

# SCIENCE & TECHNOLOGY AUSTRALIA

## POLICY SUBMISSION – 2024 ISSUES PAPER OF THE CLIMATE CHANGE AUTHORITY

14 MAY 2024

Science & Technology Australia thanks the Climate Change Authority (CCA) for the opportunity to respond to this public consultation on its 2024 issues paper: Targets, Pathways and Progress. The issues paper outlines the CCA's approach to developing emissions targets and green technology pathways. It informs CCA's advice for the government on Australia's emissions reduction targets, sectoral pathways and progress towards becoming a net zero economy. It will be an important part of the policy framework for the nation's response to climate change.

Science & Technology Australia is the peak body for the nation's science and technology sectors, representing 140 member organisations and more than 225,000 scientists and technologists. We connect science and technology with governments, business and the community to advance science's role in solving some of humanity's greatest challenges.

We have not attempted to answer all 14 questions in the issues paper, but only those where STA can most constructively comment from an informed position.

Our submission makes the following recommendations:

### Recommendations

1. Planning and policy development on Australia's response to climate change must be informed by the latest evidence and the most accurate scientific knowledge.
2. The Authority's approach to planning and policy development should be designed with a view to deepening the capacity of Australian climate research and climate researchers.
3. The Authority's work should follow closely the objectives set out in the Paris Agreement.
4. Emissions reductions targets should be set with a view to limiting warming to no more than 2 degrees – and preferably to 1.5 degrees – in line with the Paris Agreement.
5. The Authority should set emissions reductions targets that require a deepening and acceleration of effort over time.
6. Australia's emissions reduction targets must be informed by Article 2 of the Paris Agreement, supporting global sustainable development without threatening food production.
7. Australia's targets should recognise the differing responsibility and capabilities of different countries at differing levels of industrial development. Australia should be an international leader.
8. Australia's response to climate change should actively consider the interests and needs of our Pacific neighbours.
9. The Government should continue to pursue preferential tax treatment through the green tech patent box (and potentially through other similar measures) to support homegrown green tech innovation.

10. Government should support the training of a new generation of ‘bench to boardroom’ scientists.
11. The Government should invest more in climate research and in Australia’s climate researchers and scientists.
12. The Government should implement the Solar Sunshot program and consider other, similar measures to support different areas of green tech innovation in future.
13. Government should significantly boost funding for research translation.
14. Government should move decisively to boost Australia’s R&D spending to 3% of GDP by 2035, with an interim target of 2.4% in 2030.
15. The Authority should continue and deepen its consultations with First Nations people on matters that affect their communities.
16. The Authority should draw on Indigenous knowledges about stewardship of Country to inform work on Australia’s response to climate change.
17. Any developments or projects that occur on or impact Aboriginal and Torres Strait Islander lands must be undertaken in partnership with Traditional Owners.

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### **Q1. How should the authority take account of climate science and Australia’s international obligations in considering possible emissions reductions targets for 2035?**

It is crucial that planning and policy development on Australia’s response to climate change is underpinned by the most recent evidence and the most accurate scientific knowledge. An accurate understanding of the impacts of climate change and developing effective adaptation and mitigation responses depend on high quality science, and mechanisms that allow the science to effectively inform the policy process. Appropriate and achievable emissions targets can only be developed through consideration of the science on what is needed to limit average temperature increases and on practical strategies and options to reduce greenhouse emissions.

Science & Technology Australia (STA), with its vast membership base that reaches across all areas of the science and technology sector, stands ready to assist with advice or targeted analysis to help inform robust and effective policy.

Parallel to the urgent need for a strong greenhouse gas emissions reduction target is the need to better inform our predictive capabilities and adaptation and mitigation strategies. The [2021 Intergovernmental Panel on Climate Change](#) report outlined the stark and urgent challenges amid the accelerating pace of climate change. Even with strong action, the impacts of global warming are set to continue accelerating until at least mid-century.



Preparedness, enabled by an ever-deepening understanding of Australia’s unique ecosystems and environment, will be key to our ability to deal with this challenge. Australia will need to deepen our climate research capabilities to ensure national preparedness for more frequent and dangerous extreme weather and environmental hazards. We need to enhance our ability to predict and be resilient to escalating storms, heat waves, floods and bushfires. This requires continuing and increasing investment in facilities such as [ACCESS-NRI](#) – a major piece of national research infrastructure set up to support the Australian Community Climate and Earth Systems Simulator, to simulate past, present and future climate, weather and earth systems.

