

PHILANTHROPY REPORT

High-Impact Climate Giving in Australia



2024

www.givinggreen.earth

This report is a product of Giving Green Australia, a project of [Giving Green](#) in partnership with [Effective Altruism Australia Environment](#) (EAAE).¹ Giving Green Australia's mission is to identify highly effective Australian nonprofits working on climate change. This report is non-partisan and is intended for educational purposes.

We would like to thank Rick Baker, Marcelo Cummins, Lisa Cliff, Glen Klatovsky and Michael Noetell for their comments on this report. Though this report does not represent their views, it has benefited from their feedback and thoughtful insights.

Questions and comments are welcome at givinggreen@idinsight.org.

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¹ Giving Green is a climate nonprofit evaluator that identifies highly-effective nonprofits working on climate change in a global context.



Summary

- **We think the most promising philanthropic strategy to address climate change from within Australia is decarbonising Australia's industry exports.** This strategy maps well with all five of our impact indicators: systems change, global impact, comparative advantage, political context, and neglectedness. We also analysed reducing coal and natural gas exports, but we found this strategy to be less neglected and less politically viable.
- **Australia is uniquely well-placed to decarbonise industrial emissions globally.** Due to Australia's unique comparative advantages—abundant solar and wind resources, abundant raw materials, and a strong export market—it may be able to decarbonise a significant portion of heavy industry at a lower cost than almost any other country would be. This approach would affect Australia's domestic heavy industry, and also a significant portion of global heavy industry emissions through Australia's exports. Some economists estimate that Australia could decarbonise an estimated 7% of global emissions.²
- **This approach is high scale, partially due to the high carbon footprint of Australian exports.** The contribution of Australian exports to global emissions is several times larger than all of Australia's domestic emissions combined. Carbon-relevant exports include fossil fuels and raw materials for heavy industry such as iron and aluminium. As an example, this approach could see Australian iron ore turned into iron here using green hydrogen, rather than exported overseas and processed using high-emissions technologies.
- **This approach is ready for philanthropic support.** Recent years have seen a rise in nonprofits working on decarbonising Australia's heavy industry exports by advocating for greater deployment of renewables, upgrading and expanding the grid, and financing industrial development and innovation.
- **We identified four promising focus areas within this strategy.** We believe the most effective “sub-strategies” are: to electrify on a large scale and enhance transmission networks; to implement policies that encourage the development and financing of green industry; to implement policies that support innovation in industrial technology; and to build supportive coalitions in key regions. These

² “Australia can supply zero-emissions goods and services that directly reduce global emissions by around 8%, much more than Europe (including the UK) achieving zero net emissions, or more than twice Japan, or more than India doing so”, ([Garnaut, 2022](#)); “by far the least public discussion is on the third: producing energy-intensive green exports. Yet these industries could reduce world emissions by as much as 6–9%, easily Australia's largest contribution to the global effort.”, ([Simms, 2023](#)) “The calculations show that Australia could feasibly contribute to as much as an 8.6% reduction in the Asia-Pacific's greenhouse gas emissions by switching to the export of zero-carbon electricity, green hydrogen, green aluminium, and green steel.” ([Burke et al, 2022](#))



actions can also assist in creating alternative industries and exports for those regions currently reliant on heavy industry.

- **We acknowledge a few key uncertainties in this strategy.** Key uncertainties include the likelihood of technological progress in other areas lessening Australia's comparative advantage in green industry, the efficacy of government incentives, and the willingness of other countries to import cost-competitive industrial goods from Australia.
- **Overall, we think it is important to direct more philanthropic funding toward creating and expanding green heavy industries in Australia.** This view is informed by the significant opportunity size, a perceived high level of tractability, challenges of decarbonisation in this sector in other countries, comparative advantage in the Australian context, and the comparatively low level of funding these sectors have received so far.
- **Following this investigation, we identified actionable routes for philanthropists to direct funding to this strategy.** While outside the scope of this report, we conducted a search for the most effective nonprofits decarbonising heavy industry. The nonprofits we found form our list of [top climate nonprofits in Australia](#).

1. Overview

This report describes what we believe to be some of the most promising, high-impact approaches in Australian climate philanthropy and the research process that led to these conclusions.

We began our investigation with three guiding questions:

1. What are Australia's highest-scale climate opportunities that can be affected by Australia?
2. What comparative advantages does Australia have that could make interventions there competitive on a world scale?
3. What does the literature suggest is Australia's most important role in addressing climate?

These questions led us to what we believe to be the highest-impact Australian opportunities to address climate change.



In 2020, Giving Green conducted an assessment of philanthropic strategies for addressing climate change in Australia. The Australian climate ecosystem has changed dramatically since 2020, partly due to significant shifts in the Australian political landscape—in particular, the change of federal government. With these changes in mind, Giving Green decided to conduct this new philanthropy assessment. This initial phase of our research consisted of a comprehensive literature review and a survey of experts from academia, the private sector, government, and civil society. The information we gathered formed the basis of our conclusion that the funding strategies in Australia with the highest marginal impact lie in (i) decarbonising exports (e.g., raw materials for heavy industry) and (ii) sparking the development of domestic green industrial production. We think these strategies reflect Australia’s comparative advantages of abundant natural resources and renewable energy potential. In addition, the impact of these strategies would extend beyond Australia’s emissions by influencing industrial emissions globally. Specific philanthropic approaches employed to catalyse these strategies are detailed in [section 3.2](#).

The conclusions of this report reflect the political and economic landscape as of 2024. In future years, these recommendations may shift.

Specific 2024 Australian non-profit recommendations of organisations using these strategies are explored in more detail in Giving Green’s [organisation deep dives](#).

2. Research framework

In this section, we describe Giving Green’s approach to identifying highly effective opportunities for climate giving in Australia, including the key parameters we used to guide our research process.

2.1 Key objective

Impact per marginal dollar

We aimed to identify strategies for which an extra dollar of support leads to the largest amount of avoided greenhouse gas (GHG) emissions. We call this *impact per marginal dollar*. We think this is a critical lens because there are many very important climate strategies that are already well-funded, so additional funding would have diminishing returns.



While impact per marginal dollar is a key metric, we recognise that it is difficult to measure with high certainty in a complex context. Furthermore, there is fundamental uncertainty about the chances of success of many important climate projects. With this in mind, we curated a list of core indicators that guided us toward a qualitative impact assessment. If several indicators strongly pointed to a specific intervention, we assessed this intervention as more likely to have a high impact per marginal dollar.³

2.2 Impact indicators

Five core indicators acted as our guideposts for measuring impact.

Systems change

We think interventions that lead to systems change can achieve significantly higher levels of impact per dollar. This conclusion is informed by (i) past Giving Green research into systems change interventions and into targeted interventions such as carbon offset projects and (ii) historical learnings from past progress in policy and technology.⁴ Examples include advocacy efforts leading to the 2022 passage of the Inflation Reduction Act in the United States, which unlocked \$370 billion USD (approximately \$560 billion AUD) in climate funding, and innovation in solar photovoltaic (PV) technologies, which have made solar power increasingly cost-competitive with fossil-fuel-generated power.⁵

Global impact

Although the consequences of climate change are felt globally, only a small number of countries are directly responsible for the majority of current and historic emissions.⁶ We think that one powerful way countries with relatively small carbon footprints like Australia can have an outsized impact on emissions reductions while simultaneously growing their economies is by looking beyond direct emissions and considering the influence they can have on global innovation or supply chains.⁷ For instance, the policies of a few key

³ This is motivated by GiveWell's cluster thinking approach, which is designed to make recommendations robust to problems with any specific principle or indicator. ([Givewell, 2014](#))

⁴ This pattern of systems change interventions outcompeting direct delivery interventions is observed from Giving Green's cost-effectiveness analyses of systems change interventions. See [decarbonising industry CEA](#) and [nuclear power CEA](#) as examples.

⁵ \$370 billion: ([Forbes, 2022](#)); solar PV: "Policies that stimulate market growth have played a key role in enabling PV's cost reduction, through privately-funded R&D and scale economies, and to a lesser extent learning-by-doing" ([Kavlak, McNerny, & Trancik, 2018](#))

⁶ For example, two countries, the United States and China, contribute over one-third (~37.7%) of world emissions ([Our World in Data, 2020](#)).

⁷ While we refer to Australia having a small carbon footprint, this refers primarily to Australia's domestic emissions profile. Australia's emissions profile is much more significant when coal exports or scope 3 emissions from industrial exports are included. Furthermore, this statement does not consider Australia's high per-capita emissions.



countries (e.g., Germany, China) accelerated worldwide innovation and deployment of solar PV.⁸

Comparative advantage

We sought to prioritise strategies that utilised Australia's comparative advantages relative to other countries. For example, we searched for specific attributes in the regulatory environment, scientific research and development (R&D) infrastructure, geography, or natural resource availability may give a country an edge in the green transition. In addition to finding areas where Australia could play a unique role in climate solutions, this was also a tool used to identify areas where Australia may be strongest overall.

Many such strategies are unlikely to be done well in other countries, meaning that Australia's contribution is unique and necessary. On the other hand, strategies for which Australia has no comparative advantage might be done equally well, or even better, by other, larger countries, or countries which are better placed to address specific climate strategies - rendering Australia's contribution less counterfactually impactful.⁹

Neglectedness

We specifically focused on sectors, solutions, and organisations that are 'neglected,' compared to their relative importance in reducing GHGs. Certain areas with significant opportunity for impact receive much less attention than they should. Such sectors can be considered to be overlooked. If not addressed, these areas may continue to be ignored, leading to more greenhouse gas emissions over time. Neglected sectors can map to opportunities that address higher levels of emissions overall and accelerate progress in sectors where decarbonisation efforts are lagging.

