



Clean Jobs Plan

How 76,000 new jobs for Australians
can help rebuild our economy now
and tackle climate change

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Introduction

Australia is facing twin crises. After last summer's climate change-fuelled bushfires many communities are still doing it tough, and now, hundreds of thousands of other Australians are out of work due to COVID-19.

Economic recovery is top of mind for Australians, and governments have a crucial role to play in making targeted investments and implementing policies that can put Australians back to work. In doing so governments can choose to invest in initiatives that set us up for the future, creating win/win solutions that create jobs and tackle long-term problems at the same time.

This Clean Jobs Plan provides a whole-of-economy solution. It identifies 12 major policy opportunities to immediately kick-start economic growth. Collectively, these

opportunities represent 76,000 jobs. Job creation would start immediately and continue over a three-year period.

Crucially, these opportunities are shovel ready, deliberately targeted to regions and occupations hit hardest by job losses, and have the potential to grow the entire economy in the long term.

These are jobs for the many Australians who need to get back to work now:

- Seventy percent of the jobs are in construction and administrative services, sectors that have already seen 80,000 jobs lost to COVID-19;
- Forty percent of the jobs are in regional areas; and
- A third of the jobs require minimal training.



Introduction (continued)

The analysis does not identify every job that can be created. Instead, it focuses on targeting regions and occupations hit hardest by job losses and on programs that can create jobs quickly.

The Clean Jobs Plan is based on detailed economic modelling. It provides specific analysis for each state and territory, identifying five priority areas for each that will generate large numbers of jobs quickly, while also complementing current economic plans.

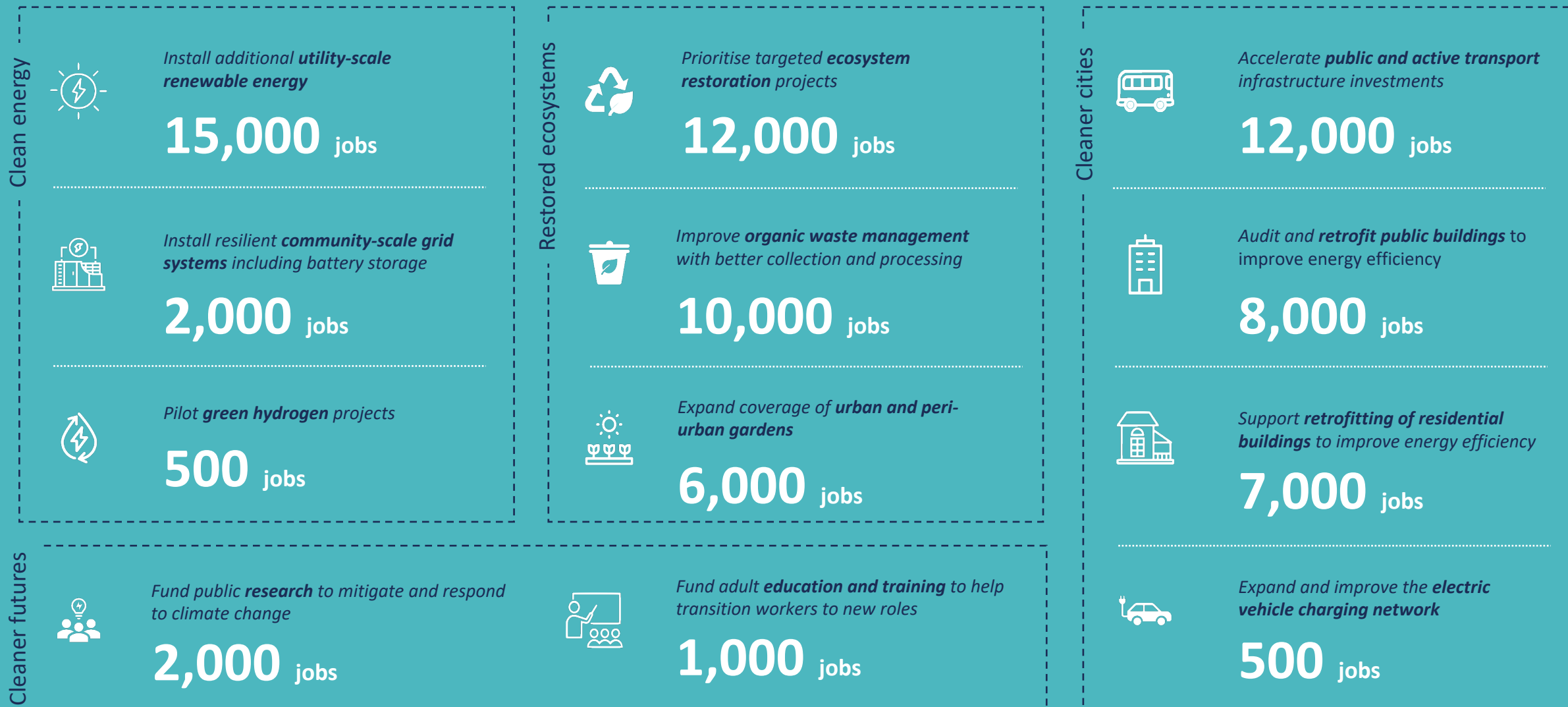
It provides excellent bang for buck. Analysis reveals that the Clean Jobs Plan is as cost-effective as, or better than, similar Australian economic recovery programs. The Clean Jobs Plan is also highly focused on maximising the value of public investment. The proposed policy opportunities were found to be highly efficient job creators due to their labour intensity. Most of the 12 options identified in the Plan offer significant opportunities to leverage private investment for the Australian economy. Investment in pilot-scale green hydrogen facilities would unlock \$4 for every dollar of public

investment; utility-scale renewable energy unlocks \$3 for every dollar invested; and investing in electric vehicle infrastructure, improving the collection and processing of organic waste, and community scale energy and storage, would all unlock \$2 for every dollar invested.

A strong economy needs a healthy environment. By focusing on clean policy measures, governments can build modern, resilient electricity systems, develop new industries and restore and protect Australia's unique landscapes. This protects all of us from climate change, while investing in the growth industries of the future.

Australia's experience with the COVID-19 pandemic has shown that we can work together, follow expert advice and take decisive action to keep the virus contained. We must apply this same rigour to other pressing issues and introduce smart, clean stimulus measures to kick-start the economy, create jobs and tackle climate change.

Twelve policy opportunities to deliver 76,000 jobs that re-engineer our energy system, renew industries and restore our environment



Key findings

1

The Clean Jobs Plan shows how 12 policy opportunities can put 76,000 Australians to work, reboot the economy, *and* tackle long-term challenges including climate change.

The 12 major opportunities, identified through granular economic modelling, include:

- 15,000 jobs installing utility-scale renewable energy, including solar and wind farms, transmission infrastructure and adding utility-scale batteries.
- 12,000 jobs in targeted ecosystem restoration, including more than 5,000 in Queensland.
- 12,000 jobs in public and active transport construction, including 7,000 - 8,000 jobs for New South Wales workers.
- 37,000 jobs in other projects across Australia including in organic waste, energy efficiency in buildings, urban green spaces, community-scale storage and more.

2

Implementing the Clean Jobs Plan will help people and industries that have been hit hardest by the COVID-19 crisis, especially in regional Australia.

- Approximately 1 in 3 job openings would require minimal training, meaning that displaced workers, from hospitality workers in Victoria to tourism operators in Cairns, could be rapidly employed.
- Seventy percent of job opportunities are in construction and administrative, support and logistics services – sectors where 80,000 workers have already lost their jobs.
- Forty-two percent of the job opportunities identified are for regional Australians.
- The 12 policy opportunities can be actioned by state and territory governments right away. Job creation can start immediately, and continue over the three-year analysis period.

3

The Clean Jobs Plan identifies thousands of job opportunities in every state and hundreds in each territory.

- The Clean Jobs Plan provides a top 5 priority list for economic stimulus in every state and territory, in alignment with each jurisdiction's current priorities.
- For example, utility scale renewable energy in Victoria can create 3,000 - 4,000 high and low skilled jobs and help the state meet its Renewable Energy Target of 50% by 2030.
- States and territories can create jobs where they are needed most. For example, two of the 12 major policy opportunities, ecosystem restoration and utility-scale renewable energy, can significantly benefit regional areas with high levels of unemployment.

4

Economic stimulus can set Australia up for the future by creating jobs, kick-starting the economy and tackling climate change simultaneously.

- The Clean Jobs Plan can unlock significant private investment for the Australian economy and further industry development. For example, investment in pilot-scale green hydrogen facilities would unlock \$4 of private investment for every dollar of public investment.
- The Clean Jobs Plan will indirectly benefit other downstream industries such as manufacturing, trade and hospitality in delivering these projects.
- Investment in large and small-scale renewable energy assets, transmission infrastructure, and energy storage facilities can reduce energy costs for households and businesses and provide clean, reliable power for the future.

1

The recovery opportunity

A high-impact, targeted, and timely clean jobs plan can rebuild our economy *and* tackle climate change

Climate action is needed for Australia to alleviate economic risks and thrive in a low-emissions world

Climate change is a major threat to Australian lives and livelihoods. Australia is over 1°C warmer than it was 100 years ago.¹ Extreme weather events, such as heatwaves and dangerous bushfire conditions, are worsening. The Australian economy is vulnerable to these escalating climate risks, with property prices liable to fall up to \$571 billion and agricultural and labour productivity by \$19 billion in the next decade.² Flow-on effects will be felt across the country, and will worsen unless emissions are lowered.

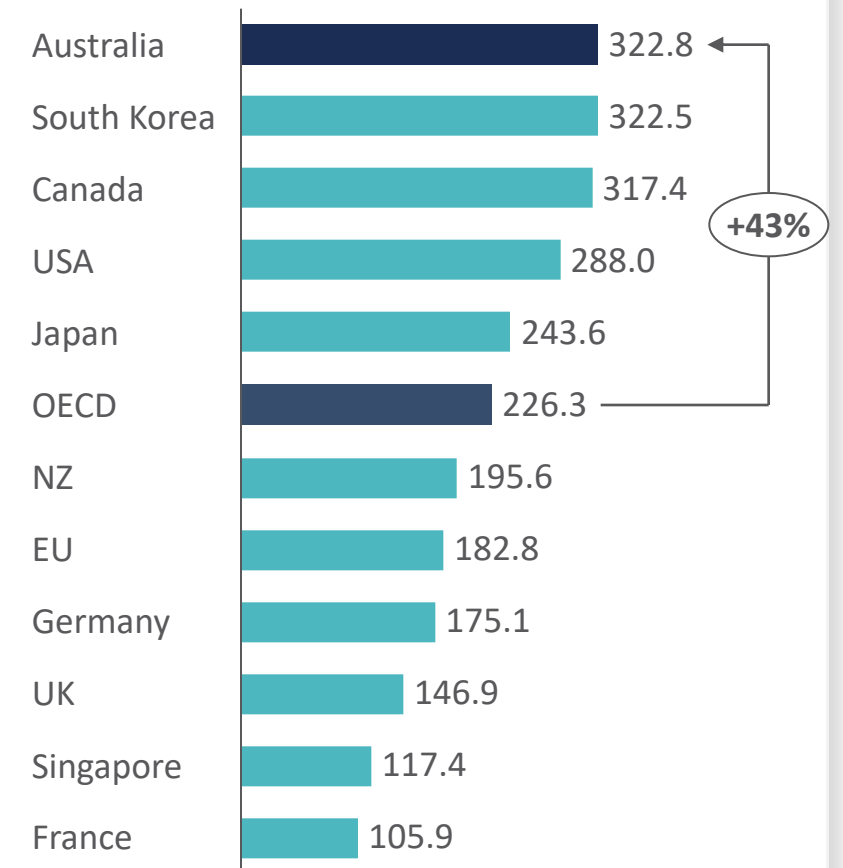
Economic authorities agree that the climate crisis threatens Australia's economic well-being. The Reserve Bank of Australia has stated that more severe, persistent climate-related shocks could threaten the stability of the Australian economy.³ The Australian Securities and Investments Commission has labelled

climate change a 'systemic risk', calling for firms to include climate risks in their financial disclosure documents to ensure investors are sufficiently informed.⁴ And the Australian Prudential Regulation Authority has highlighted that the financial risks of climate change are 'foreseeable, material and actionable now'.⁵

The Australian economy can thrive in a low-emissions world. Australian economic activity is more emissions-intensive than its OECD peers (see chart). Transitioning to a low-emissions economy is needed to contribute to the global effort to alleviate the material economic risks cited above. Australia also needs to transition to ensure that businesses and workers can thrive in a global economy that demands low-emissions technology and services.

Australian economic output is more emissions-intensive than global peers

CO₂ emitted per \$1m of GDP, tonnes⁶



¹ CSIRO (2018) *State of the Climate*. ² Climate Council (2019) *Compound Costs: How Climate Change is damaging Australia's economy*. ³ RBA (2019) 'Climate Change and the Economy'. ⁴ ASIC (2018) 'Climate Change: Keynote address by John Price, Centre for Policy Development: Financing a Sustainable Economy'. ⁵ APRA (2017) 'Australia's new horizon: Climate change challenges and prudential risk'.

⁶ Select nations. Estimated based on latest global data (2014 – 2017). GDP adjusted on PPP terms. SOURCE: World Bank Open Data, data from Carbon Dioxide Information Analysis Center, Environmental Sciences Division, Oak Ridge National Laboratory, Tennessee, United States.

COVID-19 has created a new, urgent need for jobs to support Australian families and avoid long-term harm

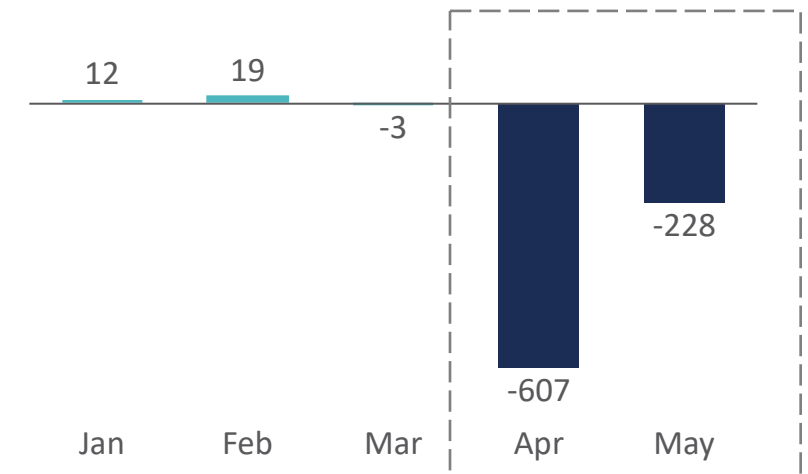
The Australian economy has already lost **838,000 jobs to the COVID-19 crisis**. Mid-March to mid-June saw the steepest rise in unemployment ever recorded in the Australian economy. Over half a million Australians have stopped looking for work. Of the remaining job seekers, one in five are 'underutilised' meaning they are either out of work or working fewer hours than they seek.¹ This represents significant hardship among Australian households and a threat to the long-term productivity of our economy.

Such steep job losses will likely cause long-term harm if left unaddressed. Even short-term unemployment can create significant household stress, as well as longer term flow-on effects for the economy. Households facing financial hardship are likely to reduce spending, spurring further job losses. This dampens skills, business and consumer confidence, resulting in a slower economic recovery for Australia.

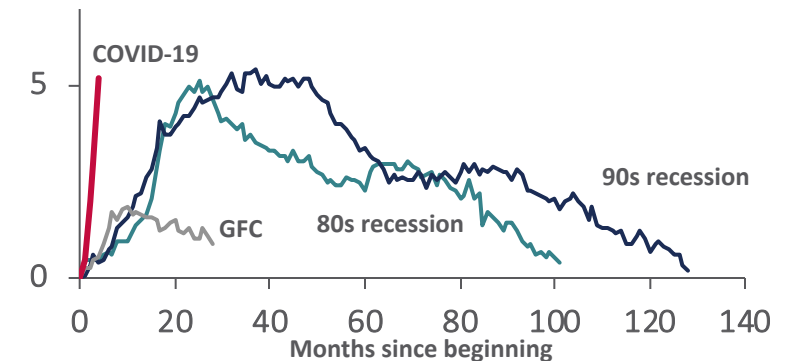
As businesses fail and people stop looking for work, job creation tends to return slowly. Even the most optimistic forecasts by the RBA do not see jobs returning to pre-crisis levels until 2022.² These forecasts are supported by historical experience: studies of downturns in 1982, 1991-92, and the Global Financial Crisis show that employment tends to fall quickly in recession but is slow to return to pre-crisis levels (see chart).

Stimulus policies that spur public and private investment are needed to hasten economic recovery. Government investments can provide the money needed to support business activity and jobs. Government investments can also encourage further private investment. Clear action from government can provide businesses, workers, and investors the certainty they need to take risks – to retrain, keep their businesses open, or make new investments.

838,000 jobs lost since COVID-19 outbreak
Change in count of employed people, 000s



Unprecedented pace of job loss and recovery
Change in Australian unemployment rate (percentage point)



NOTE: Australia COVID-19 unemployment is based on RBA Governor forecast of 22 April 2020 that unemployment would be 10% by June. SOURCE: ABS (2020) 6291.0.55.001 – Labour Force, Australia, Detailed, April 2020.

¹ ABS (2020) 6291.0.55.001 – Labour Force, Australia, Detailed, April 2020. ² Ken Henry, The Guardian (2020) 'The unemployment rate doesn't go back to normal after a recession – there are long-term effects'.

An effective stimulus program could deliver jobs quickly and address climate change while improving Australia's long-term economic outlook

Australia faces a unique opportunity to rapidly rebuild a low-emissions post-COVID economy. Australian governments have already announced significant stimulus packages since March, but economists and policymakers recognise that more is needed to support the economy as it recovers from COVID-19.¹ A stimulus package that focuses on the creation of clean jobs could be pivotal in supporting such a recovery whilst also growing new industries and encouraging existing businesses and workers to build the capabilities they need to thrive in a low-emissions world.

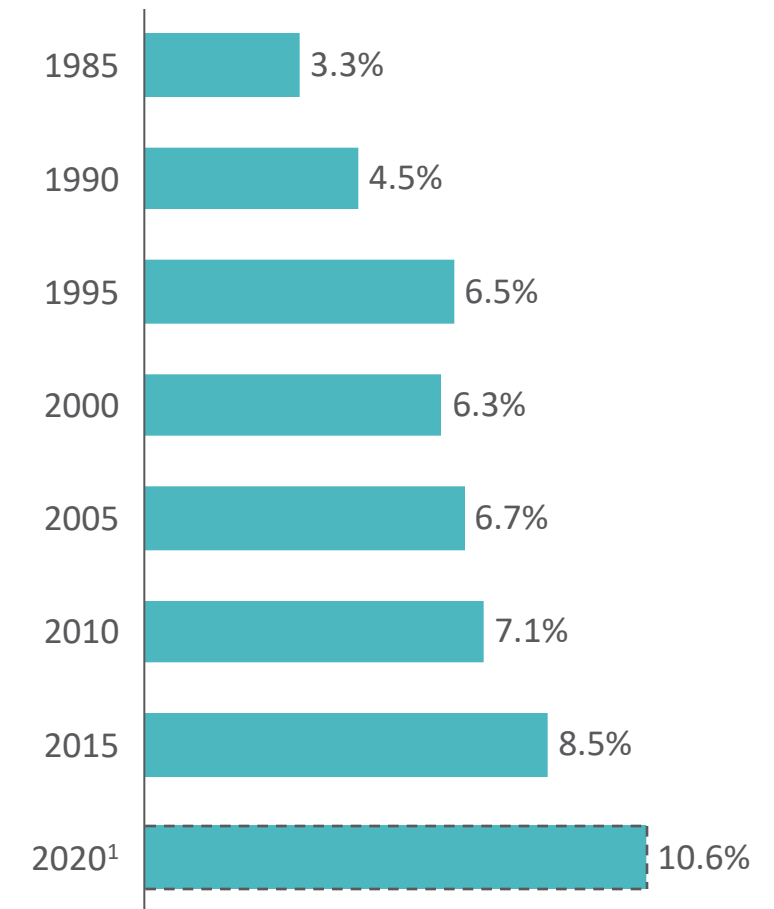
The Clean Jobs Plan can also deliver social benefits. Projects that improve energy efficiency, modernise the power grid and create more green spaces benefit households by enabling cheaper power and healthier environments overall. Australia has so far been slow to make these investments due to the upfront costs involved. By providing large-scale

funding and direction, a stimulus package could unlock social benefits that would otherwise be unachievable on a smaller scale.

