

ARENA CORPORATE PLAN

2020-21 – 2023-24



Australian Government
Australian Renewable
Energy Agency

ARENA

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FROM THE CHAIR

Australia's clean energy transition is well underway, driven by technologies able to deliver low emissions energy at ever lower costs, as well as by the desire of consumers, corporations and governments to find new, cleaner solutions.

The opportunities for Australia in this energy transition are substantial. With our prolific clean energy resources, we have the opportunity to pioneer a path to a low-cost, low emissions domestic energy system as well as develop enormous clean energy export industries.

There are many technological hurdles to clear before we can achieve such an outcome. The challenges of transitioning a century-old, largely centralised electricity grid to a new world of distributed, variable, zero-marginal-cost renewable energy are significant. Hydrogen presents transformational clean energy opportunities but we need to find ways to substantially reduce its cost of production to realise this potential. And we need innovative solutions to assist sectors such as transport and heavy industry to make their transitions to a clean energy future.

ARENA is central to Australia achieving these outcomes. Its purpose is to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation that benefits Australian consumers and businesses, and it has a strong record of supporting new technologies, business models and investment in the renewable energy sector since its establishment in 2012.

This Corporate Plan outlines ARENA's priorities and challenges for the next four years including the delivery of lasting benefits from its substantial portfolio of projects under management.

This strategy reflects a focus on connecting investment, knowledge and people to deliver energy innovation. With continued high-quality execution, ARENA will underpin critical elements of the energy transition, crowd-in private sector investment, contribute to economic activity and growth and provide an outstanding return to Australia on funds deployed.

ARENA invests in innovative companies developing and commercialising new low emissions technologies and will play an important role in helping achieve the vision of the Technology Investment Roadmap. New funding announced in the 2020-21 Budget will enable ARENA to support the next generation of energy technologies to accelerate the transition to a lower emissions economy. Subject to Parliament's consideration of amendments to the ARENA Act, this could extend to other low emissions technologies consistent with the Technology Investment Roadmap First Low Emissions Technology Statement 2020.

2020 represents the beginning of the crucial decade where the world must make dramatic progress on reducing its carbon emissions. This challenge must now be met in the context of fragile post-COVID economies. ARENA is a key delivery agent for the Australian Government in bringing to bear the most effective tools and technologies to support the changing energy landscape and help Australia reduce its emissions.

Yours sincerely
Justin Punch
Chair

Statement of preparation

I, as Chair of the Board of the Australian Renewable Energy Agency (the accountable authority) present our four-year Corporate Plan as required under paragraph 35(1)(a) of the Public Governance, Performance and Accountability Act 2013.



Mr Justin Punch
Chair, December 2020

Period of coverage

The Corporate Plan is prepared for the reporting period 2020-21 to 2023-24.

ABOUT ARENA

ARENA was established on 1 July 2012 by the *Australian Renewable Energy Agency Act 2011* (ARENA Act).

The overarching objective of the ARENA Act is to:

- › improve the competitiveness of renewable energy technologies
- › increase the supply of renewable energy in Australia.

We work at the forefront of new energy solutions where risk and potential reward is high. We focus on finding and fostering innovation in energy products, services and business models that will bring about transformational change.

Our approach is two-fold: fund innovation in renewable energy technologies and business models to provide a path to commercialisation; and address the technological, commercial, regulatory and market barriers impeding energy transition. We support research, inform policy decisions and bring together the energy sector, government, start-ups and universities to collaborate and share knowledge.

The impact of our work is significant. Since 2012, ARENA has invested \$1.63 billion in 566 renewable energy projects, driving innovations in solar photovoltaic (PV), batteries, biofuels, hydrogen, solar thermal, ocean energy, pumped hydro, distributed energy and demand response, unlocking a total project value of \$6.69 billion across Australia.