Tractability

Factors such as a country's political environment can strongly impact the tractability of various climate strategies, especially for strategies involving policy. If a country's government is particularly open or closed to certain climate policies or strategies, we aim

⁸ Accelerated innovation and development:: "We find that increased module efficiency was the leading low-level cause of cost reduction... contributing almost 25% of the decline. Government-funded and private R&D was the most important high-level mechanism over this period. After 2001, however, scale economies became a more significant cause of cost reduction, approaching R&D in importance. Policies that stimulate market growth have played a key role in enabling PV's cost reduction" ([Kavlak et al. 2018](#)); "Without this manufacturing shift to China and strong US investor support, photovoltaics would likely have remained promising, but still too expensive for widespread uptake" ([Green, 2019](#))

⁹ As an example, cell agriculture may serve a promising route in decarbonising agricultural emissions. However, countries like Israel and Singapore seem significantly better placed to break ground on strategies of this kind due to more welcoming regulatory and investment environments.



to consider this in our evaluation. For example, before the passage of the Inflation Reduction Act (IRA) in the US, Giving Green focused on US federal policy advocacy as we identified that (i) there was a promising political moment to pass climate policy, in that the Democrats (a climate-receptive party) held all three of the House, Senate and Presidency, and (ii) that a major US climate bill would have global spillover effects—primarily in the form of technological advances that other countries could utilise to decarbonise their emissions. Similarly, in Australia, the most promising interventions are likely to change over time based on the political party in power and their varying views and approaches to climate change

2.3 Data sources and approach

Our approach had five key stages.

1. Assess high-level strategies based on the impact indicators.

Initially, we identified promising high-level strategies by reviewing relevant literature and interviewing experts from government, academia, foundations, and nonprofits. After we identified a number of strategies, we assessed them against our key impact indicators, discussed previously. Our assessment of five promising high-level strategies can be found in [Table 1](#).

2. List specific philanthropic sub-strategies for top-rated high-level strategies.

We prioritised the top two strategies, industrial exports and fossil fuel exports, for further assessment. Next, we identified specific sub-strategies that serve as levers to push the broader philanthropic strategy. We explore the strongest high-level strategy in [section 3.1](#) and list these sub-strategies in [section 3.2](#).

3. Assess sub-strategies using the Scale, Feasibility, Funding Need framework.

We assessed sub-strategies for both top strategies. From this approach, it became clear that a number of sub-strategies around industrial emissions were the most competitive. We provide our assessment of sub-strategies for decarbonising industrial exports in [section 3.2](#) and that for affecting fossil fuel exports in the [Appendix](#).

4. Develop and assess theory of change for top sub-strategies.

We built a theory of change (TOC) encompassing the most promising sub-strategies. The TOC enabled us to explore key assumptions and uncertainties in executing each sub-strategy.



5. Identifying and picking top charities within top sub-strategies.

We made a longlist of climate organisations working within these sub-strategies and narrowed this to a shortlist based on the assessment methodologies in this report. We then assessed shortlisted sub-strategies through expert interviews, desk research, and theory of change analysis. We also assessed organisation-specific traits such as room for more funding and track record. However, a full exploration of this step is beyond the scope of this current report. The conclusions of this step are explored in more detail in our [organisation-specific deep dives](#).

2.4 Assessment of high-level strategies

Our assessment of five promising high-level strategies can be found in **Table 1**. Experts to whom we spoke consistently identified these five as some of the strongest opportunities in the Australian climate space.

We deprioritised natural carbon sinks, vehicle emissions, and alternative proteins, primarily due to lower scale of impact (as with vehicle emissions, which can only affect certain parts of domestic emissions), lower comparative advantage (as with alternative proteins), and/or lower tractability.

Note that we still consider the deprioritised strategies to be among the most impactful opportunities in climate. For instance, we consider accelerating alternative proteins to be an especially strong intervention; however, we deprioritised it primarily due to a lack of comparative advantage in Australia, as compared to countries like Singapore and Israel, which have more favourable regulatory and R&D environments.



Table 1: Assessment of Australian philanthropic strategies

Policy advocacy for:	Systems change	Global impact	Comparative advantage	Neglectedness	Political context
Decarbonising industrial exports	5	5	5	4	4
Reducing coal and natural gas exports	5	4	3	2	2
Accelerating alternative proteins	5	5	2	3	2
Reducing vehicle emissions	5	2	2	3	5
Improved land management to sink carbon	5	2	3	3	3

Of the remaining strategies, we found decarbonising heavy industry exports to be more promising than reducing fossil fuel exports. Multiple sources of information pointed to this conclusion. First, experts indicated to us that decarbonising industry (and industry exports) is relatively neglected by funders.¹⁰ Second, there are indications that green industry approaches are significantly more tractable in the current political environment. This is due to multiple factors, including the absence of an opposing lobby, the previously expressed receptiveness of government to these opportunities, and the lower risk of political blowback in accelerating these policies. Finally, we believe that the counterfactual impact of projects to reduce fossil fuel exports is quite uncertain. For example, buyers of coal may instead source coal or natural gas from another exporter country, resulting in overall neutral impact on the climate—displacing where emissions come from, but not significantly lessening them.¹¹ Notably, unlike any other approach, industrial emissions strategies scored highly on every impact indicator.

¹⁰ Data on exact philanthropic spending within climate in Australia is scarce, so this was informed primarily by interviews with foundations and other organisations with visibility on the overall funding ecosystem.

¹¹ It seems likely that a number of the most significant players affecting Australian coal production (in particular, overseas buyers), cannot be easily affected by philanthropic action within Australia. As such, there may be more viable interventions to do with decreasing the cost of renewables in other countries to make coal non-competitive as an import good.



From this, we conclude that decarbonising industrial exports is the strategy with the highest potential impact per marginal dollar in the Australian context. We devote [section 3](#) to describing the strategy of decarbonising industrial exports and our justification for this determination.

For a summary of our analysis of the four deprioritised approaches, please see the [Appendix](#).

3. High-level strategy: Decarbonising Australia's industrial exports

Using Australia's highly productive, low-cost renewable resources to decarbonise industrial exports stood out as an unusually high-impact approach under almost all our impact indicators. Specifically, this strategy would involve developing new exports and growing existing exports in heavy industry sectors such as iron, ammonia, aluminium, and critical minerals. In doing so, Australia could serve a critical role in decarbonising industrial emissions globally.

In our discussion of heavy industry, we are referring to industries such as:

- Iron & steel: 7% of world emissions;
- Aluminium: ~3% of world emissions);
- Ammonia: ~1.8% of world emissions, and projected to grow;¹²
- Hydrogen: projected to play a large role in decarbonising heavy industry

To better understand this strategy in practice, we turn to an illustrative example: decarbonising iron by onshoring its production.

Example: Decarbonising green iron production in Australia

At present, Australia is one of the world's major producers of iron ore, producing 38% of the world's supply.¹³ The vast majority of the world's iron ore (~98%) is turned into steel, typically after being exported to countries with larger steel production industries such as

¹² Steel, 7% of world emissions: "Steel production is highly energy- and emissions-intensive, accounting for around 8% of global energy demand and 7% (2.6 Gt CO₂) of total emissions [globally]" (IEA, 2020); aluminium, 3% of world emissions: (IEA, 2023); ammonia, 1.8% of world emissions: (IEA, 2021).

¹³ "Australia accounts for 38% of global production" ([Global Data, 2021](#))



China.¹⁴ In this process, the iron ore is smelted in a blast furnace along with coking coal and is turned into pig iron, which is then refined into wrought iron. This is an energy and emissions-intensive process, and it is this stage that causes the majority of emissions from the conventional steel industry. After being refined, wrought iron can be turned into steel through the use of a basic oxygen furnace. This steel is then sold and used to produce more complex goods, such as cars or consumer products, which are sold both domestically and to overseas markets.

However, under an Australian strategy to decarbonise industrial emissions, this chain would look quite different. Australia would continue to produce large quantities of iron ore, but, rather than shipping the ore overseas, Australia would process iron ore domestically into “green” wrought iron. A low-emissions production process would require the use of hydrogen blast furnaces, replacing traditional blast furnaces that use coking coal.¹⁵ Thus, production of green iron requires:

- i. availability of green hydrogen—hydrogen produced using renewable electricity—to be used in hydrogen blast furnaces;
- ii. availability of low-cost renewable energy to produce green hydrogen.¹⁶

The process of creating green wrought iron is highly energy-intensive and would not be economically viable in most countries. However, Australia has significant cost advantages in creating green wrought iron.¹⁷ The largest is the low cost of renewable energy, which is needed to produce green hydrogen through electrolysis and is one of the main cost drivers of green hydrogen. In addition, there are significant cost advantages in co-locating iron mining, refining, and smelting facilities with hydrogen production facilities.