An effective stimulus program will diversify the economy, improving its long-term outlook. Even before the COVID-19 crisis, the Australian economy faced long-term risks. Productivity growth has recently been at half the long-term average, while underemployment has grown significantly over the past 35 years (see chart).² Australia ranks far below its peers on international measures of innovation and economic complexity, dampening its long-term competitiveness and resilience.³ An effective stimulus program could improve Australia's economic outlook by encouraging the development of new industries, technologies and skills, while also creating better job opportunities now and into the future.

¹ RBA (2020) 'The Reserve Bank's Policy Actions and Balance Sheet'. ² Productivity Commission (2020) *Productivity Insights February 2020*. Multi-factor productivity growth was 1.5% from 1975 – 2019, but just 0.7% from 2014 – 2019; RBA (2019) 'The Labour Market and Spare Capacity'. ³ Harvard's Growth Lab (2019), *Atlas of Economic Complexity*. Australia's Economic Complexity Index (a measure of export diversity) is -0.6, ranking 93rd in the world and significantly behind neighbours and peers like Singapore (1.8), UK (1.4) and Canada (0.7).

The national jobs shortfall is worsening *Share of workforce looking for more work⁴*



⁴ Calendar-year average of monthly underemployment rate. Underemployed workers are employed people aged 15 years and over, who want, and are available to work, more hours than they currently have. Jan-May 2020. SOURCE: ABS 6202.0, Table 22.

Methodology: the Clean Jobs Plan involves 12 policy opportunities that were chosen based on existing proposals and expert input

Step 1: A longlist of 30 options was identified

The policies were identified based on a review of current proposals from Australia and around the world. This includes the European Green Deal,¹ the UK Government's recently announced £3 billion 'Plan for Jobs 2020',² and proposals from policy-makers, academics, investors and advocacy groups.³

Step 2: Selection criteria were identified based on policy evaluations and economic research

To be effective, stimulus policies should be high-impact, timely, and targeted.

These criteria were chosen based on a review of economic literature and policy evaluations. This includes broad reviews from the Organisation for Economic Co-operation and Development, International Monetary Fund, Australian Treasury, and policy analyses from the Australian National Audit Office.

Step 3: The longlist was evaluated against the criteria to select a shortlist of 12 policy opportunities

Our choice of policies was tested with policymakers and industry experts. Stakeholders were consulted extensively throughout the preparation of this report. These included policymakers in state and territory governments as well as subject-matter experts in industry, at universities and at peer advocacy organisations.

The 12 policy opportunities highlighted in this report demonstrate the ability of climate-related policies to provide an efficient path to a resilient economic recovery. It is recognised however that these are just some of the many possible measures to support a transition to a zero-emissions economy, and that other post-COVID stimulus programs are needed to address priorities beyond the scope of the policy opportunities in this report.

3 key criteria for inclusion in Clean Jobs Plan



High impact

Does it maximise the jobs created per dollar invested?

Does it add investment to the economy?

Does it leverage funding from the private sector?



Targeted

Are jobs being targeted at the right industries and occupations?

Are jobs being targeted at the right regions?



Timely

Can the program be scaled rapidly for immediate job creation?

Does the program create jobs in the medium and long term?

¹ European Commission (2019); Financial Times (2020) 'Lagarde puts green policy top of agenda in ECB bond buying'. ² HM Treasury (2020) A Plan for Jobs 2020.

³ Several proposals for public clean stimulus programs have been made. See, for example, a review of policy options from the OECD (28 May 2020), a speech from the IMF Managing Director (29 April 2020), an open letter by US academics (23 March 2020), analysis from McKinsey & Company (27 May 2020), and several others.

Methodology: The jobs impact of each policy opportunity was estimated based on the labour-intensity and potential scale of each option

Step 4: Detailed economic analysis was conducted to estimate potential jobs impact

This report estimates the job creation potential of each policy opportunity by first identifying the industries that will be involved in delivering it. Industries are identified from the goods and services that would need to be directly purchased to deliver each policy. For example, a stimulus policy for installation of renewable energy will require buying goods and services ('output') from the construction, utilities, professional services and other industries.¹ The number of jobs created by each stimulus option is a function of two things.

- First is the amount of additional goods and services that need to be purchased from relevant industries expressed in dollars ('scale of investment').
- Second is the number of workers it takes to produce a given quantity of goods and services in that sector ('labour intensity').

$$\text{Jobs} = X_1Y_1 + X_2Y_2 + \dots + X_nY_n$$

The formula above summarises the jobs impact calculation. For each industry relevant to a given policy opportunity (1 through to n), X_n represents the labour-intensity of each industry and Y_n represents the scale of investment. X was estimated based on ABS data showing the output and labour-intensity of each detailed sub-industry in Australia.² Y was estimated based on the total amount of investment expected for each policy opportunity, which was in turn informed by past experience and current capacity constraints. For example, the rate of renewable energy investments over the past few years together with recent rising costs and exchange-rate risks informed our estimate of the potential rate of renewable energy investments over the next few years. The Appendix provides further detail on each policy opportunity.

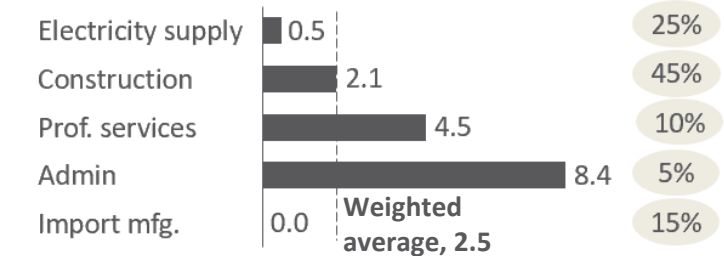
NOTE: The length of time any given job would last varies – for example, construction jobs tend to be temporary whilst operational jobs are ongoing. See Appendix for a further discussion of how the quantification of jobs in this analysis compares to measures like "job years". ¹ Industries were defined in accordance with the Australia New Zealand Standard Industry Classification (ANZSIC) system, as reported by the Australian Bureau of Statistics (ABS) at a sub-industry level. ² ABS (2020) 8155.0 Australian Industry, 2018-19, Australian industry by subdivision. This data source is used to estimate the number of workers required to produce a given level of output in each sub-industry.

Illustrative analysis

What sub-industries are used in this policy opportunity?

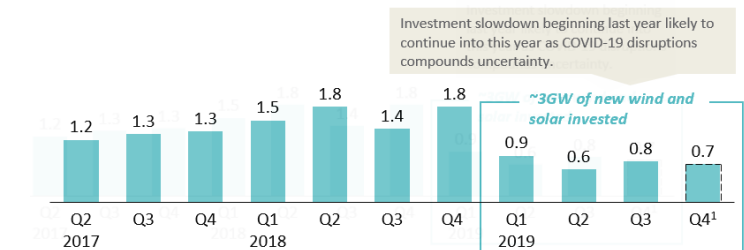
Labour intensity by relevant sub-industry

(Share of spending in policy by sub-industry in RHS bubble)



How much extra investment can be added in this sector?

Quarterly investments in Variable Renewable Energy (wind and solar), by capacity (GW)



TOP: The labour intensity of each sub-industry is provided in ABS data. Imports are assumed to be 0 as there's no direct domestic employment. An average of this value across sub-industries, weighted by their relevance to each policy opportunity, informed our estimates of the overall labour intensity of stimulus programs. **BOTTOM:** The scope of investments possible for each policy was estimated based on historical experience, taking into account current capacity constraints. See Appendix for detailed discussion of scope estimates for each policy opportunity.

2

The Clean Jobs Plan

12 policy opportunities that will put 76,000 Australians to work, reboot the economy, and address long-term challenges

Twelve policy opportunities to deliver 76,000 jobs that re-engineer our energy system, renew industries and restore our environment



Utility-scale renewable energy

Install large-scale wind and solar generation facilities, together with the associated transmission upgrades and battery storage infrastructure.



Ecosystem restoration

Boost the ability of forest and wetland ecosystems to absorb carbon through revegetation, amending irrigation systems, and changing usage patterns (e.g. through fencing).



Public and active transport

Accelerate construction of public and active transport infrastructure, including new lines, carriages, and system planning, along with cycleways and walkways.



Community-scale grid systems

Build local energy infrastructure which can generate, store and distribute energy through independent local grids.



Organic waste management

Expand the collection of food and garden organic waste, and build the processing facilities required to divert this waste from landfill.



Retrofitting of public buildings

Improve the energy efficiency of government buildings by installing energy-efficient devices and systems (e.g. heating, ventilation and air-conditioning).



Green hydrogen

Fund pilot projects to install and test green hydrogen technology.



Urban and peri-urban gardens

Increase the amount of tree canopy cover in urban areas, improve the usability of green spaces, and fund urban agriculture projects.



Retrofitting of residential buildings

Improve the energy efficiency of households by installing a combination of smart meters, insulation, heat-pumps and glazing, along with energy-efficient appliances.



Research

Directly fund research and development which can enable long-term carbon abatement initiatives.



Education and training

Enable the transition to a zero-emissions economy by creating the required skills – through vocational education, workplace training, and other adult re-skilling programs.



Electric vehicle charging network

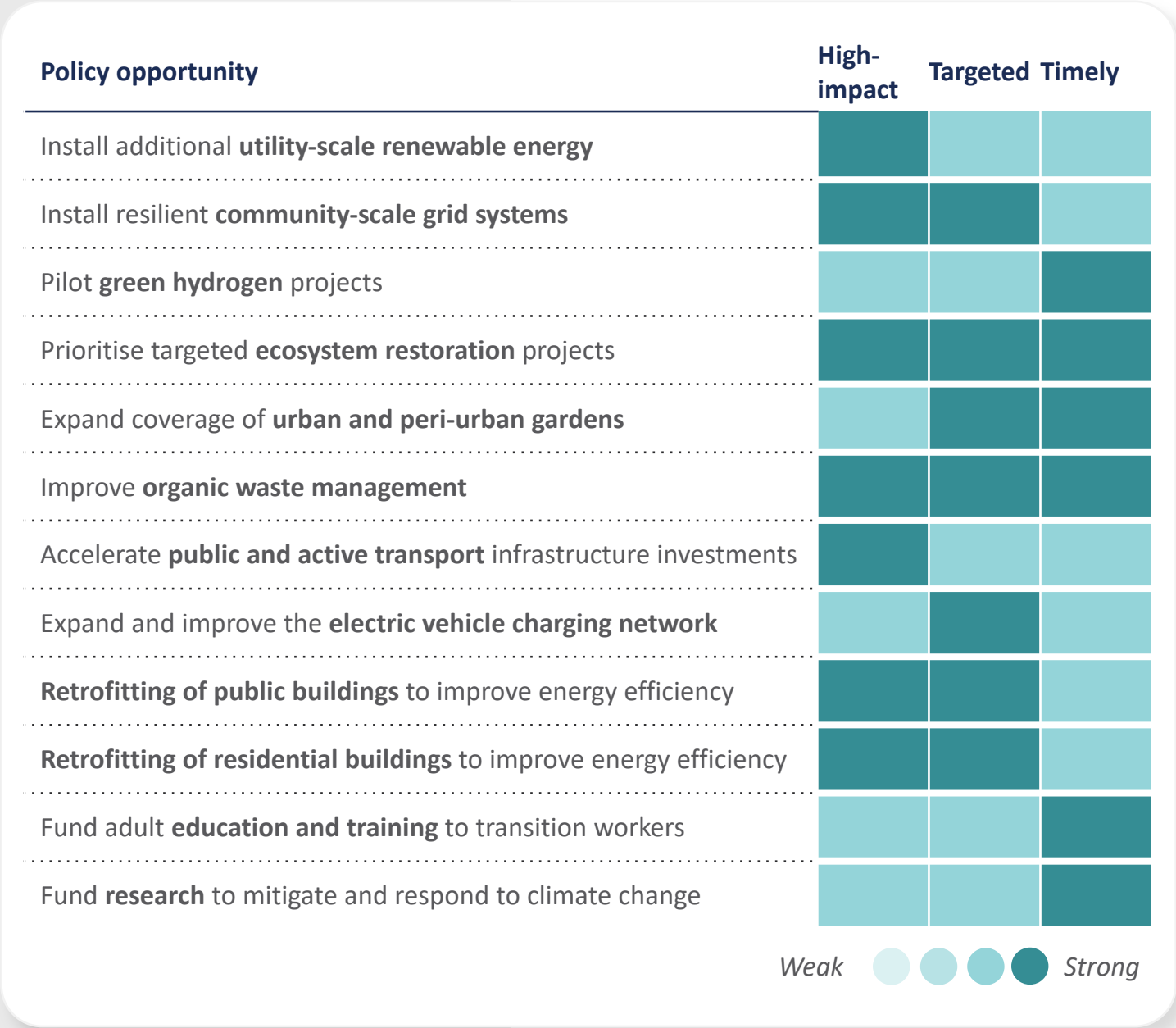
Install fast-charging ports in more locations, including in new residential builds and on major highways to enable long-distance travel.

The Clean Jobs Plan prioritises high-impact, targeted, and timely policies

The Clean Jobs Plan prioritises a rapid, targeted recovery from the economic impacts of COVID-19. A total of 12 policy opportunities were selected based on their ability to create jobs at scale ('high-impact'), be targeted to those who most need those jobs ('targeted') and delivered rapidly to address Australia's urgent need for jobs ('timely'). These three criteria ensure that the Clean Jobs Plan will quickly and effectively create much needed jobs for Australia while reducing emissions, lowering energy costs, protecting ecosystems, and creating a healthier environment.¹

Each of the proposed policies build on existing Australian capabilities for ease of implementation. The Clean Jobs Plan has been designed around practical opportunities, rather than long-term, 'blue sky' proposals. Proposed policy opportunities build on existing capabilities in Australia's renewable energy, agricultural services, construction, and professional services sectors. A conservative approach was taken to the selection and modelling of each option in order to account for existing capacity constraints in the economy. All 12 proposed policies may be implemented over the next three years, beginning as soon as possible.

¹ See Appendix for discussion for why each of the policy opportunities was shortlisted for evaluation, with a short rationale against each of the identified criteria.



The Clean Jobs Plan could create a total of 76,000 jobs over three years

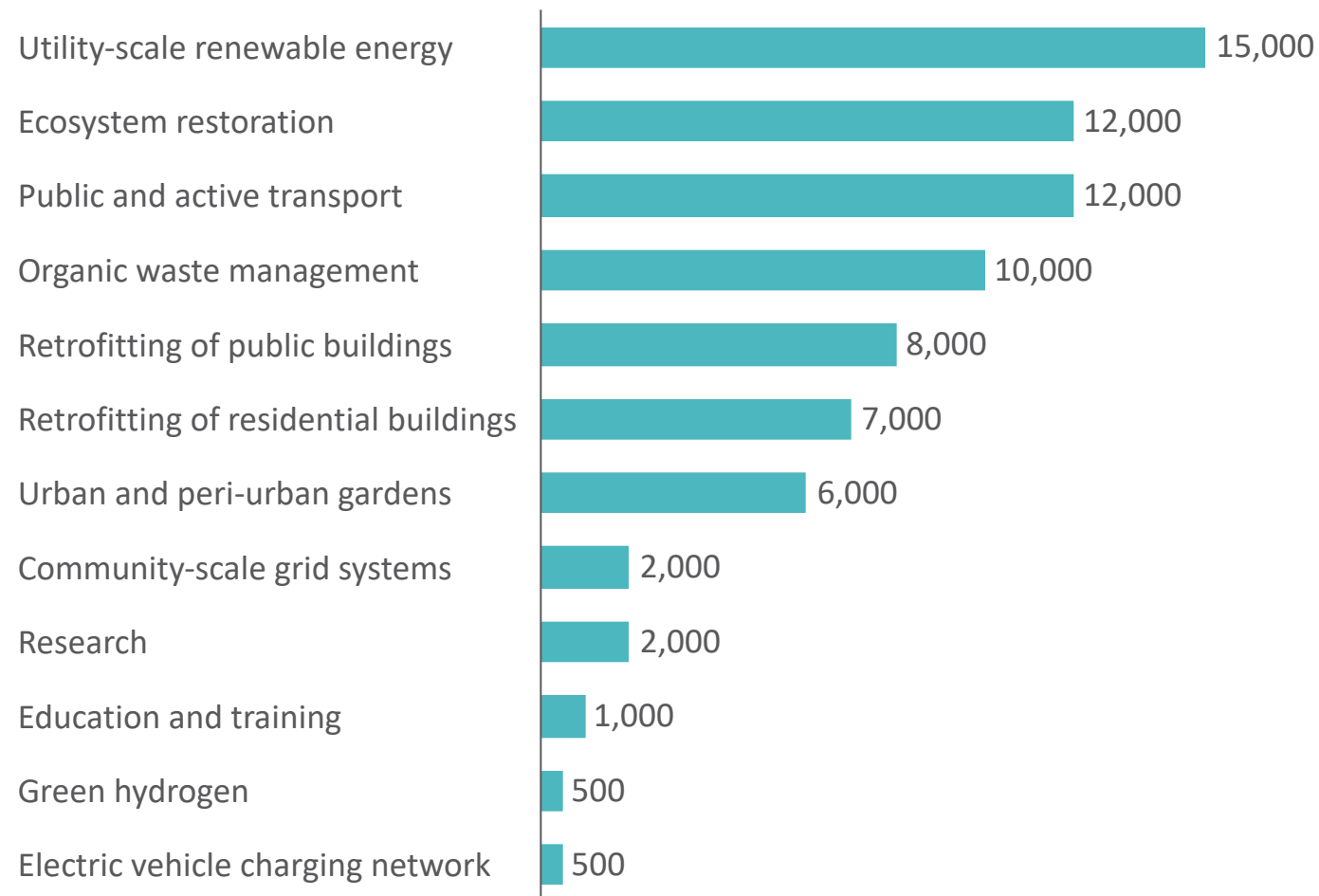
The 12 policy opportunities could generate 76,000 job openings over three years. Large-scale infrastructure projects are expected to create the most jobs. These include utility-scale renewable energy, public transport and organic (food and garden) waste management. Smaller-scale options such as research, training, and select community-scale projects will create jobs rapidly while also meeting long-term objectives of reducing emissions and developing new industries. Job creation would begin immediately and continue throughout the three-year period.¹

The jobs creation potential is significant even compared to pre-COVID levels of economic growth. The Clean Jobs Plan would create the equivalent of 1 in 10 of *all* jobs produced even if the economy were to grow at pre-crisis levels.² This is a significant share, especially considering that it counts only the *direct* employment impacts. Even more jobs will be created through the indirect and induced effects of economic stimulus.³

¹ See Appendix for discussion of estimated 'job-years' created. ² Approximately 800,000 jobs were added in the three years to March 2020, see ABS 6202.0. ³ *Indirect* impacts flow through the supply chain in delivering each stimulus program. *Induced* impacts are the general rise in consumption as economic activity begets more economic activity (e.g. someone employed by the stimulus chooses to spend more on entertainment). Such impacts are difficult to establish with any great level of accuracy and have therefore been omitted from this analysis.