ARENA AT A GLANCE - FUNDING COMMITMENTS TO PROJECTS 2012-20



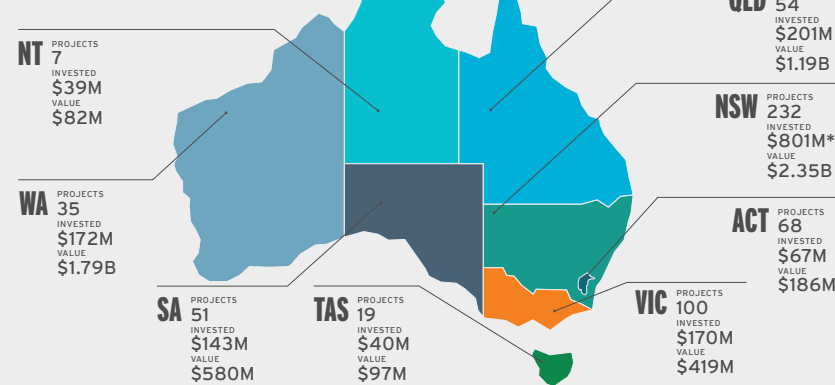
PROJECTS BY TECHNOLOGY



RECENT ACTIVITY

- \$70M** Hydrogen Funding Round shortlists 7 projects
- \$8.2M** for Australia's largest virtual power plant in SA
- \$2.4M** for a world-leading electric vehicle to grid trial in the ACT
- \$2.17M** for Alice Springs Future Grid project
- \$995K** to investigate the feasibility of a renewable energy zone in NSW
- \$220K** to enable multi-tenanted buildings to access and benefit from rooftop solar

INVESTMENT BY STATE



* Includes \$567 million contributed to projects inherited by ARENA in 2012.

INVESTMENT LEVERAGE ALONG THE INNOVATION CHAIN

STUDY \$1:\$1.62	R&D \$1:\$1.63
DEMONSTRATION \$1:\$1.84	DEPLOYMENT \$1:\$5.91

ARENA UPDATES

- ARENA WELCOMES NEW FUNDING**
Prime Minister and Minister for Energy and Emissions Reduction announced \$1.62B in funding for ARENA, including 1.43B guaranteed baseline funding over 10 years.
- NEW BOARD MEMBERS APPOINTED**
Minister for Energy and Emissions Reduction appoints a new Chair & 3 new board members.
- TECHNOLOGY INVESTMENT ROADMAP**
First Low Emissions Technology Statement released.

2020-21 CORPORATE PLAN



This Corporate Plan outlines our priorities and challenges for the next four years, including the delivery of benefits from our substantial portfolio of projects under management. This portfolio sets the foundation for our strategy. To properly account for the measures announced in the 2020-21 Federal Budget and the release of the First Low Emissions Technology Statement, ARENA will review its strategy during 2020-21. This may involve reformulating our investment priorities to best support the long-term challenges and stretch goals set out in the First Low Emissions Technology Statement.

You can also read about:

- › our investment priorities and how to apply for funding in our [Investment Plan 2019](#)
- › how the ARENA Act guides our funding decisions in our [General Funding Strategy](#)
- › our achievements and outcomes to date in our [Annual Report](#).

Go to www.arena.gov.au

COVID-19 had a significant effect across the Commonwealth that led to the deferral of the 2020-21 Federal Budget. This had a significant impact on ARENA as it made it impractical for ARENA to prepare a Corporate Plan that properly reflected its intended activities for the year. For this reason, the ARENA Board considered it was not reasonably practicable for ARENA to prepare and publish its 2020-21 Corporate Plan by 31 August 2020.

OVERALL STRATEGY



ARENA aims to support a path to commercialisation for technologies that will help address the challenges identified in the Australian Government's Low Emissions Technology Statement 2020. This is an opportunity to focus on the next generation of energy technologies to accelerate the transition to a lower emissions economy.

ARENA supports renewable energy technologies to become commercially viable by investing in innovation and knowledge, and by building skills and capabilities in supply chains.

Early investment in new ideas reduces technical and commercial risk, helping to grow Australia's renewable energy sector.

When granting funds, ARENA considers the potential for positive impact beyond the immediate project and looks for opportunities to fast-track innovation or make new technologies and business models available sooner.




We invest throughout the innovation chain, balancing investment in emerging commercial technologies with research, development and demonstration to address long-term needs.

We amplify the benefits of our projects through knowledge sharing and by bringing together our partners across industry, government and regulatory bodies to support the energy transition. We will coordinate our work with other agencies and organisations such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Clean Energy Finance Corporation (CEFC) and universities.

Our strategy focuses on cutting edge solutions where we expect renewable energy will have the greatest future impact in reducing emissions or growing the economy. Our focus is on:

- › integrating renewable energy into the electricity system
- › accelerating hydrogen
- › supporting industry to reduce emissions.

