17 March 2023
Department of Industry Science and Resources

To whom it may concern,

Re: Climateworks Centre submission on National Battery Strategy Issues Paper

Climateworks Centre (Climateworks) welcomes the opportunity to respond to the National Battery Strategy Issues Paper. Climateworks develops expert, independent solutions to assist the transition to net zero emissions for Australia, Southeast Asia, and the Pacific in line with a 1.5°C limit. We also develop pathways to industrial decarbonisation and set out to position Australian industry to prosper in a net zero global economy. A non-profit organisation, Climateworks was co-founded in 2009 by the Myer Foundation and Monash University and works within the Monash Sustainable Development Institute. Climateworks responds to government requests for submissions as part of our work, and has recently submitted to the Department of Industry, Science and Resources on the National Reconstruction Fund.

In this submission to the National Battery Strategy Issues Paper, Climateworks makes recommendations based on our research, including work on the Australian Industry Energy Transitions Initiative (Climateworks Centre and Climate-KIC Australia, 2023). The Australian Industry Energy Transitions Initiative (Industry ETI, energytransitionsinitiative.org) brought together leaders from industry and business to develop pathways towards net zero emissions. It focused on high-emissions supply chains, including the ‘other metals’ supply chain covering copper, nickel, zinc, and lithium, many of which are used in batteries. In this submission, when Climateworks refers to the battery industry, this includes associated mineral processing rather than necessarily assuming it includes manufacturing of the batteries. The findings from the Australian Industry ETI apply to all initiatives to increase the addition of value onshore – in this case, resource extraction and processing.

Climateworks recommends that:

- The National Battery Strategy (Strategy) includes an explicit objective to meet Australia’s emissions reduction targets in line with the Paris Agreement.
- The Strategy is designed as part of a broader industrial strategy to catalyse industrial transition and to create the energy system that supports the industrial transition.
- Investment is designed as part of a broader innovation strategy to identify gaps and identify which type of innovation support is most appropriate and is coherent with the proposed co-investment plans for the National Reconstruction Fund.
- That 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.
The Strategy promotes alignment and cooperation with state and territory policy to enable greater gains and opportunities to leverage funding available in those jurisdictions, alongside setting a national strategy for tapping new battery industry and related mineral processing export markets in line with the net zero global economy. Criteria for assessing projects include an assessment of their compatibility with the development of future export markets for battery minerals or battery components. Funding is subject to an expectation that recipients meet high-quality climate-related financial risk disclosure and have robust net zero emissions transition plans or explain the absence of such plans. The Strategy supports the development of renewable energy industrial precincts (REIPs) through a national place-based industrial decarbonisation program to coordinate the design and implementation of REIPs nationwide. The Strategy ties in with action through the priority areas of the National Reconstruction Fund (renewables and low emissions technologies, transport and value-add in resources). The Strategy supports early market development through procurement, underwriting or contracts for difference. The Strategy includes developing a regional and national workforce plan to invest in and develop the skills needed for the battery industry or associated mineral processing.

Government support to develop battery manufacturing onshore brings additional benefits beyond increased capture of economic value from Australian resources. Creating battery manufacturing at scale will also give Australia better access to the technologies it needs to make the best use of opportunities from the transition to a net zero global economy. Electricity storage will be a crucial part of decarbonising Australia’s electricity system – and so underpins emissions reductions in electricity production and emissions reductions in the wider economy by enabling electrification of other sectors using renewable electricity. Battery storage is, therefore, a key element in the energy transition, with batteries reducing system costs (Arvind Rangarajan, Sean Foley, Stefan Trück, 2023). Recent research also suggests that short-term storage batteries can sustain the storage needs of an electricity system of 80% renewables without deep storage (NREL, 2022).

Climatworks recognises initiatives by the Australian Government to support the decarbonisation of industry and the growth of manufacturing and exports using renewable energy. Examples include the Powering the Regions Fund (PRF) and National Reconstruction Fund (NRF).
**Relevant to Q 1.1**

Australia has world-leading renewable energy resources and relevant mineral resources, that can be harnessed to create a battery industry.

