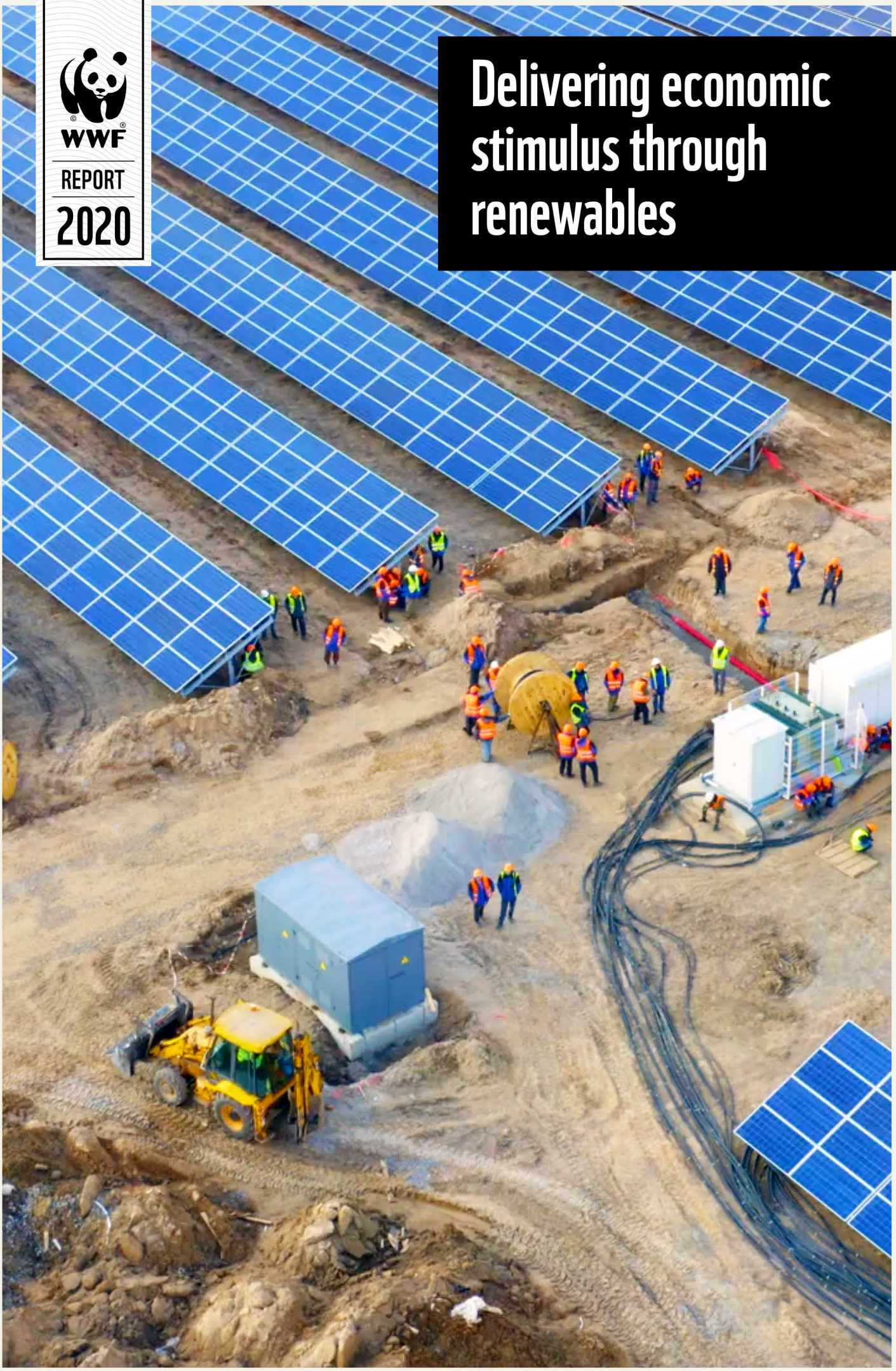
WWF

REPORT

2020

Delivering economic stimulus through renewables



DELIVERING ECONOMIC STIMULUS THROUGH RENEWABLES

Introduction

Australia has to date successfully managed the health impacts of the COVID-19 crisis. But the COVID-19 related employment loss is predicted to impact 8-10% of the current Australian workforce over the next 18 months (despite the Jobkeeper program). This is the next stage of the COVID-19 crisis that Australia will confront. Australian governments at all levels now need to frame strategies to deal with the complex problems of economic and social recovery and create the cooperation necessary to avoid prolonged stagnation and international disruption.

In response to the profound economic impacts of COVID-19, WWF-Australia proposes a renewable stimulus which would drive new employment growth, provide greater diversity within the broader economy, accelerate climate action and put Australia on the pathway to becoming a renewable export powerhouse.

Recent polling by WWF shows that nationally, when asked to choose between two positions, 69% of respondents said Australia's potential to be an economic superpower of the post-carbon world was more aligned with their thinking, than a critique of renewables which argued they were not a good solution for the future. This holds up across all states and even across party lines. For example, in Queensland this rises to 72%. Among coalition voters this figure is 61%. Most people want us to go for renewable-powered growth.

WWF's Renewable Recovery Package - Summary

WWF-Australia's renewable recovery package has two components.

1. ***"Australia renewable export COVID-19 recovery package",*** **a report authored by EY** (formerly known as Ernst and Young).

This report outlines how an economic recovery based on renewables can boost local manufacturing, grow existing sectors and unlock new industries, increase exports, reskill our workforce, and reduce carbon pollution.

More specifically it shows how we can re-employ people across industries which suffered some of the largest job losses – construction, professional, scientific and technical services, and manufacturing – and provide work in Indigenous communities. It identifies 12 stimulus opportunities that fall into six focus areas for action:

- **Reimagining our manufacturing and export industries to increase competitiveness,** including manufacturing low-carbon technologies locally, electrifying and reducing GHG emissions from existing manufacturing and manufacturing and exporting green hydrogen
- **Incentivising renewable electricity generation, transmission and storage, and energy exports,** including increasing community rooftop solar photovoltaics (PV), improving local and international transmission and distribution of electricity and improving distributed storage of electricity
- **Directing infrastructure investment towards zero carbon activities** including building renovation and retrofitting of State and Federal infrastructure

- **Rethinking and decarbonising transport**, including constructing infrastructure to enable public transport, government fleet vehicles, and private vehicles to run on electricity.
- **Investing in Australian research, training, innovation and technology,** including investing in data-driven renewables solutions and innovation and supporting renewable energy upskilling and education opportunities.
- **Regulatory and government driven climate action,** including implementing a 2050 net-zero missions trajectory and target.

2. *Detailed renewable stimulus proposals*

Based on the focus areas identified by EY, WWF has designed five targeted economic stimulus measures (see Table 1) that will create jobs and support redeployment across existing and new industries, are cost effective, promote capital investment and commercialisation of onshore supply chains and technology, prioritise climate adaptation and mitigation, develop a local knowledge economy and focus on rebuilding in a post-COVID-19 world.

WWF-Australia proposes $2 billion in Commonwealth renewable stimulus spending over the forward estimates to deliver these five measures, beginning in 2020-21, with 90% spent in the first two years. This would provide employment for just over 45,000 people.

If these five measures were combined with support for transmission and large-scale renewable deployment the employment potential grows to over 100,000 jobs.

Program	Description	Commonwealth investment	Estimated jobs created	Economic benefits
Modernising critical manufacturing	Boosts the competitiveness and resilience of our critical manufacturing sector by slashing costs, creating new jobs and positions Australian manufacturers as global leaders in the renewable, advanced manufacturing revolution.	$520 million	22,000	$1.4 billion industry contribution
Battery nation	Positions Australia as a leading global battery manufacturer, leveraging our minerals and industrial capabilities to increase value and jobs across the supply chain.	$500 million (plus $240 million in low-cost finance)	4,500 manufacturing jobs 2,300 installer and construction jobs	$ 1 billion household investment in home batteries $ 5 billion industry investment by 2030
Electric bus revolution	Fast-track electric buses in our cities and build a national manufacturing sector that supplies electric buses to the world	$240 million	10,000	$233 million industry & public transit investment
Local solar	Cuts the cost of energy for thousands of community organisations – childcare centres, schools, country fire stations, Aboriginal communities, public halls, sports clubs, hospitals, and Councils - freeing up funds to spend on core services.	$500 million (plus 400 million in low-cost finance)	5,000	Up to $1 billion in community and private investment
Accelerate renewable hydrogen	Accelerating Renewable Hydrogen will increase Australian fuel security, increase energy reliability, and position Australia at the forefront of an expanding global hydrogen market, capitalising on our world-leading renewable resources.	$225 million	1200	Up to $765million in private sector investment
Total		$1985 million	45,000 direct jobs	$9398 million

Given the existing work on renewables of many State and Territory governments, we recommend that these measures be delivered cooperatively by the Commonwealth, State and Territory governments, working in close collaboration with the private sector and building on existing and proven coordination and delivery mechanisms. We recommend that, where possible, regions hardest hit by the COVID-19 economic impacts be prioritised for the delivery of these measures.

While the five detailed proposals are Federally focused, WWF-Australia calls on all levels of government to support this stimulus package. By supporting WWF's renewable recovery package - opportunities identified in the EY report and the five priority stimulus measures - governments can unlock more than 100,000 jobs.[1]

The push for a clean stimulus package is the first step towards WWF's priority of making Australia a renewable export powerhouse. If you would like to support WWF's efforts or for more information please contact WWF-Australia's Energy Transition Manager Nicky Ison on nison@wwf.org.au.

[1] This figure combines the 50,000 new direct jobs by accelerating wind and solar projects with development approval (Clean Energy Council, A Clean Recovery, 2020), the 8,000 jobs through fast-tracking new transmission projects to revitalize Australia's congested transmission network (Beyond Zero Emissions, The Million Jobs Plan, 2020), the 45,000 jobs in WWF's five priority stimulus measures and many more that are unquantified in the remaining stimulus opportunities set out by EY.

1. MODERNISING CRITICAL MANUFACTURING

Modernising critical manufacturing will boost the competitiveness and resilience of our critical manufacturing sector by slashing costs and creating new jobs. The program will position Australian manufacturers as global leaders in the renewable, advanced manufacturing revolution.