Thus, using low-cost Australian renewable energy and low-cost Australian green hydrogen, green iron production would be comparatively cheap relative to the global marketplace.¹⁸ The economics strongly favour the use of Australian electricity and

¹⁴ “About 98% of world iron ore production is used to make iron in the form of steel.” ([Geosciences Australia, 2023](#))

¹⁵ (IEA, 2020)

¹⁶ Note that it is important that green hydrogen is produced relatively near to the iron forging process, as transporting green hydrogen from other nations is quite cost-inefficient.

¹⁷ “Australia (and to a lesser extent, Brazil) emerges as a potential future leader in green H₂-based steel manufacturing and exports, given the projection of reasonably competitive green H₂-DRI-EAF production costs and extensive iron ore resources” (Devlin et al, 2023); “Australia, endowed with abundant renewable resources and iron ore deposits, is ideally placed to support this global effort” (Wang et al, 2023).

¹⁸ Australia would likely be able to produce green iron more cheaply than most other countries, but the cost would likely still be higher than the cost of conventional iron. As a result, success relies also on (a) countries producing conventional iron imposing an emissions price, (b) carbon border adjustment mechanisms (taxes) increasing the price of conventional iron and steel, (c) other countries being willing to pay a premium for green industrial products, or (d) technological improvement.



hydrogen to process Australian minerals domestically.¹⁹

Green wrought iron would then be exported to countries like China, which currently imports Australia's iron ore, to be processed into steel.²⁰ This final step of production is significantly less emissions-intensive than previous steps. Labour costs have a large impact on the overall cost of this step, meaning other countries are better placed to engage.²¹

In effect, this approach allows international steel producers to use Australia's abundant renewable resources and low-cost renewable energy to cheaply decarbonise their supply chain, lowering the cost of production of green steel for a number of countries.

There are a number of industries for which the price of electricity or hydrogen is a major factor in global competitiveness or is projected to be an increasingly important factor in the future.²² As such, similar approaches can be applied to decarbonising other industrial products. Energy-intensive industries, such as the production of green iron, aluminium, ammonia, and hydrogen, would gravitate economically towards low-cost renewable energy. This effectively enables trade-partner countries to significantly lower the cost of decarbonising industrial emissions by outsourcing this task to Australia.

This solution has the potential for global impact on GHG emissions. We think this two-pronged export strategy—decarbonising Australia's industrial exports and increasing its production of additional green exports—has a significantly higher potential to mitigate climate change than almost any other Australian strategy.²³

¹⁹ Note that while there are strong advantages to processing materials in Australia with renewables, this approach made less economic sense in the fossil fuel era. There are now much larger advantages to using electricity at home, as renewable energy cannot be as easily transported as fossil fuels. While coal can be shipped cheaply—transported to northeast Asian for ~10% of its value, for example—shipping hydrogen is significantly more expensive: costs of hydrogen at port destinations are likely to be 100% higher than costs at location of origin in Australia (Garnaut, 2019). For goods where the cost of energy and/or hydrogen is a significant price driver, only a few countries will be able to engage in renewable versions of these industries in a cost-competitive way.

²⁰ Note that green iron would be exported at a higher price than iron ore, as the iron would have had value added by having been processed.

²¹ LMICs are particularly well-placed here.

²² "Electricity costs represent, on average, up to 40% of European primary aluminium production costs." (European Aluminium, 2022)

²³ "Australia is uniquely well placed to lead and prosper from the land use transformation, just as it is in energy and energy-intensive manufacturing." (Garnaut, 2019)



3.1 Decarbonising industrial exports: Overview

This section explains how we assessed the philanthropic strategy of decarbonising Australia's industrial exports against each of our five impact indicators.

Global impact

This solution has the potential to prevent GHG emissions at a very high scale, and have global impact. We think that if Australia were to decarbonise its industrial exports and lean into the production of additional exports like green ammonia, this could have significantly higher impact potential to mitigate climate change than almost any other domestic strategy.

Regarding domestic emissions, Australia's domestic emissions profile seems quite conventional, as summarised in **Figure 1**, below.²⁴

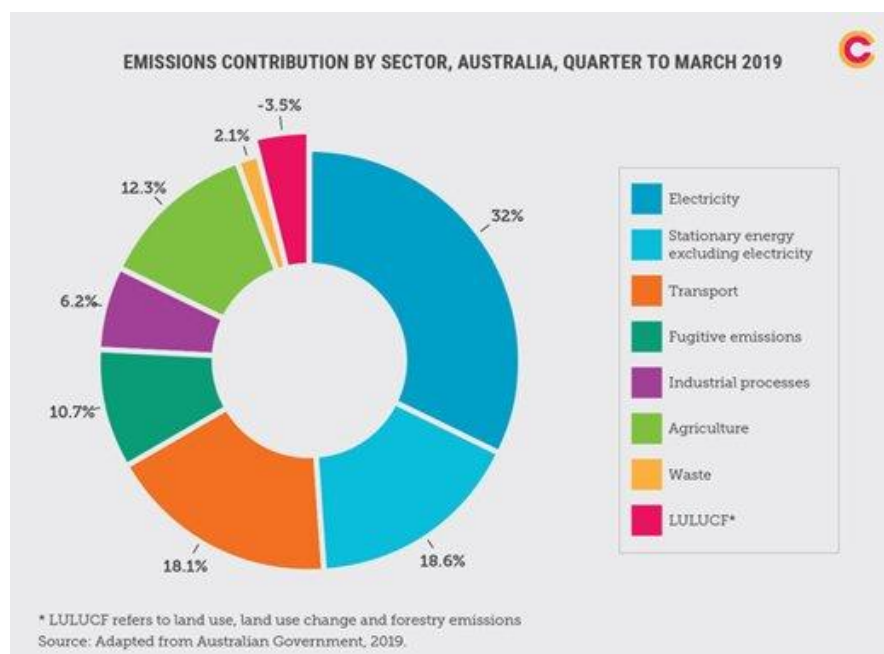


Figure 1: Emissions contribution by sector, Australia, March 2019

However, focusing solely on domestic emissions obscures higher-impact opportunities that can lead to emissions reductions beyond Australia's borders, such as export emissions. Export emissions refer to emissions caused overseas by exported Australian resources. One simple example of this would be coal that is shipped overseas, and burned in other

²⁴ ([Department of Environment and Energy, 2019](#))



countries - thereby releasing CO₂.²⁵

Australia's context is unusual: export emissions dominate its overall emissions profile.

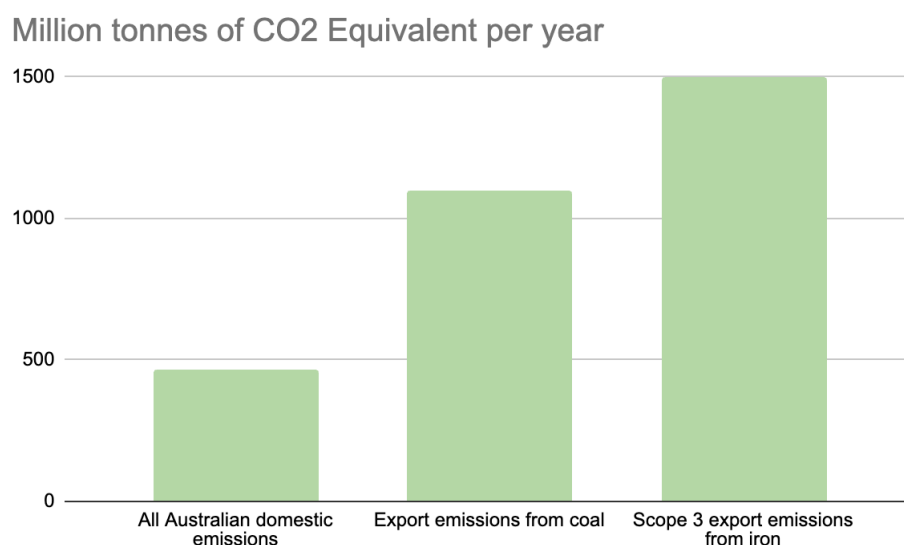


Figure 2: Sources of Australian CO₂ emissions²⁶

With this in mind, when seeking to target the highest-impact activities in Australia, lessening the carbon impact of exports may be higher-impact than addressing any sector of domestic emissions. Australia's domestic emissions make up only 1.05% of world emissions.²⁷ But it is estimated that decarbonising industrial exports could have a significantly higher impact ceiling: about 7% of global emissions.²⁸ In addition, this approach would decarbonise a sector (industrial emissions) that other countries find to be among the most difficult areas of GHG emissions to address.²⁹

²⁵ The green iron example discussed previously is an example of reducing scope 3 export emissions; Australian iron is used in emissions-intensive steel manufacturing processes overseas, but these scope 3 emissions could be averted if Australia processed iron into low-carbon green steel domestically.

²⁶ Data in this graph is drawn from multiple sources. Australia's domestic emissions total for 2022 was 465.9 million tonnes of CO₂e (page 3 of [DCCFEW, 2023](#)); coal export emissions were 1100 million tonnes of CO₂e per year ([Moss, 2021](#)); scope 3 export emissions from iron were 1500 million tonnes of CO₂e per year ([CSIRO, 2022](#)).

²⁷ As of 2021, Australian emissions made up 1.05% of global emissions ([OWID, 2021](#)). Australia's per capita emissions are quite high. However, partly due to its small population (~25 million), domestic emissions are only a small share of global emissions.