These priorities reflect a path to reducing emissions by growing the share of renewables in the electricity mix, fuel switching to electricity, and developing other solutions for hard-to-abate sectors where electrification is expensive or unworkable.

Our purpose	To improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation that benefits Australian consumers and businesses.		
Our strategy	Connecting investment, knowledge and people to deliver energy innovation. We invest in Australia’s energy future by finding and demonstrating first-of-a-kind renewable energy solutions.		
Expected results	More competitive renewable energy choices for Australian consumers and businesses.	Industry learns more quickly. Government, regulatory bodies and the public are better informed to navigate the energy transition.	
Our activities	Providing financial assistance to Australian scientists, innovators and businesses. Collaboration and knowledge sharing to make information and data available to a diverse audience and help increase the spread of ideas.		
Our priorities	 <p>INTEGRATING RENEWABLES INTO THE ELECTRICITY SYSTEM</p> <p>THE NEED Renewable energy can reduce emissions from electricity and help reduce emissions in other sectors through electrification. The variability of wind and solar energy, along with its distributed nature and technical characteristics, require new approaches to power systems operation.</p> <p>OUR ROLE By investing in innovative ways to use, store, manage and share renewable energy, ARENA will help provide affordable, secure and reliable electricity for Australian consumers and businesses through the energy transition.</p>	 <p>ACCELERATING HYDROGEN</p> <p>THE NEED Electrification can be expensive or unworkable for some sectors. Renewable hydrogen may have an important role to play in both our domestic economy and for export.</p> <p>OUR ROLE ARENA will help drive innovation in hydrogen supply chains, from production to end use, to reduce costs, create opportunities across the domestic economy and position Australia to become a major renewable energy exporter.</p>	 <p>SUPPORTING INDUSTRY TO REDUCE EMISSIONS</p> <p>THE NEED Industry accounts for about 40 per cent of all energy used in Australia. Accelerating the uptake of renewable energy for this sector is critical in helping Australia meet its long-term emissions reduction commitments.</p> <p>OUR ROLE ARENA will help Australian industry reduce emissions by investing in new and replicable technologies and processes that increase the adoption of renewable energy (including renewable electricity, renewable fuels, solar thermal, hydrogen and bioenergy).</p>

OUR CAPABILITIES

INNOVATION

Innovation can reduce risk, build skills, move technologies towards commercialisation, test new business models and address regulatory hurdles.

We identify where, and what kind of, innovation is necessary to increase capability and capacity in the renewable energy sector. With the right people, systems and processes, we design and deliver mechanisms for financial assistance and share knowledge to address innovation needs.

BRINGING TOGETHER PEOPLE AND IDEAS

Bringing together the right innovators, regulators, policy makers, researchers, industry participants and consumer bodies can drive change in the energy sector.

The Distributed Energy Integration Program (DEIP) has created a space for strategic discussion and coordination of complex, multi-stakeholder challenges related to distributed energy resources (DER). Building on the success of this program will ensure rooftop solar and home batteries benefit all users of the energy system and electric vehicles integrate efficiently into networks and markets.

Through A-Lab, ARENA has also created cross-sector partnerships and world-first projects that draw on a network of people with the expertise and passion to drive systemic change in the energy sector.

We believe A-Lab can enable breakthrough creative thinking on some of the most exciting and complex challenges facing the energy sector. A-Lab will continue to evolve and refocus to ensure it is best placed to help solve problems and deliver projects consistent with ARENA's investment priorities.

RIGOROUS PROJECT ASSESSMENT AND SELECTION

ARENA applies a rigorous approach when assessing the merit of projects for funding, taking into account risk and value for money. Our processes aim to ensure that we do not fund projects that would proceed without ARENA support.

ARENA draws on the technical expertise of the ARENA Advisory Panel. The panel's expert members provide advice to support the development and selection of projects and initiatives for funding by ARENA.

RISK-BASED AND PORTFOLIO APPROACH TO PROJECT MANAGEMENT

ARENA's client managers are focused on managing projects to success. Our people are strongly customer and outcome-focused. We work closely with project proponents to ensure that each project delivers value for money.

ARENA's project portfolio is risk-rated and managed accordingly. This enables us to balance rigour and efficiency, maximise the chance of success and quickly vary or terminate non-performing projects. Integrating risk ratings into our systems will continue to improve controls and consistency of treatment.