**Climateworks recommends that:**

- The National Battery Strategy (Strategy) includes an explicit objective to meet Australia’s emissions reduction targets in line with the Paris Agreement.
- The Strategy is designed as part of a broader industrial strategy to catalyse industrial transition and to create the energy system that supports the industrial transition.

Australia has enormous global net zero economy opportunities due to its world-leading wind and solar resources and ample land. These advantages allow Australia to decarbonise its existing industry, add value to our extractive resources, and become a leading exporter of decarbonised products. For example, the analysis on net zero pathways in the Australian Industry ETI considered a sensitivity where Australia builds export-oriented green hydrogen and green metals export industries as part of a 1.5°C scenario, and found that over 1.3 million jobs could be created and that industrial emissions could be reduced by up to 92% by 2050.

Australia has abundant minerals and established a strong track record of extracting and delivering minerals. This mineral wealth means that Australia stands to benefit more than most countries from mineral exploitation linked to the energy transition, in particular, mining the battery precursor minerals copper, nickel, zinc and lithium.

The Australian Industry ETI (Climateworks Centre and Climate-KIC Australia, 2023: Ch 5) sets out a pathway for the ‘other metals’ supply chain in line with net zero emissions. This shows how the mining and processing of copper, nickel, zinc and lithium can be heavily decarbonised. These metals are key battery inputs, and, by 2050, the decarbonisation of these metals could achieve a 90% reduction in associated emissions, even while the production of metals increases (ETI). This path would require $9.2b in technology investment, 26 TWh/year of renewable electricity and 26,000 tonnes/year of hydrogen. Figure 1 shows this decarbonisation’s timing estimate and the required key technologies.
Figure 1: Decarbonisation timing for other metals, including copper, nickel, zinc and lithium industries in Australia (Climateworks Centre and Climate-KIC Australia, 2023).
Relevant to Q 3.1

Australia can leverage world-class mineral and industrial resources to attract investment in the battery industry and related mineral processing.

Climateworks recommends that:

- **Investment is designed as part of a broader innovation strategy to identify gaps and identify which type of innovation support is most appropriate and is coherent with the proposed co-investment plans for the National Reconstruction Fund.**
- **That 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.**
- **The Strategy promotes alignment and cooperation with state and territory policy to enable greater gains and opportunities to leverage funding available in those jurisdictions, alongside setting a national strategy for tapping new battery industry and related mineral processing export markets in line with the net zero global economy.**
- **Criteria for assessing projects includes an assessment of their compatibility with the development of future export markets for battery minerals or battery components.**
- **Funding is subject to an expectation that recipients meet high-quality climate-related financial risk disclosure and have robust net zero emissions transition plans or explain the absence of such plans.**

Government has a role in setting up a new industry and the associated research. In contrast, when a business pursues a new industry, the outcome is limited to that business, plus some trickle-down effects. Government can corral broader social benefits. This is partly through the coordination of multiple arms of government but also being able to seed investment through a lower cost of capital.

To encourage investment in the battery industry, we recommend focusing on coordination between government and industry, skills development, and building enabling infrastructure. The enabling infrastructure includes renewable generation, associated transmission/distribution, and hydrogen supply. Australian Industry ETI coordinated the development of a pathway for decarbonising the current battery minerals copper, nickel, zinc and lithium and overhauling technology and processes (Climateworks Centre and Climate-KIC Australia, 2023: Ch5). This pathway shows that Australia’s investment in decarbonising industrial regions and energy systems over 30 years will be roughly A$20.8 billion per year to remain on track to limit warming to 1.5°C. Around two-thirds of this investment is in the energy system and one-third in industry technologies, electrification and energy efficiency. This research showed there needs to be coordination between government and industry, skills development and enabling infrastructure to encourage investment.

Climateworks has been working with key stakeholders to identify how the Australian Government, state and territory governments, industry, and private finance can collaborate and co-invest to make decarbonised industrial development a reality. For example, support for a battery industry could encompass the following:

- Financial incentives to attract new businesses
- A strategy/plan to attract new businesses
- The Clean Energy Finance Corporation (CEFC), Australian Renewable Energy Agency (ARENA),
North Australian Infrastructure Facilities (NAIF) and Export Finance Australia (EFA) co-investing in decarbonised industrial development.