²⁸ "The full export of zero-carbon goods and carbon credits would reduce them by about 7 per cent [of world emissions]" ([Garnaut, 2021](#)). Estimate is based on Garnaut's analysis of supply constraints in Australia and demand constraints in primary export countries. Refer to chapter 1 for more detail.

²⁹ Difficult to address sectors are less likely to be addressed in a short time frame, so all else being equal, addressing these sectors can lead to higher expected reductions in emissions overall.



Table 2: Australia's rank as producer and exporter, and its percentage of total world production, of major climate-relevant export goods.

Climate-relevant export	Australia's worldwide rank as producer	Australia's worldwide rank as exporter	% of total world production	Major importers (from Australia) & share of Australia's exports to each
Coal	#5 ³⁰	#2	6.2%	India: 30.8% ³¹ Japan 27.6% South Korea: 12.7% Taiwan: 7.9% Vietnam: 4.08% Indonesia: 2.46% Malaysia: 2.44%
Liquid Natural Gas	#7 ³²	#1 (for Liquid Natural Gas exports)	3.7%	China: 40% ³³ Japan: 37% Korea: 10%
Iron Ore	#1 ³⁴	#1 ³⁵	38% ³⁶	China: 83.4% ³⁴ Japan: 7.9% South Korea: 6.4% Taiwan: 2.2%
Bauxite (Aluminium ore)	#1 ³⁷	#1 ³⁸ (of aluminium ores and concentrates)	31%	China: 97% ³⁹
Lithium	#1 ⁴⁰	#1 ⁴¹	53% ⁴²	China: 97% ⁴³

³⁰ Data on production, exports, and % of production sourced from: ([Geosciences Australia, 2022](#)).

³¹ Data sourced from ([OECD, 2021](#))

³² Data on production, LNG exports, and % of world production sourced from: ([Geosciences Australia, 2022](#))

³³ ([Statista, 2022](#))

³⁴ ([Statista, 2022](#))

³⁵ Notably, 65% of China's overall iron ore supply. ([Statista, 2023](#))

³⁶ ([Western Australian DJTSL, 2022](#))

³⁷ ([Geosciences Australia, 2016](#))

³⁸ ([World Bank, 2021](#))

³⁹ While 97% of exported aluminium ore is exported to China, only 25% of Australian aluminium ore is exported. 75% is used domestically.

⁴⁰ ([USGS, 2019](#))

⁴¹ ([Australian Bureau of Statistics, 2022](#))

⁴² ([Frost, 2023](#))

⁴³ ([Australian Bureau of Statistics, 2022](#))



There are a few exports of particular interest when considering carbon emissions. Typically, these are significant sources of scope 1 or scope 3 emissions⁴⁴, illustrated in **Table 2**.

Collectively, these exports make up a significant percentage of world emissions, both directly and through Scope 3 emissions. Given Australia's role as a key producer and exporter of these goods, Australia is thus able to influence the decarbonisation of global supply chains through decarbonising these exports.

Comparative advantage

The approach of decarbonising industrial exports also plays powerfully into Australia's comparative advantages. When seeking to decarbonise many areas of industrial emissions, one major factor affecting cost (and therefore influencing whether this is viable for a country) is the cost of renewable energy.⁴⁵ One of Australia's strongest comparative advantages is that it has some of the most productive renewable energy resources in the world, in the form of abundant solar and wind resources.⁴⁶ This also means that it has the capacity to produce energy that is among the cheapest renewable energy in the world.⁴⁷ Globally cost-competitive renewable power supply is already feasible now in the most favourable locations.⁴⁸

As a second major comparative advantage, Australia is also one of the largest exporters in the world of a variety of raw materials, which, when transformed, make up a significant proportion of industrial emissions worldwide. This combination of a) having large amounts of key resources and b) having the renewable energy capacity to decarbonise the scope 3 emissions of these resources at a lower cost than almost any other country, suggests that Australia is uniquely well placed to decarbonise a significant proportion of the world's industrial emissions. This approach could functionally reduce the global cost of decarbonising production of a number of high-emissions industrial goods, including iron

⁴⁴ Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level, such as the burning of coal on site. Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Scope 3 emissions are the result of activities from assets not owned by an organisation or country, but which they indirectly affect with their value chain.

⁴⁵ "The primary factors in determining the cost of producing steel are the production route and the costs of the main input materials (iron ore, scrap and energy)" (IEA, 2020) Note that the ability to colocate renewable energy production with industrial processing can also be a significant cost driver - but Australia has significant advantages here as well.

⁴⁶ Resources: (Griffiths, 2022). Interesting to note here, there are a higher proportion of households utilising rooftop solar in Australia than in any other country, "with almost one in three homes hosting PV panels" (Hannam, 2023). Partly this is because of the high yield of solar panels generate in Australia, which increases the economic value of solar panel installation.

⁴⁷ "We have been able to rank those regions in order of least to highest cost renewable industrial electricity supply. Based on the minimum cost in each region, the top three are India, Western Europe and China. Australia is ranked fourth" (CSIRO, 2023)

⁴⁸ "Globally competitive renewable power supply is already feasible now in the most favourable locations" (Garnaut, 2019)



(as steel production makes up 7% of world emissions), aluminium (~3% of world emissions), ammonia (~1.8% of world emissions, and is projected to have a growing emissions profile), hydrogen, and critical minerals.

In short, Australia has a powerful comparative advantage in becoming a major exporter of green industrial products by leveraging its renewable energy potential. In doing this, Australia could play an important role in decarbonising not just its own domestic emissions, but significant portions of industrial emissions from many other countries as well.

Note that mining exports of iron ore, coal and natural gas make up by far the highest proportion of Australia's exports.⁴⁹ For further context, see a map of Australia's major exports in **Figure 3**, below.

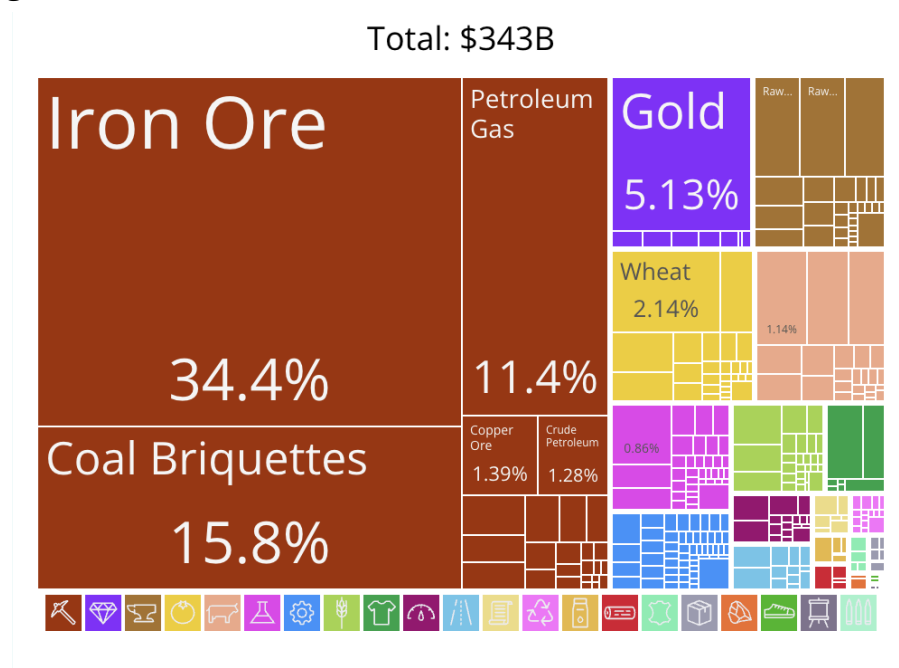


Figure 3: Australian exports, by % of overall export value (2021)⁵⁰

Emissions from these industries are also particularly difficult for many other countries to address.⁵¹ The cost of decarbonising heavy industry, and therefore the viability of doing so,

⁴⁹ In addition to these existing export markets, Australia could also have strong advantages in exporting resources like green ammonia.

⁵⁰ (OEC, 2021)

⁵¹ "Steel, cement, and chemicals are the top three emitting industries and are among the most difficult to decarbonize" (Gross, 2021)



is heavily influenced by the cost of renewable energy.⁵² This is because many low-emissions alternatives to current industrial processes require the use of electricity, either directly in the process itself or to produce hydrogen as a fuel source for the process.

Australia, however, has some of the most productive renewable energy resources in the world, in the form of abundant solar and wind resources.⁵³ These resources grant it the capacity to produce some of the cheapest renewable energy in the world.⁵⁴ In fact, a globally cost-competitive renewable power supply is already feasible now in the most favourable locations.⁵⁵

Therefore, Australia has an opportunity to become a major exporter of green industrial products by leveraging its renewable energy potential. Australia may be able to decarbonise the production of various industrial goods more quickly and cheaply than other countries would be able to decarbonise their own domestic production lines. It can then propagate these emissions cuts internationally through its exports: “green” equivalents of existing export goods, “green” equivalents of goods currently produced overseas with Australian raw materials.⁵⁶ Australian exports can functionally make decarbonising industry significantly lower cost for importer countries.

In short, by doing this, Australia is uniquely well-placed to decarbonise a significant proportion of the world’s industrial emissions.

