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To whom it may concern,

Climateworks Centre submission on the National Reconstruction Fund

Climateworks Centre welcomes the opportunity to respond to the Department of Industry, Science and Resources' consultation on the National Reconstruction Fund (NRF). Climateworks Centre specialises in accelerated climate transitions for Australia, Southeast Asia and the Pacific in line with a 1.5-degree Celsius (1.5°C) limit. An independent not-for-profit organisation, it was co-founded in 2009 by the Myer Foundation and Monash University and works within the Monash Sustainable Development Institute.

Climateworks supports the government's creation of funds such as the NRF. We see a strong benefit from government financing to support the rapid transition to a net zero global economy, back regional industry and deliver secure jobs of the future. We recommend the design of the investment mandate and investment priorities for the NRF consider how all priority areas of the fund will support the achievement of Australia's emissions reduction targets. This would allow the fund to prepare Australia to thrive in a net zero global economy while achieving the goals of leveraging Australia's natural and competitive strengths, supporting the development of strategically important industries and shoring up supply chains. Australia's natural assets in mineral resources and renewable energy capacity position Australia to make the most of the global net zero opportunity.

The government has the opportunity to design the NRF to support Australia's climate policy priorities, emissions reductions targets, and long-term goal of net zero emissions in line with the Paris Agreement. Climateworks recommends this applies across the fund and not only to the priority area for renewables and low-emissions technologies. Ensuring all government investment considers emissions reductions impact is especially urgent given the window to keep global warming within 1.5°C is still open, but narrowing.

Submission summary

Climateworks' submission includes recommendations on the investment mandate, as well as recommendations based on key findings for industry from our Australian Industry Energy Transition Initiative project and our work on Renewable Energy Industrial Precincts (REIPs) as well as research by our food, land and oceans system team.

Climateworks recommends the investment mandate includes:

- An objective to support Australia's transition in line with the Paris Agreement for the whole fund, with very limited exceptions. The NRF will create more economic impact if it supports Australian decarbonisation at the same time as the sectoral industry development goals.
- Criteria assessing projects on the basis of their compatibility with the development of future export markets.
- An expectation that recipients would have robust climate risk disclosure and net zero emissions plans consistent with the government's forthcoming requirement for internationally-aligned mandatory corporate disclosures on climate change.

Climateworks welcomes the commitment for government to develop co-investment plans with industry by the end of 2023. These plans would be an ideal opportunity to publish sectoral emissions reduction pathways to set clear market signals and help guide investment opportunities and build industrial capabilities as part of the transition to a global net zero economy.

Climateworks also recommends:

- The NRF is designed as part of a broader industrial strategy to catalyse industrial transition and to create the energy system that supports industrial transition.
- The 2023 co-investment plans proposed for the NRF include sectoral pathways to net zero emissions in line with Australia's emissions reductions targets and the goals of the Paris Agreement.
- Investment from the NRF is designed as part of broader innovation strategy, guided by the proposed NRF co-investment plans to identify gaps and identify which type of innovation support is most appropriate.
- That NRF investment is part of a co-investment partnership between federal, state and territory governments to create scale and enable better leverage of private sector funding
- NRF priority area investment, which aligns with Renewable Energy Industrial Precincts (REIPs) – renewables and low emissions technology, transport and value-add in resources, is delivered through a national place-based industrial decarbonisation program to create Renewable Energy Industrial Precincts.

Key complementary actions to investment through the NRF include:

- Setting a national strategy for tapping new export markets in line with the net zero global economy.
- Support for early market development through procurement, or some form of underwriting, contracts for difference etc.
- Developing a regional and national workforce plan to invest in and develop the skills needed for the transition.
- Using the proposed Australian investment taxonomy to provide transparent and credible definitions of what constitutes sustainable investment – to assist with deployment of the fund and catalyse private sector investment.
- Alignment and cooperation with State and Territory policy to enable greater gains and opportunities to leverage funding available in those jurisdictions.