Portfolio management of funding agreements also enables us to monitor technology areas to appropriately identify broader risks and issues and inform new program design.

INCREASING IMPACT THROUGH KNOWLEDGE SHARING

With extensive networks, established forums and award-winning media and social media channels, ARENA can share knowledge broadly with the Australian community and connect industry, researchers, scientists and businesses with information, data and insights to help them navigate the energy transition.

These activities are made possible by our strong analytical, engagement and communication capabilities.

Diversifying our Insights Forums and Insights Newsletters, and making greater use of webinars and podcasts, will continue to extend the reach and impact of our knowledge sharing activities.

In 2020-21, other activities might include drawing together other energy agencies, state governments and project proponents, with a particular focus on grid scale batteries, hydrogen and technologies that support the integration of renewable energy into Australia's electricity grid. We will also focus on knowledge sharing to support industry to reduce emissions.

CONTINUOUS IMPROVEMENT

ARENA welcomes opportunities to improve its key frameworks and processes. This year, we will focus on maturing our performance framework and integrating our information systems and grant management processes to increase assurance. We will also continue to undertake evaluations to demonstrate the extent to which ARENA's programs are impacting our legislative objectives.

OUR OPERATING ENVIRONMENT

Australia's energy system is undergoing its greatest transformation since the 1950s. This transformation is driven by technology innovation, environmental factors and consumer preferences.

In September 2020 the Government announced an investment package in future technologies to lower emissions, support jobs growth now and into the future, cut costs for households and improve the reliability of Australia's energy supply. The 2020-21 Budget introduced measures to support the next generation of energy technologies with an extra \$1.62 billion for ARENA. The Government has also announced an intention to expand the focus of ARENA and the CEFC to back new technologies that will help reduce emissions in the agriculture, manufacturing, industry and transport sectors.

Against the backdrop of the 2019-20 summer bushfires and COVID-19, demand and investment interest in renewable energy supply has shown resilience. This reflects the underlying cost advantage of solar and wind as they achieve higher scales of deployment and continuing revenue opportunities for fast-acting battery storage to provide system security services. By reducing energy costs, renewable energy investments can support economic recovery in the medium term while contributing to sustainable economic productivity improvements over time.

ARENA has also shown resilience in the face of unexpected workforce and industry change, adapting quickly to the impact of COVID-19. Our systems and processes have proven robust and we are working with our grant recipients to understand and respond to the challenges they face.

TRANSITIONING ENERGY SYSTEMS

Australia faces a number of technology challenges as it pursues the vision of becoming a global low emissions technology leader. The Technology Investment Roadmap: First Low Emissions Technology Statement 2020 identifies four challenges:

- › delivery of more affordable, clean and reliable energy to households and industry for transportation, heating, production and power
- › expanding production and increasing productivity creating jobs and substantially reducing emissions from Australia's primary industries

- › preserving and expanding onshore manufacturing of energy-intensive products and capturing new export markets for low emissions commodities
- › scaling geological and biological sequestration to provide globally significant permanent sequestration of carbon dioxide.

In the electricity sector, wind energy generators and solar photovoltaics are now the cheapest sources of new electricity supply. The rapid uptake of wind and solar is reducing electricity wholesale prices and the emissions intensity of grid electricity. At the same time, there is increasing pressure on parts of our distribution and transmission network that were not designed to support significant amounts of generation at customer premises or in weak parts of the grid.

Minimum demand in parts of the National Electricity Market (NEM) is falling significantly, with potential local voltage and regional system stability issues. Traditional sources of essential system services, like 'system strength' and inertia, have become less abundant.

To maintain system stability, the market operator has constrained output from solar and wind generation to ensure 'synchronous' generators remain operational. These constraints, while prudent, reduce renewable energy supplies to the wholesale market increasing costs for consumers.

ARENA-funded projects and studies are demonstrating alternative technologies and management approaches that will enable renewables to supply more electricity. Energy storage and demand management are demonstrating their ability to support grid operation, but many knowledge gaps remain and this critical work is ongoing.

Project insights are informing market reforms through the Energy Security Board's post-2025 Market Design initiative, and building understanding across the sector through the DEIP.

Electrification allows renewable energy to power transport and ARENA is making strategic investments that will underpin the commercial uptake of electric vehicles and demonstrate the positive contribution they can make to grid management. This includes facilitating cross-industry collaboration and supporting the roll-out of smart charging infrastructure.