Tractability

Decarbonising industrial exports seems tractable in today’s political context. A survey of experts suggested that decarbonising heavy industry would be highly tractable given that this approach would provide significant economic benefits to Australia, both in terms of economic growth, export income, tax revenue, and job creation.⁵⁷ Both

⁵² “The primary factors in determining the cost of producing steel are the production route and the costs of the main input materials (iron ore, scrap and energy)” (IEA, 2020) Note that the ability to colocate renewable energy production with industrial processing can also be a significant cost driver; Australia has significant advantages here as well.

⁵³ Resources: (Griffiths, 2022). Interesting to note here, there are a higher proportion of households utilising rooftop solar in Australia than in any other country, “with almost one in three homes hosting PV panels” (Hannam, 2023). Partly this is because of the high yield of solar panels generate in Australia, which increases the economic value of solar panel installation.

⁵⁴ “We have been able to rank those regions in order of least to highest cost renewable industrial electricity supply. Based on the minimum cost in each region, the top three are India, Western Europe and China. Australia is ranked fourth” (CSIRO, 2023)

⁵⁵ “Globally competitive renewable power supply is already feasible now in the most favourable locations” (Garnaut, 2019)

⁵⁶ In addition, in the process of scaling up green production, Australian industry could produce technological improvements that could be adopted by industry elsewhere.

⁵⁷ “Australia could quickly become a world leader in the production of hydrogen, ammonia, steel, aluminium and other metals using 100% renewable energy. These opportunities would create 230,000 jobs.” (Beyond Zero Emissions, 2020)



government and the private sector interest in this strategy has been increasing.⁵⁸ As of 2024, there is no strong opposing lobby to this approach, making it potentially more tractable than other climate mitigation approaches that do face opposition, such as preventing or lessening coal and natural gas production.

2024 may be a particularly feasible time to advance this approach. In 2022, the Australian Labor Party was elected to power in the federal government. This led to a significant shift towards more proactive climate policies, including the passage of the *Climate Change Act* (2022), which set GHG emissions reduction targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050 and introduced mechanisms to enforce these targets.⁵⁹ Experts we surveyed in the climate non-government organisation (NGO) space indicated that, in 2024 as compared to previous years, they see a significantly higher political will to address climate, including willingness to engage from ministers and other government officials.

Neglectedness

Decarbonising industrial exports is also quite neglected. Climateworks estimates that efforts to decarbonise heavy industry make up only 2% of overall philanthropic climate funding, despite the fact that industrial emissions are estimated to make up 29.4% of world emissions.⁶⁰ Climateworks also reports that industrial interventions are comparatively neglected in the Oceania region in particular.⁶¹ In conversations with our team, a number of climate funders indicated to us that approaches addressing industrial decarbonisation were underfunded and could be meaningfully improved with further philanthropic and public funding.⁶²

Government funding for climate has dramatically increased in recent years. However, the vast majority of this funding (approximately \$12 billion) has been allocated towards expanding and upgrading the transmission network and ensuring grid resilience.⁶³ A smaller but meaningful proportion of funding has supported the development of a

⁵⁸ Government: (Australian budget overview, 2023). This budget specifically mentions making Australia a 'renewable energy superpower', and includes an allocation of \$2 billion towards building out green hydrogen infrastructure as a precondition to enabling this 'renewable superpower' transition; Private sector: One example of private interest is included here, "Fortescue Future Industries has built a pilot plant that can turn iron ore into green iron without hydrogen – or coal – as part of its quest to slash carbon emissions from steel production" (Thompson, 2023)

⁵⁹ Climate Change Bill (Climate Change Bill, 2022); Safeguard mechanism: The Safeguard mechanism and the commitment to a 43% reduction can be found here.

⁶⁰ 2% of overall philanthropic funding: (Climateworks, 2021); 29.4% of world emissions, when including electricity emissions from industrial work: (Our World in Data, 2020)

⁶¹ (Climateworks funding trends report, 2023)

⁶² We are aware funders working on industrial decarbonisation may have an incentive to report a need for more funding, in order to bring further funders into the space. However, we consider this information likely to be accurate given that other sources of information point to the same conclusion, e.g. Founders Pledge, 2022.

⁶³ (Australian budget overview, 2023)



hydrogen economy, with \$2 billion allocated to the Hydrogen Headstart program to make Australia a world-leading hydrogen producer. Outside of funding and subsidies, climate mitigation policies include regulations and carbon pricing. For example, the [Safeguard Mechanism](#) prices domestic carbon emissions, including in the industrial sector. However, the Safeguard Mechanism only tracks and prices domestic emissions, so export emissions remain neglected here as well. Overall, it seems highly likely that interventions to decarbonise heavy industry remain comparatively neglected in Australia.

Almost all of the principles/indicators outlined in this report point to decarbonising heavy industry exports as a uniquely high-impact strategy in Australia.

Other advantages of industrial strategies

There is also reason to believe that strategies addressing export emissions might matter significantly more in terms of causing emissions reductions. This is because domestic strategies may run the risk of merely shifting emissions reductions between sectors, rather than causing concrete, irreplaceable reductions.

Partly, this is due to the structure of Australia's climate commitments. Australia has committed to clear domestic emissions targets, aiming to reach 43% below 2005 levels by 2030. This is a very positive commitment, however, the incentives created by such a commitment are complex, at least where philanthropic work is to be considered. In particular, if work in one area of emissions reduction is made to progress faster than expected (for example, due to advocacy or philanthropic action), the committed reduction would still remain at 43%. Because of this, faster than expected progress in one area might mean that government then chooses to move more slowly in addressing some other areas of emissions, as the original commitment could still be met. In essence, there is a risk that accelerated emissions reductions in one sector of domestic emissions might slow progress in other areas. Because of this, accelerated progress in areas of domestic emissions might not map to concrete reductions in emissions at all - rather, it might only map to displacement of emissions reductions from other sectors.

However, while this may be true for domestic emissions, Australia has no such commitments to reducing export emissions. With this in mind, implementing strategies that meaningfully reduce Australia's export emissions would be especially valuable. Reductions in export emissions would be highly unlikely to displace any domestic emissions reduction in Australia - because the reduced export emissions would not be included in Australia's domestic emissions profile. Therefore, such progress would not be



expected to negatively affect work in other areas of emissions.

This is a strongly positive point in favour of strategies addressing export emissions. Due to the incentives of the Australian government's commitments, strategies focused on export emissions are more likely to provide irreplaceable reductions in carbon emissions than strategies focused on domestic emissions.

Final assessment

Overall, conditions in Australia are very promising for nascent green industries like green iron. Nonprofits engaging in policy work can play a critically important role in facilitating the development of these industries. More detail on useful actions from the nonprofit sector can be found in [section 3.2](#).

3.2 Sub-strategy assessment

We now turn to specific sub-strategies that nonprofits can undertake to accelerate this strategy to decarbonise industrial exports, and thereby cut global industrial emissions. We have specifically identified eight promising sub-strategies that NGOs are currently pursuing.

We think that Australia decarbonising its industrial exports requires the following:

- High-scale deployment of renewable energy generation to provide low-cost power.
- Expanded and upgraded transmission to enable access to this cost-competitive power supply.
- Significant buildout of green hydrogen infrastructure.
- Introduction of policies to accelerate and incentivise the growth and development of green industries.
- Coalition-building to ensure local understanding of and support for these key changes, which would increase their likelihood of success.

From what we have observed, nonprofits have supported these efforts in a number of ways, outlined in **Table 3**, below. These approaches fall into three broad categories: (1) renewables deployment, rewiring, and electrification; (2) policy work; and (3) coalition building. In this table, we also briefly evaluate the scale, feasibility, and funding need for each listed strategy.



Table 3: Scale, feasibility, and funding need of potential high-impact approaches nonprofits use to promote the decarbonisation of industrial exports

Strategy	Scale	Feasibility	Funding Need
1. Advocacy efforts for faster deployment of renewable energy, and for expanding and upgrading the electricity transmission system. ⁶⁴	Medium to high	High	Low to medium
2. Advocacy to push for a significantly higher scale of deployment of renewable energy capacity	High	Medium to high	Medium
3. Public education and support to encourage mass uptake of rooftop solar	Low to medium	High	Low
4. Advocating for policies that unlock investment in green industry	Medium to high	Medium	High
5. Advocating for policies that encourage the financing of innovations relating to low emissions industrial technologies	High	Medium	Medium to high
6. Advocating for policies that support the financing and development of green hydrogen infrastructure	Medium	Medium to high	Low
7. Coalition-building and community engagement efforts with industry and key constituencies in regions that could be green industry hubs	Medium	Medium to high	Medium

A more in depth explanation of each strategy and of our ratings can be found in [the Appendix](#).

Four of the listed seven sub-strategies scored medium to high on every impact indicator. Therefore, we identify these four as particularly promising:

- **2.** Advocacy for higher-scale renewable deployment.
- **4.** Policy work to incentivise green industrial development.

⁶⁴ This approach also includes measures to expand access to cheap renewable energy in likely hubs of industrial activity.



- **5.** Policy work to encourage green industrial innovation.
- **7.** Coalition-building in critical regions.

We consider the other three sub-strategies to be highly promising, but less neglected in the current environment.

In [section 4](#), we develop a theory of change for decarbonising exports through these four approaches, detailing the mechanisms and anticipated impacts for each of these sub-strategies.