At-a-glance

- $520 million Commonwealth investment over two years
- $1 billion of industry investment in energy modernisation
- More than 22,000 jobs created
- Energy costs of manufacturers slashed through tax investment incentives, grant funding for critical industries, and increasing the energy knowledge and capabilities of manufacturers.

1.1. The case for energy transformation in our industries

Covid19 has highlighted how critical manufacturing is for ensuring Australia has the products and services we need to survive and thrive. Manufacturing has been in long-term decline in Australia. Today only 7% of our workforce (about 729,000 people) is in manufacturing. This decline is not inevitable. Manufacturing makes up 16% of the workforce in Germany, Switzerland and Japan, and advanced manufacturing is thriving in Sweden and Israel who both have small populations.[2]

Energy is a major factor in how competitive a manufacturer is. Australian industry is the most energy inefficient in the developed world, and this means our businesses are paying much more than they should for their energy needs.[3] The Australian Alliance to Save Energy (A2SE) estimates that if Australia doubles energy productivity by 2030 there will be a 2.8% increase in real GDP ($2000 per capita), a $30 billion savings in energy spend and a 20% reduction in greenhouse gas emissions.[4]
While ClimateWorks found that certain Australian companies could be much more competitive and achieve growth in annual profits of 2-13% by increasing their energy productivity to that of their best performing peers within their sector globally.[5]

Manufacturers' reliance on gas has put enormous pressure on companies. After Australia became an exporter of gas in 2014 the price of gas doubled.[6] While gas prices have recently come down, they are anticipated to rise again. Long-term gas contracts set long-term gas

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[2] *Manufacturing further economic decline*, The Australian, 2 December 2019, http://www.theaustralian.com.au/commentary/manufacturing-further-economic -decline/news-story/5357ac5f103f8abeac50010ccd8d3ed2, accessed 8 May 2020

[3] *Australia deemed a world laggard in energy efficiency,* ARF, https://www.afr.com/companies/energy/australia-deemed-a-world-laggard-in-energy-efficiency-20180626-h11vpo, Accessed on 5 May 2020

[4] www.a2se.org.au/component/content/article/53-media/media-releases/406-doubling-energy-productivity-by-2030-saving-30-billion-each-year

[5] ClimateWorks Australia, 2016, https://www.climateworksaustralia.org/wp-content/uploads/2019/11/climateworks_australia_energy_productivity_index_companies_guide_for_investors_final_may2016.pdf

[6] *Electrifying Industry*, Beyond Zero Emissions, 2018

prices, and these are currently at $8 – $12 per Gigajoule, which is around two to three times the price of international pricing.[7]

Investor action on climate change is also driving industry to reduce emissions. A recent survey of Australian and New Zealand investors (representing AU $1.3 trillion) finding investors have an increasing appetite for climate aligned investment.[8] Businesses are also leading with 873 global companies committed to science-based targets stretching right across their supply chains to future proof their business.[9]

Electrical heat technologies provide opportunities to cut the cost of energy and emissions by using Australia's abundant renewable energy. Think Tank *Beyond Zero Emissions* has demonstrated that existing, proven electrical technologies can be used to generate any industrial heat process, and comes with a whole host of benefits including efficiency, speed, precision, and flexibility.[10]

Boosting energy efficiency fuel-switching to renewable electricity will transform our industries by lowering the risk of energy price shocks. But much more than this, it will competitively position Australia as the natural home for manufacturing, with our abundant renewable energy attracting investors and businesses looking for a major cost advantage in the renewable economy.

1.2. Program Aims

The Modernising Critical Manufacturing program aims are to:

- Significantly improve the energy productivity of Australian manufacturers, reducing their costs, boosting profits, and creating jobs
- Build domestic manufacturing capacity and resilience across supply chains
- Accelerate the uptake of clean technology and renewable energy across the manufacturing sector
- Strategically position Australia as a global clean energy manufacturing hub that leverages climate aligned investment.

1.3. Program investment and job creation

This program will invest $520 million to protect our existing 914,000 jobs[11] in manufacturing and create 22,000[12] more.

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[7] *What's the 'new normal' post coronavirus? Australia says gas. This is a mistake*, IEEFA Gas Chat, 23 April 2020, Accessed at http://www.breaker.audio/ieefa-gas-chat/e/61896762

[8] *Accelerating Change: Capital Growth in Climate Solutions*, IGCC, August 2019

[9] *Science Based Targets Initiative*, SBTi, https://sciencebasedtargets.org, Accessed 5 May 2020

[10] *Electrifying Industry*, Beyond Zero Emissions, 2018

[11] *Australian Manufacturing in 2019; Local and Global Opportunities*, The Australian Industry Group, May 2019

[12] We have assumed similar manufacturing job creation to that realised under the *Manufacturing Modernisation Fund*, where an investment of $215 million in capital equipment and new technologies will deliver more than 2,600 new jobs. See http://www.minister.industry.gov.au/ministers/karenandrews/media-releases/backing-aussie-manufacturers-modernise

1.4. Part one: Asset write-offs to support energy upgrade investment

Investing in energy upgrades will reduce energy costs and build resilience by:

- reducing exposure to high gas and electricity prices
- leveraging the falling cost of renewable energy power purchasing agreements, and
- aligning energy use with advanced manufacturing processes.

1.4.1. The opportunity

There are proven and commercialised energy efficiency and fuel switching technologies, but the capital investment cost can be a disincentive to investment. Extending the instant asset write-off program for energy upgrades will support businesses to invest in new equipment that will deliver immediate cost savings. Instant asset write-offs provide quick and uncomplicated investment support for businesses, and the current program has been warmly welcomed by peak groups including the Australian Industry Group and the Australian Chamber of Commerce and Industry. This package also complements the Federal Government's generous *Backing Business Investment* initiative.

1.4.2. Investment

This package will allocate $280 million over one year.

1.4.3. What does the package do?

WWF-Australia recommends extending the COVID-19 instant asset write-off threshold of $150,000 (for an annual turnover of less than $500 million) for one year, made available for the purchase energy modernisation equipment, for example, energy productivity measures, electrical heating technologies like industrial heat pumps, solar panels and battery storage. Instant cash write-offs deliver immediate investment support for businesses. Write-offs are streamlined, easy to access and significantly reduce the time and administrative burden of grant funding support. We assume this package would realise $1 billion in industry investment, saving businesses $280 million.[13]

1.4.4. Industry participation requirements

To be eligible for instant tax write-offs, businesses need to provide evidence of purchasing energy modernisation equipment. To ensure clarity, an approved list of equipment should be prepared and published by the ATO.

[13] Extending the $700 million net cost (for approximately one quarter) to an entire year would be a net cost of $2.8 Billion. We assume that 10% of the uptake of the Covid19 $150,000 instant write off will be for energy equipment. Therefore, the budget impact of offering $150,000 instant asset write-offs for energy equipment is assumed to be 10% of $.8 Billion. See http://treasury.gov.au/sites/default/files/2020-03/Fact_sheet-Support_for_business_investment.pdf

1.4.5. How will the package be delivered?

Instant assets write-offs will be delivered through the 2020-21 budget process.

1.5. Part two: Energy fit program for critical supply chains

COVID-19 has highlighted the risks of international interdependence across supply chains. Government has signalled plans for increasing Australia's economic sovereignty, and Australian businesses are forecast to increasingly place greater value on domestically manufactured production inputs across all supply chains.[14] Ensuring production output in these critical industries are matched with energy upgrades and fuel switching will maximise the productivity and resilience across supply chains.

1.5.1. The opportunity

Building energy productivity and renewable energy into expanded manufacturing for critical supplies - like food and pharmaceuticals - will build an energy fit supply chain that cuts energy costs, freeing up funds for innovation and job creation. Supporting targeted, strategic sectors over the long-term will deliver productivity gains across an entire national supply chain as the lessons learnt, user experience with energy fit processes and supply of equipment is mainstreamed across an entire sector (and not limited to sporadic case studies). The Federal Government's recent support for the newly established Race for 2030 CRC provides the perfect catalyst for this national building initiative.

"…it is so important that we work together with industry and researchers to deploy the right technology when and where it is needed for cheaper bills and lower emissions." - Minister Taylor, at the launch of Race for 2030.[15]

1.5.2. Investment

This package will allocate $220 million over two years.

1.5.3. What does the package do?

This investment will provide grants for up to 1,000 manufacturers in industries identified by the Government as critical for sovereign industrial capability. The grants will support manufacturers to modernise energy processes. Grant recipients can access grant funding for capital upgrades that increases energy productivity and fuel switches to renewable electricity (for example, industrial heat pumps, refrigeration upgrades, solar and battery storage, waste avoidance and recovery to reduce energy costs associated with waste). Grant recipients can use grant funds for developmental costs, installation of equipment and associated staff training. The program will also fund program leaders and outreach officers to ensure this national building investment is strategically deployed to achieve long-term

[14] *Short Supply: COVID-19 Implications for Australian Supply Chains*, IBIS*World*, 21 April 2020, http://www.ibisworld.com/industry-insider/analyst-insights/short-supply-covid-19-will-have-long-term-implications-for-australian-supply-chains

[15] *Race for 2030 Funding Announced: Supporting affordable clean energy*, 22 April 2020, racefor2030.net.au, Accessed 6 May 2020

growth and resilience of these industries. The grant program can be matched by innovative finance options, such as the Sustainable Finance Fund (underwritten by Bank Australia) that provides low cost, long-term finance for environmental and building upgrade projects.[16]

1.5.4. Industry participation requirements

To be considered for a grant, businesses will need to demonstrate that the investment will increase energy productivity and lead to job creation. Businesses must also demonstrate that they will prioritise local procurement of equipment, where available.

1.5.5. How will the package be delivered?

The Department of Industry, Science, Energy and Resources' successful *Modernising Manufacturing Fund* can be extended to deliver the Energy Fit program. Levering existing program grant infrastructure will save administrative costs and time. Following the recent Modernising Manufacturing Fund grant round structure, small projects could receive 50% of project costs up to $100,000, and large projects between $100,000 and $1 million could access funding for 25% of project costs. Energy transformation outcomes and outputs of the grant should be co-designed with leaders of the nominated critical industries, energy productivity experts and peak groups, and the Race for 2030 CRC. Slight adjustments to co-funding requirements and milestone payments may be needed to ensure grant funding can unlock private investment. This adjustment should be developed in close consultation with industry peak groups. An Energy Modernisation program unit, steered by an expert advisory committee, will design and deliver the grant program. This Unit will also deliver a supply chain capacity program to ensure the grants achieve long-term gains in energy productivity.