Australia’s unique biodiversity, our agricultural industries – and the wellbeing of all Australians – depend on improved predictive capacity and preparedness.

It is important to ensure that adaptation measures are conceived, planned and rolled out in such a way that they are adapted to regional and local needs. For this reason, climate change adaptation must be a matter for all three levels of government.

Artificial intelligence has been applied across multiple environmental conservation and climate change initiatives. This includes use of remote technologies for planning and monitoring, species and habitat protection, prediction of extinction risk and for dynamic biodiversity data analytics. It can enable industry, government and the research community to make more informed decisions to better protect Australia’s unique biodiversity.

STA notes that climate change legislation passed in 2022 (the Climate Change Act 2022) requires all government agencies, programs or schemes that deal with aspects of emissions reduction to consider Australia’s emissions reductions targets and the Paris Agreement objectives in their work. This will ensure a whole-of-government approach to effective, evidence-based policy development and implementation.

#### Science & Technology Australia Recommendations

1. Planning and policy development on Australia’s response to climate change must be informed by the latest evidence and the most accurate scientific knowledge.
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## Q2. How should the authority weight the goals of ambition and achievability in considering possible emissions reductions targets for 2035?

Climate action is critical. Our aims must be ambitious. Emissions reduction targets set out in the *Climate Change Act 2022* are achievable – but they will take effort. The point of emissions targets is to evoke and focus such effort. Efforts to meet ambitious targets are more likely to lead to important new advances in a range of green tech and sustainable development areas, as Australia’s best and brightest work hard and smart to meet demanding targets within a constrained timeframe. To address climate change effectively, we will need to make deep changes to how our economy works and how we live.

As STA members the Australian Meteorological and Oceanographic Society’s 2021 Climate Change Position Statement says:

*‘Any delay in reducing emissions will increase the practical and economic costs of avoiding dangerous climate change and place a greater burden on future generations to adapt to higher levels of warming.’*



At the same time, it is important that targets remain achievable and the scale of the problem does not induce despair. Every tonne of CO<sub>2</sub> emissions adds to global warming and any reductions we make can therefore help offset the effects of global warming.

The science is clear: ambitious emissions reduction targets will be needed to halt climate change and limit global warming to 1.5°C, as per the [Paris Agreement](#). The legislated commitment to a 43 per cent emissions reduction target is a ‘floor’, not a ‘ceiling’. Over time, Australia will be able to – and will need to – deepen and accelerate effort on cutting climate emissions.

The CCA’s assessment of 60-75% reduction in greenhouse emissions by 2035 is consistent with the goals of the Paris Agreement.

The need for deep, rapid cuts to emissions, and the opportunities for Australia in leading a rapid transition to a low carbon economy, are well supported by global evidence. For example, there is a significant body of evidence that describes the relative impacts of 1.5 degrees versus 2 degrees warming (examples below):

- Predicted loss of 99% of coral reefs at 2 degrees warming, compared with 70% at 1.5 degrees;
- 3 times as many people will be exposed to extreme heat under 2 degrees warming compared with 1.5 degrees
- There are increased risks of crossing climate tipping points, resulting in amplification of warming, at 2 degrees versus 1.5 degrees.

STA strongly supports ambitions to strengthen emissions reduction targets in coming years. The Paris Agreement commits all nations to pursue ‘their highest possible ambitions’ in their efforts to reduce emissions and combat climate change. As we break new ground in policies and technologies to address climate change there will be uncertainty about the precise extent of the impacts of these actions. This uncertainty argues for more rather than less ambitious action.

Legislation passed in 2022 aligns with the principle of ‘no backsliding’, laid out in Article 4 of the Paris Agreement. This ensures any future targets or goals must improve on the existing commitments: policy goals and targets must not become less ambitious over time. Safeguarding progress will be essential to achieve net zero, and subsequent negative emissions goals, as soon as possible.

CSIRO’s [2022 State of the Climate](#) report outlines the real and serious impacts of climate change and the cost of failing to act. Australia is already experiencing the escalating damage of climate change – warming temperatures, changing rainfall patterns and more frequent extreme and catastrophic weather events. These changes will pose an ever greater risk to Australia if left unchecked.