Climateworks has identified insights from work on industrial decarbonisation with industry partners, and on Renewable Energy Industrial Precincts, that can be delivered through the priority areas already identified in the NRF. First, large-scale investment and deployment of renewable energy, energy infrastructure and measures that improve efficiency and flexibility, as well as underpin industrial transition and the development of new clean industries. Second, coordinating investment in

and planning for industrial decarbonisation with decarbonisation of energy systems is more cost-effective and can bring multiple benefits. This is because industrial decarbonisation brings substantial changes in scale and type of energy demand. Coordinating investment and planning across supply and demand in this way improves affordability and reliability of energy systems.

To improve the impact of the NRF on the renewables and low-emissions technology priorities and value-add in the resources sector, Climateworks recommends the NRF:

- Prioritise funding and support for pilots and demonstrations based on export market analysis through the proposed co-investment plans. These can identify where Australia is most likely to benefit from building capability and expertise to maintain and grow market share in existing industries, and expand activities into new parts of supply chains and new industries where Australia has natural advantage.
- Prioritise collaboration between multiple industry partners to provide supply and demand solutions, shared infrastructure and supply chain level initiatives through the development of sectoral and regional roadmaps. This could include the development of long-term value chain strategies.

Climateworks also recommends the following to improve the impact of the NRF on value-add in the food and agricultural sectors:

- Define and measure this priority areas to include positive environmental outcomes and indicators.
- Broaden the current investment focus from livestock feed to make more of forthcoming markets – particularly for the diversification of protein (including plant-based and novel-based proteins). Scaling new protein production and manufacturing systems can make better use of natural resources – requiring less land and fewer resources while tapping in to new markets.
- Complement achieving the goals of the NRF with focused investment efforts around nature-based solutions (NbS) to achieve broader climate and environment outcomes in line with government policy.

Detailed submission

An investment mandate that includes an objective of meeting Australia's emissions reduction targets as well as driving economic growth will be effective at setting up the Australian economy and workforce for the future

The investment mandate for the National Reconstruction Fund (NRF) will guide the NRF Board to deliver the outcomes expected from the NRF and how it should exercise its investment functions and powers. This mandate will also act as a signal to the market. The investment mandate is an important opportunity to further Australia's policy priorities and long-term goal of net zero emissions in line with the Paris Agreement – as well as Australia's 2030 target. The NRF, if well designed, can achieve the goals of leveraging Australia's natural and competitive strengths, supporting the development of strategically important industries and shoring up supply chains while also preparing Australia's industries to thrive in a net zero emissions world. In this way, investments by the NRF can support Australian decarbonisation at the same time as sectoral industry development goals.

Climateworks therefore recommends:

- The investment mandate includes an objective to support Australia's transition in line with the Paris Agreement, and criteria to guide how to implement this for specific priority areas supported by the fund.

To strengthen its impact in achieving transition, we also recommend the following additional assessment criteria for the fund:

- Compatibility with proposed project for funding with the development of new export markets – metrics for which could be developed through the sectoral investment plans to be developed during 2023.
- An expectation that recipients would have robust net zero emissions plans or be asked to explain why these are not already in place. The NRF is a significant opportunity to support Australian industry while meeting the new expectations of governments and community in embedding net zero transition planning into business and industry and aligning with international standards on sustainable finance. Including this expectation would strengthen the signal already provided from the government's forthcoming requirements for internationally-aligned mandatory corporate disclosures on climate change.

Connecting the National Reconstruction Fund with broader industrial policy – including on innovation and skills – will create greater impact

Climateworks supports the government's focus on industrial decarbonisation and transformation, evident in its policies under the Future Made in Australia agenda.

The Australian Industry Energy Transitions Initiative (Australian Industry ETI), co-convened by Climateworks, brings together key Australian industry participants¹ to accelerate action towards achieving net zero supply chains by mid-century. The Australian Industry ETI report 'Setting up industrial regions for net zero'² presents a range of emissions reductions opportunities across five industrial regions that are equivalent to 88 per cent of Australia's current total emissions. This work provides helpful guidance for government action to support successful industrial decarbonisation and regional economic development, including for the design of the NRF. The report highlights cross-cutting findings that are central to effective decarbonisation of industrial regions. These findings are

¹ The industry participants are: Australian Gas Infrastructure Group, APA Group, BHP, BlueScope Steel, BP Australia, Fortescue Metals Group, Orica, Rio Tinto, Wesfarmers Chemicals, Energy & Fertilisers and Woodside; Aurecon and Schneider Electric; Westpac; AustralianSuper; Cbus; HSBC Australia and National Australia Bank; ARENA and CEFC.