1.6. Part three: Industry energy knowledge and capacity building

This package provides practical mentoring and support to significantly improve manufacturers' energy knowledge and support the sector to make strategic energy investment decisions.

1.6.1. The opportunity

The doubling of energy prices since 2014 has made energy use and procurement a complex and strategic business decision. Manufacturers (from executives, workers, engineering consultants to electricians and plumbers) don't always have all the knowledge they need to transform energy use. They are also time poor, making it a challenge to invest in new energy skills and capacity building.

Successful state government programs show that energy mentoring and capacity building can make a positive difference for businesses. The NSW Sustainable Advantage program has engaged 500 businesses, and their combined actions are saving $95 million every year.[17] Circular Economy programs can also save money by reducing the embodied energy of a material through replacing raw materials with reuse and recycling. Supporting state and territory governments and peak groups to expand their capacity building programs will

[16] See sustainableaustraliafund.com.au

[17] *Sustainable Advantage*, NSW Department of Planning, Industry and Environment, https://www.environment.nsw.gov.au/sustainabilityadvantage/, Accessed 5 May 2020

quickly add value for manufacturers by leveraging existing relationships, program infrastructure and aligned grants. There is also the opportunity to deliver sector-wide, long-term energy capacity by partnering with peak groups to develop and deliver a strategic reform project that lifts the energy productivity of Australian manufacturers.

1.6.2. Investment

This package will allocate $20 million over two years.

1.6.3. What does the package do?

This package will scale the leadership and capacity of state and territory governments, industry groups and other training providers to deliver knowledge and capacity building programs for industry. Entities seeking funding will be encouraged to put forward program proposals that can quickly leverage existing program infrastructure and industry relationships to ensure programs can add value to businesses in the short-term. Existing initiatives that could be scaled include:

- Capacity building projects like NSW's *Sustainable Advantage*[18] program and the Australian Industry Group's *Energy efficiency mentoring program*[19]
- Circular economy programs that reduce energy via recycling, like the ASPIRE program that uses an online marketplace to match businesses with potential remanufacturer, purchases or recyclers of waste materials[20]
- Learning and networking events, such as those convened by the Australian Alliance for Energy Productivity, industry groups like Diary Australia and the Energy Efficiency Council
- developing and delivering TAFE programs for energy efficiency and electrical heating technology, like the Victorian *Advanced Diploma of Engineering* Technology[21]and the Certificate IV in *Energy Management and Control*.

The package also provides funding to develop a national strategy for increasing the energy literacy of manufacturers. This is an essential precondition for Australia to move from being the most energy inefficient, to one of the most competitive and productive sectors in the world.

1.6.4. Participation requirements

Program providers must be able to demonstrate that their proposals:

- leverages existing program infrastructure, capabilities, and relationships, and can be scaled and delivered quickly
- will involve business and industry groups to ensure content and delivery will add value for businesses
- will use energy experts that are suitably experienced and qualified (for example, are certified to deliver energy audits).

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[18] *Sustainable Advantage*, NSW Department of Planning, Industry and Environment, http://www.environment.nsw.gov.au/sustainabilityadvantage/, accessed on 8 May 2020

[19] *Energy Efficiency Capability Program*, The Australian Industry Group, http//:www.aigroup.com.au/policy-and-research/businesspolicy/energy/energy-efficiency-capability-program/ Accessed on 8 May 2020

[20] *ASPIRE*, http://www.aspiresme.com, Accessed 6 May 2020

[21] *22478VIC Diploma of Engineering Technology and 22479VIC Advanced Diploma of Engineering Technology*, Victorian Department of Education and Training, 2018

1.6.5. How will the package be delivered?

The funding opportunity for capacity building programs will be administered by the Federal Department of Industry, Science, Energy and Resources, who will call for proposals and allocate program funding to providers. The energy productivity strategy will be led by the Department of Industry, Science, Energy and Resources in partnership with the Energy Efficiency Council, Australian Industry Group, Race for 2030 CRC, State and Territories, and other industry peak groups.

2. BATTERY NATION

Battery Nation will position Australia as a leading global battery manufacturer, leveraging our minerals and industrial capabilities to increase value and jobs rights across the supply chain.

At-a-glance

- $500 million Government investment over three years plus $240 million in low cost finance
- Delivers:
    - 100,000 home battery installs
    - 5 small battery manufacturing plants
    - new infrastructure to recycle 6,000 tonnes of waste every year
    - 2 large-scale battery manufacturing plants
    - 1 lithium refinery plant
- Creates 4,500 ongoing manufacturing jobs and 2,300 installer and construction jobs
- Leverages:
    - $1 billion private investment in home batteries by 2024
    - $5 billion industry capital investment in heavy industry by 2030
- Positions Australia as a leading global battery manufacturer by 2030 by scaling up the South Australian Home Battery Program nationally, ensuring procurement leads to local battery manufacturing and incentives for lithium refining, battery recycling and reprocessing and battery innovation.

2.1. The case for ramping up battery manufacturing

Global energy storage is set to boom by 2040 and this represents a $662 billion investment opportunity.[22] Experts anticipate that Australia is one of only ten countries able to secure three-quarters of this global market.[23] The global electric vehicle market alone is predicted to consume 2.7 million tonnes of lithium by 2025. For context, the world currently makes around half a million tonnes, and new lithium refining capacity currently planned for Australia will only double world supply to 1 million tonnes.[24]

Now is the time to assertively position Australia as the world's leading battery nation. Australia has all the pre-conditions to capture the full value of the battery supply chain: minerals, an excellent investment destination, outstanding industrial capacity, an attractive market for small and big scale batteries, world-class infrastructure, and proximity to Asia. But we are not doing enough to make sure that the full economic value of our resources benefits Australia. While we have outstanding reserves of lithium most of our activity is limited to mining and exporting. This is a problem because most of lithium's economic value is in refining, processing, and battery manufacturing. In 2017 Australian lithium realised $213 billion in the global market, but only 0.53% ($1.13 billion) of this wealth stayed in Australia.[25] Most of Australia's lithium (spodumene) is exported to China for processing. After that it is

[22] *Energy Storage Investments Boom As Battery Costs Halve in the Next Decade*, Bloomberg New Energy Finance, 31 July 2019, https://about.bnef.com/blog/energy-storage-investments-boom-battery-costs-halve-next-decade/, Accessed 3 May 2020

[23] Ibid

[24] *A bubble or the next big thing,* resourceful, Issue 15, 15 October 2018

[25] *The Lithium-Ion Battery Value Chain – New Economic Opportunities for Australia,* Australian Trade and Investment Commission, 2018

sent to Japan and Korea where it is transformed into battery packs, which are then imported to Australia and other countries.[26]

The critical parts of advanced battery manufacturing can all be made in Australia. The Australian Trade and Investment Commission has identified that the current lack of advanced battery manufacturing is a critical gap in the Australian lithium supply chain.[27] Accelerating the uptake of home batteries is the key to establishing Australian battery manufacturing plants that can quickly scale up and generate high quality manufacturing jobs.

In turn, this growing market will generate demand for downstream lithium processing, boosting the business case for investing in new refinery plants. In line with the Commonwealth Government's Critical Minerals Strategy and a commitment to "*promoting investment in Australia's critical minerals sector and downstream processing*",[28] Australia should aim to capture between 15 to 25% of the anticipated $662 billion global lithium market growth by 2040. Targeted Government support now will unleash a global battery powerhouse that drives investment and jobs right across the value chain from mining, refining, making, and recycling.

Case studies highlighting Australia's battery opportunity are included at Section 3.7

2.2. Program Aims

- Create nearly 7,000 jobs by 2030
- Increase the value capture of Australia's lithium resources to 25% by 2030 (up from 0.53% in 2017)
- Increase lithium-ion battery recycling to 25% by 2025
- Lower power bills by accelerating battery uptake across Australia.

2.3. Program investment and job creation

Battery Nation invests $500 million and provides $240 million for low-cost finance. This investment will secure 2,000 new jobs within three years, with an additional 4,800 jobs created by 2030.

2.4. Part one: Home and small business battery scheme

Ramping up home batteries is Australia's most immediate opportunity to expand our lithium supply chain. This package will scale up the successful South Australian Government's *Home Battery Scheme*, making the benefits of small batteries available Australia-wide, while incentivising investors to set up battery manufacturing and assembling plants in all states and territories.

2.4.1. The opportunity

[26] *The Lithium-Ion Battery Value Chain – New Economic Opportunities for Australia,* Australian Trade and Investment Commission, 2018

[27] Ibid

[28] https://www.industry.gov.au/data-and-publications/australias-critical-minerals-strategy

Smart Government support that encourages home battery uptake will incentivise battery manufacturers to invest in Australia by creating market demand. This in turn will grow jobs on the factory floor and across the supply chain. The South Australian Government has shown what smart investment and a simple, streamlined program can do. After just 18 months SA has attracted 2 new battery manufacturers to Adelaide, creating 350 jobs. Sonnen has set up in the former Holden Factory and has recruited former Holden workers into their business.

Home batteries will lower power bills, and by using smart technology, can be linked to create virtual power plants that secure energy supply across the grid. The 2020 Australian Battery Market report found that "Home energy storage systems are still the main game for most battery manufacturers, wholesalers and retailers."[29] In 2019 more than 22,000 small-scale batteries were installed across Australia, providing more than 1 GWh in capacity,[30] and this is projected to grow to 28,000 batteries in 2020.[31]

2.4.2. Investment and jobs

This package will allocate $480 million over three years:

- $240 million will provide battery subsidies for households and small businesses
- $240 million in low cost finance will be made available through the Clean Energy Finance Corporation.

The program aims to create:

- 500 new installer jobs
- 1200 new manufacturing, technical support, and sales jobs
- 300 construction jobs.

2.4.3. What does the package do?

This package will:

- subsidise 100,000 small battery installations for households and small businesses (under $1 million turnover) over three years
- make available low interest loans.

To incentivise rapid uptake in the first year of the program and generate the scale needed to attract new manufacturing plants, the first participating 20,000 households and / or small businesses will receive a $4,000 subsidy.[32] All remaining 80,000 participants will receive a $2,000 subsidy. The increased market demand generated by the subsidies and low interest loans will attract new battery manufacturers to Australia. The program will have a target of attracting at least five new small battery manufacturers, generating 1,200 direct new jobs in total. We also assume building these new plants will generate at least 300 construction jobs. This package will unlock $1 billion in private investment from households.