Australia should show global leadership in rapid transition to a low carbon economy. The economic, social and environmental risks of significant climate change to Australia (and globally) far outweigh any risks of a rapid transition to decarbonisation.

Australia’s targets must be informed by Article 2 of the Paris Agreement, which stipulates that strengthening global responses to climate change should be done in a way that supports sustainable development and eradication of poverty without threatening food production. Countries’ efforts should aim at limiting warming to no more than 2 degrees – and preferably no more than 1.5 degrees – above pre-industrial levels and should foster adaptation and climate resilience and support low emissions development.



In setting national targets, Australia should be mindful of principles of equity between nations, and the differing responsibilities and capabilities of different countries at differing levels of industrial development. As a rich, industrially developed country, Australia has both the capacity and the obligation to bear a bigger share of the global effort to reduce emissions and tackle climate change.

At the same time, though, we need to be wary of the impact on Australian exports, both of new green tech and of minerals and fossil fuels from an Australian target that was either significantly less or significantly more ambitious than other countries' targets.

#### **Science & Technology Australia Recommendations**

4. Emissions reductions targets should be set with a view to limiting warming to no more than 2 degrees – and preferably to 1.5 degrees – in line with the Paris Agreement.
5. The Authority should set emissions reductions targets that require a deepening and acceleration of effort over time.
6. Australia's emissions reduction targets must be informed by Article 2 of the Paris Agreement, supporting global sustainable development without threatening food production.
7. Australia's targets should recognise the differing responsibility and capabilities of different countries at differing levels of industrial development. Australia should be an international leader.

### **Q3. How can Australia further support other countries to decarbonise and develop sustainably?**

Australia has an important responsibility to other nations in the Pacific region. The bulk of global climate research is done in the Northern Hemisphere and reflects Northern Hemisphere conditions and needs. In carrying out climate research and developing policies and interventions for abatement, mitigation and adaptation, Australia must consider the interests and needs of Pacific nations, which are particularly threatened by the impact of climate change and which have limited capacity to do their own research.

Australia should actively seek to advance the interests of our Pacific neighbours in all the climate work we do, and this imperative should be built into the design of Australia's climate change research as well as interventions and targets.

More generally, Australia must set targets with reference to those adopted by other countries, both with a view to supporting international coordination of efforts to address climate change and with reference to the competitiveness of Australia's export industries. Australia should be alert to opportunities to collaborate with other countries on emissions reductions and responses to climate change.

#### **Science & Technology Australia Recommendations**

8. Australia's response to climate change should actively consider the interests and needs of our Pacific neighbours.



## **Q6. How can governments stimulate private finance needed for the net zero transition – are there innovative instruments that could be deployed or new business models that governments could support? Is there a bigger role for governments to play in coordinating the investment needed to transition the economy?**

The Government introduced a patent box to support medical and biotechnology research in the 2021/22 Budget. In the following year, the patent box was expanded to cover technological innovation that reduces carbon emissions.

A patent box is a generic term for regimes that apply a concessional tax treatment to profits derived from eligible intellectual property (IP).

A patent box aims to further encourage innovation in Australia by taxing corporate income derived from patents at a concessional effective corporate tax rate of 17%, instead of the headline corporate rate (30% for large businesses and 25% for small to medium enterprises). The patent box will offer a competitive tax rate for profits generated from Australian owned and developed patents. The requirement for domestic development will encourage additional investment and hiring in research and development activity and encourage companies to develop and apply their innovations in Australia.

Patents relating to low emissions technology, as set out in the 140 technology areas listed in the Government's 2020 Technology and Investment Roadmap Discussion Paper or included as priority technologies in the Government's 2021 and future annual Low Emissions Technology Statements are within scope, provided the patented technology is considered to reduce emissions.

Australia has been a world leader in developing low emissions technologies for decades - including in solar, batteries, and optics (mirrors). A patent box can help Australian research and industry to capitalise on opportunities to manufacture these technologies onshore.

A patent box can be a powerful driver of growth in Australia's clean energy technology sector. Many innovative ideas are produced in Australia, and often result in companies founded here. A patent box encourages local clean energy technology companies to stay in Australia – boosting investment in local manufacturing, translation, and commercialisation. It strengthens the development of advanced manufacturing here – and boosts the sovereign capability of Australia's manufacturing, biomedical, and clean energy technology sectors.