² <https://arena.gov.au/assets/2022/06/setting-up-industrial-regions-for-net-zero-report-2.pdf>

- Large-scale investment and deployment of renewable energy, energy infrastructure and improved energy system efficiency and flexibility enables industrial transition and the development of new clean industries.
- Coordinating investment in and planning for industrial decarbonisation with decarbonisation of energy systems is more cost-effective and can bring multiple benefits. This is because industrial decarbonisation brings substantial changes in scale and type of energy demand and coordinating investment in supply and demand measure at the same time can improve affordability and reliability of energy systems.
- Enhanced collaboration between governments and businesses is seen as key by industry participants including investors – bringing greater economic benefits and reducing barriers to investment.
- Clear benefits of acting now: setting transformative changes in motion by laying the groundwork for greater deployment of technologies can bring forward reductions in technology costs.

Achieving the scale of decarbonisation needed will require significant investment. By 2050, cumulative investment needed to transition the energy system in Australia could be as high as A\$440 billion, including A\$220 billion for renewable electricity generation, A\$130 billion for transmission and A\$50 billion for storage. This total energy expenditure is estimated to be 12 per cent greater than business as usual over the same time period. A further A\$190 billion by 2050 could be needed for investment in low emissions industry technologies, electrification and energy efficiency; representing an 81 per cent increase in investment compared to business as usual.³

Climateworks' experience from the Australian Industry ETI program, and associated research, has highlighted the benefit of designing financial support as part of broader industrial strategy. This would make the NRF more likely to unlock the scale of investment capable of transforming the energy system to support transition and of catalysing industrial transition.

In addition to recommendations on the NRF investment mandate, Climateworks recommends that the government builds greater understanding of the emissions reduction pathways for the different economic sectors through the proposed investment plans. This would help ensure government support at the sectoral level was assisting action coherent with achievement of Australia's economy-wide emissions reduction goals. Such pathways would also create a signal for the market as well as provide guidance for applying the investment mandate of the NRF.

Therefore Climateworks recommends:

- The NRF co-investment plans include sectoral pathways for emissions reductions aligned with the Paris Agreement to guide investment from the NRF and provide a signal to private-sector investment.

Supporting innovation and market development for new and emerging supply and demand will enable future domestic and global opportunities

Governments are already playing an active role in helping to pull new technologies through the research, development, demonstration and commercialisation pipeline. While currently some green processes appear to be competitive only in the long term, effective large-scale deployment in the short term could drive the technology improvements needed to reach cost parity much sooner than expected, as has been seen with solar and wind pricing. Climateworks sees major advantages from integrating the NRF into a broader, coordinated program on innovation support for emerging low and zero emissions technologies. The NRF can build on work by the Clean Energy Finance Corporation (CEFC), Australian Renewable Energy Agency (ARENA) and previous plans under the Low Emissions Roadmap to strengthen the innovation cycle within Australia.

³ Climateworks Centre and Climate-KIC Australia (forthcoming) 2023, 'Pathways to industrial decarbonisation: Positioning Australian industry to prosper in a net zero global economy.'

Through the development of the co-investment plans and regional roadmaps as part of the proposed REIPs program, the NRF can identify gaps in innovation and build on existing initiatives to:

- Coordinate support for research, development, demonstration and deployment of the range technical solutions needed to decarbonise.
- Support market development for new and emerging supply and demand, to enable future domestic and global opportunities.

Work with industry on innovations has shown that potential skills shortages and timely developments supply chains to maintain and repair new technologies can reduce industry confidence and act as a barrier to investment. Climateworks therefore sees the importance of ensuring that the proposed co-investment plans developed with industry are coordinated with the development of the national skills agenda.