In response to the King Review¹, which looked at ways to unlock low cost carbon abatement across the economy, particularly in hard-to-abate sectors of industry, transport and agriculture, the Government provided funding in the 2020-21 Budget for the King Review Technology Co-Investment Fund. ARENA's 'supporting industry to reduce emissions' investment priority targets opportunities for emissions reductions through electrification, direct production of renewable heat and production of synthetic fuels using renewable sources.

There is growing international interest in low emissions energy commodities such as 'green hydrogen' and this is expected to continue. Hydrogen can be used to reduce emissions in sectors where electrification is expensive or unworkable and, when produced using renewable electricity, is a pathway for renewable energy to meet the needs of hard-to-abate sectors.

In November 2019, the Australian Government released Australia's National Hydrogen Strategy which sets a vision for the development of a clean, innovative, safe and competitive hydrogen industry. The potential for Australia's hydrogen sector is underlined by the high level of interest in ARENA's \$70 million hydrogen funding round that closed for applications in May 2020. As a key funding agency in the delivery of the strategy, ARENA is supporting projects that will improve the technological and commercial readiness of hydrogen supply chain elements and that will inform the development of future standards and regulatory frameworks.

A PARTNERSHIP ACROSS GOVERNMENT

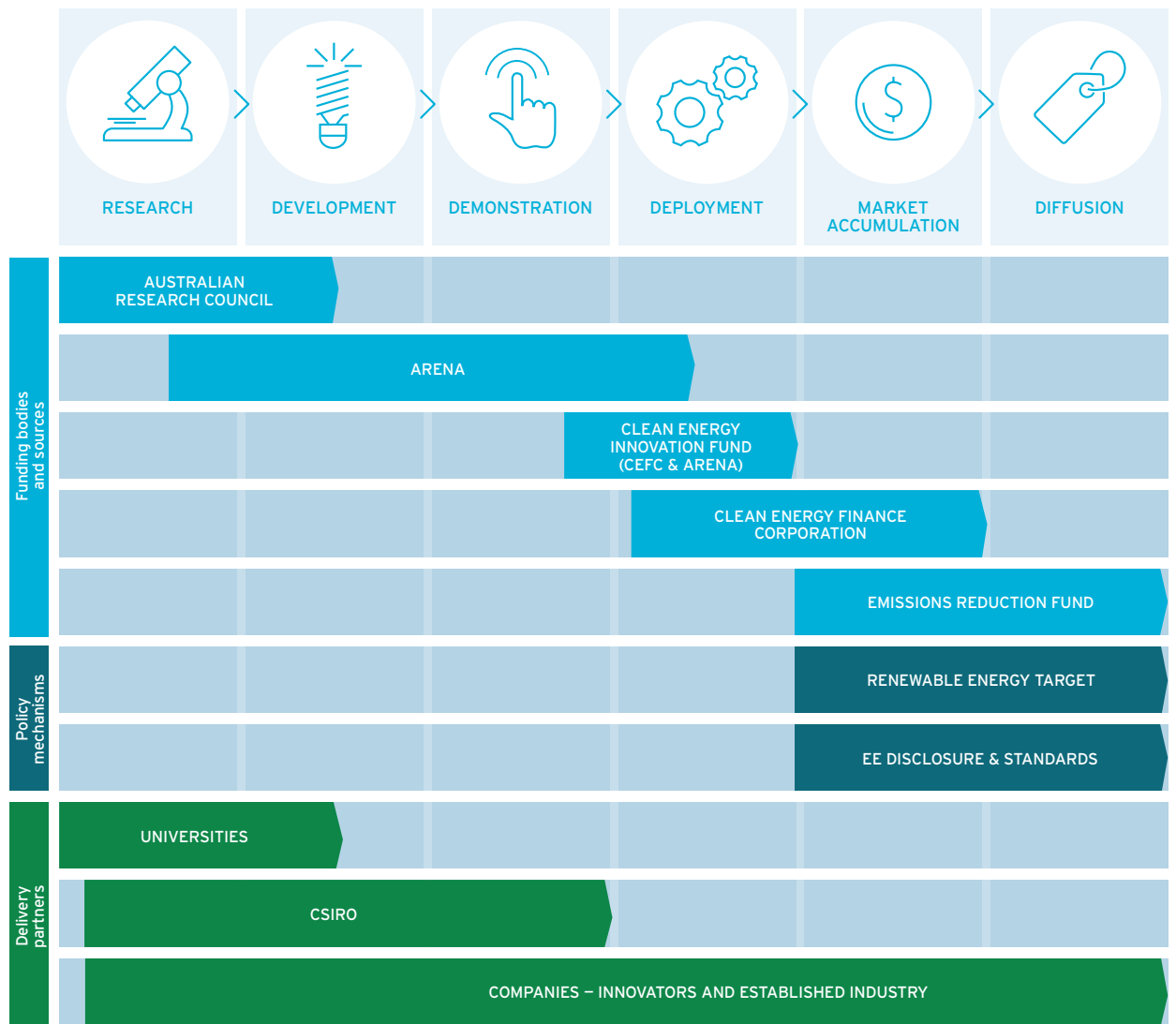
In September 2020, the Australian Government released the Technology Investment Roadmap: First Low Emissions Technology Statement. The Roadmap will guide the public and private sector on government priorities for future energy and emissions-reduction technologies and will become the cornerstone of Australia's long-term emissions reduction strategy, to be delivered ahead of COP26².