2.4.4. Industry participation requirements

[29] *Australian Battery Market Report 2020 (media summary)*, Sunwiz, April 2020.

[30] *Clean Energy Australia Report 2020*, Clean Energy Council, April 2020.

[31] *Australian Battery Market Report 2020 (media summary)*, Sunwiz, April 2020

[32] This builds on the SA experience, who realised a rapid increase in subsidy applications when it recently signalled it would reduce the subsidy from $6,000 to $4,000.

The program will recruit a panel of approved battery providers, and by using these providers households and small businesses will be able to receive subsidies and access low interest loans.
To become a battery provider for the program, four threshold conditions must be met:

- demonstration of financial and technical competency
- battery must be able to participate in a Virtual Power Plant
- a Clean Energy Council accredited supplier
- a demonstrated commitment to install batteries assembled or made in Australia.

2.4.5. How will the package be delivered?

The package will be administered through the Federal Department of Industry, Science, Energy and Resources. This will ensure a rapid start-up, while also strategically linking the program to aligned industry development programs across the Federal Government. WWF-Australia notes that only the South Australian Government has an extensive home battery program. Consulting with the South Australian Government will ensure the two programs align to offer maximum value for SA residents and battery providers. Other state and territory programs are smaller in scale. Households and small businesses will only be able to access one subsidy program and will not be able to 'double up' by accessing both a federal and state government subsidy.

2.5. Part two: processing and manufacturing package

This package provides support for establishing new high value-add lithium industries across Australia. Funding and market incentives will focus on three priorities: mineral refining, battery manufacturing and battery recycling.

2.5.1. The opportunity

Scaling up lithium refining, processing and battery manufacturing will keep the high value parts of the battery supply chain in Australia. Increasing our lithium value capture from 0.53% to 25% would boost the annual economic value from $1 billion, to $54 billion. Ramping up battery recycling will maximise the value of our lithium. CSIRO estimates that today's lack of battery recycling represents a lost economic opportunity of $813 million to $3 billion.[33] The Battery Stewardship Council of Australia has developed an industry-led battery stewardship scheme, which will drive responsible management across the entire battery supply chain, importantly increasing recycling rates[34]. The scheme is currently awaiting approval from the ACCC. There are positive developments in lithium refining and battery manufacturing, but they need to be scaled up and coordinated to ensure we build a competitive and world leading industry.

2.5.2. Investment and jobs

This package will allocate $240 million over five years to provide smart investment support to establish new refineries, manufacturing, and recycling plants. The program aims to create:

[33] *Lithium battery recycling in Australia; Current status and opportunities for developing a new industry,* CSIRO, April 2018

[34] *Proposed Stewardship Scheme for Batteries,* Battery Stewardship Council, November 2020

- 500 new refinery jobs
- 2,300 large scale battery manufacturing jobs
- 500 recycling jobs
- 1,500 construction jobs.

2.5.3. What does the package do?

This package will provide targeted investment to support the commercialisation and scaling up of large processing and manufacturing facilities. The package aims to create:

- at least one new refinery and two new large-scale battery plants, and
- new battery recycling infrastructure that recycles 5,000 tonnes (25% of annual battery waste) within 5 years.

An expert panel of industry leaders will be formed to advise Government on high-value industry ventures to support, and to provide on-going advice and facilitation for funded projects to ensure long-term success. This package also includes a three-year infrastructure grant program to increase domestic battery recycling infrastructure and processing. This is a key support package to ensure the success of the Battery Product Stewardship Scheme. For the battery recycling grant, we suggest a design of 25% federal funding, 25% state funding and 50% commercial funding.

2.5.4. Industry participation requirements

All investors, new market entrants and manufacturers set to benefit from federal government investment support and grant funding must demonstrate that their proposal:

- supports local content procurement, to maximise the value of investment into regional economies
- complies with the National Battery Stewardship Scheme
- creates new job opportunities for Australians
- excellence in environmental management
- supports strong economic empowerment for Traditional Owners, including trade opportunities with Aboriginal owned enterprises and job opportunities.

2.5.5. Delivery

ARENA will deliver investment in battery commercialisation and scaling and will convene the expert panel of industry leaders to advise on funding allocation. The Federal Department of Industry, Science, Energy and Resources will administer the battery recycling grants. This package should be designed and delivered in partnership with the CRC for Future Battery Industries, The Chief Scientist, The Battery Stewardship Council, industry leaders and state and territory governments.

2.6. Part Three: Battery Innovation

This package will ensure Australia is a global leader in advanced manufacturing and battery innovation though developing a national battery strategy and supporting innovation across the battery supply chain.

2.6.1. The opportunity

The Federal Government's recently announced *National Hydrogen Strategy* and aligned funding packages have excited industry and generated investor interest. Australia can also be at the forefront of battery storage, exporting its batteries and expertise to the world. Exciting innovations include light-weighting batteries to power electric buses that hold more passengers, electric planes, and electric road trains, and, graphene batteries in a car which could be refuelled while stopped at traffic lights.[35] Developing a national battery strategy and supporting Australian innovation will position us at the forefront of global battery economy.

2.6.2. Investment

This package invests $20 million over five years.

2.6.3. What the package does

The package funds the Chief Scientist to develop a national battery strategy and boosts CSIRO's capacity to deliver research and commercialisation of new battery technologies. The national battery strategy should consider:

- how to maximise Australian lithium value capture across the full supply chain
- the target scale and size of the industry, including full investment, jobs, and export potential
- a series of incentives to attract new metal refineries, small- and large-scale battery manufacturers and recyclers to Australia.

2.6.4. Delivery

The COAG Energy Council will commission the strategy, which will be delivered by the Chief Scientist, and CSIRO will deliver new battery research projects. Both programs should be delivered in partnership with the CEC for Future Battery Industries.

2.6.5. New Jobs Created

This package will support long term job creation highlighted in Part 2 by ensuring the right market incentives are in place to grow Australia's manufacturing and battery export potential.

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[35] *A graphene breakthrough hints at the future of battery power*, Wired UK, 16 August 2018, Accessed at https://www.wired.co.uk/article/graphene-batteries-supercapacitors on 2 May 2020

2.7. BATTERY CASE STUDIES

South Australia Home Battery Scheme

The South Australian Government's leading Home Battery Scheme shows how Government can kick-start a local manufacturing sector. Launched on 29 October 2018, the scheme is cutting energy costs for residents and attracting battery manufacturers to the state.

Fast facts

- Government is investing $200 million over three years to install 40,000 home batteries that can be linked to create a Virtual Power Plant. The South Australian Government is providing $100 million in subsidies, and the Clean Energy Finance Corporation is providing $100 million in low interest loans.[36]
- 6,700 new homes applied for funds in late April. Installing these will generate the equivalent of **150 full-time installer jobs** in six months.[37]
- The program has attracted three new battery providers to the state. Two of these will manufacture batteries in Adelaide.
- Sonnen started manufacturing batteries in the former Holden factory in October 2018. After one year **47 people were employed and 2,000 batteries** were made.[38] Sixty-six additional people are employed in technical support and sales.[39]
- AlphaESS manufacturing plant opened in September 2019. This year they aim to make **1,000 batteries per month**, and they intend to **employ between 80 to 100 people**.[40]

"Australia is on the map for cleantech manufacturing…We've leveraged Australia's heritage in automotive manufacturing and applied this to cleantech…" – Nathan Dunn, Managing Director Sonnen Australia.

Other state and territory schemes include:

- NSW – interest free loans to homeowners in the Hunter Valley
- VIC – rebates offered for 10,000 batteries over ten years[41]
- QLD - interest-free loans or grants (program now closed)
- ACT – rebates available for up to 5,000 homes
- NT - $6,000 grant available for 130 batteries (recently launched)
- WA – no scheme, recently announced that government will install ten community batteries.

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[36] *Switch flicked on world leading home battery scheme,* South Australian Government, 29 October 2018, accessed at https://www.premier.sa.gov.au/news/media-releases/news/switch-flicked-on-world-leading-home-battery-scheme on 27 April 2020

[37] *Thousands pile into S.A. home battery scheme before subsidy winds back*, One Step of the Grid, 17 April 2020, https://onestepoffthegrid.com.au/thousands-pile-in-to-s-a-home-battery-scheme-before-subsidy-winds-back/, Accessed 3 May 2020

[38] *Sonnen Li Ion Batteries gain Australian made status,* @AuManufacturing, 21 October 2019, https://www.aumanufacturing.com.au/sonnen-li-ion-batteries-gain-australian-made-status , Accessed 3 May 2020

[39] *A lot can change in 12 month at sonnen*, 25 November 2019, https://sonnen.com.au/blog/lot-can-change-12-months-sonnen/, Accessed 3 May 2020

[40] *Ramp-up of a new SA battery plant*, 26 September 2019, https://alpha-ess.com/Web/News-Detail.aspx?newsId=abd73d3f-7cc0-40b8-bf6f-abdf9d2b427d, Accessed 3 May 2020

[41] *Notice to Market Solar Homes Program*, Solar Victoria, 17 April 2020

Western Australia's lithium valley

A coalition of Western Australian industries has come together to create the *Lithium Valley* concept, showing the way with an exciting vision that could be extended right across Australia. The coalition's aim is for WA industries, clustered around the Kwinana industrial area, to be a "World leader in power storage design, production, research, operations, technology and applications… also encapsulat(ing) other industries and products, such as transport or hydrogen, that are part of the global transformation of energy."[42]

Western Australia holds the world's largest lithium reserves and is leading the charge to keep the lithium value chain in Australia. Three refineries are currently in different stages of development, and together are expected to generate 2,100 construction jobs and 1,000 ongoing jobs.