Some complementary elements of innovation policy are outlined below:

- Some examples of complimentary work identified through our work, including the Australian Industry ETI, are: sharing knowledge, supporting early applications to create broad acceptance of new technologies.
- Supports diffusion of proven but not yet commercial technologies: support market uptake of new solutions which are technically viable but not yet commercially competitive through efforts such as government procurement, targets, mandates, underwriting, contracts for difference, subsidies and feed-in tariffs, for example for green hydrogen.
- Enables accelerated scale-up of proven and commercial technologies: support faster uptake through regulation, standards and market signals as well as enabling infrastructure, business models, user and customer practices and technical skills and capabilities e.g. renewable electricity.

A national place-based industrial decarbonisation program would increase economic diversity and support the development of alternative employment

The Australian Industry ETI program has also highlighted the benefits of facilitating and supporting industry, communities and other regional stakeholders to align on a shared vision and regional decarbonisation roadmaps and manage the flexible implementation of solutions for the region. This could be part of a place-based approach combining scale with a regional focus.

Establishing a national place-based industrial decarbonisation program by the federal government, in partnership with state and territory governments, would assist regional economic diversification and the creation of jobs. These jobs would be created in new industries and through supporting existing industries to transform their processes and services. The purpose of this program would be to ensure the transition of regions occurs in a coordinated and collaborative way prioritising those at risk of negative impact from decarbonisation.

Climateworks recommends such a program would include establishing Renewable Energy Industrial Precincts (REIPs)⁴ across the country in regions prioritising those at risk of negative impact from decarbonisation. REIPs are a cluster of existing or new industrial businesses (e.g. manufacturers) powered by 100 per cent renewable energy (which could include both renewable electricity and renewable heat). The development of REIPs presents an opportunity to leverage multi-user infrastructure and existing workforce skills. The deployment of a range of efforts at a precinct level, such as demand side response and integrated hydrogen systems to balance energy loads from renewables, can allow for more effective use of transmission, distribution and storage infrastructure as part of decarbonisation transformation.

Four key pillars can support the effective implementation of REIPs: coordination and skills development; building enabling infrastructure; decarbonising existing industry; and attracting new

⁴<https://www.climateworkscentre.org/news/renewable-energy-industrial-precincts-reips-explained-what-are-they-benefits-best-practice/>

industries.⁵ Investment from the NRF can be directed to these pillars, specifically through the 'renewables and low emissions technologies' and 'value-add in resources' priority areas. Climateworks has identified the following proposed areas for NRF investment that are already in line with the REIPs pillars:

- Building critical infrastructure, such as energy transmission and network infrastructure, green hydrogen pipelines, and upgrades to ports and roads. Climateworks notes that this area may also be supported through the Rewiring the Nation program.
- *Supporting* existing emissions-intensive industries to buy, construct, install or commission new equipment or establish new processes that create transformational change in line with sectoral emissions reduction pathways outlined in the co-investment plans.
- Incentivising new clean industries, such as battery manufacturing and green hydrogen production, to establish themselves in industrial regions. Climateworks further notes proposals being developed for a specific initiative on batteries.

Australian governments can unlock a greater scale of investment by establishing a 'co-investment partnership' involving federal departments and agencies, and state and territory governments. This will ensure that funding from the NRF, and other funding for the national place-based program, can have greater bang for buck. Other relevant government programs that can be part of this funding partnership include: Powering the Regions, the CEFC, ARENA at the federal level and similar programs of state-based investment.

A national REIPs program could coordinate with work by the National Energy Transformation Partnership on the pathways for decarbonised energy in regional areas and ensure a focus is also given to preparing industry to operate with zero emissions energy and to attract investors.

Australia economy has a strong export focus and understanding the potential trade benefits from a net zero global economy will strengthen the effectiveness of the NRF

Many of Australia's heavy industry supply chains are export-focused, feeding into global supply chains and so affect the emissions of countries and industries abroad. Since the Paris Agreement on climate came into force, momentum and urgency for action towards net zero emissions is building.⁶ Many of Australia's largest trading partners including China, Japan, South Korea and the United States (US) have made commitments to achieve net zero emissions by 2050 or 2060. Australian industry has much to gain from being leaders in the global net zero emissions transition, and an important role to play in decarbonising materials and the energy system at an international scale.

The demand and price for Australia's exports will be impacted by other countries' actions to avoid or abate emissions. Carbon border adjustment mechanisms or carbon tariffs – already coming into force in the EU – will also be relevant future demand and price. Australia's supply volumes are expected to be heavily affected by how emissions intensive these export commodities are. The NRF could form an important part of assistance for Australian industry to maintain exports.

