its NDC to reflect this stronger long-term target.

Targets in Australia's NDC are backed by evidence that demonstrates their alignment with limiting global warming to 1.5°C.

The Authority advises government on:

- how to incorporate the emissions reduction goal more effectively into the objectives and purpose of legislation, building on the foundation created through the Climate Change Consequential Amendments Act 2022
- information frameworks for high-quality disclosure for emissions both in and outside of government.

The Authority acts beyond its explicit statutory duties in order it meets the broader objectives of its governing Acts. We therefore recommend the Authority provides advice that:

- Sets out the appropriate architecture for governance and information to guide the net zero transformation.
- Highlights the importance of 1.5°C aligned emissions trajectories and sector pathways, and suggests how these should be created and reviewed periodically, including which independent institution should develop and hold them if not the Authority.

Specifies the additional information platforms and data that will allow the government and others to make informed decisions and assess progress against these pathways and the required economic transformation.

The Authority's Strategic Framework includes an overarching objective to achieve net zero emissions domestically in line with 1.5°C and to position Australia as a leader in a net zero global economy. We

recommend that the Strategic Framework is modified slightly and includes additional enablers and actions.

That economic and emissions analysis, including by the Authority and elsewhere in government, includes 1.5°C aligned scenarios. We recommend sectoral trajectories and pathways in line with 1.5°C are used by the Authority to guide their advice to government.

The government legislates all Australia's national targets submitted as part of an NDC under the Paris Agreement through amendments to the Climate Change Act 2022. We strongly support that the government has legislated its existing 2030 and 2050 targets and would extend this to any updated targets.

The Authority proposes a suite of targets beyond a whole-of economy for sectors and enablers that will be key to transforming the national economy in a cost-effective manner.

Climateworks recommends the following additional targets that would benefit from being set in regulation:

- A goal for a zero-carbon building code for residential and commercial buildings by 2030 at the latest, underpinned by a revised trajectory for Low Energy Buildings.
- A goal and trajectory for light vehicle Fuel Efficiency Standards to reach zero carbon by 2035.
- 2050 and 2030 national energy efficiency targets (in absolute terms), with yearly savings of at least 1 per cent of Australia's overall energy consumption. Climateworks notes that this would require associated national legislation.
- Minimum standards for appliances through the Greenhouse and Energy Minimum Standards in line with energy performance targets in the National Energy Performance Strategy.

The government establishes a regular and transparent process for reviewing the suite of sectoral, regional and whole-of-economy targets, to ensure that the suite of targets continues to provide a coherent set of indicators for decarbonisation in line with keeping temperature rise below 1.5°C.

The Authority establishes indicators that enable quantitative tracking of emissions reductions and policy impacts and for qualitative measures. We recommend including metrics to assess enabling conditions, technology uptake, investment, corporate climate risk disclosure and transition plans.

The Authority's advice to the Minister on future targets, policies and the long-term emissions reduction strategies includes consideration of how diplomatic priorities and work on trade linkages and investment attraction can enhance the leadership role Australia can play on climate action to mutual benefit.

That economic and emissions analysis, including by the Authority and elsewhere in government, includes an assessment of the emissions impacts of energy and fossil fuel exports in terms of their use internationally and their production domestically. We suggest this is categorised by thermal coal, metallurgical coal, and gas exports. Climateworks also recommends that the Authority's policy advice includes interventions to catalyse the roll-out of green hydrogen, beyond the current Hydrogen Headstart program.

Climateworks highlights the importance for government in setting the information architecture that will catalyse and guide corporate action, and of sectoral emissions pathways held by an independent institution such as the Authority. Climateworks recommends that the Authority:

- provides guidance on how the government can use sectoral emissions pathways within corporate reporting in line with international standards
- sets out how the government could track disclosure and progress against credible corporate transition plans and suggests appropriate information platforms and institutions

advises on the information platforms, institutions and data that would support emerging requirements for corporate and financial reporting on scope 3 emissions.

Climateworks highlights the importance for government in setting the information architecture that will catalyse and guide corporate action, and of sectoral emissions pathways held by an independent institution such as the Authority. Climateworks recommends that the Authority:

- provides guidance on how the government can use sectoral emissions pathways within corporate reporting in line with international standards
- sets out how the government could track disclosure and progress against credible corporate transition plans and suggests appropriate information platforms and institutions
- advises on the information platforms, institutions and data that would support emerging requirements for corporate and financial reporting on scope 3 emissions.

The Authority provides advice to the government on how to improve the NGER scheme:

- by increasing the transparency of data at a facility level
- bringing in requirements for reporting of scope 3 emissions.

Climateworks notes concerns about the accuracy of methane estimation and reporting and recommends the Authority conducts specific research in this area to inform the NGER review.

Climateworks notes the Authority is due to advise government regarding on the Carbon Farming Initiative and Emissions Reduction Fund and policy impacts including around Australian Carbon Credit Units. Climateworks recommends that the Authority considers five aspects for this advice:

- integrity of the how the scheme is operating overall
- integrity of how offsets are created
- integrity of how offsets can be used
- co-benefits and risks of perverse outcomes from offset projects
- analysis of long-term potential for production and use of offsets.

Climateworks provides further details of what these considerations might cover.

The Authority advises that the Department for Climate Change, Energy, Environment and Water and the Department for Agriculture, Food and Forestry develop a roadmap for promoting nature-based solutions. A roadmap would help the government increase carbon sequestration while taking account of other environmental co-benefits and minimising trade-offs. A roadmap would help align the wide range of market and non-market mechanisms that are required to promote nature-based solutions at the scale needed.