Project	Investors	Annual output	Job creation
Covalent:[43] ● Mt Holland mine and concentrator ● Kwinana refinery ● 40-year project	SQM & Wesfarmers 50:50 joint venture	● 340,000 tonnes spodumene concentrate ● 45,000 tonnes battery quality lithium hydroxide	● 700 construction jobs ● 150 mining jobs ● 150 refinery jobs
Tianjin Kwinana refinery: ● Spodumene sourced from Greenbushes WA mine	Tianqi Lithium (Cheney, China)	● 48,000 tonnes battery quality lithium hydroxide	● 900 construction jobs ● 200 refinery jobs[44]
Albemarle Kemerton refinery: ● Spodumene sourced from Greenbushes, WA ● $1 Billion investment ● Works began January 2020	Albemarle (Albemarle also holds 49% shares in its Talison Lithium, owner of Greenbushes mine)	● 100,000 tonnes battery quality lithium hydroxide by 2025[45]	● 500 construction jobs ● 500 operational jobs[46]

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[42] *Lithium Valley Strategic Plan Summary*, Infranomics, April 2020

[43] Covalent Lithium, https://www.covalentlithium.com/news-1 Accessed 1 May 2020

[44] Tianqi Lithium Australia, https://www.tianqilithium.com.au/site/About-Us/tianqi-lithium-global, Accessed 1 May 2020

[45] Albemarle, https://www.albemarle.com/businesses/lithium/locations/western-australia, Accessed 1 May 2020

[46] *WA cashed in on lithium boom as work begins on world's largest lithium refinery,* ABC News, 28 March 2019, https://www.abc.net.au/news/2019-03-28/wa-cashes-in-as-work-begins-on-worlds-largest-lithium-refinery/10950970, Accessed 3 May 2020

Making big batteries

The Hornsdale battery (which at 100MW is the biggest in the world) demonstrates the benefits of utility scale batteries. In 2019 the battery saved customers $116 million, up from $40 million in savings delivered in 2018.[47]

Demand for community scale grid batteries are also set to grow. The Federal Regional and Remote Communities Fund is investing $50.4 million over five years to fund microgrid feasibility studies.[48] The WA Government's *Distributed Energy Resources Roadmap* proposes that ten new community batteries be installed by the end of this year.[49]

> "Supplying remote, grid supplied customers to a self-supporting microgrid could save hundreds of millions of dollars in costly network infrastructure and maintenance while improving reliability." Minister for Energy Angus Taylor[50]

Paving the way for utility scale battery manufacturing today will ensure Australia is leading hub for global supply by 2040.

Spotlight on Magnis' Townsville Giga-battery Factory

Magnis is moving forward with its plans to build Australia's first large scale battery cell production in Townsville. Magnis' feasibility study found that that the 18 GWh lithium-ion battery manufacturing plant would achieve a net present value of $2.55 billion. The plant will cost $3 billion and provide 1,150 direct jobs.[51]

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[47] *Hornsdale big battery doubles savings to consumers, and keeps lights on*, RenewEconomy, 28 February 2020, https://reneweconomy.com.au/hornsdale-big-battery-doubles-savings-to-consumers-and-keeps-lights-on-85139/ Accessed on 27 April 2020

[48] *Regional and remote communities reliability fund, https://www.energy.gov.au/government-priorities/energy-programs/regional-and-remote-communities-reliability-fund,* Accessed 1 May 2020

[49] West Australia puts community batteries at top of new energy roadmap, RenewEconomy, 5 April 2020, https://reneweconomy.com.au/west-australia-puts-community-batteries-at-top-of-new-energy-roadmap-38533/, Accessed 1 May 2020

[50] *Federal Government launches $50 million microgrid funding program,* PV Magazine, 11 October 2019, https://www.pv-magazine-australia.com/2019/10/11/federal-government-launches-50-million-microgrid-funding-program/ Accessed 1 May 2020

[51] *Magnis moves closer to $1BN battery plant go ahead*, Australian Manufacturing Forum, 2 October 2019, https://www.aumanufacturing.com.au/magnis-moves-closer-to-1bn-battery-plant-go-ahead Accessed on 27 April 2020

Battery recycling gets full value from lithium

Setting up a battery recycling industry will ensure Australia gets maximum value from lithium and other critical battery elements. Australia generates about 20,000 tonnes of battery waste every year, but only 10% is recovered.[52] By 2036 waste is expected to grow to between 100,000 to 188,000 tonnes.

Spotlight on Envirostream

Starting in 2017, Victorian company Envirostream became Australia's first lithium battery recycler. Located in New Gisborne, the $2 million facility has provided 5 new jobs.[53] In 2018 Envirostream recycled 240 tonnes of batteries. Last year Lithium Ion Australia increased its investment in Envirostream from 23.9% to 74%, signifying the opportunity to market participants who vertically integrate across the supply chain.

"Lithium Australia and Envirostream are developing environmentally responsible solutions to the mounting problems of spent batteries…Keeping spent batteries from landfill and exporting the energy metals they contain is an Australian imperative." Adrian Griffin, Lithium Australia Managing Director.[54]

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Battery innovation

ARENA has invested $95 million in battery innovation which is now accelerating the benefits of distributed energy resources across our energy system.[55] Projects include the:

- Hornsdale Power Reserve Upgrade, adding an extra 50 MW to provide an Australian-first large-scale demonstration of battery potential to provide inertia to our network
- Agnew hybrid microgrid which will deliver up to 60% renewable energy to the Agnew gold mine
- Ballarat Energy Storage System, which will store energy at times of relatively low value. The battery will use stored energy and use it at times of relatively high value.[56]

Continued ARENA funding will accelerate national uptake of battery storage, drive down energy costs and build demand along the lithium battery supply chain.

CSIRO has over 35 years of experience with batteries and has been working in the lithium battery field for over 15 years.[57] Investing in CSIRO will continue to drive battery innovation in partnership with industry.

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[52] Advice provided by industry expert to WWF Australia's consultant, 1 May 2020

[53] *Australia's first lithium battery recycling plant opens,* Sustainability Victoria, 28 April 2018, https://www.sustainability.vic.gov.au/About-us/Latest-news/2018/04/26/04/57/Australias-first-lithium-battery-recycling-plant-opens Accessed on 27 April 2020

[54] Ibid

[55] *ARENA Annual Report 2018*, ARENA, 2019

[56] *Projects*, ARENA, https://arena.gov.au/projects/?project-value-start=0&project-value-end=200000000&technology=battery-storage, Accessed 2 May 2020

[57] *Advanced lithium batteries*, CSIRO, https://research.csiro.au/lithium/, Accessed 2 May 2020

Spotlight on Ultra Battery

The Ultra Battery combines the lead-acid battery and a super capacitor to create an economical, super-fast charging battery with long life power.[58] The battery was developed by CSIRO and built by the Furukawa Battery Company. Following commercialisation, it is now being used in the Honda Odyssey hybrid.[59]

[58] *UltraBattery*, CSIRO, 18 October 2019, https://www.csiro.au/en/Research/EF/Areas/Grids-and-storage/Energy-storage/UltraBattery Accessed on 2 May 2020

[59] Ibid

3. ELECTRIC BUS REVOLUTION

Electric Bus Revolution will fast-track electric buses in our cities and build a national manufacturing sector that supplies electric buses to the world.

At-a-glance

- $240 million Government investment over two years that puts 500 new, Australian made buses on the road
- Leverages $233 million of industry investment in electric buses and depots
- Grant funding puts 500 new electric buses on the road and builds associated charging depots
- Doubles Australia's existing manufacturing workforce of 10,000 people by 2030 with a two-pronged approach – a grant program and innovation fund - to create:
    - 3,000 new jobs by 2023 through public transport bus procurement and depot upgrades
    - 8,000 new jobs by 2030 through kickstarting an e-bus export industry.

3.1. The case for building an e-bus industry

Global demand for electric buses is set to grow. Today, there are around 425,000 electric buses worldwide. Bloomberg New Energy Finance projects that by 2040, 81% of all municipal (public transport) bus sales will be electric.[60] Twenty-six global cities have committed to only buy electric buses by 2025 –a procurement potential of 80,000 buses.[61]

In Australia, NSW has committed to a fully electric bus fleet, is currently trialling e-buses on four busy routes and is set to expand this with a recent call for expressions of interest to run more trials as part of their plan for a wider switch. Brisbane City Council recently entered into contract for 60 electric buses, and the Victorian and ACT Governments each are trialling an e-bus with success.
The drivers for making the switch to e-buses include:

- Healthier cities – diesel buses release harmful pollutants. New York City is transitioning its fleet of 5,700 buses to electric, and it is estimated that each electric bus will save $150,000 per year in reduced health care costs.[62]
- Cheaper to run – electric buses have much lower operating costs (based on total cost ownership) than conventional buses.[63] Even the most expensive 350 kWh electric bus can realise around $130,000 in savings over a 15-year lifetime.[64]

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[60] *Electric Transport Revolution Set to Spread Rapidly Into Light and Medium Commercial Vehicle Market,* Bloomberg New Energy Finance, 15 May 2019, https://www.about.bnef/blog/electric-transport-revolution-set-spread-rapidly-light-medium-commercial-vehicle-market/ Accessed 28 April 2020

[61] *Zero Emission Vehicles*, C40 CITIES, c40.org, Accessed on 28 April 2020

[62] ClimateWorks Australia submission to inquiry into Electric buses in regional and metropolitan public transport networks in NSW, ClimateWorks Australia, 19 December 2019, https://www.climateworksaustralia.org/wp-content/uploads/2020/01/ClimateWorks-sabmission-NSW-electric-bus-inquiry.pdf, Accessed on 28 April 2020.

[63] *Electric Buses in Cities: Driving Towards Cleaners Air and Lower CO2*, Bloomberg New Energy Finance, 10 April 2018, https://about.bnef.com/blog/electric-buses-cities-driving-towards-cleaner-air-lower-co2/ Accessed on 29 April 2020

[64] Ibid

- Cost parity - By 2030 it is projected that electric buses will reach upfront cost parity with diesel buses. Accelerated demand could bring this forward to 2025.[65]

Bus manufacturing is an important Australian industry with a workforce of around 10,000 people.[66] There is a need to support industry to ensure the switch to electric buses maintains and grows these jobs. Bus industry experts are telling us that strong policy support for electric buses combined with procurement will incentivise local manufacturing and assembly of electric buses in Australia.

Nexport currently imports electric bus chassis. They are working to set up an electric chassis manufacturing plant in Australia that would create 100 jobs but need a minimum order of 150 buses (delivered over three years) to make it viable.[67] Transit Systems operates 830 diesel and CNG buses in Sydney. They state that switching just 10% of Sydney's fleet would be enough to attract commercial opportunities for bus manufacturers and equipment suppliers.[68] Making electric buses for Australian cities is just the first step to growing manufacturing jobs.