For Australia to keep pace with its international peers and maintain a leadership role in the energy and metals industries, export industries will need to respond to rapidly changing market shifts. Australia's natural assets in mineral resources, renewable energy capacity and strong industrial capabilities position Australia to make the most of the global net zero opportunity, provided decarbonisation and uptake of new technologies occurs quickly and effectively.

In addition to supporting domestic policy outcomes, a well-designed NRF can support Australia's position in global markets as the world transitions to net zero. Significant shifts are already taking place as global supply chains decarbonise with Australia's trade partners and competitors already investing in transition and have expectations around access to low and zero carbon goods and

⁵ <https://www.climateworkscentre.org/news/renewable-energy-industrial-precincts-reips-explained-what-are-they-benefits-best-practice/>

⁶ UNFCCC 2015, "Paris Agreement." Available from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

services. As carbon border tax adjustments come into force, the market for decarbonised goods is expected to strengthen further.

Climateworks sees benefits from identifying likely impacts and opportunities from trends in global markets, and the pressure to address climate risks during the development of co-investment plans in 2023. This would provide the information to assess the criteria suggested by Climateworks that the NRF invests in on the basis of their compatibility with the development of future export markets. Climateworks recognises the work underway on developing Australia's trade partnerships, and bilateral international partnerships on low emissions technologies. Climateworks also notes that international trade partners and competitors are moving rapidly. For example, the Inflation Reduction Act in the USA is incentivising private sector investment in low-emissions technologies, and the EU is responding in a similar manner. The NRF can play a similar role and ensure that Australia can respond to market changes, but is only part of the government's actions in this space. We therefore recommend our proposals on tying in funding to criteria on exports markets is part of a broader strategy to ensure these actions has greatest impact – including through leveraging domestic and international financing.

Treasury's aim to finalise an Australian sustainable investment taxonomy as part of the Sustainable Finance Strategy will help to catalyse private sector financing. The investor and business community will benefit from transparent and credible definitions of what constitutes sustainable investment. This taxonomy would also be excellent guidance on implementing our proposed emissions reductions objective as part of the investment mandate of the NRF. It will also allow other public and private investment to more clearly support the achievement of emissions reduction goals.

Climateworks recommends:

- The NRF is designed as part of broader industrial strategy to catalyse industrial transition and to create the energy system that supports industrial transition.
- The 2023 co-investment plans proposed in the NRF include sectoral pathways to net zero emissions in line with Australia's emissions reductions targets and the goals of the Paris Agreement.
- NRF investment is delivered alongside a national place-based industrial decarbonisation program to create Renewable Energy Industrial Precincts.
- That NRF investment is part of a co-investment partnership between federal, state and territory governments to build scale and enable better leverage of private sector funding.
- Key complementary actions to investment through the NRF include:
 - Setting a national strategy for tapping new export markets in line with the net zero global economy.
 - Supporting early market development through procurement, or some form of underwriting, contracts for difference etc.
 - Developing a regional and national workforce plan to invest in and develop the skills needed for the transition.
 - Using the proposed Australian investment taxonomy to provide transparent and credible definitions of what constitutes sustainable investment – to assist with deployment of the NRF and catalyse private sector investment
 - Alignment and cooperation with State and Territory policy to enable greater gains and opportunities to leverage funding available in those jurisdictions.

Renewables and low-emissions technologies

Supporting industry and energy transformation

Climateworks sees the economic benefit of prioritising \$3bn from the NRF into renewables and low-emissions technologies – alongside an overall focus on industrial development in a net zero global economy as outlined above. The Australian Industry ETI's 'Setting up industrial regions for net-zero' report found that an unprecedented transformation of the energy system is needed to achieve

regional decarbonisation at scale, with a priority of delivering low cost, decarbonised, firm electricity supply and establishing a market for green hydrogen. On the technology side, it is anticipated that without further innovation support, many industrial low-emissions technologies will not be commercially viable for five to ten years, if not longer. This leaves a development and commercialisation gap in order to facilitate Australian industry to participate in lucrative global markets for low carbon goods and services and meet Australia's emission reduction targets.