Job creation potential of the Clean Jobs Plan

Estimated number of job openings created over three years, by opportunity



NOTE: The number of jobs estimated to be created by each stimulus option is a function of (A) the labour-intensity of investments; and (B) the total scale of investments possible in each option. (A) was estimated based on ABS data (8155.0) which shows the labour-intensity of output at a detailed ANZSIC sub-industry level. The industry mix of each option is modelled based on the activity required to deliver the program. For example, the majority of work in the 'Training and education' category will be delivered by 'ANZSIC 82 Adult, community and other education', which the ABS estimates needs 8.2 workers for every \$1m of output. (B) are estimates based on publicly available data, taking into account how much funding is needed and the potential supply constraints in delivering that funding. See next page and Appendix for further details.

The Plan attracts on average an additional \$1.10 in private investment for every public dollar spent

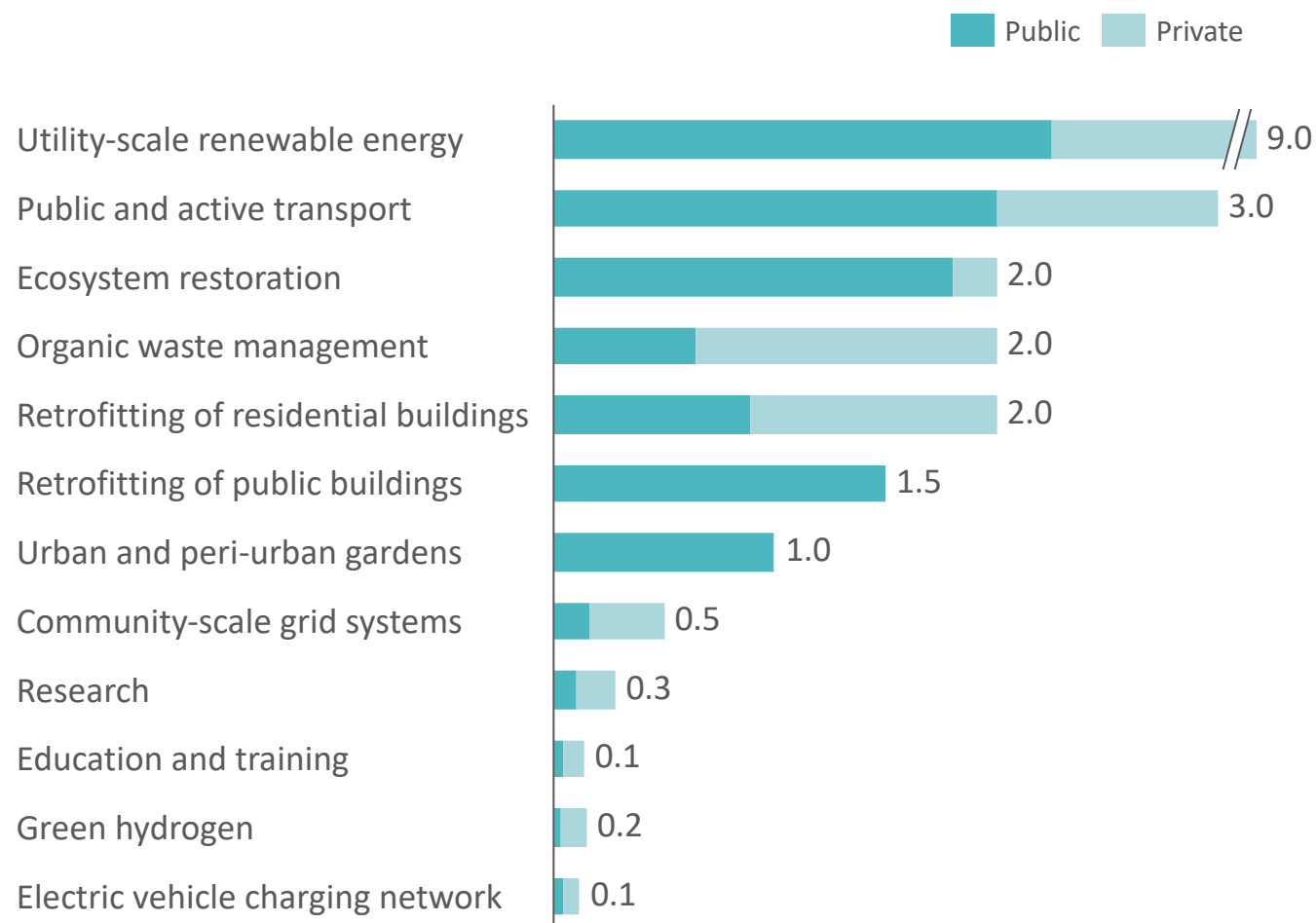
The Clean Jobs Plan requires a modest level of public investment. In total, the 12 policy opportunities will require less than 0.5% of Australian Gross Domestic Product (GDP) in public funding. For comparison, total stimulus following the Global Financial Crisis (GFC) was ~2% of GDP and currently announced COVID-19 stimulus is already at ~3.5% of GDP.

Policy opportunities would attract on average \$1.10 in private investment for every public dollar spent. This *doubling* of public investment is possible because many initiatives are profitable to private businesses in the long run. For example, private businesses will seek to co-invest in profitable infrastructure projects (e.g. renewable energy, organic waste processing) and add their spending to partial subsidies (e.g. residential retrofitting, training and education).

Specific levels of private funding will be determined by the design of each policy. Governments may choose to contribute a larger share of funding for certain policies – with access to historically low borrowing costs, this may be a more cost-effective design in many cases.

Investment by source for the Clean Jobs Plan

Estimated total investment,¹ public and private,² \$ billions



¹ The amount of investment for each option has been estimated by considering a range of factors, including the level of need or investment gap, the readiness of investment options and capacity constraints (such as shortages in skilled labour or the lack of availability of the needed materials) that may limit supply in the economy. See Appendix for details. ² The share of financing provided by private-sector actors is estimated based off current financing mix for delivering similar policies. For example, private co-financing for utility-scale renewable energy was estimated with reference to Australian Renewable Energy Agency (ARENA) and Clean Energy Finance Corporation (CEFC) projects.

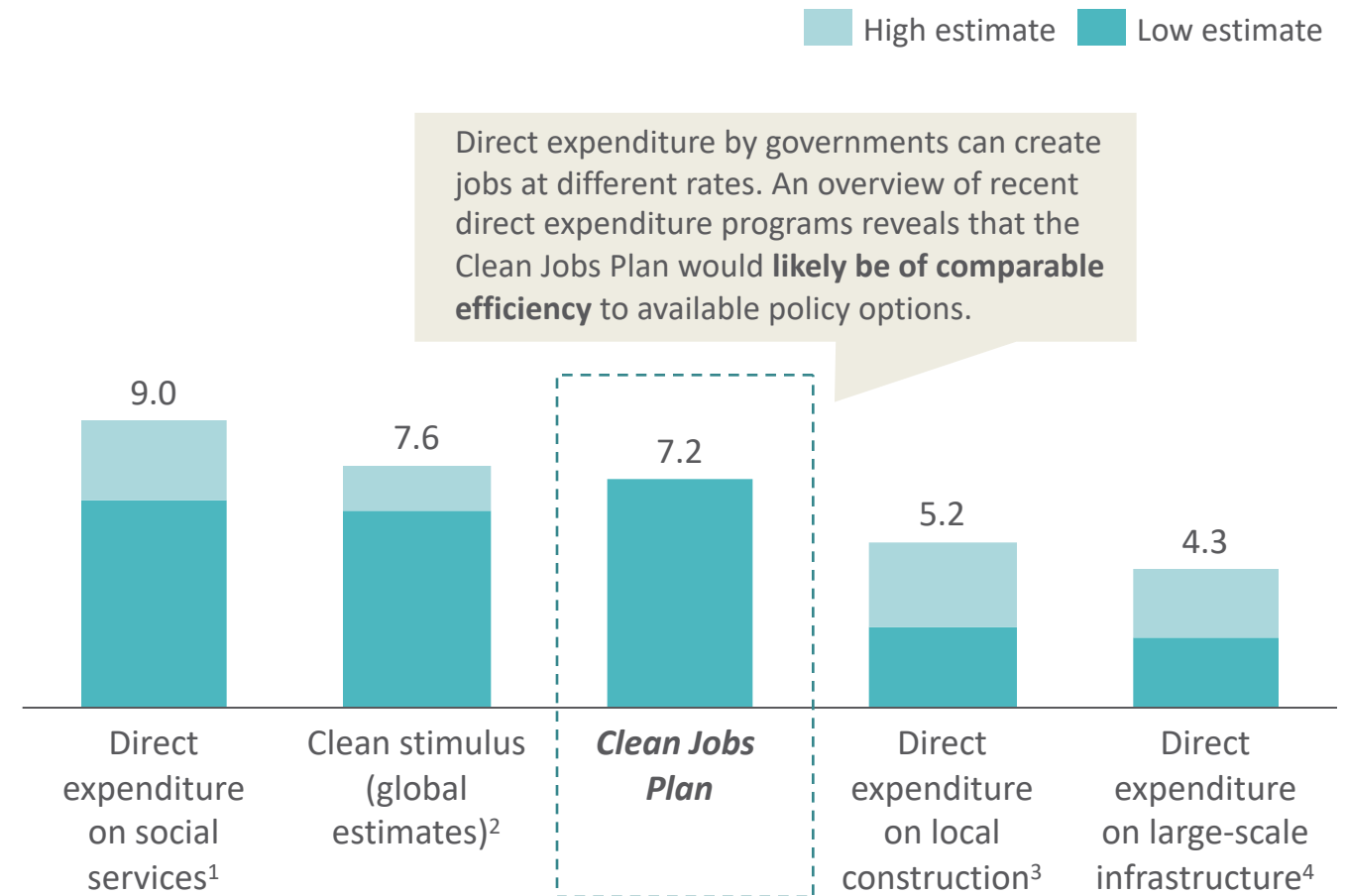
The Plan creates jobs as efficiently as other direct expenditure programs

The Clean Jobs Plan delivers an estimated 7.2 job openings for every \$1 million of public spending. Its 12 policy opportunities are relatively efficient job creators because they focus on labour-intensive industries, leverage private co-financing, and avoid capacity constraints – for example, skills or material shortages – that may otherwise increase project costs.

Direct expenditure programs vary in how effectively they create jobs. The wages of the newly employed workers are not the only cost of stimulus programs. They must also use funds to buy materials. Depending on the nature of the project, this can be a significant share of the total costs. The amount of ‘co-investment’ to multiply the impact of the public investment can also vary.

The job creation impact of the Clean Jobs Plan is comparable to that of other direct expenditure programs. It is difficult to directly compare stimulus outcomes due to the limited availability of reliable data and differences in timeframes, conditions and objectives. However, a review of available robust data suggests the Clean Jobs Plan would create jobs as efficiently as comparable spending in Australia and overseas.

Job creation efficiency of select public direct expenditure programs Estimated direct jobs created per \$1 million of public spending



¹ Estimates refer to National Disability Insurance Scheme. Calculation of job-creation efficiency was based on observing growth in ‘Aged and Disabled Carers’ and ‘Personal Care Workers’ (ABS 6291, EQ08 Employed persons by Occupation unit group of main job), along with growth in spending on the NDIS. ² United Nations Environment Programme – Global Green New Deal: an update for the G20 Pittsburgh Summit (2009); 1705 Loan program Mundaca and Richter (2015) Assessing ‘green energy economy’ stimulus packages: Evidence from the U.S. programs targeting renewable energy, *Renewable and Sustainable Energy Reviews*, vol. 42, February 2015; ILO – *Stimulus Packages to Counter Global Economic Crisis: A Review* (2009). ³ Estimates refer to the Building the Education Revolution, a \$16.2 billion stimulus program in Australia in response to the Global Financial Crisis. Calculation of job-creation efficiency was based on project-level job creation reported in reviews of the program (see, for example, NSW Legislative Council (2010)) *The Building the Education Revolution Program*, and program evaluations (see Lewis, Dollery, and Kortt (2014)) *Building the Education Revolution: Another Case of Australian Government Failure?*, *International Journal of Public Administration*. ⁴ Average of projected job creation by project in state infrastructure plans.

Job creation will focus on sectors hit hardest by the recent downturn

The proposed policy opportunities target industries that have suffered steep job losses from the COVID-19 crisis. Over one third of job openings created by these stimulus options would be in administration, with an additional third in construction. Since the outbreak of COVID-19 in Australia, these industries have lost 6.9% and 5.8% of jobs respectively (see chart), representing ~80,000 workers in total. Without government support, these sectors are likely to experience further job losses as business activity declines, and fewer new projects begin.

The stimulus will indirectly benefit other key industries such as manufacturing, retail and hospitality. Jobs in the manufacturing, trade (retail and wholesale) and hospitality sectors will be supported indirectly by the Clean Jobs Plan. This is because firms in these sectors are

suppliers to those that will be directly engaged by the proposed policies. As a result, the Clean Jobs Plan will support a wide range of industries and a diverse range of workers: men and women, young and old, and those with specialist and general skills.

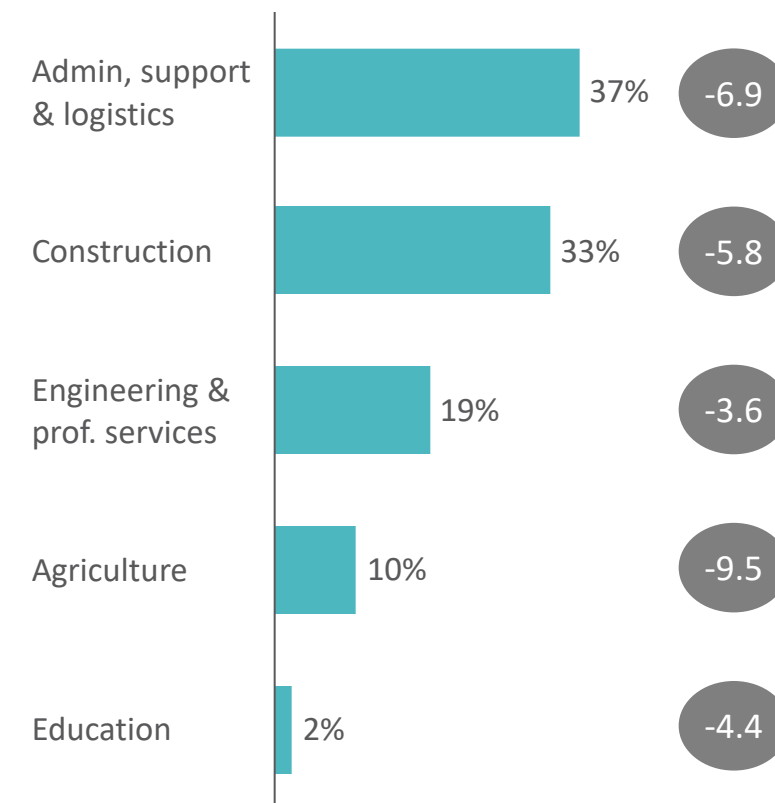
Support for the administration and construction sectors will likely create significant flow-on effects. The two largest sectors of the Clean Jobs Plan represent a broad array of economic activity: from managing supply chains to clerical data entry; from residential electrical work to heavy civil engineering. These sectors tend to have long supply chains, meaning that each unit of output needed from these sectors stimulates activity from other sectors across the economy.¹

¹ ABS (2020) 5209, Table 5 Australian National Accounts: Input-Output Tables, 2017-18

Jobs impact by industry

Share of jobs created by proposed stimulus, %

RHS bubble: share of jobs lost from 14 March to 30 May, %¹



SOURCE: ABS (2020) 6160.0 *Weekly Payroll Jobs and Wages in Australia*, 30 May 2020. NOTE: The industry distribution of the jobs impact is modelled based on the activity required to deliver the program. For example, the majority of work in the 'Training and education' category will be delivered by 'ANZSIC 82 Adult, community and other education' workers. The above figures reflect an average across all stimulus options.

Many new jobs will require minimal training, enabling rapid employment of COVID-impacted workers

The Clean Jobs Plan prioritises work that can be deployed rapidly. A third of job openings will be in occupations requiring either on-the-job training or under 12 months of formal education. This is not an estimate of training requirements for implementing the stimulus as in many instances workers already equipped with the relevant qualifications may simply be hired. It does indicate however that the job openings from these stimulus options will provide work for lower skilled workers. It also indicates that labour can be mobilised rapidly where necessary.

The stimulus program will create jobs in a broad range of occupations. Approximately half the jobs created will target labourers and

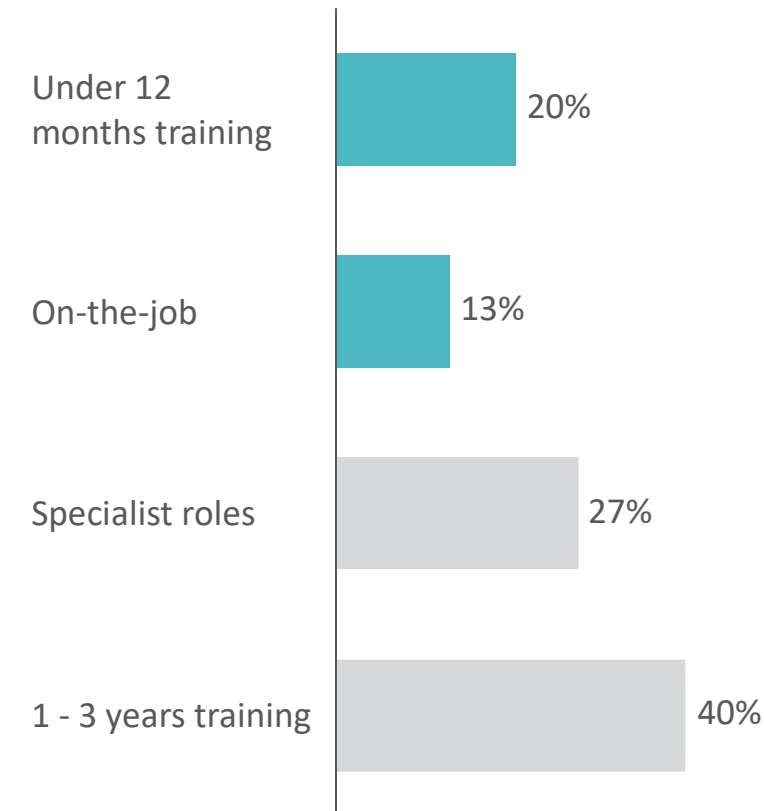
clerical roles. About a third of the job openings will be for managers and professional service workers. The remaining roles will be for machinery operators (including drivers), community workers and salespeople.¹

Training and careful transition will still be an important part of successfully implementing the Clean Jobs Plan. Historical experience in Australia and elsewhere demonstrates that the ability to transition workers to new sectors and train them adequately is essential to the success of stimulus policies.² The scale and content of the policies proposed in this Clean Jobs Plan is designed to avoid worker shortages, and provide sufficient time for training and effective transition.

¹ The occupation categories referred to here are according to the Australia and New Zealand Standard Classification of Occupations. ² See, for example, the Australian National Audit Office review of the Home Insulation Program (2010)

One in three job openings will require minimal training

Share of job openings by average training requirement of occupation, %



NOTE: Estimates of training requirements are based on the occupation profile of the industries in which the stimulus is being spent. They are not an estimate of the operational requirements of the stimulus. For example, electrical systems engineers are classified as specialist roles as they require significant training – but existing workers with those qualifications can be hired to deliver the relevant projects without need for further qualification or training.

The proposed stimulus will have an equitable impact in cities, regions, states and territories

The Clean Jobs Plan will create thousands of jobs in each state and territory. The Clean Jobs Plan will provide a similar rate of job creation across the country, creating between 2.5 and 4 jobs per 1,000 residents. Each of the 12 policy opportunities is able to be implemented in all states and territories, and in many cases can be targeted to local areas.