4. Evaluation of theory of change for decarbonising industrial exports

GREEN INDUSTRY EXPORTS THEORY OF CHANGE

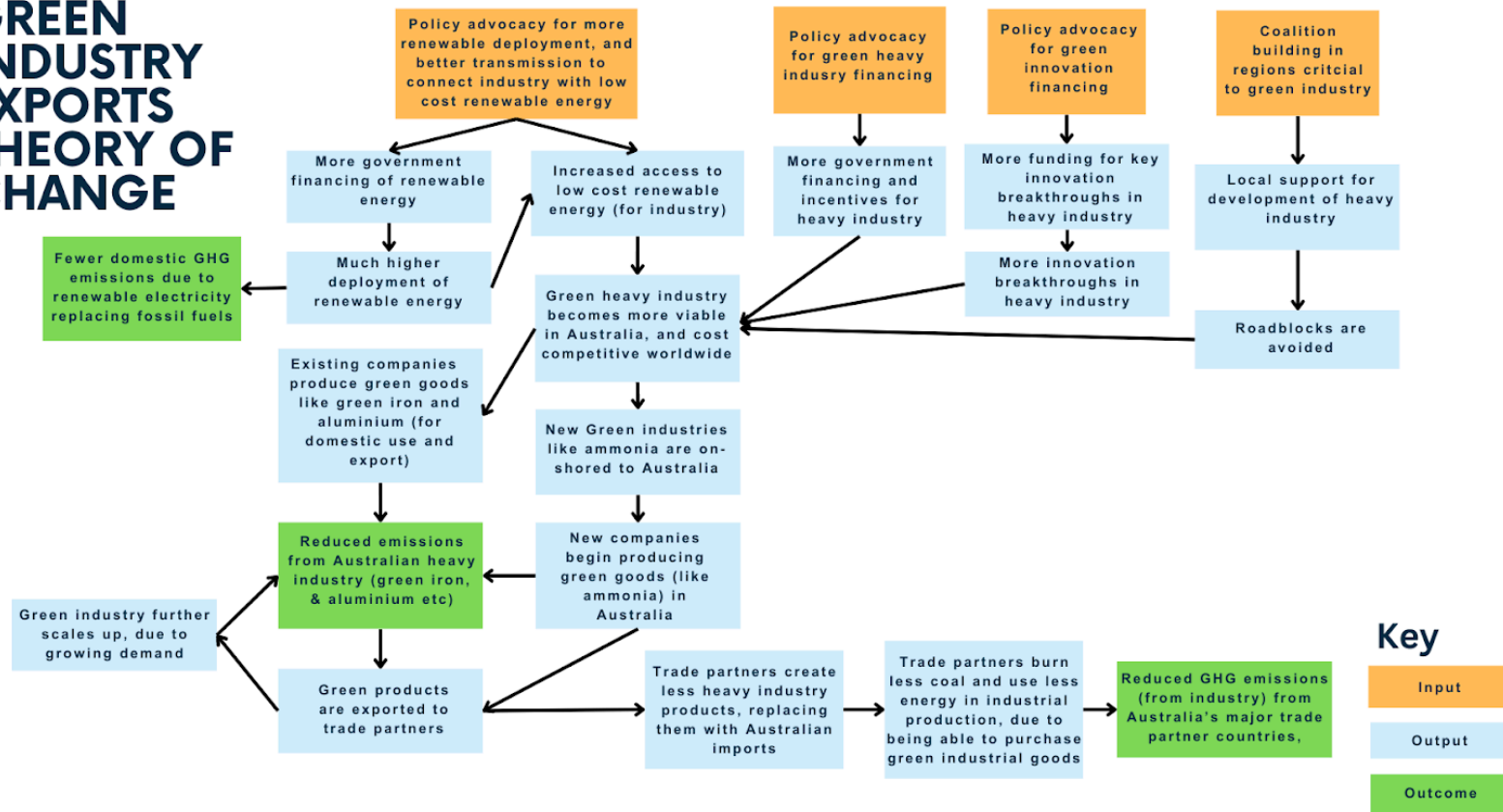


Figure 4: Theory of change for decarbonising green industry exports

Based on a number of factors, including Australian comparative advantages, available opportunities in the current Australian political environment, the ambition levels of current policy approaches, allocations of government and philanthropic spending, and an assessment of various interventions' capacity to impact global emissions, we have developed a high-level theory of change for how donors and philanthropic actors can most effectively push to fight climate change in the Australian context. This analysis allows us to better understand the strengths and weaknesses of each strategy.

In this section, we outline assumptions in our theory of change and evaluate the main assumptions related to each one. For each assumption, we rank whether we have low, medium, or high certainty about the assumption. Our assessment is based on primary and secondary evidence, as well as our general impression of the plausibility of the assumption.

4.1 Assumptions in theory of change

1. Advocacy efforts can push government to adopt policies around electrification and rewiring (**high certainty**)

Our understanding is that the Australian government's Rewiring the Nation plan is the most ambitious policy in this area to date. However, we think that further action is required if higher-scale renewable electrification is to occur. Australia has signaled significant interest in the expansion of renewable and transmission infrastructure, directing \$12 billion towards improvements in transmission.⁶⁵ Experts we interviewed suggested that think tank advocacy heavily informed these plans. Though we have high certainty that momentum for these approaches will continue, we have low certainty regarding both the efficacy of implementation of these approaches (e.g. whether renewable energy industrial precincts will be introduced, whether common use facilities will be developed, etc.) and the ambition levels of future approaches (e.g. whether these policies will stop once 85% of renewable output has been reached, or whether a significant higher level of renewable generation will be normalised as a preferred policy).

2. Advocacy efforts can push the Australian government to adopt policies to incentivise the financing of industry and innovation in green industry (**medium certainty**)

There is meaningful precedent for governments adopting policies to incentivise the financing of industries, including green industries. The Australian government, for example, has provided rebates for solar panel installation. Government entities and independent government agencies like [The Australian Renewable Energy Agency](#) and [Clean Energy](#)

⁶⁵ ([Australian budget overview, 2023](#))



[Finance Corporation](#) have provided funding, grants, and support for innovative research and for the development and deployment of renewable energy technologies. Perhaps the strongest analogue to our green industry approach is the 2023 federal budget allocations of \$2 billion towards the buildout of a hydrogen industry.⁶⁶ Overseas examples include China's policies, including subsidies and tax breaks, to spur the development of green industries such as electric vehicle production.⁶⁷ This has made China the largest EV market globally.⁶⁸

Furthermore, current political conditions seem promising for advocacy around green industry. Experts we interviewed thought this approach was likely tractable, partly due to lack of opposition and partly due to its economic and employment benefits. Furthermore, language in the 2023 Australian budget indicates receptiveness to related policies.⁶⁹ Despite the favourable environment, only a few NGOs currently advocate for policies related to green industry. Therefore, we only have medium certainty that advocacy will be successful.

3. Availability of cheap renewable energy, better financing, and better funding for innovation will make the development of green heavy industry more likely to occur (medium to high certainty)

Government funding and other incentives have successfully catalysed the development of industries around the world. For example, in Australia, significant solar rebates and other government support led to the growth of the solar industry; similarly, the coal industry received government financial assistance. As such, we have high certainty that providing better financing, incentives, and other methods of improving the enabling environment for green heavy industry will make its development more likely.

However, we rate our overall certainty for this assumption as medium-high. We think that even given favorable conditions, green heavy industry may still fail to grow due to (a) lower-than-expected demand for green industrial goods or (b) higher-than-expected

⁶⁶ ([Australian budget overview, 2023](#))

⁶⁷ "As a result of generous government subsidies, tax breaks, procurement contracts, and other policy incentives, a slew of homegrown EV brands have emerged and continued to optimise new technologies so they can meet the real-life needs of Chinese consumers." ([Yang, 2023](#)); ([Lee, 2023](#))

⁶⁸ "the number of EVs sold annually in the country grew from 1.3 million to a whopping 6.8 million, making 2022 the eighth consecutive year in which China was the world's largest market for EVs." ([Yang, 2023](#))

⁶⁹ Budget: the 2023 Australian national budget mentions the goal of "Making Australia a renewable energy superpower" ([Australian budget overview, 2023](#)). This approach of becoming a renewable energy superpower is strongly related to/complementary to building out green industry - indicating some level of government receptiveness already. However, interviews with experts from government and nonprofit sectors indicate that while receptiveness is present, advancement in government policy is unlikely without philanthropic support/without action from the NGO sector.



competition from other countries in supplying the goods. This concern is explored further in [section 5](#).

4. Green hydrogen will be scaled sufficiently to meet the needs of Australian green industry (medium certainty)

As mentioned, the 2023 federal budget includes an allocation of \$2 billion towards the buildout of a hydrogen industry, specifically to drive Australia's renewable future. However, we only have medium certainty in this assumption, as it is currently unclear whether this funding will result in the growth of green hydrogen production or merely result in having more hydrogen production from less clean energy sources.

5. Key uncertainties

This section outlines the major uncertainties identified by Giving Green on the strategies recommended in this report.

- **Significant technological progress could invalidate significant parts of this plan.**

If alternative energy technologies like [advanced geothermal](#) or moonshot technologies like [nuclear fusion](#) make significant progress and become cost-competitive with Australian solar, Australia could lose its comparative advantage in producing clean energy and therefore in decarbonising industrial emissions quickly and cheaply. This could invalidate the strategy we have described.

However, from a pragmatic perspective, this does not affect our assessment. If such technological progress were to occur, decarbonisation would quickly accelerate, and the worst climate impacts would likely be averted. In this sense, working to decarbonise world industrial emissions through cheap Australian energy de-risks the more dangerous scenarios where these significant clean energy breakthroughs aren't made.