The NRF can help support energy and industry transformation outcomes that can create very substantial emissions reductions. Technologies to support improvements to buildings as well as industrial electrification and energy efficiency are repeatedly shown to be an important part of least-cost pathways in Climateworks' research (Climateworks 2020, Climateworks and Climate-KIC 2022 and Climateworks and Climate-KIC forthcoming). We have outlined above the huge emissions reductions opportunities in heavy industry supply chains. With the scale of these opportunities in mind we have recommended ways in which the NRF can complement existing government initiatives supporting greater innovation in industry. Here we focus on the priority area of renewables and low emissions technologies.

Priority areas for investment

The forthcoming work from the Australian Industry ETI can already provide an evidence base for potential priority technologies in five key supply chains for iron and steel, aluminium, other metals, chemicals and LNG – developed with the inclusion of industry participants. Low-emissions solutions for heavy industry that will require further government and private sector investment to bring them to commercial readiness include hydrogen direct reduction iron, melter-Basic Oxygen Furnace for green steel, industrial applications of carbon capture and utilisation and storage (CCUS).

Climateworks recommends the NRF:

- Identifies with industry the key technologies for decarbonisation as part of the co-investment plans. Modelling sectoral emissions reductions pathways and agreeing key inputs and assumptions with industry stakeholders will assist in understanding which technologies are expected to be key.
- Coordinates with the CEFC and ARENA on renewable generation and storage on additional action in the following areas:
 - Distributed energy generation and storage. Small-scale energy generation can provide flexibility to the grid, especially when combined with community or household-level battery storage. In addition to meeting household power demand, new energy management systems can coordinate how this generation and storage feeds into the grid by aggregating small-scale generation and storage – as well as coordinating a reduction in demand when supply is low. This aggregation is often described as a 'virtual power plant' which can be dispatched and bid into the energy market bringing financial benefit to customers as well as economic benefits for the energy system.
 - Utility scale energy storage: pumped hydro, solar thermal (e.g. molten salt) and front-of-meter batteries can provide various services to increase grid flexibility. These storage solutions can store excess renewable energy generation and 'firm' energy supply. For system operators, battery storage systems can also provide grid services like frequency response, regulation reserves and ramp rate control, along with deferring the need for investments in peak generation and grid reinforcements.
 - Support for electric vehicle integration: The rapid uptake of electric vehicles poses challenges to the grid, but could also bring opportunities. For instance, current static electric vehicle charging could be modified to respond to dynamic rates or control signals to shift charging demand into more desirable periods for the grid. Similarly, under vehicle-to-grid (V2G) and vehicle-to-home (V2H), electric vehicles act as an integral part of the grid and/or home energy system, and respond to signals through charging and discharging. Similar to distributed energy generation, there is potential

for aggregators to combine a large number of electric vehicles and sell their battery capacity into the grid, charging or discharging in response to grid needs for flexibility.

- Supports innovation in heavy freight transport – considering battery electric (BEV) and hydrogen fuel cell electric vehicles (FCEVs) for heavy haulage. For example, there are currently no commercially ready large open-pit, battery-electric mine vehicles; however, smaller underground BEVs are already commercially available and offer benefits as the lack of exhaust gases removes the need for ventilation providing cost savings. The challenge for developing larger, heavy haul BEVs is in balancing battery size and capacity. Battery energy density cannot currently compete with diesel on range or refuelling time. Furthermore, a switch to FCEVs will require the build-out of hydrogen infrastructure including production, transport, and storage. Depending on mine location, onsite hydrogen production could be favoured over transporting hydrogen from larger production sites and will depend on the difference between hydrogen transport and production costs.
- Supports energy and material efficiency – alongside proposed activities through the National Energy Performance Strategy. Given challenges with deploying zero emissions energy at scale, ‘no-regret’ actions such as energy-efficient technology upgrades can reduce energy waste, and ‘free up’ energy generation for use in other areas of the economy. Examples of relevant technologies that can improve industrial energy efficiency include motor drives, pumping systems, compressed air systems, heating and cooling.
- Despite apparently short payback periods for energy efficiency upgrades, with investment costs offset by energy savings, there can be non-price barriers to uptake – with industry lacking confidence that there are skilled people available for maintenance, that spare parts will be available or the new technologies will be sufficiently reliable.