The Clean Jobs Plan includes a strong focus on regional areas that may otherwise not have a private-sector led recovery. Approximately four in ten (42%) job-openings created by the Clean Jobs Plan will be in regional areas. This is disproportionate in comparison to the share of the workforce (a quarter) and households (a third) in regional areas.¹ Policy opportunities were selected deliberately to focus on these regions, where private investment may

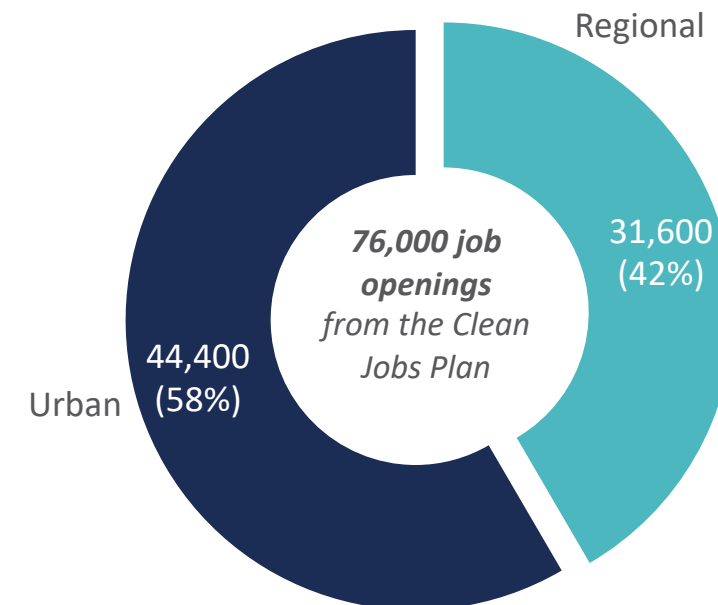
otherwise not exist, or may be slow to return. Regional areas may also have been particularly hard hit by COVID-19 due to their reliance on the agricultural sector, which has shed ~9% of jobs since the start of the crisis.²

New jobs can be further targeted to local areas that need them most. Some policy opportunities can be locally targeted by rolling out in some areas before others. For example, a state-wide organic waste collection and processing program could begin with pilot projects in certain local government areas first if the economic need is highest there. Other policy opportunities can be locally targeted by rolling out in some areas exclusively. For example, ecosystem restoration projects could be limited to certain areas based on ecological and economic need.

¹ ABS (2020) 1410 Data by region, 2013 – 2018. ² ABS (2020) 6160 Weekly Payroll Jobs and Wages in Australia, week ending 30 May 2020.

Job openings by region

Share of job openings by location, %¹



¹ Estimate of geographical distribution of job openings based on distribution of investment opportunity. Analysis accounts for the nature of the stimulus option (e.g. urban gardens assumed to create jobs in urban areas only, ecosystem restoration assumed to be predominantly in regional areas etc.), the distribution of economic activity and population by geography (e.g. a quarter of national workforce and third of national households are outside capital cities).

3

Setting us up for the future

Clean jobs investments can be deployed rapidly and will set the stage for a long-term, resilient recovery

The Clean Jobs Plan may be tailored to states and territories, depending on local economic needs

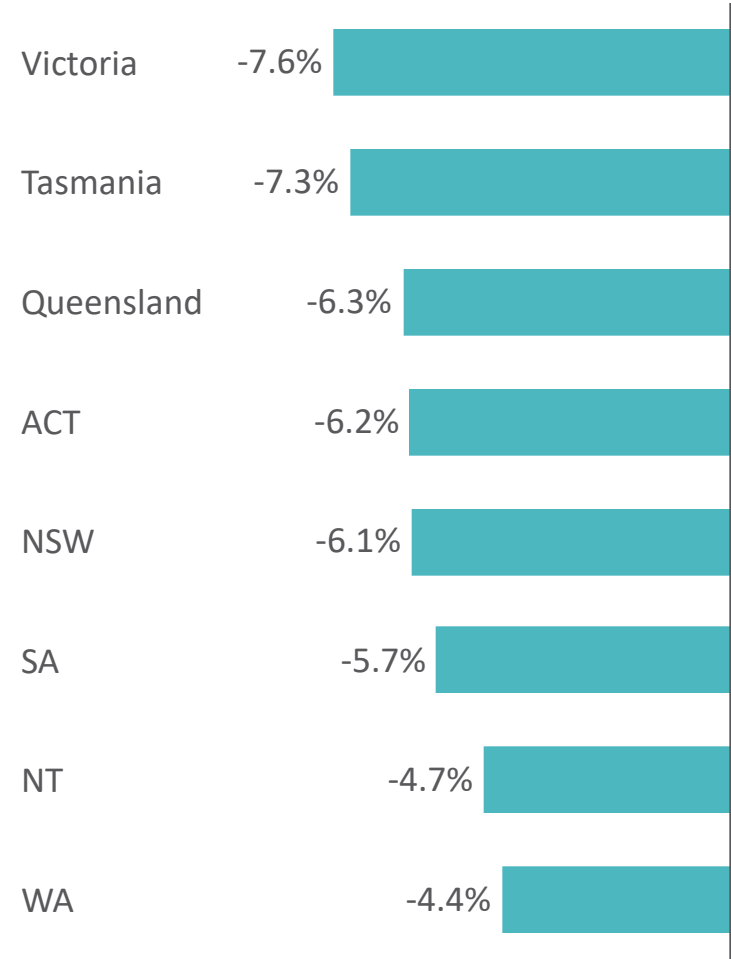
All states and territories have seen steep job losses of 4 – 8% since the onset of the COVID-19 crisis. The economic impact of COVID-19 has varied slightly across the country, depending on the scale of shutdowns required in each jurisdiction. However, no state or territory has been spared from significant economic disruption.

The suitability of each policy opportunity will depend on the circumstances of each state or territory. For example, ecosystem restoration is more relevant in Queensland – with its large and diverse ecosystem and related industries like tourism – than, for example, in the Australian Capital Territory (ACT). The suitability of each policy opportunity also varies according to how consistent it is with current priorities in the state or territory. For example, many states have already embraced urban greening projects which can be expanded through stimulus programs.

The set of 12 policy opportunities can be tailored to meet different policy needs in each state or territory. Some are high-impact job creators which can be delivered at scale. For example, ecosystem restoration and organic waste processing projects can hire large numbers of people into locally based programs. Some are more targeted but financially efficient investments, either due to their potential to attract private funding (e.g. residential retrofitting) or focus on labour-intensive activities (such as teaching and research). And some will be an especially good fit for the policy priorities of each state or territory.

Governments can treat the Clean Jobs Plan as a starting point to consider practical and immediate investments to create jobs and mitigate climate risks. Governments across Australia can consider the Clean Jobs Plan as a starting point to design and develop an effective stimulus program for their jurisdictions.

Job losses by state
Share of jobs lost since COVID-19, %¹



¹ Calculated from 14 March till 13 June.
SOURCE: ABS (2020) 6160, Weekly Payroll Jobs and Wages in Australia, 30 June 2020.

Policy opportunities: New South Wales

In New South Wales (NSW), the Clean Jobs Plan will create an estimated 20,000 – 25,000 job openings across its 12 policy opportunities.¹ Major job creators include building public and active transport infrastructure (7,000 – 8000 job openings) and installing utility-scale renewable energy (5,000 – 5,500).

Existing policies in NSW can strengthen the feasibility of certain policy opportunities. For example, the **NSW Net Zero Plan** Stage 1 (2020 – 2030) prioritises interventions consistent with the policies in this report including the diversion of organic waste from landfill, expanded R&D funding, and installing renewable energy.²

NSW has a **pipeline of scoped infrastructure projects** which can help deliver some policy opportunities more quickly. For example, the state has a large program of public and active transport infrastructure which can be accelerated to create more jobs in the short-term.³ The NSW Government has recently announced financial support for Central West and New England Renewable Energy Zones.⁴

NSW also has a **large and diverse workforce**, making it more feasible to deliver several of the identified policies.

¹ Jobs impact for states and territories were calculated based on modelling the nationwide job impacts of each policy opportunity. A range, rounded to the nearest 100, is given to better represent the confidence of these more local estimates. The extremes of the ranges do not sum to the national total since a high value in one state would be consistent with a lower value in other states and vice versa. ² NSW Government ([14 March 2020](#)), *Net Zero Plan Stage 1: 2020 – 2030* ³ NSW Government ([2018](#)) *NSW Infrastructure Strategy 2018 – 2038*. ⁴ NSW Government ([2020](#)) *Renewable Energy Zones*.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Public and active transport	<ul style="list-style-type: none">▪ High impact: Large job creation opportunity across skill levels in admin and construction, with abatement potential from a mode shift	7,000 – 8,000 jobs (\$1.0b – 1.5b)
Utility-scale renewable energy	<ul style="list-style-type: none">▪ High impact: Large job creation opportunity in both low and high skill sectors, with an ability to leverage substantial private finance	5,000 – 5,500 jobs (\$0.7b – 0.9b)
Organic waste management	<ul style="list-style-type: none">▪ Policy fit: Aligns with state’s target for net zero emissions from organic waste by 2030, providing a substantial abatement benefit	2,500 – 3,000 jobs (\$0.15b – 0.2b)
Ecosystem restoration	<ul style="list-style-type: none">▪ Financially efficient: Able to rapidly mobilise a large workforce including admin, forestry and scientific services, at a low cost	2,000 – 2,200 jobs (\$0.2b – 0.3b)
Residential retrofitting	<ul style="list-style-type: none">▪ Financially efficient: Creates jobs at a relatively low cost in data collection, conducting energy audits and installation	2,000 – 2,500 jobs (\$0.25b – 0.3b)

Policy opportunities: Victoria

In Victoria, the Clean Jobs Plan will create an estimated 15,000 – 20,000 jobs across its 12 policy opportunities. Major job creators include installing utility-scale renewable energy (3,000 – 4,000) and organic waste management (2,000 – 2,500).

Existing policies in Victoria can strengthen the feasibility of certain policy opportunities. For example, the **Zero Net Carbon Homes** pilot program is identifying ways to improve residential energy efficiency through simple retrofits such as installing smart meters as well as deeper redesigns.¹ Similarly, the **City of Melbourne Green Our City Strategic Action Plan** has made progress in implementing urban and peri-urban gardens.² The state’s ambitious **Renewable Energy Target** of 50% by 2030 can be supported by installing additional renewable energy infrastructure.

Some large opportunities are less prominent in Victoria due to their geography. For example, there is less opportunity for ecosystem restoration projects than in larger states like New South Wales, Queensland and Western Australia. However, Victoria has a **large and diverse workforce**, making it more feasible to deliver several of the identified policies.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Utility-scale renewable energy	▪ High impact: Large job creation opportunity in both low and high skill sectors, with an ability to leverage substantial private finance	3,000 – 4,000 jobs (\$0.5b – 0.6b)
Organic waste management	▪ Policy fit: Aligns with state’s intention to reduce waste to landfill and increase the uptake of organic waste collection services	2,000 – 2,500 jobs (\$0.1b – 0.15b)
Public and active transport	▪ High impact: Large job creation opportunity across skill levels in admin and construction, with abatement potential from a mode shift	2,000 – 2,200 jobs (\$0.3b – 0.4b)
Urban and peri-urban gardens	▪ Policy fit: Aligns with current ambition to increase canopy cover and expand green spaces to maintain health and liveability	1,800 – 2,000 jobs (\$0.25b – 0.35b)
Education and training	▪ Financially efficient: Able to create jobs at a very low cost in teaching and curriculum development for climate-related fields	400 – 450 jobs (< \$0.05b)

¹Sustainability Victoria ([accessed May 2020](#)), *Zero Net Carbon Homes*. ²City of Melbourne ([June 2017](#)), *Greening our City Strategic Action Plan 2017 – 2021*

Policy opportunities: Queensland

In Queensland, the Clean Jobs Plan will create an estimated 15,000 – 20,000 job openings across its 12 policy opportunities. Major job creators include ecosystem restoration and revegetation (5,000 – 5,500) and installing utility-scale renewable energy (1,800 – 2,200).

Existing policies in Queensland can strengthen the feasibility of certain policy opportunities. For example, the **Queensland Transition Strategy** identifies ‘pathways to a clean economy’ which leverage the state’s reputation for innovation to deliver advances in renewable energy innovation and adoption.¹

Queensland’s **diverse ecosystems and large-scale carbon sink** – from old-growth forests and grasslands, to complex marine ecosystems – all provide opportunities for significant restoration and revegetation projects.

The **prominence of remote and regional communities** in the state may limit the effectiveness of some policies due to localised skill shortages. Policies which can therefore be locally tailored, such as residential retrofitting, or are targeted investments, such as green hydrogen pilots, are more promising in this state.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Ecosystem restoration	▪ High impact: Creates jobs across skill levels in admin, forestry and scientific services and has long-term abatement benefits	5,000 – 5,500 jobs (\$0.5b – 0.6b)
Utility-scale renewable energy	▪ High impact: Large job creation opportunity in both low and high skill sectors, with an ability to leverage substantial private finance	1,800 – 2,200 jobs (\$0.25b – 0.35b)
Residential retrofitting	▪ Financially efficient: Creates jobs for a relatively low cost in data collection, conducting energy audits and installation	1,200 – 1,600 jobs (\$0.2b – 0.3b)
Research funding	▪ Policy fit: Aligns with the Advance Queensland initiative in support of climate-related R&D projects and solutions	150 – 200 jobs (< \$0.05b)
Green hydrogen	▪ Policy fit: Aligns with the state’s Hydrogen Industry Development Fund to create sustainable jobs in regional areas	100 – 150 jobs (< \$0.05b)

¹ Government of Queensland, Department of Environment and Heritage Protection (2018) *Pathways to a clean growth economy*

Policy opportunities: Western Australia

In Western Australia (WA), the Clean Jobs Plan will create an estimated 8,000 – 10,000 job openings across its 12 policy opportunities. Major job creators include ecosystem restoration (2,000 – 2,500) and installing utility-scale renewable energy (1,000 – 1,500).

Existing policies in WA can strengthen the feasibility of certain policy opportunities. For example, the **Distributed Energy Resources (DER) Roadmap** prioritises creating an energy system that can adapt to the increased prevalence of DER technologies like rooftop solar and smart devices. Stimulus policies like expanding utility-scale renewable energy (including storage and transmission upgrades) and residential retrofitting can support the priorities identified in this roadmap.

WA also has a pipeline of scoped and announced **large-scale infrastructure investments** which can be accelerated to create more jobs in the short term. This includes public transport upgrades to its rail cars and extension of current lines.² Australia’s biggest green hydrogen plant was also recently announced in WA, making the state a promising candidate for stimulus programs that can leverage existing investments to support the emergence of new industries.³

¹ Government of Western Australia ([December 2019](#)) *Distributed Energy Resources Roadmap*
² Government of Western Australia, Public Transport Authority ([accessed May 2020](#)) *Projects*³ PV Magazine ([29 April 2020](#)), ‘Australia’s biggest green hydrogen plant secures initial investment’

Top policy opportunities

Option	Rationale	Jobs & public Investment
Ecosystem restoration	▪ Financially efficient: Able to rapidly mobilise a moderate workforce including admin, forestry and scientific services, at a low cost	2,000 – 2,500 jobs (\$0.2b – 0.3b)
Utility-scale renewable energy	▪ High impact: Moderate job creation opportunity in both low and high-skill sectors, with access to deep private finance	1,000 – 1,500 jobs (\$0.15b – 0.2b)
Public and active transport	▪ High impact: Moderate job creation opportunity across skill levels in admin, planning and heavy construction	1,000 – 1,200 jobs (\$0.2b – 0.3b)
Residential retrofitting	▪ Financially efficient: Creates jobs for a relatively low cost in data collection, conducting energy audits and installation	700 – 900 jobs (\$0.05b – 0.1b)
Green hydrogen	▪ Policy fit: Aligns with the state’s Renewable Hydrogen Fund to undertake capital works projects and further develop the industry.	20 – 50 jobs (< \$0.05b)

Policy opportunities: South Australia

In South Australia (SA), the Clean Jobs Plan will create an estimated 5,000 – 7,000 job openings across the 12 policy opportunities. Major job creators include installing utility-scale renewable energy (2,000 – 2,500) and ecosystem restoration (700 – 800).

Existing policies in SA can strengthen the feasibility of certain policy opportunities. For example, the **Blue Carbon Strategy for South Australia** aims to protect and restore SA’s extensive coastal ecosystems and has already identified a program of work which can be accelerated with additional stimulus spending.¹ The state is currently developing an updated Climate Change Strategy, due to be released in mid-2020.

South Australia has also been a prominent site of recent innovative activity. For example, the state’s first **super-fast electric vehicle** (EV) charger was installed earlier this year, an important addition to serve EV transport between Melbourne and Adelaide.² Similarly, SA has for several years sought to position itself as a **global hub for green hydrogen**.³

¹ Government of South Australia, Department for Environment and Water ([accessed June 2020](#)), *Climate Change Change Strategy and Blue Carbon Strategy* ² Chargefox ([2020](#)), ‘Chargefox opens South Australia’s first ever ultra rapid EV charging station in Keith’ ³ Government of South Australia ([August 2018](#)), *South Australia’s Hydrogen Action Plan*.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Utility-scale renewable energy	<ul style="list-style-type: none">▪ High impact: Creates both low and high skill jobs and aligns with the state’s target to be 100% renewable by 2030	2,000 – 2,500 jobs (\$0.3b – 0.4b)
Ecosystem restoration	<ul style="list-style-type: none">▪ Financially efficient: Creates jobs across skill levels in admin, agriculture and scientific services for a relatively low cost	700 – 800 jobs (\$0.05b – 0.1b)
Residential retrofitting	<ul style="list-style-type: none">▪ Financially efficient: Creates jobs at a relatively low public cost to address peak demand challenges faced by the state	400 – 600 jobs (\$0.05b – 0.07b)
Green hydrogen facilities	<ul style="list-style-type: none">▪ Policy fit: Capitalises on existing infrastructure to further existing competitive advantage and hydrogen strategy	100 – 200 jobs (< \$0.05b)
EV charging networks	<ul style="list-style-type: none">▪ Policy fit: Aligns with the state’s electric vehicle strategy to shift transport energy demand and use abundant renewable energy	30 – 50 jobs (< \$0.05b)

Policy opportunities: Tasmania

In Tasmania, the Clean Jobs Plan will create approximately 1,000 – 2,000 job openings across the 12 policy opportunities. The most jobs are in installing utility-scale renewable energy (400 – 500) and ecosystem restoration (300 – 400).

Existing policies in Tasmania can strengthen the feasibility of certain policy opportunities. For example, **Tasmania’s Climate Change Action Plan 2017 – 2021** identifies six priority areas for action.¹ This includes building on its strengths in its renewable energy capability (aiming for 200% renewables by 2040) and reducing emissions from the waste sector, as well as supporting households to reduce emissions. This plan is matched by activities at a local government level. For example, **the City of Hobart is expanding its ‘FOGO’ (Food Organic and Garden Organics) waste collection** as part of an initiative to have zero waste going into landfill by 2030.² Such activities can be expanded and accelerated with further stimulus spending.

Tasmania’s coastline and old-growth forest ecosystems are a major part of its heritage and economic activity – making **ecosystem restoration** both an important and high-potential opportunity in this state.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Utility-scale renewable energy	▪ High impact: Moderate job creation opportunity across skill levels and aligns with 100% renewable energy by 2022 target	400 – 500 jobs (\$0.06b – 0.08b)
Ecosystem restoration	▪ Financially efficient: Able to rapidly mobilise a low-skill workforce including admin and forestry labour for a low cost	300 – 400 jobs (\$0.03b – 0.05b)
Organic waste management	▪ Policy fit: Aligns with current state investment and provides additional abatement given ~100% renewable uptake	100 – 150 jobs (< \$0.01b)
Residential retrofitting	▪ Policy fit: Aligns with the Draft Renewable Energy Action Plan in rolling out advanced metering for all households	100 – 150 jobs (\$0.02b – 0.04b)
Education and training	▪ Policy fit: Can create jobs at a low cost to expand the Energising Tasmania skills initiative for renewable energy training	< 50 jobs (< \$0.01b)

¹Tasmanian Government ([accessed May 2020](#)) *Climate Change Action Plan 2017 – 2021* ²City of Hobart ([accessed May 2020](#)), FOGO: Food Organics & Garden Organics.