To encourage investment, Climateworks supports the development of battery manufacturing precincts which are designed and delivered as part of a broader industrial strategy to catalyse industrial transition, alongside work by the National Energy Transformation Partnership to create an energy system that can support the transition. This broader industrial strategy could include establishing a national place-based industrial decarbonisation program delivered by the Australian Government in partnership with state and territory governments. The purpose of this program would be to catalyse investment to accelerate regional industrial decarbonisation while ensuring the transition of regions occurs in a coordinated and collaborative way, prioritising those regions most at risk of negative impacts from industrial transition.
**Relevant to Q 3.4:**

Climateworks research has shown the advantages of a Renewable Energy Industrial Precinct model for diversifying regional economies and making the most of opportunities from the global net-zero economy.

**Climateworks recommends that:**

- **The Strategy supports the development of renewable energy industrial precincts (REIPs) through a national place-based industrial decarbonisation program to coordinate the design and implementation of REIPs nationwide.**
- **The Strategy ties in with action through the priority areas of the National Reconstruction Fund (renewables and low emissions technologies, transport and value-add in resources).**
- **The Strategy supports early market development through procurement, underwriting or contracts for difference.**
- **The Strategy includes developing a regional and national workforce plan to invest in and develop the skills needed for the battery industry or associated mineral processing.**

Climateworks and other organisations actively working to decarbonise industries – locally and nationally – have identified how to support regional economic diversification and ensure Australia can make the most of economic opportunities.

Specifically, Climateworks recommends a national place-based renewable energy precinct (REIP) program delivered by the Australian Government in partnership with state and territory governments. The purpose of this program would be to accelerate regional industrial decarbonisation while ensuring the transition of regions occurs in a coordinated and collaborative way, prioritising those regions most at risk of negative impacts from industrial transition.

**Renewable Energy Industrial Precincts (REIPs)**

Renewable Energy Industrial Precincts (REIPs) are clusters of industrial businesses (for example, steel producers or minerals processors, along with supporting industries) with renewable energy from a nearby renewable energy zone or equivalent outside the NEM. REIPs would also ideally have access to green hydrogen production and infrastructure to serve industries requiring zero-emission fuel for industrial processes or feedstocks. Their energy might be from nearby renewable energy zones or from further afield through high-voltage transmission lines. These precincts might also be ‘hydrogen hubs’ and be an investment focus. Other countries, including the United Kingdom, Germany, Canada and China, are investing in their own ‘net zero industrial clusters’.

Climateworks has identified possible decarbonised industrial precincts across Australia (Figure 2). Each is in existing industrial areas with a proximal renewable energy supply and workforce. REIPs can help Australian industry and regional communities decarbonise, and ensure Australia is well-placed to thrive in a green economy.
Benefits of using REIP precincts to develop battery industries or associated mineral processing

Clean exports from REIPs could be worth triple the value of fossil fuel exports in 2019, creating upwards of 40,000 jobs in 10 years (Beyond Zero Emissions, 2022). REIPs can also help to attract new industries to regional areas, helping to provide long-term economic growth and jobs. The benefits of using precincts to develop battery industries and associated mineral processing include:

- The 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 energy infrastructure and lower costs.
- Businesses in industrial precincts can benefit through leveraging low-cost renewable energy and access to shared user infrastructure, labour pooling, input sharing, knowledge spillovers and circular economy benefits.
- A precinct’s participants can share benefits from collaboration across the precinct. International clustering experience has shown that individual businesses benefit from the interconnectedness within precincts through increased partnerships, knowledge sharing, and risk sharing (Accenture, 2022). Collaborative precincts can spur the economic performance of actors within them in addition to accelerating decarbonisation efforts (Benneworth et al., 2003). They can also lower business costs by sharing access to transport and energy infrastructure, inputs and labour, cheaper green hydrogen, and circular economy practice.
Siting a battery industry or associated mineral processing in decarbonised precincts would align with the above three benefits of precincts. The location of new infrastructure will vary depending on access to firm renewable electricity to match industrial demand. Still, key elements include: a skilled workforce; access to water and bulk material handling ports; transmission/distribution; promotion of energy efficiency and flexibility to deliver reliable and affordable decarbonised energy systems; and coordination between energy and industry stakeholders.