Value-add in resources

Climateworks supports the NRF targeting investment towards value-adding to extraction and processing of resources. Climateworks joint research outlined above has shown there are considerable economic opportunities for the resources sector in a net zero global economy that industry and investors are not currently unlocking. The metals and mining sector is increasingly exposed to community and investor concerns around emissions, water use, deforestation and impacts on local communities. These concerns are likely to increase under global decarbonisation amid a greater focus on supply chain transparency and product provenance. In particular, mining companies have been under recent shareholder and consumer pressure to address scope 3 emissions – particularly in the products they sell to market – ‘downstream’. This sector would therefore greatly benefit from an increased government role in catalysing industrial transition and investment. Investment via the NRF as well as complementary reforms can improve performance and position this priority area for success in the future.

Support from the NRF, and complementary reforms, can assist companies to onshore processes and manufacturing to add value to minerals extraction. Australian companies have the opportunity to influence global decarbonisation by decreasing their scope 3 emissions. The development of onshore processing and manufacturing industries should align to global ESG standards, building Australia’s reputation as a supplier of green products. To achieve this, onshore processing and manufacturing will need to consider the future market for net-zero products and how to be cost-competitive in the future. The NRF could help to achieve this transformation. As discussed earlier in the submission, the clustering of mining with downstream processing and manufacturing can facilitate onshoring. This supports collaborations across the supply chain and helps to reduce financial risk through shared infrastructure developments and co-investments. In this way, industry partners can collaborate on decarbonisation, including the pressure from customers and investors for industry to address scope 3 emissions – especially downstream.

For example, although a major global producer of lithium, Australia could capture considerable economic value through more downstream processes onshore. Despite world-leading lithium resources, along with almost all of the elements required for lithium-ion battery storage, Australia

captures just 0.5% of the global value chain.⁷ Estimates suggest the global market for lithium-ion batteries could grow to more than A\$3 trillion by 2025 (up from around A\$200 billion in 2017). Australia could benefit from its high lithium reserves and capture a larger share of the global battery manufacturing value chain. To capture this opportunity, Australia could also leverage advantages such as existing mining expertise, efficient logistics, high-quality infrastructure and an attractive investment landscape.

For value add-in resources, Climateworks recommends the NRF:

- Prioritise funding and support for pilots and demonstrations based on export market analysis through the proposed co-investment plans. These can identify where Australia is most likely to gain from building capability and expertise to maintain and grow market share in existing industries, and expand activities into new parts of supply chains and new industries where Australia has natural advantage;
- Prioritise collaboration between multiple industry partners to provide supply and demand solutions, shared infrastructure and supply chain level initiatives through the development of sectoral and regional roadmaps. This could include the development of long-term value chain strategies.

Agriculture, forestry, and fisheries sector

Climateworks welcomes the inclusion of the agriculture, forestry and fisheries sectors as priority areas for investment in the NRF. These sectors will play a key role in the transition to a net zero economy. Given our current research focus on food and land (agricultural) systems, we focus here specifically on food (value-add protein).

Defining transformation and diversification in the agriculture, forestry and fisheries sectors

Driving sustainable economic growth in the agriculture, forestry and fisheries sectors means ensuring their compatibility with global climate goals and broader environmental outcomes on biodiversity. Investing especially in climate mitigation, adaptation and biodiversity enhancement is crucial not only for meeting climate and environmental targets but also supporting the underpinning ecological systems upon which these agriculture, forestry and fisheries sectors depend.

Climateworks recommends:

- That value-add in the food and agricultural sectors should be defined and measured to include positive climate and environmental outcomes and indicators.

Priority areas for investment

We note that ‘new livestock feed to reduce methane emissions’ is cited as an activity for investment in the NRF. Whilst we support the inclusion of solutions that offer the potential of methane reductions in the agriculture sector, we strongly recommend the extension of this opportunity area to apply to low-emission protein sources more generally. Changes in livestock feed have a role to play, but are limited in their applicability to some production systems. They also do not address the full range of climate and biodiversity land use related opportunity costs associated with livestock enterprises.