- **Other countries may not be willing to buy Australian low-carbon exports.**

Even if Australia can produce high-energy green goods at a lower price, it may be that trade partner countries will be hesitant to offshore their industries. For instance, other countries may be motivated by national security concerns, such as making sure that trade partners do not have leverage over critical resources, or for domestic concerns, such as keeping jobs in key industries on-shore.



These concerns may be more relevant in certain sectors than in others. Industries in which part of the supply chain is already offshore may face less of a national security constraint. For example, China sources significant amounts of iron ore internationally. Sourcing green processed iron, rather than its precursor iron ore, internationally would not necessarily make the country less resource-secure than the status quo. However, industries that do not yet exist in Australia, such as green ammonia, may face security-related barriers to becoming key exports. We are uncertain whether the lower cost of Australian-produced goods will outweigh importers' concerns about sourcing goods internationally. However, we think that the sectors where we expect these concerns to be weaker, such as green iron, are some of the most significant sources of emissions. Therefore, we still think pursuing our recommended strategy is impactful.

- **Australian industries may be made non-competitive due to other factors.**

Even with Australia's competitive advantages, it may be that some of its industries fail to provide goods at lower costs than competitors. Countries like India⁷⁰, for instance, may have slightly stronger advantages in low-cost renewable energy generation. This uncertainty is strongest for industries where labour is a significant cost driver. For example, steel production is relatively labour-intensive, and labour costs could affect the viability of a market for Australian green steel. On the other hand, labour is a significantly smaller cost driver for green iron.⁷¹ As such, we expect that it is unlikely that many or all green industries are made non-competitive.

- **As of 2024, it is unclear where the ceiling lies on government cooperation and support for climate work in Australia.**

There seems to be significant political will in Australia around climate. However, in the lead-up to the next federal election in 2025, it is possible that climate becomes an area for attack and that the government could be less willing to push ambitious climate strategies. There is significant uncertainty here, as climate may instead win public support.

- **Government funding and support may lack efficacy.**

Even if the government takes action to provide support for green industry, the implementation or design of policy could be poor and not materialise into actual change and growth in industry.

⁷⁰ The CSIRO estimates that India has the potential for lower cost solar energy than Australia ([CSIRO, 2023](#)), however, Garnaut argues that while this is true, Australia has absolute advantages in production of green industry, due to the combination of low-cost energy and colocation with some of the largest mining operations of raw materials in the world, which drives significant cost efficiencies.

⁷¹ "But the economics of producing green direct reduced iron are slightly different, because it is much less labour-intensive [than steel]" ([Wood, T., Dundas, G., and Ha, J, 2020](#))



6. Conclusions

In summary, decarbonising Australia’s industrial exports has the capacity to address ~7% of emissions globally, in some of the hardest-to-decarbonise and therefore most important sectors. Given our evaluation of philanthropic strategies, the potential global impact of these strategies, and the relatively low level of funding these sectors have received, we think it is important for more philanthropic funding to be directed toward decarbonising Australia’s industrial exports.

As part of our 2024 investigation into the Australian climate philanthropy space, Giving Green recommends [three top Australian giving opportunities to mitigate climate change](#), based on the principles discussed in this report.

7. Appendix

7.1 Analysis of sub-strategy ratings (industrial exports)

Table 4, below, lists the potentially high-impact sub-strategies we identified among nonprofits advancing global decarbonisation via Australia’s green industry exports, as discussed in [section 2.3](#). It then explains our ratings of scale, feasibility, and funding need for each sub-strategy.

Table 4: Our ratings of scale, feasibility, and funding need for sub-strategies to decarbonise industrial exports

Sub-strategy	Explanation of rating
Sub-strategy 1: Advocacy efforts for faster deployment of renewable energy and expansion and upgrade of the	Possible policy interventions include stronger public investment in transmission upgrades, renewables deployment, and decarbonisation of the three main Australian grids.⁷³ Governments could also support, including via funding, the development of renewable energy industrial precincts (REIPs) and common-use facilities on private grids.⁷⁴ Scale: medium to high. The impact of this advocacy could be very high, as renewable electrification and extensive transmission upgrades are necessary for decarbonising industrial

⁷³ Investment: investment could be delivered by existing bodies like the Australian Renewable Energy Agency or Clean Energy Finance Corporation; Grid: The primary grids are the National Electricity Market (NEM), the South West Interconnected System (SWIS), and a grid in the Pilbara

⁷⁴ REIP: REIPs are clusters of industrial businesses that have access to low-cost renewable energy. Common-use facilities: common use facilities are resources which can be used by multiple actors - such as electricity infrastructure, roads, and train lines that can be accessed by multiple businesses (and often are not privately owned or exclusively privately operated) ([Pilbara Industry Roundtable Communique, 2023](#))



electricity transmission system.⁷²	exports. However, deployment may only work to replace Australia's current electricity generation, and stop short of what is needed to decarbonise industry. High-scale impact would require further policies involving significantly larger expansion of renewable energy production. Feasibility: high. As evidenced through the recent federal budget, the incumbent government, led by the Labor Party, has expressed significant interest in rewiring and electrification.⁷⁵ Funding need: medium to high. Our impression is that, among green industry sub-strategies, this approach is comparatively well-resourced. Significant government funding is already allocated to rewiring and electrification, with the 2023 Australian budget allocating \$12 billion to transformational transmission projects.⁷⁶ However, higher levels of rewiring and deployment, and therefore higher levels of spending, will still be required for the greening of industry. Thus, several experts we interviewed suggested that there are still promising, underfunded philanthropic opportunities in this space.
Sub-strategy 2: Advocacy to push for significantly higher scale deployment of renewable energy capacity	This approach would involve renewable deployment that is 200-300% of the current Australian electricity production total, representing 201 TWh of generation and requiring 77 GW of additional renewable capacity.⁷⁷ This higher level of renewable deployment (and low-cost renewable energy generation) is necessary for higher scales of green industrial production and decarbonisation of Australia's industrial exports. Almost all green industrial processes rely on abundant renewable energy, so energy generation and distribution are two of the most significant bottlenecks to an economically viable green industry. Thus, a focus on high-scale renewable energy buildout is essential. Scale: high. Extensive renewables deployment will be necessary decarbonise industrial exports at scale, which could have global impact. Feasibility: medium to high. Similar to the previous strategy, the Australian government has expressed significant interest in approaches to rewiring and electrification, indicating potential tractability. However, we rated the feasibility of this as lower than that of sub-strategy 1, because there is currently less awareness of or momentum for among government and civil society actors regarding the need for 200-300% electrification than there is for 90-100% electrification. Funding need: medium. Electrification and rewiring, generally speaking, are comparatively well-funded within climate. However, from our survey of experts, it is our impression that advocacy for higher-scale deployment in particular, is comparatively neglected, and there is room for nonprofits to address key market and policy gaps.

⁷² Note that this approach also includes measures focused towards providing access to cheap renewable energy to areas that are likely hubs of industrial activity.

⁷⁵ ([Australian budget overview, 2023](#))

⁷⁶ ([Australian budget overview, 2023](#))

⁷⁷ As modelled by Beyond Zero Emissions's '[Electrifying Industry](#)' report.

"Fulfilment of vast manufacturing potentials would require significant expansion of renewable energy production.... over 4 times the national energy grid capacity would be required in 2050." ([Devlin et al, 2023](#))



Sub-strategy 3: Public education and support to encourage mass uptake of rooftop solar	Scale: low to medium. Public education efforts—for instance, public communications through media, education programs in specific communities, and direct delivery programs to increase solar uptake at the household level—have a lower potential for impact at scale than government policy; unlike policy, this strategy is largely limited to addressing the domestic household emissions of the direct recipients of the program. This energy supply will contribute to the overall renewable supply on the grid, but cannot scale to the 200-300% level required for industrial decarbonization. Feasibility: high. The strong economic benefits of solar PV in Australia and the positive public opinion around solar indicate reasonably high feasibility. Australian rates of rooftop solar deployment are, per capita, the highest in the world. Funding need: low. Increasing solar penetration generally replaces fossil fuel generation and is an electrification strategy. As noted, electrification and transmission strategies are relatively well-resourced. For-profit solar companies already have incentive to encourage uptake of rooftop solar; with this in mind, philanthropic work may not have additional marginal impact.
Sub-strategy 4: Advocating for policies which unlock investment in green industry	Example policies include (a) tax incentives for organisations shifting to green industry; (b) policies that incentivise investment in greener industrial processes indirectly, for instance by increasing the availability of debt financing; (c) government purchase commitments for green industrial goods meeting certain standards, to incentivise domestic production; (d) ensuring the Safeguard Mechanism is applied consistently, thereby preventing industry groups from getting exemptions which could prolong high emissions for decades; and (e) providing funding and investment in industry through grants or loans. Scale: medium to high. Early financing for green heavy industry could open up significantly more activity over the long term and could serve as a catalyst to decarbonise Australia's domestic emissions and exports. Feasibility: medium. Government reports indicate receptiveness to decarbonising heavy industry, if gaps can be addressed. Experts that spoke with us consider this strategy reasonably tractable. However, targeted policy for heavy industry still remains under-emphasised, relative to that for the power sector. Funding need: high. According to Climateworks' 2023 funding trends report, heavy industry is one of the most philanthropically neglected sectors in the climate space in Australia, Asia, and Oceania.⁷⁸ Experts we spoke to also indicated that a number of strong organisations have room for more funding.
Sub-strategy 5: Advocating for policies which encourage the financing of	Specific asks could include (a) commitment of government grants or (b) policies to expand private investment in innovation. Investment could be delivered by existing bodies such as the Australian Renewable Energy Agency or Clean Energy Finance Corporation. While this is already happening to some extent, increased funding would allow a higher level of investment. Primary focus industries