Quantitative reports exist for REIPs in the Hunter (Figure 3) and Gladstone regions (Beyond Zero Emissions, 2022 and 2022b). These offer a deep insight into the opportunities offered by REIPs and support the use of precincts in the development of battery industries or associated mineral processing.

**Suggested government roles in developing REIPs to develop a battery industry or associated mineral processing**

Governments, working with industry and the local community, can take a place-based approach to the design of developing the battery industry or associated mineral processing. Precincts should recognise the unique context of each location, including the existing industries, the community and social infrastructure, land, and traditional custodians. Our research suggests several factors underpin the good design of a decarbonised battery industry precinct:

1. **Coordination and skills development for a new battery industry begins with stakeholders at the design stage to co-design roadmaps.** This coordination and skills development must be between industry and governments (federal, state and territory). Governments can work with industry and the community to co-design roadmaps for land use planning considerations, skills and training initiatives, and co-investing in the enabling infrastructure. The Australian Government could coordinate battery industry precincts by co-investing alongside states, territories, and industries; and providing advice and coordination roles. Government investment could be through programs like the Powering the Regions Fund and National Reconstruction Fund.

2. **Building enabling infrastructure to ensure clean fuels for a battery industry would include developing renewable energy.** This may include green hydrogen pipelines for industrial users and upgrades to ports and roads. It would also include storage and transmission. Flexible energy use can be developed to match variations in renewable supply. These are best developed with energy users, so they can be part of the solution and guide their investment.

3. **Decarbonising existing battery mineral copper, nickel, zinc, and lithium industries is required.** These can be helped by government signals (for example, through decarbonisation roadmaps) or by supplying funding for new equipment or processes (grants or loans). The ETI pathway offers specific guidance:
   - Develop supply chain roadmaps.
   - New mines should be net zero.
   - Develop a workforce plan for the transition.
   - Support the development of remote renewable energy systems and hydrogen for off-grid mining.
   - Provide research, development, and commercialisation support for flexible renewable energy infrastructure.
   - Support partnerships to produce value-added products from mineral carbonation.
   - Establish partnerships to develop net zero haulage between OEMs and miners.
   - Development of an emissions reduction fund methodology for mineral carbonation.
4. **Attracting new battery industry participants can be supported by communicating the role of these centres for innovation, such as for green hydrogen production and the opportunity for new export markets.** A new battery industry can also be supported through clear communication about the battery precincts being open for business and supplied with renewable energy. These should help the new battery industry find markets, domestic and international.

In summary, a precinct model for the battery industry would set clear policy signals such as net zero emissions targets; get state/territory governments on board by co-designing roadmaps with key stakeholders, including industry and local communities; drive demand for new technology and accelerate the deployment of relevant technology through the support of Australian Government co-investment; undertake planning to identify needed new infrastructure; identify skills gaps and set up training; and establish local governance mechanisms, such as at the regional level, and leverage existing governance programs.

The below case study shows plans for such a precinct in the Hunter region of NSW.

### Case study: Hunter REIP

This information has been drawn from the Beyond Zero Emissions report on the [Hunter REIP](Beyond Zero Emissions, 2022).

The Hunter REIP has seen the Australian and NSW governments recently announce a $7.8b deal to connect NSW’s renewable energy zones (REZs) and plug Snowy 2.0 into the grid.

Economic modelling by ACIL Allen commissioned by Beyond Zero Emissions and WWF-Australia showed that a dedicated Renewable Energy Industrial Precinct in the Hunter has the potential to:

- unlock new capital investment of $28 billion
- create 34,000 new ongoing local jobs in new manufacturing and service industries
- generate $11 billion in revenue per annum by 2032
- protect existing manufacturing activities and the jobs they provide by repowering them with renewable energy.

Significant benefits will also flow to sectors beyond industry, providing low-cost, firmed renewables for households, transportation and support for the broader grid. The complete decarbonisation of all existing industries in the Hunter (including Tomago Aluminium and Orica and new green steel plants) requires approximately 22 GW of renewable generation – comfortably covered by the 29 GW generation capacity potential of adjacent renewable energy zones, of which 17.8 GW has already been announced.
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,

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References