The development of diversified sources of protein will be an important part of accelerating and anticipating shifting consumer demands and preferences for protein in Australia and among export partners. Anticipating and supporting these shifts is critical for ensuring the future prosperity of these sectors and must be done in a way that aligns food and fibre production and land use with environmental goals. The global Food and Land Use Coalition estimates that the diversification of

⁷ Australian Trade and Investment Commission 2018, The Lithium-Ion Battery Value Chain: New Economy Opportunities for Australia. Australian Trade and Investment Commission. Available from: <https://www.austrade.gov.au/news/publications>. [3 October 2022].

protein offers a US\$240 billion business opportunity by 2030 if sufficient investments are made⁸. Australia has a prime opportunity to lead in this opportunity area. However, currently there are low levels of venture capital investment in Australia⁹ which present a barrier to the development of competitive alternative protein companies and industries.

We recommend extending the priority areas to promote plant-based and novel-based proteins as opportunities for value-added proteins which better align with the NRF's aim around diversification and transformation of Australia's industry and economy. Forecasts point to diversification of protein as a key characteristic of future food systems. Indeed, CSIRO's protein roadmap suggests future protein demand can only be met by bringing together animal, plant and non-traditional protein production systems¹⁰.

Climateworks views the inclusion of novel production systems as areas of priority for investment e.g. precision fermentation and 'lab-grown' meats. This is an important component of transitioning the food and land use sectors with Climateworks research (forthcoming) confirming the importance of shifting how and what Australia produces for domestic consumption and export will be key to maintaining productive food and land use sectors, export values while lessening the impact on our environment.

Climateworks recommends:

- Extending the priority area for value- to promote plant-based and novel-based proteins as opportunities for value-added proteins which better align with the NRF's aim around diversification and transformation of Australia's industry and economy.

Complementary reforms

Our work in the Land Use Futures Program has found that achieving prosperous and sustainable agriculture, forestry and fisheries sectors will be dependent on more strategic use of land/sea resources and reconciling tensions between competing priorities. This requires industry and practice-specific research and development to be accompanied by landscape-level assessments and robust planning processes.

In Australia, substantial changes will be necessary if we are to continue to maintain the success of our industries whilst ensuring that our food and agricultural system can meet emissions targets aligned with a 1.5°C pathway. Achieving this goal will require a transformation of our food and agriculture system. There are numerous ways the government can support this transformation. can only be achieved if a panoply of strategies and solutions are deployed with urgency and in parallel. Scaling new protein production and manufacturing systems that need far less land and fewer resources is a key opportunity. Beyond this, realising the goals of the NRF would be complemented by focused investment efforts around nature-based solutions (NbS).

NbS are a critical component of realising climate and biodiversity goals whilst also generating job opportunities that align with sustainable economic growth. It is estimated that globally, if sufficient investment is realised in climate change mitigation, biodiversity and land restoration goals, an additional 20 million jobs in NbS could be created by 2030¹¹. We suggest there is a clear benefit for Australia from the NRF, and future iterations of it, incorporating the potential of nature-based jobs. As a first step, this could include building in principles around nature-based solutions as a means of prioritising investment opportunities in the NRF.

⁸ Food and Land Use Coalition (2019) Growing Better

⁹ McFarland, C. 2020, 'Australia must tap into plant-based meat boom', United States Centre, viewed 7 July 2020, <https://www.ussc.edu.au/analysis/australia-must-tap-plant-based-meat-boom>

¹⁰ CSIRO Futures (2022) Protein – A Roadmap for unlocking technology-led growth opportunities for Australia. CSIRO, Canberra

¹¹ ILO, UNEP and IUCN. 2022. Decent Work in Nature-based Solutions 2022. Geneva. Licence: CC BY-NC-SA 3.0 IGO

Thank you for taking the time to consider our submission. Climateworks supports the creation of the NRF as a key part of a broader package of industrial and innovation policies. We encourage the government to design the all aspects of the NRF in a way to maximise the opportunities for Australia to thrive in a net zero emissions world. We would welcome an opportunity to brief your team if you would like to explore our responses in further detail.

Yours sincerely,

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