There may be scope in future for other similar measures in different areas of green tech.

Investors and founders are readily available in Australia, however, there has been a lack of incentives historically to ensure they focus on Australia. Australia has a deep well of scientific talent that could be turned into company founders with the right training, networks, and opportunities.

STA has proposed Australia train a new generation of “bench-to-boardroom scientists”. Providing skills to a scientific workforce that takes the technologies they have developed and turn them into commercial clean energy technology maximises the returns to Australia of research on the cusp of commercialisation and creates a new generation of Australian company founders.



There is a prime opportunity here to encourage investors to buy into the low-emission technology companies created by such “bench-to-boardroom scientists” and develop a much bigger cohort of Australian-focused founders. Australia’s research-intensive university sector produces world-leading research that has strong urgent potential for stronger translation and commercialisation. An ability to translate technology into products in close proximity to the inventors is appealing to investors and companies. Investors can also drive decisions on location - with major investors often more willing to buy into local innovations and products.

STA strongly supports the Government’s recent announcement of the ‘Solar Sunshot’ program, to be administered by the Australian Renewable Energy Agency (ARENA). This program will provide up to \$1 billion funding to build Australia’s solar photovoltaic (PV) manufacturing capabilities.

The program aims to support innovative manufacturing facilities in Australia across the solar PV supply chain. The solar PV supply chain includes polysilicon production, production of ingots, wafers, solar PV cells, and solar module assembly.

The program may also support complementary aspects of the solar PV supply chain such as solar glass, module frames, deployment technology and other innovation or manufacturing elements required for solar deployment.

Similar measures may be possible in future in other areas of green tech.

We need to invest more deeply in our climate scientists – those researching our land, water, oceans and atmosphere. We need to constantly improve our understanding of how climate has changed in the past, as well as our ability to model the future changes. Ongoing uncertainty about the precise impacts of climate change and how these will be distributed highlights the need for continued investment in climate research. This includes both research on the physical climate system and the socioeconomic impacts of climate change.

More broadly, Australia needs to invest in improving capability in expertise and research on impacts and adaptation, across different ecological, social and economic domains, including in ways that support transdisciplinary responses.

A further complementary measure to turbo-charge the development of Australia’s clean energy technology would be to significantly boost research translation funding. This could turbo-charge clean energy technology growth in Australia to make us a global power in clean energy technology. This would generate vast economic returns to Australia and to our national tax base.

To secure the nation’s future prosperity and competitiveness – and to deal with massive, complex issues like climate change – Australia needs a bigger research effort. We need to move to investing 3% of GDP in research and development by 2035 – with an interim target of 2.4% by 2030.

Australia’s current overall R&D spend is just [1.68% of our GDP](#). This is not only [significantly lower than our international competitors](#) including the US, Japan, Germany and Korea, but shows we are going backwards – our 2019–20 investment was 1.8% of GDP.

Government investment in R&D as a percentage of GDP is at its lowest level in four decades – at [just 0.49%](#).

Australia’s poor performance on the Harvard Index of economic complexity has become well known: we are ranked 93<sup>rd</sup> out of 133 countries. Australia has been going backwards for a long time: in the past 10 years we’ve fallen 12 places. Since 1995, we’ve fallen 38 places. We are now just behind Uganda – even though our GDP per capita is 68 times bigger<sup>1</sup>.

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<sup>1</sup> InnovationAus.Com (2023), [Australia’s economic complexity ranking now behind Uganda](#).



The Atlas notes that Australia ‘has not yet started the traditional process of structural transformation’ to develop higher-value industries and we have not diversified our exports – we are still reliant on selling things we dig out of the ground. This leaves us much more exposed to fluctuations in global commodity prices than other rich nations<sup>2</sup>.

International response to climate change make this an even more damaging limitation for Australia, as countries around the world transition to greener fuels and materials.

A bigger investment in R&D can help Australia de-risk by investing strong in green tech at the same time as moving up the economic complexity ranking.

Government action now to increase investment in Australia's innovation capacity, combined with setting the right incentives to drive business spending on R&D, will move Australia towards the 3% target, secure our nation's future prosperity and investing in research in crucial areas including climate change.