Policy opportunities: Northern Territory

In the Northern Territory (NT), the Clean Jobs Plan will create approximately 1,000 job openings across the 12 policy opportunities. The most jobs are in ecosystem restoration (100 – 200) and improving collection of organic waste (100 – 200).

Existing policies in the NT can strengthen the feasibility of certain policy opportunities. For example, the NT’s **Solar Energy Transformation Program** (SETuP) led the way in delivering community-scale, independent power to benefit 25 remote communities.¹ The City of Darwin encourages mulching and domestic composting, but is yet to build a central organic waste collection and processing service.

The NT’s **relatively small and remote workforce** makes skill shortages a concern here. For example, while the NT has the land and weather to support **large-scale wind and solar installation**, the possibility of skills shortages has been taken into account. This is not to imply that such investments are not possible or desirable in the NT – projects like SETuP and SunCable show the significant potential here.² However, a more conservative approach has been taken in this project to identify short-term stimulus policies.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Ecosystem restoration	▪ High impact: The NT has a large footprint of ecosystems, making restoration and revegetation projects valuable	100 – 200 jobs (< \$0.01b)
Organic waste management	▪ Policy fit: Aligns with territory’s intention to reduce emissions from landfill and to investigate waste to energy initiatives	100 – 200 jobs (\$0.01b – 0.02b)
Residential retrofitting	▪ Financially efficient: Can create jobs at a low cost to collect information, conduct energy audits and install devices or materials	50 – 100 jobs (< \$0.01b)
Public building retrofitting	▪ Financially efficient: Able to support jobs at a relatively low public cost to generate emissions abatement benefits	50 – 100 jobs (\$0.01b – 0.02b)
Community-scale grid storage and generation	▪ Policy fit: Can create jobs that support resilience, particularly in remote NT, by building independent infrastructure	< 50 jobs (< \$0.01b)

¹ Australian Renewable Energy Agency ([accessed June 2020](#)), ‘NT Solar Energy Transformation Program’
² PV Magazine ([27 May 2020](#)), ‘SunCable to build Darwin mega-battery’

Policy opportunities: Australian Capital Territory

In the Australian Capital Territory (ACT), the Clean Jobs Plan will create approximately 1,000 job openings across the 12 policy opportunities. The most jobs are in funding research (200 - 300) and retrofitting public buildings (150 – 200).

Existing policies in the ACT can strengthen the feasibility of certain policy opportunities. For example, the **ACT Climate Change Strategy** prioritises the energy efficiency of buildings as well as keeping organic waste out of landfill.¹ Canberra **Living Infrastructure Policy** builds on the ACT’s target to keep 70% of new development within the existing urban footprint.² The ACT has also emphasised the importance of driving down emissions from its transport sector. However, as many of these projects have already been funded for implementation (or already put in place), relatively little *additional* scope for stimulus has been identified.

The ACT has a **relatively small, high-skilled workforce** with significant public sector and research sectors. This drives the suitability of expanded research and public building retrofit programs.

Top policy opportunities

Option	Rationale	Jobs & public Investment
Research funding	<ul style="list-style-type: none"> High impact: Business and public research can generate jobs for specialised workers and help develop cleantech solutions 	200 – 300 jobs (\$0.02b – 0.03b)
Public building retrofitting	<ul style="list-style-type: none"> High impact: A large stock of publicly operated buildings creates a large scope for retrofitting activity that can generate jobs 	150 – 200 jobs (\$0.01b – 0.02b)
Organic waste management	<ul style="list-style-type: none"> Policy fit: Able to create jobs by bringing forward current plans to develop processing infrastructure and introduce FOGO collection 	100 – 200 jobs (< \$0.01b)
Urban and peri-urban gardens	<ul style="list-style-type: none"> Policy fit: Aligns with current Living Infrastructure Policy to increase tree canopy cover to 30% by 2040 	50 – 100 jobs (< \$0.01b)
Community-scale grid storage and generation	<ul style="list-style-type: none"> Financially efficient: Potential to create low-cost jobs in construction services and utilities that leverage substantial private finance 	< 50 jobs (< \$0.01b)

¹Government of the Australian Capital Territory Environment, Planning and Sustainable Development Directorate – Environment ([accessed May 2020](#)) *ACT Climate Change Strategy*. ²Government of the Australian Capital Territory Environment, Planning and Sustainable Development Directorate ([accessed May 2020](#)) *Canberra’s Living Infrastructure Plan: Cooling the city*

The Clean Jobs Plan can be delivered over the next three years

The policy opportunities in this report can be implemented over the next three years. Governments around Australia can move fast to implement a clean jobs plan – indeed, rapid response is needed to both stem the economic scarring from COVID-19 and to mitigate the economic risks of climate change. The policies in this report have been chosen and scoped to be able to be implemented in the short-term; they are not blue-sky ambitions.

Existing programs provide examples of how each of the stimulus options may be implemented. National policy experiences like the Australian Renewable Energy Agency (ARENA) through to local ones like Melbourne's Greening Our City strategic plan offer examples to learn from and follow. These policies were studied to understand the practicality of each of the stimulus options.

The following pages contain case studies that demonstrate how different regional-scale renewable energy initiatives could be used to maximise job creation potential in Australia's three most populous states. These extend existing state-led initiatives to ensure that each region (NSW's Central West, Victoria's Latrobe Valley and Queensland's Darling Downs) can maximise the short- and long-term benefit from COVID-19 recovery initiatives.

Illustrative implementation timeline

August – September
2020



Selection and design of stimulus programs

Australian governments can review their policy priorities, financial capacity and local workforce needs to select the most suitable stimulus options. The Clean Jobs Plan in this report provides governments with a menu of potential choices.

October – December
2020



Programs begin to mobilise

Stimulus programs can begin to be rolled out, including by scaling up or modelling existing programs. The policy opportunities included in the plan have been chosen for their practicality – Australia already has the experience, skills and resources needed to begin implementing them.

January 2020 –
July 2023



Implementation and job creation

The job creation impact of the Clean Jobs Plan was estimated based on a three-year design and implementation timeframe. Some will create most jobs in early construction phases, but most provide opportunities for sustained employment.

Onwards



Follow-on programs to sustain benefits

The Clean Stimulus options identified in this report are 'no-regret' first steps toward a larger economic transformation. They establish or enable the systems and infrastructure needed to support an ongoing transition to a zero-emission economy.

Case study: Dubbo / Central-west in New South Wales (1 of 3)

NSW: Dubbo / Central-west Renewable Energy Zone

The New South Wales Government has recently taken several steps toward establishing Australia's first Renewable Energy Zone (REZ) near Dubbo, dubbed the Central-West Orana REZ.¹

A REZ is an area with exceptional wind and solar resources and high potential for large-scale renewable energy projects, but where coordinated planning is required to ensure that sufficient transmission is built so that this potential can be realised at the lowest possible cost. As this report demonstrates, governments can create thousands of jobs across the country by accelerating utility-scale renewable energy projects. Every dollar of public investment in large-scale renewable energy will unlock a further \$3 from the private sector.

To help create jobs in regional NSW, the state government could accelerate the Central-West REZ by streamlining approvals where appropriate and providing grants, low-cost loans and other financing for the installation of large-scale clean energy infrastructure. A strong pipeline of reliable work in the area and billions of dollars worth of investment could be created by enabling some of the more than one hundred projects that have applied to be a part of the REZ.² This would kick-start the local economy by helping locals across the Central West of NSW get back to work, setting the region on track to be a long-term renewable energy employment hub and cutting greenhouse gas emissions across the state.

There are dozens of projects around Dubbo and Orange proposed for development, including the following four projects which alone could create 610 jobs in the region.

- The Dunedoo solar farm – 66MW and could create 100 jobs (near Dubbo)³
- The Molong solar farm – 39MW and 160 local jobs (near Orange)⁴
- The Ungunja wind farm – 400MW (enough to power 170,000 homes) and 250 jobs (between Dubbo and Orange)⁵
- The Gilgandra solar farm – 50MW and 100 jobs created (near Gilgandra north of Dubbo)⁶.

¹ Renew Economy ([23 June 2020](#)), 'NSW first renewable zone attracts stunning 27GW of solar, wind, storage proposals'. ² Ibid ³ Dundee Solar Farm ([accessed July 2020](#)) ⁴ PV Magazine ([27 May 2020](#)), 'Gransolar group to build Molong solar farm in NSW' ⁵ Ungunja Wind Farm ([accessed July 2020](#)); Renew Economy ([27 May 2020](#)), 'Huge ungula wind project edges closer in NSW renewable energy zone'. ⁶ Gilgandra Solar Farm ([accessed July 2020](#))

Case study: Gippsland in Victoria (2 of 3)

Victoria: Gippsland region renewable energy projects

The Gippsland region has been earmarked for a number of new renewable energy projects, including \$2.6 billion for the Repower Gippsland project.¹

The first two stages of the project would see a total of 124MW installed with 115MWh of battery storage on site and the third stage would see up to 1,000MW of additional renewable capacity, accompanied by significant battery storage. This third stage would also be ideal for on-site production of green hydrogen. Through bringing forward existing programs, and extending greater support for projects like these, over 3,800 jobs can be created in large-scale renewable energy, transmission and storage projects in Victoria over the next three years.

Because the region has strong transmission connections to Melbourne and the rest of

the electricity network, the region has the potential for a very large pipeline of projects. This enables long term employment and many new and creative solutions to the decarbonisation challenge that go far beyond what could be modelled here.

For instance, FloatPac Solar, a floating solar company, has identified the “to be filled” open mine pits of Hazelwood and Yallourn Power Stations as having a very large potential for floating solar. With the pit from the Hazelwood mine due to begin filling this year, the company has assessed that the pit is capable of holding a floating solar system that could be as large as 780MW. Alongside this, the now demolished power station’s cooling water pit sits well above the mine pit and so has the potential to shore up the supply from the floating solar farm through becoming a

pumped hydro facility.² This project alone would see hundreds of jobs targeted precisely at those areas that have been hit hardest by the necessary transition away from brown coal in the state.

The Delburn wind farm, which would overlook the site of the former Hazelwood Power Station, could see 33 wind turbines generate enough power to support 125,000 homes.³ The combined construction and operations of the Delburn Wind Farm are expected to generate \$96 million over 30 years in the three Local Government Areas of Latrobe, Baw Baw and South Gippsland.⁴ The project is expected to generate 186 jobs across the construction phase and 24 jobs in the operation phase. The local community will also be provided with an opportunity to co-invest in the project along with other significant community benefits on offer.⁵

¹ Renew Economy ([10 September 2019](#)), ‘Plans floated for \$1.2bn 550MW Gippsland solar and battery energy park’; Gippsland Times ([17 December 2019](#)), ‘Wellington shire energy park plans are progressing’

² Private correspondence (2020) ³ osmi Australia ([accessed July 2020](#)), ‘Delburn Wind Farm Project Overview’ ⁴ Delburn Wind Farm Economic Impact Assessment 3 July 2020 ⁵ Delburn Wind Farm Economic Impact Assessment 3 July 2020; Renew Economy ([25 February 2020](#)), ‘Wind farm planned for Victorian coal centre trims turbine numbers’

Case study: Darling Downs in Queensland (3 of 3)

Queensland: Darling Downs Renewable Energy Zone

The Queensland Government is currently in the process of mapping out its own Renewable Energy Zones through the state, including the Darling Downs Renewable Energy Zone (REZ).¹ The Australian Energy Market Operator (AEMO) has identified almost 7,000MW of new renewable energy capacity that could be built in the region. The region also has potential for pumped hydro and is well-connected to the existing grid. Around 3,000MW of new wind and solar could be built before any major transmission upgrades are required.²

The state government is already supporting the 400MW Western Downs solar farm in the region. This project will create 400 jobs

and construction is planned to begin later this year.³ More is needed to ensure that the state meets its legislated target of generating 50% of its electricity needs from renewable energy by 2030. There is a large pipeline of other projects proposed in and around Darling Downs, including the 200MW Wambo wind farm and the 40MW Kingaroy solar farm, which would create 200 and 100 jobs respectively.^{4,5}

This report has identified that the government can create 2,000 additional jobs in the next three years in renewable energy, transmission and battery storage projects in the sunshine state by providing grants, low cost loans and other financing

to proposed projects.

By accelerating development of the states' seven renewable energy zones, the Queensland Government can help to accelerate and facilitate even greater long-term benefits by providing a framework for new renewable energy projects to connect to the grid, supporting local jobs, attracting investment and securing a steady pipeline of renewable energy projects in the Darling Downs and Toowoomba regions.

¹ Renew Economy ([6 May 2020](#)), 'Australia's largest solar farm set for construction after Neoen wins deal with CleanCo'. ² Australian Energy Market Operator ([accessed July 2020](#)), *Network visualisation map*. ³ Queensland Government (6 May 2020), 'Media statements: Jobs and clean energy to flow from new solar farm'. ⁴ Wambo Wind Farm ([accessed July 2020](#)), 'About the project'. ⁵ Terrain solar ([accessed July 2020](#)), 'Kingaroy'

The identified stimulus opportunities provide a foundation for a resilient long-term recovery

The 12 stimulus policy opportunities identified in this report are intended to directly produce 76,000 job openings over the next three years.

These options are assessed to be high-impact, targeted and timely interventions which are aligned with a low-emission economy. Public investments would leverage further private investments. And the stimulus investments are estimated to create jobs at a comparable efficiency to other stimulus options tried in the past here and around the world.

The breadth of economic activity required to deliver these policy opportunities mean jobs are created for a diverse collection of workers. The job-creating opportunities include for lower-skill workers and those in regional areas. Jobs will be created in all types of occupations. All of the major employing sectors of the economy stand to benefit from such a program, either through direct job

creation or indirect flow-on benefits.

Such a stimulus program will support a long-term transition toward a zero-emissions economy. It will do so first of all by creating assets that will deliver benefits in the long-run. This includes by retrofitting residential and commercial-sized buildings, building new energy infrastructure, and supporting systems like charging networks for electric vehicles. Second, the identified stimulus options can trial and improve policies that are needed for the future. This includes expanding initiatives like ecosystem restoration and organic (food and garden) waste management. The stimulus investments can create the administrative capacity, trained workforce, and policy experience required to deliver such programs into the future. Finally, enabling investments can guide long-term industry development, such as in green hydrogen initiatives.

The Clean Jobs Plan will also address long-term economic trends. The underemployment of Australian workers has been increasing over time, even as our productivity growth has stalled. A clean jobs plan that puts people to work and supports growth in domestic industries can begin the work of reversing these trends.

Governments should move quickly to identify and develop the options which best suit their policy needs. More and more Australians are losing their jobs even as the work of mitigating the economic risks of climate change remains undone. A tailored clean jobs program can help us address these imperatives and begin the work of a sustainable recovery.

4

Appendix

Detailed methodology

Further discussion of method and approach to jobs estimates (1/2)

DO WE MEASURE THE NET EMPLOYMENT IMPACT?

Standard economic evaluations of job creation differentiate between direct, indirect, and induced impacts. This report estimates only the direct impacts – the jobs created by the agencies and firms which are paid to deliver the stimulus policies. It does not attempt to estimate the equilibrium impact of each policy.

Indirect job creation occurs among the suppliers to those agencies and firms. Induced job creation occurs as the general level of economic activity rises and households/ businesses have more money to spend. Job creation can also displace job creation elsewhere: for example, if households invest money in buying energy-efficient devices that they would have otherwise spent elsewhere.

The equilibrium impacts of a policy are difficult to estimate accurately – especially where the economic context is changing rapidly and the

policies in question are so diverse. This report therefore takes the limited but more robust approach of estimating direct job creation.

IN WHAT UNIT DO WE MEASURE JOB QUANTITY?

The quantity of what is referred to as a job can vary widely: consider a part-time three-month contract as against a full-time three-year role. As such, a “job” can be counted in many different ways including job years, the number of people employed, advertised job openings etc.

A precise estimate of the number of job years worked, or the number of different individuals hired, or the number of job openings advertised would all require tentative assumptions about how the policies are designed and how labour market conditions vary locally. This report provides a simpler approach requiring fewer assumptions, but nevertheless provides a reliable estimate of the scale of job creation which would follow from each stimulus policy.

This report is estimating the average number of additional full-time equivalent roles that are being employed in order to deliver the stimulus program. This is based on observing the number of workers that an industry employs to produce a given level of output, using detailed data from the Australian Bureau of Statistics.

HOW DO WE ESTIMATE THE SCALE OF INVESTMENT POSSIBLE IN EACH INVESTMENT?

A conservative approach was taken in estimating the potential amount of stimulus spending that could be allocated to each policy opportunity. Our estimates, detailed in the Appendix for each stimulus option, were informed by the lower end of historical experience where possible. We also lowered our estimates or excluded certain activities where evidence of labour-market constraints called for it (continued on next page)

Further discussion of method and approach to jobs estimates (2/2)

(continued from previous page) For example, despite recent evidence in some states that residential retrofitting programs can be rolled out rapidly, lessons from previous failures in policy were taken into account to select less ambitious targets. Similarly, this opportunity excluded rooftop solar installations as labour shortages are already evident in this sector.

The private co-investments available in each policy is largely a function of how policies are designed. Consider, for example, funding the construction of organic waste processing facilities. Governments can choose to fund such construction entirely themselves as a public asset. Or they could simply enter into a services agreement for the processing of waste and require private investors to foot the full bill of building such facilities. As such, the estimates of private co-financing are in some ways a stated assumption of policy design. The value of

these investments in each case were chosen based on the best available evidence of similar policies. For example, we assume that renewable energy investments can attract ~\$3 for every dollar of public spending because this has been the experience of the Australian Renewable Energy Agency.

HOW DO WE ESTIMATE THE TYPES OF JOBS CREATED?

In order to understand the nature of jobs that would be produced by a stimulus program, this report also estimates the composition of jobs created by industry, occupation (including skill-mix) and geographic region. The industry mix is given by the underlying estimates of the distribution of spending in each stimulus option across relevant sub-industries.

The occupation and skill-mix is estimated based on

a weighted average of the overall occupation and skill-mix in relevant sub-industries. For example, in the case of accelerating public and active transport investment, the overall skill-mix is an average of the construction, professional services, public administration and other sectors.

HOW DO WE ESTIMATE THE GEOGRAPHIC DISTRIBUTION OF JOBS?

The regional distribution of jobs was estimated separately for each stimulus option based on data specific to each option such as the current state of organic waste collection across local government areas in each state or the distribution of ecosystems across the country. In some cases, relevant proxies such as the population or household distribution were used to make these estimates.

Utility-scale renewable energy (1/2)

15,000 jobs

created over three years

6.7 jobs per \$m

of public funding

\$2.25bn

Total public investment

\$1 : \$3

An extra \$3 of private co-financing could be unlocked for every dollar of public funding

Other benefits

- Creates long-standing infrastructure which can support ambitions to increase the share of renewable energy, and provide a viable alternative as coal-fired power stations are decommissioned
- More workers are trained and gain experience in growing clean energy industries

What is included in this option?

Governments can provide grants, low-cost loans and other financing for the installation of utility-scale clean energy infrastructure. This includes:

- **Wind and solar farms** to generate clean energy (accelerating state and territory ambitions to increase the share of total generation coming from renewable sources).
- Upgrades to **transmissions infrastructure** to ensure that existing and newly deployed renewable energy sources can connect to the grid.
- **Utility-scale battery storage** technology to maximise the efficiency of the renewable energy produced

Why was this option included?

Weak  Strong

Impact



- Public stimulus can create lots of jobs efficiently because of the availability of private finance and an advanced project pipeline in this sector. There is a long pipeline of projects which have either reached financial close and can be accelerated or which require financing. Public investments have been historically successful at attracting private financing at scale in this sector.