Australia can leverage its existing industry to scale-up and provide electric buses for the global market. If Australia aimed to supply just 5% of the anticipated global market by 2025, more than 8,000 new jobs could be created.

Electric bus case studies are provided at <u>Section 4.6</u>

3.2. Program Aims

The Electric Bus program aims are:

- Double's Australia's existing bus manufacturing workforce, reaching 20,000 by 2030
- Deploy at least 500 Australian made electric buses across our major cities within three years
- Develop an electric bus manufacturing strategy that aims to supply 5% of anticipated global electric bus sales by 2030.

3.3. Program investment and job creation

This program will invest $240 million to double the existing bus manufacturing workforce, reaching 20,000 by 2030.

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[65] Ibid

[66] *The Economy and the Bus Industry*, OzeBus, https://www.bic.asn.au/information-for-moving-people/economy-and-the-bus-industry/ Accessed on 29 April 2020.

[67] *Nexport submission to inquiry into Electric buses in regional and metropolitan public transport networks in NSW (submission 26),* Nextport, 20 December 2019, https://www.parliament.nsw.gov.au/ladocs/submissions/66990/Submission%20-%2026.pdf Accessed on 29 April 2020

[68] *Transit Systems submission to inquiry into Electric buses in regional and metropolitan public transport networks in NSW (submission 11),* Transit Systems, 19 December 2019, https://www.parliament.nsw.gov.au/ladocs/submissions/66975/Submission%20-%2026.pdf Accessed on 29 April 2020

3.4. Package one: Electric bus grant program

3.4.1. The opportunity

While global demand for electric buses is growing, markets outside of China are still small. Setting up an electric bus manufacturing sector today will help ensure Australia is shovel ready to sell high quality buses to the world when the expected price tipping point is achieved in 2025.

3.4.2. Investment and jobs target

This package allocates $200 million in grant funding over three years. This has the potential to create nearly 3,000 jobs:

- 300 new manufacturing jobs, by establishing three new electric chassis manufacturing plants
- 1,700 manufacturing jobs in bus body manufacturing
- 900 construction jobs to build electric charging depots.

We also assume at least 50 construction jobs created to construct 40MW solar or wind farms to power the 500 buses.

3.4.3. What does the package do?

Grants will be provided to public transport authorities to incentivise them to go to market for service contracts that use Australian made electric buses. Funding will support early uptake of up to 500 electric buses, contributing to the current cost difference between diesel and electric buses. Funding can be used to support bus procurement, depot upgrades and charging equipment. This investment will leverage $233 million investment in buses and charging depots by public transit authorities and commercial operators. This investment will also reduce operating costs for public transport operators and contribute to better air quality and amenity for our cities.

3.4.4. Industry participation requirements

To win grant funding, state and local government public transport authorities must:

- go to market for at least 50 new electric buses per contract
- include local content and manufacturing requirements in their tenders
- demonstrate that mechanisms will be put in place to run the buses with renewable electricity
- demonstrate that state bus service contracts have been updated to reflect new technologies
- demonstrate they have been partnering with the bus operators to design a bus network with the capability of accommodating new technologies and service practices
- demonstrate how they will provide practical support for investors and commercial operators looking to establish local manufacturing operations

- accelerate bus replacement program, bringing the contract life of service buses down to 15 years (from current 25 years) and prioritising the replacement of high floor buses (elderly and mobility impaired people cannot use these services)

3.4.5. How will the package be delivered?

The grant program will be administered by the Department of Infrastructure, Transport, Regional Development and Communications. Two funding rounds will be offered over 2 years, which will provide flexibility for different bus service contracts and end dates. Funding rounds will also be allocated proportionality across states and territories.

3.5. Package Two: Electric Bus Innovation Fund

3.5.1. The opportunity

Electric buses are proven technologies, but to ensure Australia gets the maximum value from electrifying buses and building new manufacturing industries a strategy and coordinated approach is needed.

3.5.2. Investment and job creation

This package will invest $40 million over two years in zero emission innovation and investment. This will build industry capacity to make and export electric buses, targeting 4,000 buses and 8,000 new jobs by 2030.

3.5.3. What does the package do?

This innovation fund will support bus operators and manufacturers to commercialise Australian e-bus innovation and to strategically scale up manufacturing to target the international market. The fund is modelled on the New Zealand *Low Emission Vehicle Contestable Fund,* where key objectives are to:

- increase the supply and variety of electric and other zero emission buses
- improve the availability of charging and servicing infrastructure
- increase demand for low emission vehicles
- develop innovative products and systems for vehicles.

To complement industry innovation, $5 million will be allocated to develop a national e-bus manufacturing strategy and implementation plan, with a focus on:

- designing the retrofit of urban bus networks to fully electric services, exploring how proven, advanced technologies can be best adopted and adapted to existing bus networks;
- bus and battery innovation, manufacturing, and deployment, to put Australia at the forefront of technology and advanced manufacturing across the entire bus supply chain;
- vehicle to grid optimisation, to ensure electric bus roll-out provides strategic grid benefits such as demand management and storage.

3.5.4. Industry participation requirements

Industry funding recipients must demonstrate how their project will create jobs and significantly upscale bus manufacturing.

3.5.5. How will the package be delivered?

The Electric Bus Innovation Fund will be administered by ARENA. The Transport and Infrastructure Council will deliver the e-bus strategy and will nominate a state to lead the strategy on behalf of the Council.

ELECTRIC BUS CASE STUDIES

3.5.6. Electric buses in Australia

The NSW Government, in partnership with Transit Systems, started a two-year trial of four electric buses on 1 July 2019. The buses are running in the inner west of Sydney, and the learnings will be shared with industry as NSW moves towards a 100% electric bus fleet.[69] Four months into the trial, NSW Transport Minister announced that the NSW Government would move to electrify Sydney's 8,000 buses.[70]

The Victorian Government is currently trialling an electric bus in inner Melbourne. The bus is the first one to be made locally in Victoria. Early reports are positive, with the bus successfully running 172 kms a day, showing encouraging cost savings signs, and benefits for driver health with reduced cab noise.[71]

The ACT Government is currently trailing a Yutong Electric E12 bus, operating all over Canberra.[72] An earlier 2017 trial that compared diesel, hybrid and electric buses concluded that electric buses were better in terms of total cost ownership and an economic perspective.[73] The ACT Government has committed to a 100% electric bus network.

State	What's happening?
NSW	• Trialling of 4 electric buses on Sydney's inner west • Government commitment to electrify all 8,000 Sydney Buses
VIC	• Trialling 1 electric bus • Developing a Zero Emissions roadmap
ACT	• Trialling 1 electric bus • Commitment to electrify entire fleet
QLD	• 1 electric bus in service • Brisbane City Council has entered into contract for 60 electric buses
SA	• Tindo electric bus operates in Adelaide • Planning to add electric buses to its trial of hybrid buses
NT	• 2019 Electric Vehicle discussion paper includes buses
WA	• Recently purchased 900 diesel buses to be delivered over 10 years, contractor could supply alternative electric technologies if requested by Transport Authority

3.5.7. Electromotive – Australia's first turnkey charging provider

Electromotive is offering a unique turnkey charging service to bus operators that provides cost effective charging infrastructure that fits the unique needs of every operator, but without

[69] *Transit System West case study,* Transport for NSW, transport.new.gov.au, Accessed on 29 April 2020

[70] *There is a real health impact: Minister plans to electrify Sydney's 8000-strong bus fleet*, SMH, 28 October 2019, https://www.smh.com.au/national/nsw/there-is-a-real-health-impact-minister-in-push-to-electrify-sydney-s-8000-strong-bus-fleet-20191028-p534ts.html, Accessed on 29 April 2020

[71] *Video Review: Volgren-BYD Electric*, Bus News, 11 April 2020, <web> Accessed 29 April 2020.

[72] *Electric bus to join Transport Canberra fleet*, Andrew Barr, MLA and Chris Steel, MLA, 11 November 2019, https://www.cmtedd.act.gov.au/open_government/inform/act_government_media_releases/barr/2019/electric-bus-to-join-transport-canberra-fleet, accessed on 29 April 2020

[73] *ACT sees electric buses as viable investment, despite flawed trial*, The Driven, 1 October 2019, https://thedriven.io/2019/10/01/elctric-bus-trial-viable-despite-flaws/, Accessed on 29 November 2020

the complexity. Electromotive partners with bus operators to plan for the transition to zero-emission technology, establish and then maintain an electric bus network.[74] Electromotive has partnered with HESS, Volgren and AAB to deliver the Brisbane Metro project, which will put 60 electric buses on the road. ABB's super-fast charging technology will charge buses in under six minutes.[75]

3.5.8. Volgren's First Electric Bus and Bus Optimisation Project

Leading bus manufacturer Volgren recently made their first electric bus at their Dandenong plant. The bus – which has entered service after being purchased by Transdev - has 324 kWh of capacity and a 300 km range.[76] The bus was a partnership between Volgren and BYD. The body construction and fit out were completed at Volgren's Dandenong plant.[77] The chassis was provided by BYD - the world's leading manufacturer of electric buses.[78]
This partnership between two leading bus manufacturers highlights how innovative and quality electric buses can be successfully made in Australia.

> "In the case of this first electric bus, we wanted to ensure that we built on a known quantity. We didn't want to conduct a science experiment of work with a conglomerate of part suppliers…We wanted something that will work from the start."
> Jon Tozer, Volgren Business Development Manager[79]

Volgren is looking to the future. Their Bus Optimisation Project aspires to take one tonne out of their Optimus model to accommodate lithium batteries. Volgren is using a scandium alloyed to aluminium, to reduce weight and maintain strength. To overcome the supply and cost issues of using scandium, Volgren is collaborating with Clean TeQ, who are developing a Scandium/Nickel/Cobalt mine in NSW[80] Funding support from the Advanced Manufacturing Growth Centre is allowing the Deakin University Institute for Frontier Materials to develop the new metal alloy.[81] This lightweight bus opens exciting domestic and export opportunities for Volgren as the electric bus market grows.