If we don't increase research investment and effort, Australia will have a smaller economy, a less healthy population, fewer tools to respond to climate change, bushfires and drought, fewer clean energy advances and less opportunity to make the most of technological breakthroughs.

Australia will become reliant on other countries for ideas and innovation. We will stagnate – or go backwards – while the rest of the world races ahead and takes advantage of new technologies.

#### Science & Technology Recommendations

9. The Government should continue to pursue preferential tax treatment through the green tech patent box (and potentially through other similar measures) to support homegrown green tech innovation.
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12. The Government should implement the Solar Sunshot program and consider other, similar measures to support different areas of green tech innovation in future.
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14. Government should move decisively to boost Australia’s R&D spending to 3% of GDP by 2035, with an interim target of 2.4% in 2030.

### **Q11. How can governments better ensure First Nations people are empowered to play a leading role in the development and implementation of climate change policies and actions, including as they relate to the ongoing curation of the Indigenous estate?**

As always, the guiding principle for empowering First Nations people and consulting their interests and needs is first to talk to First Nations people and to listen to what they have to say.

Recognising First Nations people as the first scientists of Australia and recognising the heritage of 60,000 years of caring for country is where this must begin. Indigenous knowledge systems have much to teach all Australians about how to manage the resources and biodiversity of this unique continent in a sustainable way. Consultation with knowledge-holders is essential.

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<sup>2</sup> Harvard University Growth Lab (2023), ‘Country & Product Complexity Rankings’ website, [Atlas of Economic Complexity](#)





As STA has argued in previous submissions in different policy areas, it is important to support more Aboriginal and Torres Strait Islander people into and in STEM at all levels of education, work and careers. We would need to say Indigenous knowledge and. Enabling more First Nations people to train in western STEM systems trains more STEM professionals who have the cultural capability to connect with Indigenous knowledge systems (whether or not these STEM professionals are themselves knowledge holders). Alongside this, education provides and professions should work to improve the cultural capability of non-Indigenous STEM professionals in the climate area

STA's membership network includes Indigenous Climate Change – an innovative collective of Indigenous environmental scientists and STEM professionals – dedicated to empowering Indigenous communities through climate adaptation strategies. The mission of Indigenous Climate Change is rooted in a deep respect for both traditional Indigenous knowledge and contemporary scientific methods. By merging these perspectives, this organisation creates dynamic, culturally informed climate strategies that are responsive to the unique needs of each community they serve.

Indigenous Climate Change is an excellent source of expert advice on how to approach climate change issues of particular concern to First Nations people. Indigenous Climate Change can advise on how to empower Aboriginal and Torres Strait Islander people to take a leading role in developing climate change responses and how to take control of their own and their communities' destiny.

Other Indigenous environmental and water scientists can also offer helpful (and necessary) advice on development of the relevant policies and interventions.

In planning changes to land use for the purposes of carbon abatement (for example, building new solar farms), it will be extremely important for governments, companies and other actors to be very aware of First Nations peoples' and communities' use of their land and stewardship of Country. Any initiatives to undertake development on Aboriginal or Torres Strait Islander land must only take place in the context of a genuine partnership between traditional owners and other actors.

Though it is not an example from the green tech sector, the Koonibba Test Range – South Australia's first permanent spaceport – provides some interesting pointers to how such partnerships can be designed, set up and managed. The range is a partnership between Southern Launch and the Koonibba Community Aboriginal Corporation. It is the largest commercial testing range in the Southern Hemisphere. Southern Launch and the Koonibba Community Aboriginal Corporation have been working since 2017 to develop the range. The range will help to provide local employment, investment and educational opportunities for members of the local Koonibba community, as well as the wider Eyre Peninsula.

STA commends the Climate Change Authority for its awareness of and concern about particular impacts of climate change on Indigenous people and communities – and for seeking opportunities to improve responses through recourse to Indigenous knowledges. We commend the Authority for consulting with Indigenous stakeholders to seek their views.

It is an important goal of national policy on responses to climate change to empower First Nations people to continue to care for Country as they have for millennia. All Australians can learn much from these stewardship knowledges and practices.



### Science & Technology Australia Recommendations

15. The Authority should continue and deepen its consultations with First Nations people on matters that affect their communities.
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