Targeting



- The jobs created by this spending are likely to include a high share of specialised occupations (e.g. large-haul drivers, grid design engineers etc.), however these jobs are at risk given recent downturn in renewable energy investment.
- The majority of projects are in regional areas that need employment opportunities, although there are only specific sites suitable to host such activity.

Timeliness

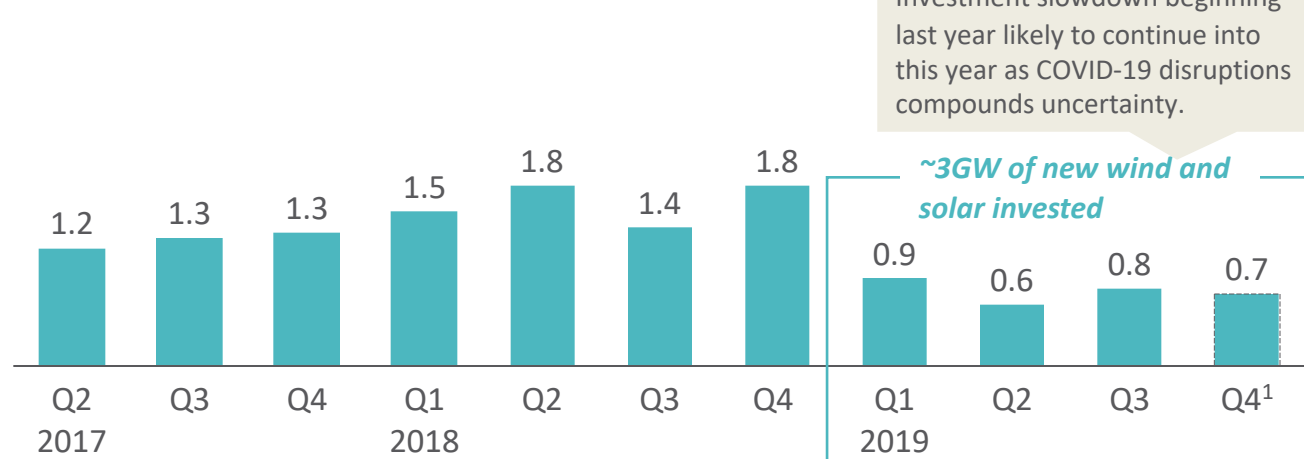


- Timely implementation can occur due to the well-scoped pipeline of projects which exist: including 11GW of wind and solar projects, additional battery storage, and identified transmission priorities.
- Funding allocation processes can be deployed rapidly, allowing feasible pipeline projects with approval to begin work sooner.

Utility-scale renewable energy (2/2)

How much extra investment can be added in this sector?

Quarterly investments in wind and solar, by capacity (GW)



- We estimate there is **scope to add \$9 billion** in investments: including \$6 billion in large-scale solar and wind (~3GW) and associated battery storage, and a further \$3 billion in transmission upgrades.
- The scale of solar and wind (and associated battery storage) investments were **chosen with reference to the Step Change** scenario in the AEMO Draft 2020 ISP, which would see ~3GW of wind and solar capacity to be added in the next few years.¹ This maintains the slower rate of investments seen recently (see chart). Accelerating to previous highs of investment volume is estimated to be difficult given increases in costs related to COVID-19 disruptions.
- The \$3 billion in transmission upgrades were selected based on **immediate priorities identified by AEMO**, projects such as HumeLink and the VNI which are currently being scoped by utility providers and the regulator but yet to be financed.²

What would this look like in practice?

Illustrative jobs created

- **Construction and utilities workers** for the construction and installation of infrastructure; e.g. building, cabling and grid connection, and machinery operation.
- **Engineering and scientific workers** for project management, surveying, electrical and mechanical design, and computer systems management.
- **Administrative workers** for management of projects; e.g. arrange land access and transportation of raw materials, manage shifts, and budget funds.

Project examples

- The Darling Downs Solar Project is one of a dozen large-scale solar PV projects that is funded by ARENA. This group of twelve projects is estimated to unlock ~\$1 billion in private funding and triple the amount of energy produced from large-scale solar in Australia.
- The Port Gregory wind, solar and battery project will provide renewable energy for industrial activity – and was the first WA project to combine wind, solar and battery into one plant.

Ecosystem restoration (1/2)

12,000 jobs
created over three years

6.7 jobs per \$m
of public funding

\$1.8bn
Total public investment

\$1 : \$0.10
An extra \$0.10 of private co-financing could be unlocked for every dollar of public funding

Other benefits




- Restoration and revegetation will improve the health and resilience of natural ecosystems, and protect biodiversity
- Australian ecosystems such as old-growth forests and mangroves are globally significant carbon sinks
- Restored ecosystems can improve tourism prospects

What is included in this option?

Governments can directly fund or subsidise conservation efforts which will increase the ability of natural ecosystems to serve as carbon sinks. This includes restoring and revegetating **forest ecosystems** as well as **wetland ecosystems**. The effectiveness of ecosystems to absorb carbon can be maximised through revegetation (e.g. planting trees or seagrass) and amending irrigation architecture, as well as restoration efforts like changing land-use practices and installing protective fences or walls to prevent degradation.

Why was this option included?

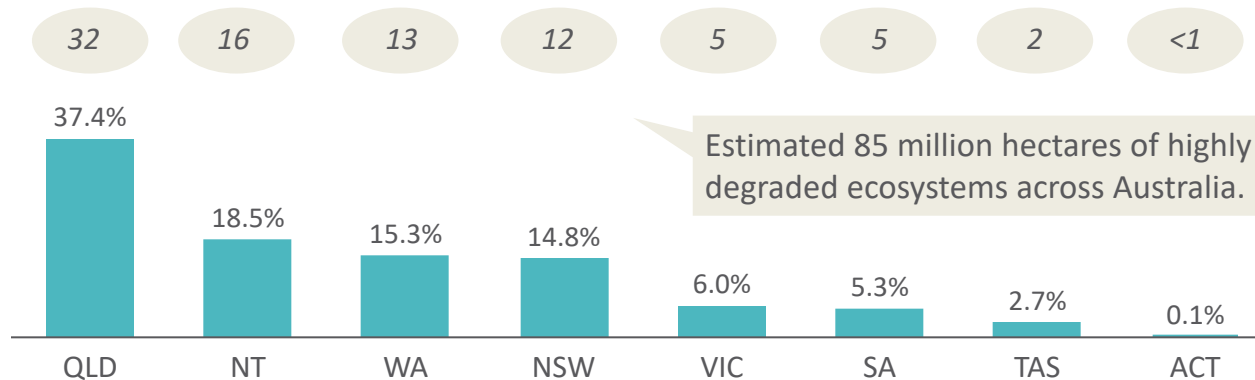
Weak  Strong

Impact		<ul style="list-style-type: none">▪ Revegetation and reforestation are labour-intensive activities that can create many jobs quickly. 6.7 jobs are estimated to be created for every million dollars of public funding, even assuming little private sector investments. This is due to the scale of work needing to be done and the relative labour-intensity of tasks that will be financed by this activity.
Targeting		<ul style="list-style-type: none">▪ The majority of jobs in this program will have relatively low formal qualification requirements, allowing a larger pool of people to be eligible to be employed.▪ Job creation can also be flexibly targeted at regions where jobs are most needed, given the regional focus of restoration and revegetation efforts.
Timeliness		<ul style="list-style-type: none">▪ Relatively low reliance on specialised labour and materials means that this stimulus opportunity could be rapidly scaled.▪ Investment in council administrative systems will expedite approval processes and allow the rapid and scalable mobilisation of the workforce.

Ecosystem restoration (2/2)

How much extra investment can be added in this sector?

Share of restorable ecosystem by state,¹ % (million hectares shown in bubble)



- We estimate an additional \$2 billion could be invested in restoration and revegetation investments, representing the **rehabilitation of 3 million hectares (Mha) of forest and wetland** ecosystems. This is just a fraction of the 85Mha of forest and wetland ecosystems that are determined to be high-priority for restoration efforts.¹
- **3Mha** represents an annual ambition of restoring 1Mha of forest and wetland ecosystem – which is approximately the **amount required to replace the annual net deforestation** across the country (0.6Mha), and to double the current rate of annual wetland restoration (0.2 – 0.4Mha)².
- Whilst this is an **ambitious target** compared to historical performance, there are limited labour or resources shortages which would prevent the target being met.
- Given the **wide scope of potential investment** into this sector, our estimates were tested with industry experts with knowledge of the current capacity of conservation organisations.

What would this look like in practice?

Illustrative jobs created

- **Agricultural service workers** who will provide the manual labour required to restore and revegetate forest and wetland ecosystems.
- **Administrative workers** for management of projects; e.g. arrange land access and materials, manage shifts, and budget funds.
- **Nursery production workers** for the propagation and growing of saplings for revegetation, specific to each region.

Project examples

- The restoration of the Nimmie-Caira wetlands (south-west NSW) is being implemented by the Nari Nari Tribal Council in partnership with The Nature Conservancy, supported by Commonwealth government financing (including the original purchase of ~86,000 hectares for a \$180m investment). The restoration has required reorganising irrigation systems, removing feral pigs and deer, and developing some financial support through managed grazing programs.

¹ Total volume of degraded ecosystems: National Climate Change Adaptation Research Facility and the University of Queensland Australia (2013) 'Protecting and restoring habitat to help Australia's threatened species adapt to climate change'. State shares estimated based on data from Department of Agriculture (forest ecosystem) and Department of Environment (wetland ecosystem). State shares are based on shares of total ecosystem cover, accounting for differential degradation rates where possible. ² The Wilderness Society (October 2017) *Towards Zero Deforestation*

Public and active transport (1/2)

12,000 jobs

created over three years

6.0 jobs per \$m

of public funding

\$2.0bn

Total public investment

\$1 : \$0.50

An extra \$0.50 of private co-financing could be unlocked for every dollar of public funding

Other benefits

- Effective public and active transport can reduce congestion and emissions from the transport sector
- Households can benefit from lower transport cost, lower exhaust pollution, and better access to the health benefits of active transport

What is included in this option?

Governments can bring forward planned spending on public and active transport infrastructure. This includes:

- **Major projects** such as new train or metro lines;
- Increasing the **frequency or capacity of existing services** through hiring more staff or purchasing carriages, or
- Reducing the emissions of **bus fleets through electrification**
- **'Active transport' investments such as** building walkways and cycle paths

The long-term emissions abatement impacts could be significant as more people are encouraged to shift their mode of primary transport, reducing the climate impact from one of Australia's biggest sources of greenhouse gas emissions.

Why was this option included?

Weak  Strong

Impact



- Public stimulus can create lots of jobs efficiently through this option as governments have a pipeline of investments which have already been identified for delivery, including those delivered through public-private partnerships.
- State and territory governments also have experience in delivering infrastructure projects, making it more likely to be able to deliver impact through added financing.

Targeting



- Jobs created through this investment would include both specialised construction-related jobs and general administrative and public sector jobs.
- Job creation is likely to be targeted at major metropolitan centres where the bulk of existing transport infrastructure projects have been identified; however, there is some flexibility in choosing which projects to accelerate.

Timeliness

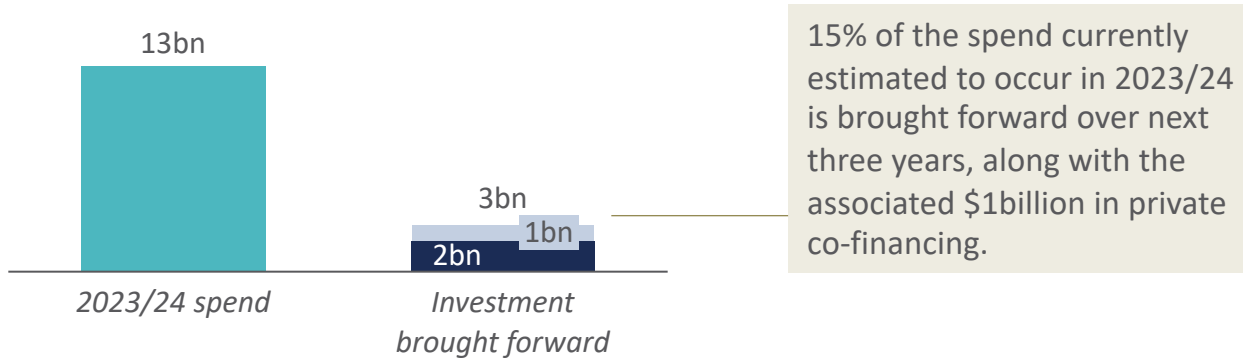


- Accelerating transport investments can lead to immediate job creation, for example to ensure project management, admin site checks and other preparation is completed.
- Some grant-based local active transport programs can be scaled up immediately, allowing for construction jobs to be created sooner.

Public and active transport (2/2)

How much extra investment can be added in this sector?

Value of public/ active transport investment currently budgeted 2023-24, \$¹



- We estimate there is scope for an **additional \$3 billion** in public and active transport infrastructure investment above what is currently planned by state and territory governments over the next three years.
- This represents **accelerating investments** that would have been made over the next 4 – 5 years, and bringing into the three-year horizon 15% of investments that would have otherwise happened after 2023 (see chart).
- This acceleration is **premised on compressing timelines of the announced projects** – projects slated to start later are presumed to be more amenable to acceleration, as the administrative work of planning and coordinating the infrastructure construction can be accelerated more easily than the physical construction work.
- The rate of acceleration that has been assumed was tested with policy-makers; the scale of job creation required to support this increase in output is not assessed to be likely to be compromised by skills shortages.

What would this look like in practice?

Illustrative jobs created

- **Construction and utilities workers** for the construction and installation of infrastructure; e.g. building, cabling and grid connection, and machinery operation.
- **Engineering and scientific workers** for project management, surveying, electrical and mechanical design, and computer systems management.
- **Administrative workers** for management of projects; e.g. arrange land access and transportation of raw materials, manage shifts, and budget funds.

Project examples

- Victoria's 'Suburban Rail Loop' is preparing for construction in 2022 with site tests, planning and consultation. This can be accelerated by employing more people and resources.
- The NSW Streets as Shared Spaces Program provides council grants for the immediate expansion of footpath and cycleway projects.

¹ Estimates based on reviews of budget and infrastructure plans of each state and territory. Where annual breakdowns were not available for multi-year projects, the investment was allocated proportionally over life of project.

Organic waste management (1/2)

10,000 jobs

created over three years

15.5 jobs per \$m

of public funding

\$0.6bn

Total public investment

\$1 : \$2.10

An extra \$2.10 of private co-financing could be unlocked for every dollar of public funding

Other benefits

- Organic waste is a major contributor of greenhouse gas emission from landfills; this can be diverted with effective processing
- Support the development of a waste processing industry in Australia which can be a driver of long-term innovation and employment

What is included in this option?

Governments can boost local efforts to collect and process household waste more efficiently. Two interventions in particular are modelled for this policy:

- introduce or expand **organic (food and garden) waste collection and processing** in local government areas, including through council collection programs and building the processing facilities required to divert the collected waste from landfill
- Surveys and communication** in order to understand and shape how households and businesses manage food and garden waste

Why was this option included?

Weak  Strong

Impact



- Public stimulus can create jobs at scale and across the country because there is a lot of work to be done: most households in Australia are yet to have access to organic waste collection services. In addition, creating reliable supplies of organic waste (through council collections, for example) can unlock private investments into processing infrastructure into the long term.

Targeting



- The work to be supported through this investment will rely on service and administrative workers – many of whom can be transitioned from the sectors most affected by COVID-19 unemployment (such as hospitality and retail trade)
- The program can be geographically targeted at a local council level, allowing for focussing the investment on areas that are affected the most by post-COVID unemployment.

Timeliness

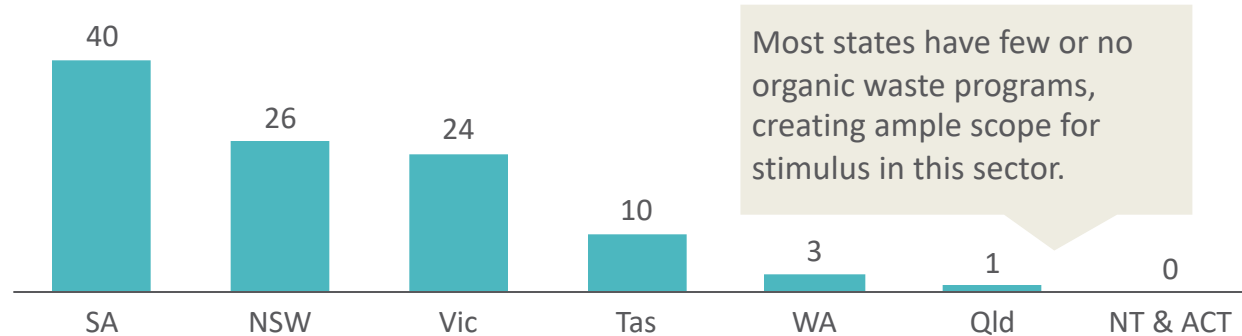


- Local councils already operate organic waste collection and behavioural change programs that can either be expanded or provide a model for other councils around the country.
- There are limited capital or supply constraints which would prevent the rapid rollout of these programs.

Organic waste management (2/2)

How much extra investment can be added in this sector?

Share of local councils with organic waste recycling programs, by state (%)



- We estimate there is scope for an **additional \$2 billion** of investment: including to build processing facilities, expand collection services, and drive behavioural change among households and businesses.
- This ambition was chosen with reference to the estimated cost of expanding organic waste services to an **additional 3 million households (doubling the estimated current coverage)**.
- The break down of the \$2 billion is as follows:
 - \$0.6 billion is needed for expanding waste collection alone over three years (the average cost of organic waste collection estimated at \$75 per household per year¹)
 - Approximately \$1.2 billion is needed to build facilities at the scale required to process the household waste of ~3 million households. The average cost of processing facilities was estimated based on existing facilities.²
 - A further \$0.2 billion is estimated to be required for household and business behavioural change programs over three years.

What would this look like in practice?

Illustrative jobs created

- **Waste management workers** for the increased collection of organic waste and the operation of waste treatment facilities.
- **Construction workers** for the construction and installation of processing infrastructure; e.g. building, cabling and grid connection, and machinery operation.
- **Administrative workers** jobs for management of projects; e.g. produce advertising materials, manage collection shifts, and budget funds.

Project examples

- Love Food Hate Waste, funded out of the Organic Infrastructure Fund (NSW), provided grants for organisations to deliver programs targeted at households or businesses to drive behaviour change reducing food waste.
- The Kerbside Performance Plus program in SA provides a financial incentive for councils to introduce food waste recycling measures.

Publicly-owned building retrofitting (1/2)

8,000 jobs created over three years

5.3 jobs per \$m of public funding

\$1.5bn Total public investment

No extra private co-financing is assumed to be unlocked; the projects are assumed to be entirely public-funded

- Other benefits:
- Buildings are responsible for a significant share of emissions; reducing their energy use will drive down greenhouse gas emissions
 - Retrofitting for energy efficiency will also drive down energy costs for governments in the long-term

What is included in this option?




There are a variety of methods to retrofit commercial buildings and we consider a mix of them in this option. Examples of retrofitting activity include:

- **Simpler steps** such as installing energy-efficient lights, or occupancy sensors to turn off heating/ lights in unused spaces.
- **Deeper retrofits** such as upgrading ventilation systems to be demand-responsive (through using ventilation system motors that can change speed according to the level of CO₂ recorded in the building)

This option also includes conducting **energy audits** and data collection to inform/ prioritise ongoing efforts.

Why was this option included?