3.5.9. Los Angeles electric buses

In November last year, the Los Angeles Department of Transportation ordered 130 electric buses. The order is part of a wider commitment to electricity all LA buses by 2030.[82] The

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[74] *Electromotive submission to Electric Buses in Regional and Metropolitan Public Transport Network in NSW,* Electromotive, 20 December 2019, https://www.parliament.nsw.gov.au/ladocs/submissions/66991/Submission%20-%2027.pdf, Accessed on 29 April 2020

[75] *Brisbane to get 60 bi-articulated EV buses with flash-charging*, InsideEVs, 28 November 2020, https://insideevs.com/news/384541/brisbane-60-ev-buses-flash-charging/

[76] *First Victoria-built electric bus gets thumbs up from bus expert*, The Driven, 27 April 2020, https://thedriven.io/2020/04/27/first-victoria-built-electric-bus-gets-thumbs-up-from-bus-expert/, Accessed on 29 April 2020.

[77] Ibid

[78] *Volgren to show off new electric bus*, @AuManufacuring, 2 October 2019, https://www.aumanufacturing.com.au/volgren-to-show-off-new-electric-bus, Accessed on 29 April 2020

[79] Ibid

[80] *Why some don't miss the bus*, @AuManufacuring, 14 March 2019, https://www.amgc.org.au/jens-blog/why-some-dont-miss-the-bus/, Accessed on 29 April 2010

[81] Ibid

[82] *Los Angeles orders 130 BYD buses*, electrive.com, 14 November 2019, https://www.electrive.com/2019/11/14/los-angeles-orders-130-byd-electric-buses/, Accessed on 29 April

order was supported by funding from the US Government. The buses will be provided by BYD, manufactured in their California factory. The buses will exceed the Federal 'Buy America' requirement and incorporate 70% US content.[83] Since 2015, the BYD California manufacturing plant has brought in around $300 million in regional investment, created over 800 permanent jobs and sold 722 buses.[84] With federal support, Australia could see similar outcomes.

[83] *Los Angeles orders 130 BYD buses*, electrive.com, 14 November 2019, https://www.electrive.com/2019/11/14/los-angeles-orders-130-byd-electric-buses/, Accessed on 29 April

[84] *BYD receives inaugural select LA foreign direct investment award,* en.byd.com, 1 June 2018, https://en.byd.com/news-posts/press-release-byd-receives-inaugural-select-la-foreign-direct-investment-award/, Accessed on 29 April 2020.

4. LOCAL SOLAR

Local solar will cut the cost of energy for thousands of community organisations, freeing up funds to spend on core services. Kindergartens, country fire stations, Aboriginal communities, public halls, sports clubs, schools, hospitals, and Councils will all benefit from the biggest local solar roll-out Australia has ever seen.

At-a-glance

- $500 million in Government investment, with $400 million offered for low cost finance.
- Up to 22,000 community and public buildings fitted with solar, cutting energy costs right around Australia
- Up to 5,000 jobs created.
- Potential to leverage up to $1 billion in community and private investment.

4.1. The case for local solar

Solar cuts the cost of energy. For community facilities that operate during the day, like kindergartens, health care centres, country fire authorities and clubs, solar can make a big difference to the bottom line, freeing up funds for core activities. A total of 160kW of solar photovoltaic systems installed across six Aboriginal communities in the west Kimberley will save each community up to $40,000 a year.[85]

Solar is also a great economic stimulator. Last year, roof-top solar systems accounted for 13,070 jobs, while large-scale solar accounted for 4,740 jobs.[86] Solar projects can be delivered quickly, with systems under 100 kw delivered in four to 5 months, and megawatt projects delivered in eight to ten months.[87] Local solar projects also generate demand in the local economy, with the Reserve Bank of Australia identifying spill-over top domestic firms, citing some contracts suggesting local content accounts for 25 - 40% of total costs.[88]

Small megawatt solar farms can reduce the power bills of local governments. The $8 million Newcastle solar farm makes good use of a closed landfill and will save Council around $9 million over its 25-year lifespan.[89] Installing local solar right across Australia will bring the benefits of solar to local communities and create much needed jobs over the next two years.

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[85] *Harnessing the sun in remote communities*, https://horizonpower.com.au/our-community/projevcts/solar-incentives-scheme/, Accessed 13 May 2020

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4.2. Program Aims

The Local Solar program aims are to:

- Create 5,000 jobs
- Reduce power bills for community organisations and state and local governments delivering public services.

4.3. Program investment and job creation

This program will invest $500 million to put solar on more than 20,000 community roofs across all Federal electorates and incentivise the delivery of 180 small solar farms right across the country, creating around 5,000 installer and construction jobs.

4.4. Part one: Community solar grant extension

This package extends and scales the current *Energy Efficient Communities Program – Community Energy Efficiency and Solar Grants 2020*.

4.4.1. The opportunity

The current *Solar Grants* program offers funding to install two energy efficient projects in each Federal electorate. (The available grant of $12,500 for up to 100% of costs could be expected install a small, 10kw system.) By leveraging this existing program Government could quickly deploy 130 solar projects in every electorate - big enough to power a small community building such as a kindergarten, community hall, rural fire station or library.

4.4.2. Investment and jobs

This package will allocate $400 million over one year, creating around 3,000 installer jobs.

4.4.3. What does the package do?

This package provides funding from $1,000 to $20,000 to not for profit groups to install solar panels on the roofs of community buildings. While the program can fund up to 100% of the project costs, we recommend that the grant round encourages and prioritises applications that install medium size systems (around 30kw) and contribute funding to the project.

Community groups set to benefit from local solar

Not-for-profit community organisations are the backbone of Australia, bringing Australians together to form communities that look out for each other, while offering vital services. The Not-for-Profit service providers that are set to benefit from this program include:

- Children's services, such as Kindergartens, day-care, maternal and child health centres, playgroups, Scouts, and toy libraries
- Community support, such as Senior Citizen Centres, women's support services, Men's sheds, multicultural services and community and neighbourhood houses
- Cultural services, such as community galleries, University of the Third Age, libraries, dance schools and theatre groups

- RSL and other service clubs
- Country fire stations
- Sports clubs like surf lifesaving clubs, netball, football and cricket clubs, community gyms
- Religious organisations
- Environment groups, like conservation volunteers and indigenous plant nurseries.

This package has the potential to generate up to $390 million in community investment.

Ensuring Aboriginal and Torres Strait Islanders access solar

The package also sets aside $70 million to ensure remote Aboriginal and Torres Strait communities benefit from this grant round. This will include resourcing a steering group to support overall program design and outreach. The funding will cover feasibility, capacity building and capital works for Aboriginal and Torres Strait community solar projects.

The steering group will also work with Aboriginal and Torres Strait communities to design a longer-term remote solar program that incorporates the knowledge and experience gathered during this grant round.

4.4.4. Participation requirements

We recommend that the current grant round requirements govern this special funding round.

4.4.5. How will the package be delivered?

This package will be delivered by establishing a special new funding round of the *Energy Efficient Communities Program – Community Energy Efficiency and Solar Grants 2020* (administered by the Department of Industry, Science, Energy and Resources). There may be opportunities to refine the grant program design to reduce the administration burden for grant seekers and grantees based on feedback from the current community grant round (closing 18 May 2020).

The Department of Industry, Science, Energy and Resources, should seek the advice of the National Indigenous Australians Agency in establishing the Steering Group and program design and delivery.

4.5. Part Two: Large rooftop solar and solar farms

This package offers low cost finance for large solar systems and offers small grants to incentivise rapid uptake.

4.5.1. The opportunity

Important community assets like schools, hospitals, closed landfills, and retail can be transformed into solar farms, providing competitively priced energy where it is needed and avoiding short-term grid congestion issues.

4.5.2. Investment and jobs

This package will allocate $100 million over two years and provide $400 million in finance through the Clean Energy Finance Corporation's Sustainable Cities fund. The initiative will create up to 2,000 construction jobs.

4.5.3. What does the package do?

This package will incentivise landowners and developers to install large scale local solar. We have assumed the package would result in 2,000 large (100kw) roof systems and 180 small (1- 15 MW) solar farms.

Organisations set to benefit from local solar

Organisations that provide vital services can access this large solar program, including:

- Public and privately owned:
    - hospitals and health centres
    - schools, TAFE and Tertiary institutions
    - retirement centres
    - train, tram, and bus depots
    - retail centres
    - large sports centres like swimming pools and gyms
    - Councils.

Up to $100 million in grant funding will be offered, covering up to 10% of a project's development and capital cost. A purpose-built asset fund will be established by the CECF to offer a competitive financing option. We have assumed around half of all projects would access this option. The grant design will ensure developers and building owners have maximum flexibility to deliver a business model that works for their community. Solar systems can be developed and owned by the property owner or can be developed and owned by a third party. WWF-Australia recommends that regions hardest hit by COVID19 shutdowns be prioritised for funding and finance.

This program has the potential to unlock $8 billion in community and private investment. If the asset fund is 100% subscribed, around $400 million in private/state and local government investment can be unlocked. The grant has the potential of incentivising projects that would add an additional $400 million in investment.

4.5.4. Industry participation requirements

To be eligible for funding, participants:

- Must be delivering either a commercial rooftop solar array greater than 100kWs or a solar farm between 1-15MWs.
- Must be a state, local government or not-for-profit in ownership of the asset
- Can be a private developer that demonstrates they have:
    - the approval of government and / or not-for-profit asset owner, and/or
    - secured the partnership of a major community leader (for example, a Council or Chamber of Commerce), and that the energy offtake will be offered at a competitive rate for use by government and / or not-for-profit asset owners
- must demonstrate that the project will generate direct local jobs and indirect jobs through local procurement

- must demonstrate compliance with regulatory requirements and use installers certified by the Clean Energy Council.

4.5.5. How will the package be delivered?

This package will be administered by the Department of Industry, Science, Energy and Resources, who will administer the grant funding, and work with the CEFC to engage a finance partner to deliver the purpose-built asset fund.

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4.6. CASE STUDIES

4.6.1. Council solar farms

Councils seeking to reduce greenhouse gas emissions and operational costs are turning to solar.

Newcastle City Council recently opened an $8 million, 5MW solar farm at its Summerhill Waste Management Centre. The $8 million, 25-year asset was financed with a $6.5 million CECF loan, $1 million grant funding from the NSW Government and $0.5 million from the council. The farm produces enough energy to power 1,300 households.[90] The farm will be saving Council $9 million over the asset life.