⁷⁸ ([Climateworks funding trends report, 2023](#))



innovations relating to low emissions industrial technologies	include green iron, aluminium, ammonia, and critical minerals. Scale: high. Faster innovation in low-emissions industrial technologies could have a meaningful climate impact in Australia and globally. Domestically, these innovations could accelerate the expansion of green industry. International effects include the diffusion of new technologies to industry in other countries and the export of green industrial goods. Feasibility: medium. The government has allocated some R&D funding for low emissions technologies outside of heavy industry, and it has allocated significant amounts of funding to sectors of climate adjacent to green industry. Funding need: high. Industry is one of the more philanthropically neglected sectors in the Australian climate space.
Sub-strategy 6: Advocating for policies which support the financing and development of green hydrogen infrastructure	Policy work can support the development and financing of green hydrogen infrastructure. In particular, advocacy can ensure that projects remain aligned with low-carbon goals rather than drifting to more carbon-intensive forms of hydrogen production. Scale: medium. Advocacy here could lead to faster growth of hydrogen infrastructure, which is a necessary condition of green industry work. Feasibility: medium to high. The government has already allocated \$2 billion towards the buildout of green hydrogen, indicating receptiveness. Funding need: medium. Because of the recent above allocation, funding need is relatively lower. However, this may change over time as the need for green hydrogen grows.
Sub-strategy 7: Coalition building and community engagement efforts with industry and key constituencies in regions that could be green industry hubs	Coalition building and engagement have multiple purposes, including (a) preventing possible barriers to green industry from arising, (b) increasing local support in key areas, and (c) developing the presence of local champions who can push for policy, all ultimately increasing the likelihood that green industry plans go ahead. This work could include bringing stakeholders together at the design stage to co-design roadmaps on critical projects, running skills and training programs to help ensure an appropriately skilled workforce, and supporting workers to transition to new clean industries. Scale: medium. We think that coalition-building between civil society and the private sector could be relatively promising, given that (a) civil society may push the private sector toward more ambitious climate stances and (b) the private sector has a strong influence over certain policy-making processes. Feasibility: medium to high. We are uncertain about the extent to which the ambition of government and companies is influenced by civil society. Funding need: medium. Some efforts are underway to create coalitions relevant to heavy industry, and our interviews with experts in the space indicates there is room for more funding.



7.2 Analysis of deprioritised strategies

In [section 2.4](#), we present an assessment of five promising high-level strategies to impact climate change. We chose to further investigate reducing coal and natural gas exports, but ultimately deprioritised it. We deprioritised accelerating alternative proteins, reducing vehicle emissions, and improved land management to sink carbon. Below, we explain our analysis and reason for deprioritising each of these four strategies.

Reducing coal and natural gas exports

Australia is the #1 exporter of coal and the #5 producer of coal worldwide. It is estimated that emissions from Australia's exported coal and natural gas make up 3.6% of all world emissions (2.9% from coal and 0.6% from gas).⁷⁹ This represents emissions totalling approximately 2.4x Australia's entire domestic CO₂ output. Meaningfully reducing Australia's coal and natural gas exports would significantly impact climate progress beyond Australia's borders.

However, there are a few core reasons that we believe this approach should be deprioritised behind the approach of decarbonising Australia's industrial exports.

First, according to experts who spoke with us, reducing coal and natural gas exports seems less philanthropically neglected than addressing industrial export emissions. A significant number of organisations work on the former. These organisations take a variety of approaches, from grassroots advocacy, to legal approaches, to working on cutting financing to key projects.⁸⁰ This is not the case for exported industrial emissions.

Second, while government receptiveness to climate action has improved in recent years, willingness to address coal and natural gas emissions through directly lessening exports is comparatively low.

Third, this approach is politically fraught, with some risk of harm. Previous attempts to reduce coal exports have been met with significant pushback, which hampered climate work in Australia for many years. There is a risk that advancing similar approaches may backfire and slow down Australia's climate progress more broadly.

Fourth, we are concerned about displacing emissions elsewhere. Reducing exports will

⁷⁹ ([Australian Climate Footprint Report, 2019](#))

⁸⁰ Grassroots advocacy: A standout example is the [Lock the Gate Alliance](#); Legal approaches: A standout example is the [Environmental Defenders Office](#); Cutting financing: A standout example is [Marketforces](#)



necessarily involve preventing some domestic fossil fuel extraction projects that otherwise would have occurred. We think preventing coal and natural gas projects likely leads to less supply of coal and natural gas, which likely leads to price increases in both. However, we are uncertain about the extent to which these price increases would then lead to reduced emissions. This is mainly a concern when evaluating the prevention of individual extraction projects. If an individual Australian mine shuts down, buyers may instead source coal and natural gas from another exporter country—emissions are displaced, but not reduced.⁸¹

In addition to our analysis of the strategy as a whole, we evaluated the scale, feasibility, and funding need for three sub-strategies we found to be promising. Our evaluations can be found in **Table 5** below.

Table 5: Scale, feasibility, and funding need of potential sub-strategies to reduce coal and natural gas exports.

Strategy	Scale	Feasibility	Funding need	Notes
Corporate pressure to prevent financing of major coal and natural gas projects	Medium	Medium to high	Medium	Scale: We think that while successful corporate campaigns are likely to prevent individual coal and natural gas projects, it is unlikely that they lead to a large-scale decline in exports. Fossil fuel exports are largely dependent on the presence of overseas buyers and the cost-competitiveness of alternatives, according to climate experts we interviewed. In addition, preventing natural gas projects could increase emissions overall, if buyers replace natural gas with coal. Feasibility: We think the theory of change of this sub-strategy is strong, and some organisations in this space have a convincing track record. Funding need: It is our impression that funding need for this sub-strategy is comparatively low, primarily due to the high level of public attention on this approach.
Legal approaches to prevent coal and	Medium	Medium	Low to Medium	Scale: We think that litigation cases with a high chance of success might impact particular projects and set precedents for future projects, but are unlikely to decarbonise or end fossil fuel exports entirely; as above, we think this is largely dependent on the presence of buyers. We also have similar concerns as above about legal cases

⁸¹It seems likely that a number of the most significant players affecting Australian coal production (in particular, overseas buyers), cannot be easily affected by philanthropic action within Australia. As such, there may be more viable interventions to do with decreasing the cost of renewables in other countries to make coal non-competitive as an import good.



natural projects from going ahead				against natural gas projects increasing use of coal. Feasibility: We think that targeted litigation cases can be won, but involve cost and inherent risk. Funding need: Organisations in this space have indicated that they could usefully deploy more funding, but seem comparatively well-funded.
Grassroots advocacy to prevent coal and natural projects from going ahead	Medium	Low to medium	Low	Scale: As above, we think these strategies may impact particular projects but not decarbonise or end fossil fuel exports entirely. We also, as above, are concerned about the unintended consequence of coal use replacing natural gas use - in particular, that this work might simply displace the source of emissions, rather than concretely reducing emissions. Feasibility: We have low certainty that grassroots advocacy campaigns will prevent coal plants and natural gas projects from going ahead. We think that it may be more feasible to influence these projects through other means, such as legal pressure or corporate lobbying (see above). Funding need: It is our impression that funding need for this sub-strategy is low, given the number of organisations working on this sub-strategy.

Advocacy for expansion of nuclear power within Australia

Some experts we interviewed viewed expanding nuclear power as a strategy where Australia has a comparative advantage. This is because Australia has significant sources of uranium and is the #4 producer of uranium in the world.⁸²

However, our impression is that this strategy has low feasibility because, in the Australian context, nuclear power is highly unlikely to be cost-competitive with renewables. CSIRO reports have found that wind and solar power are significantly lower-cost options for electricity generation in Australia, costing less than \$100/MW in 2030.⁸³ This is significantly cheaper than nuclear power, which is forecast to cost \$350/MW. In our conversations, experts have noted that the expansion of nuclear power could slow the uptake of renewables.

⁸² "Australia has the world's largest Economic Demonstrated Resources of uranium and in 2021 was the world's 4th largest uranium producer." ([Geosciences Australia, 2023](#))

⁸³ ([CSIRO, 2023](#))



We also think this strategy is lower in scale, as there is no obvious theory of change we found whereby Australian nuclear expansion could serve to decarbonise emissions more globally.

Accelerating technology around alternative proteins

Accelerating technology around alternative proteins may be a high-leverage approach by which an individual country could affect emissions globally. While Australia has a relatively welcoming regulatory environment for alternative proteins, our impression is that countries like Singapore have more favourable conditions for accelerating alternative protein technologies.⁸⁴ This is due to better regulatory environments, stronger talent and innovation ecosystems, stronger histories of food innovations, higher levels of government funding and support, and lower levels of cultural resistance to alternative proteins.

⁸⁴ "Australia's regulations also permit some plant-based proteins to be sold without pre-market approval" ([GFI, 2022](#))