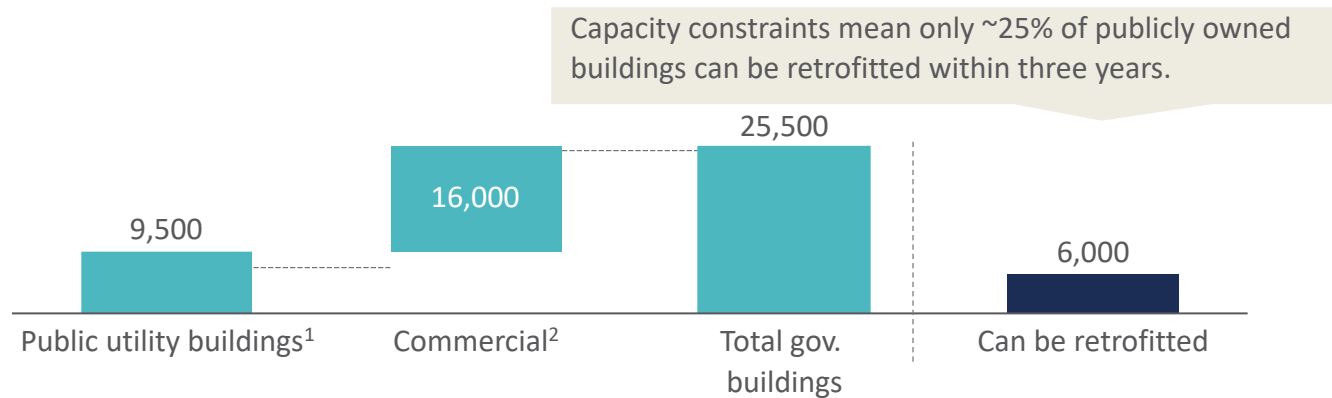
Weak  Strong

Impact		<ul style="list-style-type: none">▪ Public spending can create jobs at scale because of the large scale of investments possible in this option (there are over 25,000 publicly-owned buildings in Australia), and the variety of tasks available to be done (from energy audit and data collection work through to complex retrofitting installations).
Targeting		<ul style="list-style-type: none">▪ While some jobs created through this initiative require specialised skills including construction services, a substantial portion consists of administrative work (e.g. program management, energy audits)▪ Buildings in need of retrofitting are dispersed through metro and regional areas; this initiative has the potential to target regional job creation
Timeliness		<ul style="list-style-type: none">▪ A staggered program which rolls out building audits and prioritises low-level retrofitting such as light fittings before moving on to 'deep retrofit' initiatives can create jobs rapidly and maintain new job creation over three years.

Publicly owned building retrofitting (2/2)

How much extra investment can be added in this sector?

Total number of public buildings in Australia and number that could be retro-fitted over three years



- We estimate there is scope for an **additional \$1.5 billion** of public investment to retrofit publicly owned buildings, including the auditing of current energy use, prioritising of audit needs, and carrying out of retrofitting activity as needed.
- This scale of ambition **assumes that ~2,200 buildings are retrofitted each year** at a cost of \$200,000 each. This average rate and cost were estimated based on a review of past experience of retrofits of commercial-sized buildings.³
- This investment is a **small share of the total number of public buildings**. We estimate there are ~25,000 relevant government-owned buildings in Australia (including schools, hospitals, police stations and commercial buildings).² The investments modelled in this option would affect just ~25% of these properties.
- However, as with residential retrofitting, the potential ambition has been **moderated to account for needing well-trained staff** to complete the retrofits as well as the number of buildings requiring retro-fitting

What would this look like in practice?

Illustrative jobs created

- **Electricians and electricity supply workers** for the replacement and installation of electrical equipment; e.g. lighting, ventilation motors.
- **Administrative workers** for management of projects; e.g. procure accredited service providers, monitor and collect data, and budget funds.
- **Building construction workers** for the renovation of building stock and installation of building materials; e.g. insulation, window tinting etc.

Project examples

- The NSW Government Resource Efficiency Policy, funded through the government's existing energy efficiency finance facility, requires public agencies to take measures to cut resource use where possible – this has supported ~500 energy efficiency projects over the last 6 years (creating energy savings of over \$10 million).

¹ Schools, hospitals, fire and police stations. ² Based on a review of available government property registers and reviews of mid-tier commercial building stock, see: EY (2015) *Mid-tier commercial office buildings in Australia*. ³ For example, a 5-year retrofitting program in Melbourne cost ~\$350,000 per building but targeted deeper retrofits which are more expensive. An average cost of \$200,000 assumes a higher share of completions in three years being limited to light retrofits. See: Sustainable Built Environment National Research Centre ([September 2016](#)) *Retrofitting Public Buildings for Energy and Water Efficiency*

Residential building retrofitting (1/2)

7,000 jobs created over three years

7.9 jobs per \$m of public funding

\$0.89bn Total public investment

\$1 : \$1.25 An extra \$1.25 of private co-financing could be unlocked for every dollar of public funding

Other benefits

- Households can lower their energy bills long into the future through one-off investments like glazing, smart-meters and heat pumps
- Sustained improvements in energy efficiency will help reduce emissions from electricity consumption

What is included in this option?

Governments can subsidise retrofitting households with energy efficiency technologies – including heat pumps, smart meters, insulation and sealing/ glazing, along with energy-efficient appliances. This mix of technologies can enable emissions abatement in the long run by reducing demand for energy and allowing utility companies to more efficiently manage the distribution and pricing of electricity. This can also support households to reduce their energy bills.

Why was this option included?

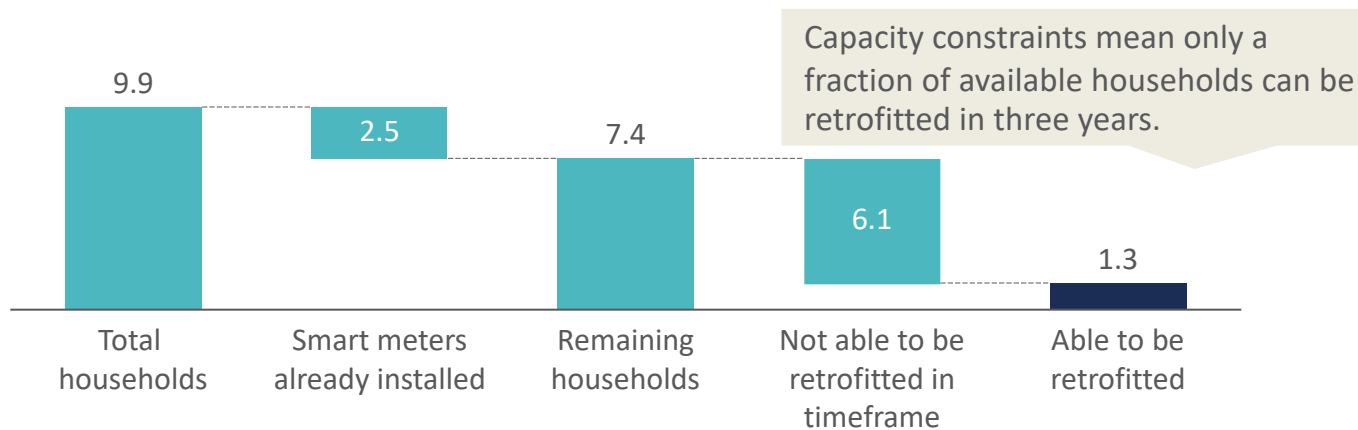
Weak Strong

Impact	<div></div>	<ul style="list-style-type: none">The relatively high estimated impact of this investment (8 jobs per million dollars of public investment) is due both to the labour-intensity of small-scale retrofitting projects (creating work for tradespeople) and the ability for government financing through subsidies to attract additional private spending from households.
Targeting	<div></div>	<ul style="list-style-type: none">Many jobs created through this initiative require specialised skills including utility-related services, but some lower-skill administrative work is neededThe initiative has the capability to benefit those that need the most assistance, including public housing and low-income households, and can extend to energy inefficient households in regional areas
Timeliness	<div></div>	<ul style="list-style-type: none">Existing initiatives to retrofit housing can be scaled up, but some time may be required to ensure adequate worker trainingThe rollout of energy efficient materials and devices may be preceded by marketing to households, training of staff, and program administration tasks – all of which will rapidly employ workers.

Residential building retrofitting (2/2)

How much extra investment can be added in this sector?

Count of Australian households by status of smart meter installation, millions



- We estimate **an additional \$2 billion in investment** (\$1 billion of which is public) could be made to retrofit an additional 0.6 million households per year over the next three years.
- This ambition was chosen based on a **review of the pace of installation in similar state-level and national schemes**. Smart meter installation and glazing programs in Victoria, New South Wales, Queensland, Tasmania and South Australia accomplished rates equivalent to a national annualised rate of retrofitting 1.2 – 1.6 million households a year.¹
- However, **constraints in supply of well-trained staff and businesses** can limit actually accomplishing this rate for three years and at a national level. Indeed, the national Home Insulation Program (2010) which retrofitted 1.2 million in its year of operation was affected by shortages of well-trained staff and appropriate safety. A rate of installation that is half this program has therefore been chosen as a conservative ambition.

What would this look like in practice?

Illustrative job roles

- **Electricity supply workers** for the replacement and installation of electrical equipment; e.g. heating, ventilation and air-conditioning systems, lighting, meters.
- **Building construction workers** for the renovation of residential stock and installation of building materials; e.g. insulation, windows, draught seals.
- **Administrative workers** for management of projects; e.g. register accredited service providers, monitor and collect data, and budget funds.

Project examples

- The Victorian Energy Upgrades program operates by allocating energy efficiency 'certificates' to upgrades, which can be sold by accredited retrofit service providers to energy retailers, incentivising the retrofits
- The NSW Home Energy Efficiency Retrofits program, as part of the Energy Saving Scheme, provides direct subsidies to for the installation of eligible energy-efficient devices

¹ Smart Energy International ([28 June 2019](#)) 'Falling behind down under'

Urban and peri-urban gardens (1/2)

6,000 jobs

created over three years

6 jobs per \$m

of public funding

\$1.0bn

Total public investment

No extra private co-financing is assumed to be unlocked; the projects are assumed to be entirely public-funded

Other benefits

- Makes cities and towns more liveable by reducing 'heat island' effects in urban centres and provide more usable green space for citizens to enjoy
- Emissions would be reduced as natural shade and cooling reduces emissions from heating and cooling

What is included in this option?

Local councils and other organisations can be funded to invest in the expansion of urban and peri-urban green spaces. This can include the following activity:

- Increasing **green ground cover** including shrubbery and trees ('canopy cover') which can increase the amount of emissions absorbed and reduce 'heat island' effects in urban centres;
- Establishing **vertical or rooftop gardens** or similar small-scale agricultural programs which can reduce the resource-intensity of some food production (e.g. through efficient water systems, reduced transport of goods, and minimised food waste) and serve as models of local agricultural production for future development

Why was this option included?

Weak  Strong

Impact



- The high job-creating impact of this option is due to its reliance on labour-intensive activities such as scoping local sites, planting trees or other green cover and administering local projects.
- Whilst there is also a large scope of potential investment, there is limited capacity to attract private financing which limits its overall impact.

Targeting



- The majority of jobs in this program will have relatively low formal qualification requirements, allowing a larger pool of people to be eligible to be employed.
- Local delivery means this program can be precisely targeted to areas that are most in need of stimulus.

Timeliness

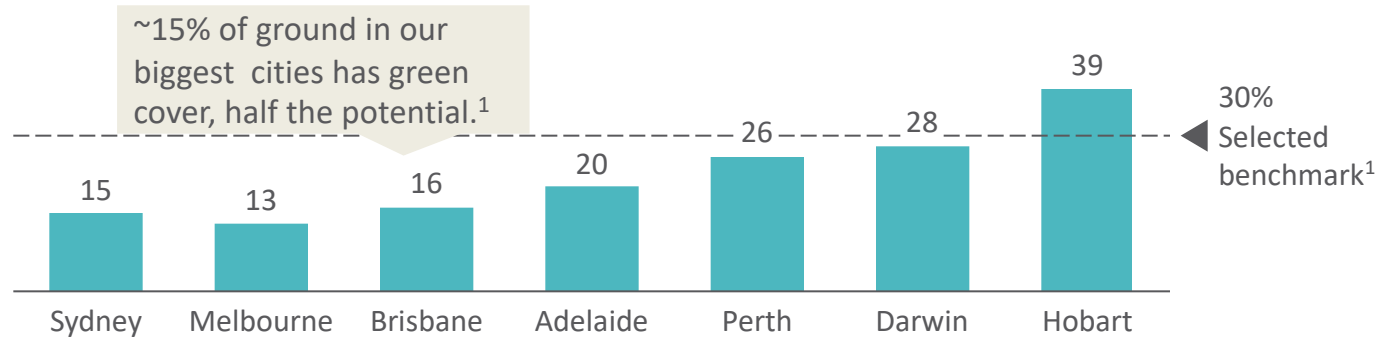


- Existing programs can be scaled up rapidly if funds are channelled through local councils, land management organisations and other existing local administrative systems.

Urban and peri-urban gardens (2/2)

How much extra investment can be added in this sector?

Share of capital city ground area with green cover, %*



- We estimate there is **scope to add \$1 billion** in investments over the next three years to improve the amount of tree cover in urban parkland environments, increase the share of urban areas that are covered by greenery, and develop existing green spaces for use.
- This scale of investment was chosen based on a **review of existing state government activity**. The NSW Open Spaces and Greener Sydney package alone has been funded to \$340 million.² Scaling a similar program nationally over three years would require ~\$1 billion in additional funding compared to what governments have committed to date.
- The scale of investment was **also benchmarked against available estimates of green-space cover**. For example, satellite imaging data reveals that councils in major cities across the country have just ~15 – 20% of their ground covered by tree canopies.³ This could be doubled, based on estimates of bare parkland or uncovered spare land although would cost more than \$1 billion.
- We have **capped the investment based on the most ambitious scale** that has been effectively deployed.

What would this look like in practice?

Illustrative jobs created

- **Agricultural service workers (generalists)** who will provide the manual labour required to develop urban and peri-urban gardens.
- **Administrative workers** for management of projects; e.g. arrange land access and materials, manage shifts, and budget funds.
- **Agricultural service workers (specialist)** who will provide guidance and program design.

Project examples

- City of Melbourne's Urban Forest Fund supports a wide range of projects including expanding gardens, tree planting, green roofs and vertical greening. For example, the Melbourne sky farm project received a \$300,000 matched-funding grant from the Fund to develop a green space for productive urban farming, education, reducing pollutant runoff and mitigating urban heat island effects.

¹ Estimates based on: Institute for Sustainable Futures (2014), *Benchmarking Australia's Urban Tree Canopy: An iTree Assessment, Final report*. Estimates adjusted to account for relative LGA coverage (e.g. Hobart and Brisbane LGAs expands well beyond metropolitan area). Benchmark canopy cover is estimated with reference to current areas of uncovered parkland. ² NSW Government ([3 February 2019](#)) 'Media release: New Minister for Public Spaces' ³ Estimates based on: Institute for Sustainable Futures (2014), *Benchmarking Australia's Urban Tree Canopy: An iTree Assessment, Final report*

Community-scale energy storage and generation(1/2)

2,000 jobs

created over three years

12.4 jobs per \$m

of public funding

\$0.2b

Total public investment

\$1 : \$2.1

An extra \$2.10 of private co-financing could be unlocked for every dollar of public funding

Other benefits




- Provides an independent source of energy for remote communities which may be cut off through bushfires or other natural disasters
- Reduces the energy costs for local communities and households
- Improves the efficiency of existing rooftop solar systems

What is included in this option?

Governments can support the establishment of local energy infrastructure which can **generate, store and distribute energy at a local level**. Initiatives can include **local solar farms, batteries and integration into transmission networks**. Local energy infrastructure can help drive down energy costs for households and businesses, and provide energy independence for communities which may need it in times of bushfire or other natural disasters.

Why was this option included?

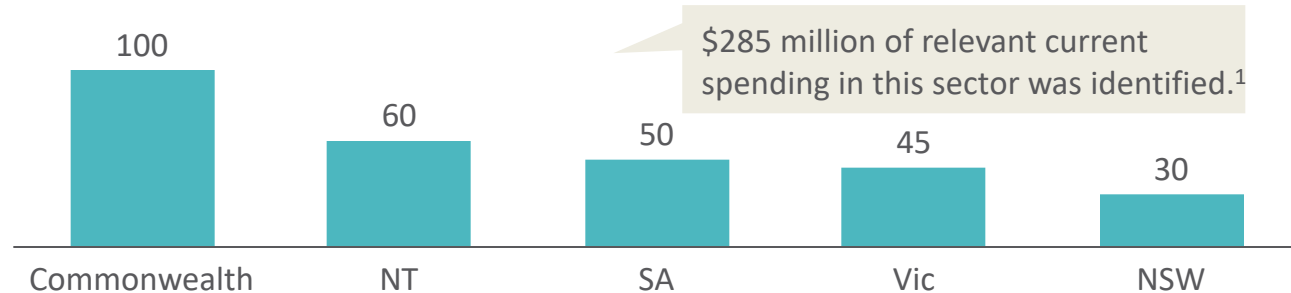
Weak  Strong

Impact		<ul style="list-style-type: none">▪ This opportunity creates 12.4 jobs for every \$1 million of public financing. The job-intensity of public investment is high, despite the need to spend on expensive specialised equipment, due to its ability to attract further private funding.
Targeting		<ul style="list-style-type: none">▪ Most jobs created through this investment require specialised skills including construction services, but less specialised administrative work is also needed▪ Given the flexibility of scale, this initiative has the capability to benefit communities in need including remote areas and those affected by bushfires, and has the capacity to create jobs in these regions.
Timeliness		<ul style="list-style-type: none">▪ Job creation is likely to be slow in the first 12 months if funds are allocated via grants to support local projects. The grant approval process in addition to the lead-time required for a project to begin will delay job creation.▪ Some existing funding programs can be replicated in viable locations, allowing for a swift council-led rollout of planned and feasible projects.

Community-scale energy storage and generation (2/2)

How much extra investment can be added in this sector?

Amount of funding for community-scale generation, transmission and storage, \$m



- We estimate there is **scope to add \$500 million** in total investments over the next three years to install community-scale renewable energy infrastructure including mid-size solar farms, microgrid transmission infrastructure, and battery storage facilities.
- This scale of investment was **benchmarked against existing government spending in this sector**. A review of ARENA, Clean Energy Finance Corporation (CEFC) and state/territory programs identified approximately \$285 million in investments at present. This stimulus investment would therefore represent a near doubling of current spending on microgrids and community-scale energy infrastructure.
- This scale of ambition is **possible given the current rate of growth of mid-size solar generation, storage, and microgrid transmission** infrastructure. Mid-size solar capacity has quadrupled in the last three years.² Interest in micro-grids is also growing. For example, the Commonwealth began funding approximately \$50m of feasibility studies for microgrids last year and is joined by states like Victoria (Microgrid Demonstration Initiative) and WA (recently released major study outlining pathway to a distributed energy future).

What would this look like in practice?

Illustrative job examples

- **Construction and utilities workers** for the construction and installation of infrastructure; e.g. building, cabling and grid connection, and machinery operation.
- **Administrative workers** for management of projects; e.g. arrange land access and transportation of raw materials, manage shifts, and budget funds.
- **Engineering and scientific workers** for project management, surveying, electrical and mechanical design, and computer systems management.

Project examples

- The South Australian Virtual Power Plant program allows households to co-invest with utilities in home battery and solar systems that have grid as well as local power benefits. 12,300 systems have been approved as of mid April, equivalent to \$1.3 million of investment.
- The Euroa Environment Group (Victoria) is developing a \$1.6 million microgrid with renewable energy generation and battery storage facilities.¹

¹ Estimates based on desktop review from various sources. Commonwealth funding includes ARENA projects related to mid-size solar and distributed energy transmission systems. ² Clean Energy Council, ([2 June 2020](#)) *Clean Energy At Work*. ³ Australian government, Department of Industry, Science, Energy and Resources ([accessed June 2020](#)) 'Regional and Remote Communities Reliability Fund'; Jaclyn Symes (State member for Northern Victoria) ([3 September 2018](#)), 'New microgrid funding for the Euroa community'; Government of Western Australia ([December 2019](#)) *Distributed Energy Resources Roadmap*

Investing in clean technology research (1/2)

2,000 jobs
created over three years

20 jobs per \$m
of public funding

\$100 million
Total public investment

\$1 : \$1.80
An extra \$1.80 of private co-financing
could be unlocked for every dollar of
public funding

- Other benefits
- Supports the growth of ‘breakthrough’ technologies which can reduce emissions, drive up productivity growth, and create more globally competitive industries in Australia

What is included in this option?