Sunshine Coast Council was the first Australian council to build a solar farm. The 15 MW farm will save council $30 million over 30 years.[91] Albury City Council is the first to build a solar farm on a former landfill.[92]

Other councils are in the early stages of delivering a farm. The Nillumbik Shire Council has agreed to go to market to secure a developer to fund and operate a solar farm (up to 5MW) and provide a power purchase agreement for council to offtake electricity.[93] South Freemantle Council is perusing a farm on a former landfill site.[94]

4.6.2. Remote Solar

Horizon Power is partnering with remote Aboriginal communities to deliver local solar. After partnering with the Djarindjin and Lombadina Corporations to install 160kW of solar, Horizon has used this model to offer the *Solar Incentives Scheme*.[95] A Queensland Scheme is installing solar in four remote communities, and an ARENA / NT Government project has delivered 10MW of solar for remote communities. This program will save 94 million litres of diesel over the life of the program.[96]

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[90] Ibid

[91] *Solar farm overview*, Sunshine Coast Council, https://www.sunshinecoast.qld.gov.au/Environment/Sunshine-Coast-Solar_Farm/Solar-Farm-Overview, Accessed 13 May 2020

[92] *Australia's first Operational Reclaimed Landfill Solar Farm*, Solarquotes Blog, https://www.alburycity.nsw.gov.au/services/waste-and0recycling/alternative-energy, Accessed 13 May 2020

[93] *Solar farm development shines light on Council climate action*, Nillumbik Shire Council, https://www.nillumbik.vic.gov.au/News/Solar-farm-development, Accessed 13 May 2020

[94] *South Freemantle Solar Farm*, City of Freemantle, mysay.freemantle.wa.au, Accessed 13 May 2020

[95] *Solar Incentive Scheme,* https://horizonpower.com.au/our-community/projevcts/solar-incentives-scheme/, Accessed 13 May 2020

[96] *Transforming the way we power the Territory*, ARENA, https://arena.gov.au/assets/2017/02/pwc-solar-setup-fact-sheet.pdf

5. ACCELERATE RENEWABLE HYDROGEN

Accelerating Renewable Hydrogen will increase Australian fuel security, increase energy reliability, and position Australia at the forefront of an expanding global hydrogen market, capitalising on our world-leading renewable resources.

At-a-glance

- $225 million in Commonwealth investment over two years to unlock short-term renewable hydrogen jobs and opportunities;
- This will leverage $765 million in private sector investment over two years;
- At least 1200 jobs created;
- Accelerating Renewable Hydrogen would be delivered by the Australian Renewable Energy Agency (ARENA).

5.1. The case for renewable hydrogen

As the world moves to a low-carbon future, countries with the best renewable resources have a comparative advantage. Renewable hydrogen is a critical energy pathway for unlocking this comparative advantage.

A recent report by Bloomberg New Energy Finance[i] (BNEF) found that if the world is to keep warming to below 1.5 degrees, renewable hydrogen will be needed to meet between 7% and 24% of global energy needs by 2050. This percentage could be higher if all the unlikely to electrify sectors in the economy substitute fossil fuels with renewable hydrogen.

Under the Bloomberg New Energy Finance strong policy scenario an additional 11TWs of wind and solar capacity will also be required just for hydrogen production over the next 30 years. To put this in perspective this is more electricity than is currently generated globally from all sources for all applications. If we unlock this opportunity BNEF projects US$11 trillion in hydrogen production, storage and transport infrastructure investment will be required.

Australia can be at the forefront of this renewable hydrogen market and strong progress is already being made through:

- The National Hydrogen Strategy;
- ARENA's $70 million hydrogen round;
- A commitment of $300 million for hydrogen finance by the CEFC;
- Renewable hydrogen strategies and programs by all state and territory governments;
- A range of feasibility, research, and demonstration projects around the country.

However, more needs to be done to unlock new demand sectors for renewable hydrogen and ensure Australia can establish job-rich supply chains for this emerging global industry. Due to the work already delivered by ARENA and the CEFC there are several advance development projects in Australia. These can be converted into near term investment opportunities. Specifically, Australia must unlock short-term demand for renewable hydrogen, helping to accelerate it down the cost curve.

We must also position ourselves as global leaders in the most promising long-term market applications for renewable hydrogen, namely those traditionally 'hard-to-decarbonise' sectors such as steel production and shipping.

5.2. Program Aims

The Accelerating Renewable Hydrogen program aims are to:

- Unlock demand for renewable hydrogen
- Accelerate renewable hydrogen down the cost curve (below $2/kg)
- Position Australia as a global leader in sectors such as green steel, hydrogen exports and low-carbon shipping
- Ensure Australian businesses are well positioned to benefit from a global renewable hydrogen industry
- Upskill Australia's renewable hydrogen workforce.

5.3. Program investment and job creation

WWF-A propose that the Commonwealth invest the following amounts:

- $25 million for a renewable hydrogen mining trucks program over the next two years and
- $200 million over the next two years to take proposed projects and hydrogen hubs from feasibility to implementation

Based on a market sounding WWF estimates that at least 1200 jobs will be created in the construction of hydrogen production facilities and installation of electrolysers, the construction of associated renewable generation and the retooling of existing industries such as mining trucks to use renewable hydrogen. Where new industry is attracted to a renewable hydrogen hub created through this program, more jobs will be unlocked.

5.4. Unlocking hydrogen demand in the short-term

5.4.1. What does the package do?

Renewable hydrogen for trucking

The National Hydrogen Strategy acknowledges that renewable hydrogen production is still expensive and as such most Government initiatives in Australia are helping to reduce the cost of renewable hydrogen to below $2/kg.

However, energy insiders suggest that renewable hydrogen production is nearly cost-competitive with expensive diesel for trucks in remote mines in Australia where the wind and solar resources are excellent.

The Renewable Hydrogen for Trucking program would provide $25 million in matched grants through ARENA for mining and trucking companies for renewable hydrogen powered mining truck and on-road truck demonstration projects. This will create jobs in the construction of

the hydrogen production facilities, renewable generation and the retooling or assembly of hydrogen trucks in Australia.

This project in turn would help kick-start a renewable hydrogen trucking industry in Australia and decrease our reliance on diesel fuel imports which currently pose a threat to fuel security.

Establishing renewable hydrogen hubs

The National Hydrogen Strategy identifies the establishment of hydrogen hubs as critical to the success of an Australian renewable hydrogen industry. These hubs would co-locate hydrogen businesses, supply chains and end users into a geographic location to better achieve economies of scale.

There is significant activity around renewable hydrogen and hydrogen hubs, including:

- A COAG Energy Council Hydrogen Hub Study,
- Hydrogen industry development work through NERA,
- A number of ARENA co-funded renewable hydrogen feasibility studies by some of Australia's largest existing hydrogen users and
- Federal and state-based funding programs.

However, none of these has yet targeted the establishment of physical renewable hydrogen hubs, nor prioritised skill development in the potential location for these hubs that would help ensure local businesses and local people are able to secure jobs in this emerging industry.

We propose the establishment of a $200 million Renewable Hydrogen Hub seed fund over two years. This would be used to take renewable hydrogen projects from feasibility to implementation and in the process use these projects as anchor projects for a Renewable Hydrogen Hub.

Funding would also be provided for targeted training and skills development in the likely locations of the Hubs.

This Renewable Hydrogen Hub fund should work to leverage maximum impact by funding synergistically with state government hydrogen programs.

5.4.2. How will the package be delivered?

The Accelerate Renewable Hydrogen package will be delivered by providing additional funding to ARENA.

It is recommended that the renewable hydrogen funding proposed in this stimulus measure, be additional to a broader budget recommitment that would see the life of ARENA extended to 2030 or beyond.

5.4.3. Industry participation requirements

Industry participants will need to comply with ARENA's usual funding guidelines and processes.

This will include providing matching funding. To date, ARENA has leveraged $3.4 per $1 of matched investment. Based on these figures the additional $115 million proposed in this program will leverage $765 million in private sector investment over two years.

5.5. CASE STUDIES

5.5.1. Renewable hydrogen projects in Australia

According to analysis by the Smart Energy Council there are 26 renewable hydrogen projects in Australia. At least one of these is operating, many others are in active development, with the remainder undergoing feasibility assessment.

These projects vary from renewable hydrogen production for fertilizer production by industry heavyweights such as Yarra (WA) and Incetic Pivot (Qld) to renewable hydrogen injection into the gas grid in NSW and South Australia. The majority of these projects have received support from ARENA and more details can be found at https://arena.gov.au/renewable-energy/hydrogen/.

Currently, South Australia, Queensland, Tasmania, the ACT and WA have all opened or undertaken renewable hydrogen funding programs. We understand similar programs are in development in NSW and Victoria.

5.5.2. Trucking

Around the world leading trucking and mining companies are starting to develop and test zero carbon trucking solutions. For example, Anglo American are developing a hybrid mining dump truck powered by both electricity and hydrogen fuel, which will be tested at their mining operations in South Africa towards the end of 2020.[ii] Meanwhile Bosch, Kenworth/Toyota and a Canadian consortium AZETEC (Alberta Zero-Emissions Truck Electrification Collaboration) are all working on long range fuel cell electric trucks to be powered with hydrogen.

Just recently, Singapore-based hydrogen trucking company Hyzon Motors announced it was opening an office in Australia. Hyzon is "also considering the options for locating its first fuel cell commercial vehicle integration facility in Australia.[iii]

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[i] https://data.bloomberglp.com/professional/sites/24/BNEF-Hydrogen-Economy-Outlook-Key-Messages-30-Mar-2020.pdf
[ii] https://www.popularmechanics.com/technology/infrastructure/a30873539/electric-mining-truck/
[iii] https://www.h2-view.com/story/hyzon-motors-australia-launched/

A RENEWABLE FUTURE

CLIMATE CHANGE

As the world moves to act on climate change and fulfil the promise of the Paris Climate Agreement, places that have the best renewable resources in the world have a significant opportunity.

CLEAN ENERGY

Renewable energy such as solar and wind is critical to decarbonising more than two thirds of global emissions, in the electricity, transport, building and industrial sectors.

POPULAR CHOICE

With over 2.1million rooftop solar systems, you just have to walk down the street to see how Australians have embraced renewable energy.

A JUST TRANSITION

WWF-Australia supports a climate action plan that ensures nobody is left behind.

RENEWABLE LEADER

Our goal is for Australia to be a leading exporter and investor in renewable energy with a zero-carbon economy achieved well before 2050.

WWF DELIVERING ECONOMIC STIMULUS THROUGH RENEWABLES · 2020

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Why we are here
To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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