Governments can enable long-term emissions abatement initiatives through funding the creation of the required ideas and scientific breakthroughs. They can do this by supporting businesses, universities, and other research centres to work on climate-related challenges. Research would help create new technologies across industrial sectors (e.g. manufacturing materials, energy generation etc) that can help reduce greenhouse gas emissions to zero over time as well as aid in the development of climate change adaptation strategies.

Why was this option included?

Weak  Strong

Impact



- This opportunity can create 20 jobs for every million dollars in public funding. The research sector has such high labour intensity despite high wages as the sector is more labour-intensive than other sectors (this is especially so once a research centre has been established). The policy is also estimated to leverage private financing.
- The overall impact is reduced however due to the relatively low scale of investment.

Targeting



- This investment is likely to support high-skilled jobs in the research and education sector, along with some generalist jobs in project administration and assistance (e.g. data entry, clerical work).

Timeliness

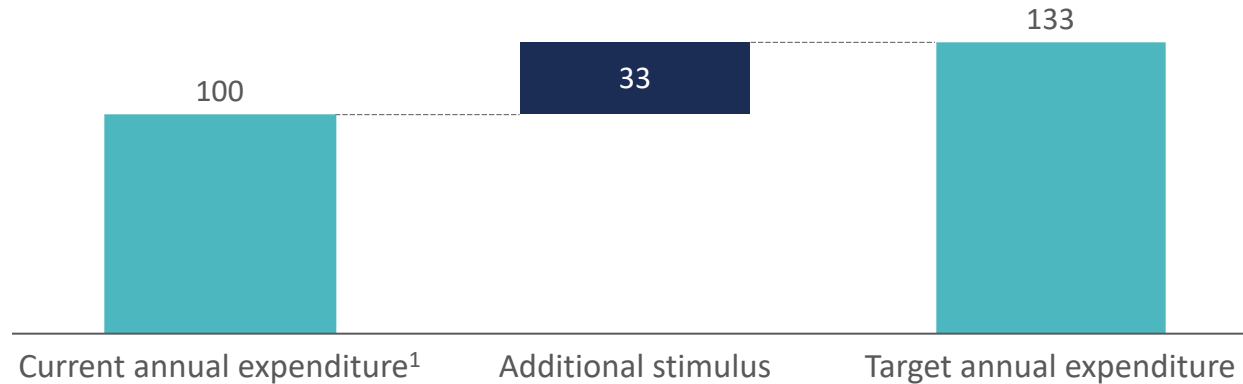


- This policy has the potential to create jobs rapidly. Some of the administrative and bureaucratic infrastructure already exists to identify and disburse funding to prioritised research projects. This means the funding can be deployed more quickly than if an entirely new policy infrastructure were needed.

Investing in clean technology research (2/2)

How much extra investment can be added in this sector?

Annual expenditure in direct government research related to climate change, \$ million



- We estimate there is scope to add **\$300 million** in investments over the next three years to boost research programs in emissions abatement technology. This would represent a ~30% boost to the total *direct* funding estimated to be allocated by the Australian government on emissions abatement activities.¹
- There is a **wide scope of potential estimates** available in this sector. This ambition has been chosen to account for the potential skills gaps in this sector – while much more funding could be absorbed in the long-run, increasing funding above the current rate of growth will require highly specialised experts in the short term.
- The research programs included in this calculation are **direct investments in frontier technologies**, for example through CSIRO, Australian Research Council, and the Cooperative Research Centres program. It does not include support of commercialised technologies (e.g. ARENA) or indirect expenditure (e.g. tax incentives).

What would this look like in practice?

Illustrative jobs created

- **Lab technicians** for practical support in designing and setting up experimental studies and data management
- **Subject-matter specialists** including engineers, chemists, technologists etc. who can shape the design and intellectual direction of research programs.
- **Research assistants** can support research work in a variety of ways, from basic analysis and data management through to research design and reporting.
- **Project managers** to manage teams deliver effective research programs

Project examples

- The “Carbon Farming Futures” program (2012 – 2017) delivered \$139 million in funding across 200 projects, which included direct funding of research as well as partnering with private landholders to implement on-farm trials of emerging technologies.

¹ Estimated based on Science, Research & Innovation Budget Tables (September 2019), *Australian Government investment in R&D by program/activity*. The value of projects related to climate change (including decarbonisation and adaption) were summed.

Education and training programs (1/2)

1000 jobs created over three years

20.1 jobs per \$m of public funding

\$49.8m Total public investment

\$1 : \$1.80 An extra \$1.80 of private co-financing could be unlocked for every dollar of public funding

Other benefits

- Enables future emissions-reduction programs that may otherwise be limited by skill capacity constraints
- Supports workers to have the skills needed to participate in a low-emissions economy

What is included in this option?

Governments can enable the transition to a zero-emissions economy by creating the skills needed to do that work. This includes explicit climate or sustainability-related expertise such as in energy modelling or renewable-energy technologies. It also includes expertise needed to facilitate the transition to a zero-emissions future such as in construction and engineering.

Why was this option included?

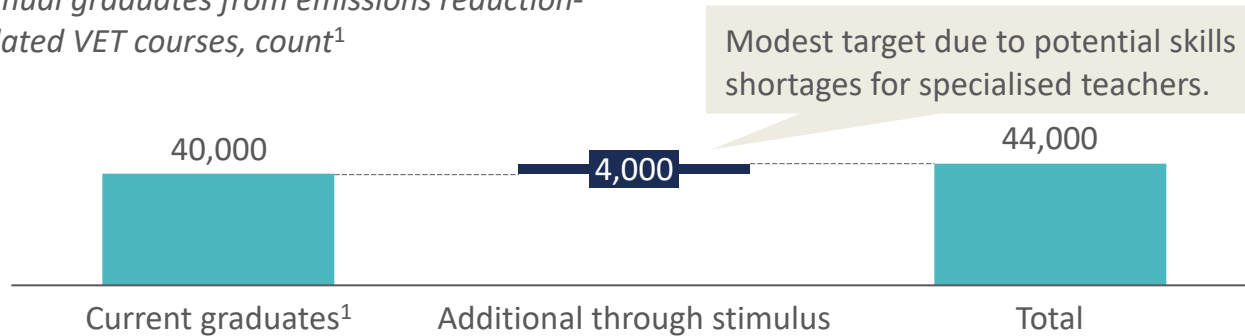
Weak Strong

Impact	<div></div>	<ul style="list-style-type: none">▪ This opportunity creates 20.1 jobs per million dollars of public funding. The high job-intensity is because of two factors. First, adult and vocational education are labour-intensive tasks. Second, as much of reskilling training occurs with employer-led initiatives or through personal funding, public investments are leveraged with private co-financing.
Targeting	<div></div>	<ul style="list-style-type: none">▪ Most jobs created require specialised skills or specific industry knowledge in order to provide education and training for workers.▪ If mobilised through community and private institutions, in addition to publicly funded ones, this initiative has the capability to create jobs across the country for those directly impacted by the recent crisis.
Timeliness	<div></div>	<ul style="list-style-type: none">▪ Jobs can be created rapidly as existing workplace training and vocational education and training (VET) programs can be scaled up. In addition, given the high share of the workforce that are currently underemployed, workers and companies are likely to be responsive to subsidies for retraining or upskilling.

Education and training programs (2/2)

How much extra investment can be added in this sector?

Annual graduates from emissions reduction-related VET courses, count¹



- We estimate there is **scope to add \$150 million in investments** over the next three years to boost the number of students and workers that graduate from emissions reduction-related courses, including vocational education and training (VET) programs and short-courses.
- This **scale of ambition represents training an additional 42,000 students** at an average cost of \$3,500 per student. For context, approximately 40,000 people graduate each year from climate-relevant VET courses at present, and ~300,000 people in Australia are employed in “clean economy” jobs.¹ Our estimate would therefore represent increasing the uptake of VET courses by ~10% (12,000 students subsidised \$6,000 each), and subsidising the upskilling of ~10% of the workers currently in the clean economy (30,000 students subsidised \$2,500 each). The average subsidy rates are chosen based on current course costs.³
- Whilst the **need for training is likely higher**, a modest ambition has been chosen for this additional stimulus for two reasons: 1) Governments are already subsidising training in high-priority areas; and 2) training in specialised areas requires specialised skills, meaning that scaling up education programs dramatically can be hampered by skills shortages.

What would this look like in practice?

Illustrative jobs created

- **Tertiary education workers** for classroom and workshop instructors, as well as apprenticeship providers
- **Administrative workers** for management of projects; e.g. arrange suitable service providers, budget funds and monitor course completion.

Project examples

- The NSW government is paying up to \$1,000 of student fees directly to training providers as part of the “Fee-Free” training and traineeship program.
- The Queensland government’s “Skills Boost” program provides support for people with existing qualifications to pursue further qualifications in fields that have been nominated as a priority in their region. For example, North Queensland priority courses include Conservation and Land Management, Agriculture, and Horticulture.

¹ National Centre for Vocational Education Research, VOCSTATS, <https://www.ncver.edu.au/research-and-statistics/vocstats> ²The share of FTE-equivalent workers in each industry which are working on sustainability-related issues was estimated based on analysing task descriptions in a database of real-time online job-advertisement data. ³ Review of current course costs and subsidy structures for a sample of upskilling courses – including VET Diplomas delivered by TAFEs and private providers, and short courses.

Investment in pilot-scale green hydrogen facilities (1/2)

500 jobs created over three years

16.7 jobs per \$m of public funding

\$30 million Total public investment

\$1 : \$4 An extra \$4 of private co-financing could be unlocked for every dollar of public funding

- Other benefits
- Diversifies national sources of low-emission energy
 - Green hydrogen has the potential to be a globally competitive new industry
 - Supports innovation and productivity growth, including through increasing the skills and knowledge of Australian firms/workers

What is included in this option?

Governments can support the development of pilot-scale green hydrogen production facilities through grants, low-cost loans and other sources of finance. Green hydrogen is a growing technology source with high potential, with pilot programs already being funded by the Australian Renewable Energy Agency and the Clean Energy Finance Corporation. There is some capacity for further funding to support the development of this industry.

Why was this option included?

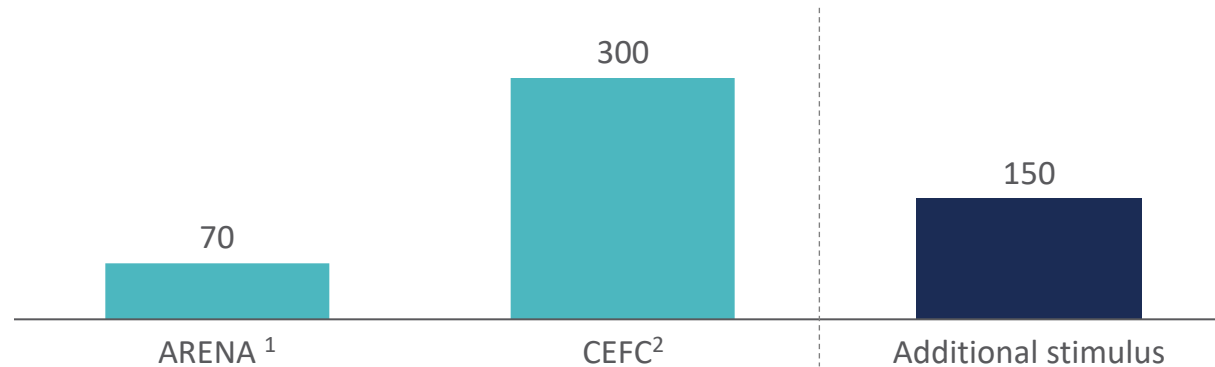
Weak Strong

Impact	<div></div>	<ul style="list-style-type: none">▪ This opportunity can create 16.7 jobs for every million dollars in public funding. Whilst there is relatively low labour-intensity in construction and utilities, this opportunity requires labour-intensive work like research and scientific services.▪ However, the government’s ability to leverage further private finance positively affects the job-intensity figure.
Targeting	<div></div>	<ul style="list-style-type: none">▪ The majority of jobs created through this investment require specialised skills for the construction and installation of hydrogen production equipment.▪ Sites suitable for green hydrogen production are typically found close to large-scale renewable generation. This means that job creation cannot be flexibly targeted at local regions.
Timeliness	<div></div>	<ul style="list-style-type: none">▪ The pace of job creation will depend on the chosen projects, but there exists a considerable list of feasible projects in the pipeline.▪ Funding allocation processes can be accelerated, allowing such projects with approval to hit the ground more rapidly.

Investment in pilot-scale green hydrogen facilities (2/2)

How much extra investment can be added in this sector?

Total prospective funding by source, \$ million



- We estimate there is scope to **add \$150 million in additional investments** over the next three years. The public component of this would add a further 15% to currently declared funding.
- Substantially more investment is being unlocked in green hydrogen. For example, the Arrowsmith Hydrogen Project announced in April 2020 alone has ~\$300 million in investment for its first phase.³ The combined value of projects applying for part-financing from ARENA is over \$3 billion.⁴
- The potential scale of ambition **for short-term stimulus is limited by two factors**: first, there has already been announced and allocated a large amount of both public and private funding leaving little room for additional government funding; second, the sharp increase in recent investments in this specialised sector could limit the ability of the sector to absorb further financing.

What would this look like in practice?

Illustrative jobs created

- **Construction workers** for the construction and installation of infrastructure; e.g. building, equipment installation, cabling and machinery operation.
- **Engineering and scientific workers** jobs for project management, surveying, electrical and mechanical design, and computer systems management.

Project examples

- The Arrowsmith Hydrogen Project, based north of Perth, is being developed by Infinite Energy and slated to be operational by 2022.
- The Pacific Solar Hydrogen project near the Port of Gladstone in Queensland is currently going through environmental impact studies.

¹ ARENA ([accessed July 2020](#)) 'Renewable Hydrogen Deployment funding round' ² Clean Energy Finance Corporation ([accessed July 2020](#)), 'Where we invest: Hydrogen' ³ Renew Economy ([29 April 2020](#)) 'Massive hydrogen project gets green light after securing \$300m investment' ⁴ PV Magazine ([5 June 2020](#)) 'ARENA receives overwhelming response to green hydrogen funding round'

Upgrade and expansion of electric vehicle charging networks (1/2)

500 jobs created over three years

12.5 jobs per \$m of public funding

\$40 million Total public investment

\$1 : \$2 An extra \$2 of private co-financing could be unlocked for every dollar of public funding

Other benefits

- Supports the uptake of electric vehicles in Australia, which can drive down emissions from the transport sector
- Provides consumers with more choice, by taking away the potential constraints of choosing to switch to electric vehicles

What is included in this option?

One of the potential barriers to electric vehicle (EV) uptake is the lack of adequate charging infrastructure – there are relatively few of them, even fewer ‘fast-charging’ stations, and they are missing on key national routes which would enable long-range transport. Government investment in fast-charging stations could therefore act as an enabler for significant emissions abatement, by incentivising the use of EVs.

Why was this option included?

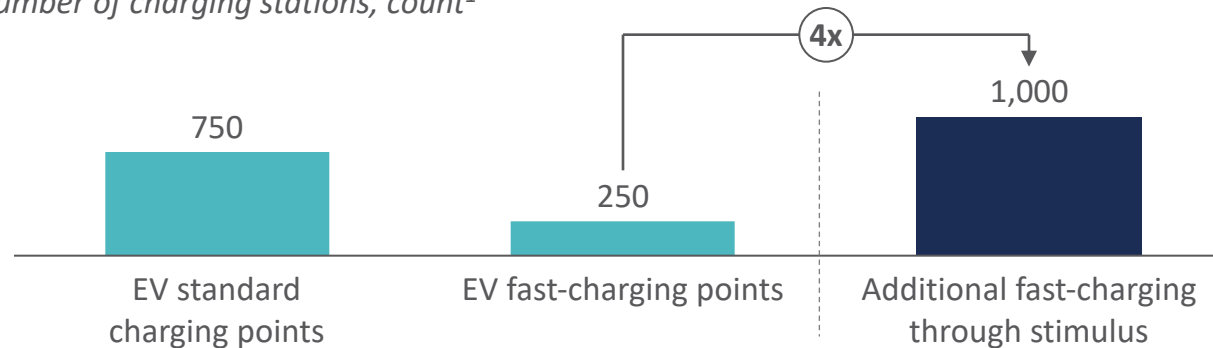
Weak Strong

Impact	<div></div>	<ul style="list-style-type: none">▪ This stimulus option can create jobs efficiently due to the labour intensity of small-scale installation projects (charging stations are delivered locally)▪ The overall impact remains low as we estimate there is limited scope for additional short-term public stimulus (limited by the overall potential scale in the long-term and material/ labour capacity constraints in the short-term)
Targeting	<div></div>	<ul style="list-style-type: none">▪ The majority of jobs created through this opportunity require specialised skills for the installation of infrastructure and connection to the grid. There is also a small proportion of less specialised administrative jobs.▪ Whilst there is some potential to target local regions, in the near term the uptake of EVs, and therefore the need for EV infrastructure, will be focused in dense metropolitan areas.
Timeliness	<div></div>	<ul style="list-style-type: none">▪ The rollout of infrastructure is subject to three variables: fund allocation from grants programs, the lead time to organise permits to construct and potential grid capacity constraints.▪ However job creation may be swift in locations where existing infrastructure could be upgraded to include additional ports.

Upgrade and expansion of EV charging networks (2/2)

How much extra investment can be added in this sector?

Number of charging stations, count¹



- We estimate there is scope to add **\$100 million in investment** over the next three years to install charging networks for electric vehicles (EVs). This investment represents quadrupling the current stock of public fast-charging stations in Australia, from 250 to 1,000.¹ The unit costs of installing fast-charging networks was estimated based on academic modelling.² This expanded network we would have one charging station for every 10 – 20 EVs in Australia, significantly higher than the penetration of petrol stations.
- **In the longer-term, there will need to be substantially more invested** in building fast-charging networks. Whilst just ~10,000 EVs exist in Australia at present, it is estimated that ~70-100% of new vehicle sales by 2040 will be EVs.³ It is for this reason that Infrastructure Australia has identified the creation of a national fast-charging network to be a high priority initiative.
- The potential scale of this initiative is limited by the **availability of private financing**, the **relatively small scale of individual projects** (meaning governments would need to administer hundreds of grants), and the **potential labour/material constraints** as specialised, high-cost equipment and skills are required.

What would this look like in practice?

Illustrative jobs created

- **Construction and electricity supply workers:** for the construction and installation of infrastructure; e.g., equipment installation, cabling and grid connection, and machinery operation.
- **Administrative workers** for management of projects; e.g. arrange permits and easements for charging sites, manage worker shifts, and budget funds.
- **Engineering and scientific workers** for electrical and mechanical design, and grid systems management.

Project examples

- The developer ChargeFox is installing 22 fast-charging stations across Australia. ARENA's Advancing Renewables Program has provided 40% of the funding.
- Private investors including the Australian Mobility Clubs, Wilson Transformers and Carsales have also provided debt funding for the project.

¹ Infrastructure Australia ([accessed June 2020](#)) 'National electric vehicle fast-charging network' ² The International Council on Clean Transportation ([August 2019](#)) *Estimating electric vehicle charging infrastructure costs across major U.S. metropolitan areas* ³ Australian Financial Review ([19 May 2020](#)) 'Australia needs to fast-track EV charging stations'

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