ARENA will, through the ARENA Chair's membership of the Technology Investment Advisory Council, advise on the preparation of future Low Emissions Technology Statements. We complement the Australian Government's support for clean energy innovation and energy sector reform by working alongside organisations such as the CEFC, the CSIRO, the Australian Energy Market Operator (AEMO), the Australian Energy Market Commission (AEMC), the Australian Energy Regulator (AER), the Energy Security Board (ESB) and innovators in industry (see Figure 1). We work alongside other government initiatives such as the Regional and Remote Communities Reliability Fund, Climate Solutions Fund and the Renewable Energy Target.

1 An expert panel led by Mr Grant King. Its recommendations are available in the 'Report of the Expert Panel examining additional sources of low cost abatement'.

2 The 2021 United Nations Climate Change Conference, also known as COP26, is the 26th United Nations Climate Change conference. It is scheduled to be held in Glasgow, Scotland from 1 to 12 November 2021.

FIGURE 1 - A PARTNERSHIP ACROSS THE INNOVATION CHAIN



FUNDING AND EXPENDITURE

ARENA's investment in renewable energy innovation complements other measures to support research, development, demonstration and commercialisation including Australian Research Council funding, research and development tax credits, and patents. These measures boost or stimulate private investment in innovation across the economy.

Private investors are not able to capture the full societal value of innovation in clean energy. ARENA's targeted focus on innovation in renewable energy addresses this, lowering the cost of transitioning the energy system to reduce emissions. ARENA's support of start-ups, innovative Australian companies and researchers also helps Australia to prosper through the energy transition.

The ARENA Act contains a profile of funds that ARENA is able to draw down to meet its liabilities in each year. Funds that are not drawn down in a financial year can be rolled over to future financial years until 30 June 2022.

The 2020-21 Budget provided \$1.62 billion over twelve years from 2020-21 to continue funding ARENA. The measure includes:

- › \$1.43 billion over twelve years from 2020-21 to continue funding ARENA to provide research and development investment for emerging low emission technologies to increase their commercial readiness
- › Funding to ARENA of \$67.9 million for the King Review Technology Co-Investment Fund
- › Funding to ARENA of \$71.9 million for the Future Fuels Fund
- › Funding to ARENA of \$52.6 million for an expanded Regional and Remote Communities Reliability Fund.

ARENA is reviewing its program suite to best deliver impact from the additional baseline funding made available in the 2020-21 Budget. The Advancing Renewables Program will remain open for new applications at this stage.

OUR PRIORITIES

It is essential for ARENA's priorities to remain aligned to broader policy, technology and commercial developments so that our activities contribute effectively to the energy transition.

ARENA has helped to significantly improve the competitiveness of renewable energy technologies such as large-scale solar, grid-scale batteries, bioenergy and distributed energy. As technologies have matured, our focus has evolved from renewable energy generation technologies to helping integrate variable renewable energy into the electricity system.

We are now working on longer-term opportunities such as renewable hydrogen and reducing emissions in the transport and heavy industry sectors. In these harder to abate sectors, government support is particularly valuable to help industry identify, research, pilot and demonstrate appropriate technologies and techniques to commence sectoral transitions.

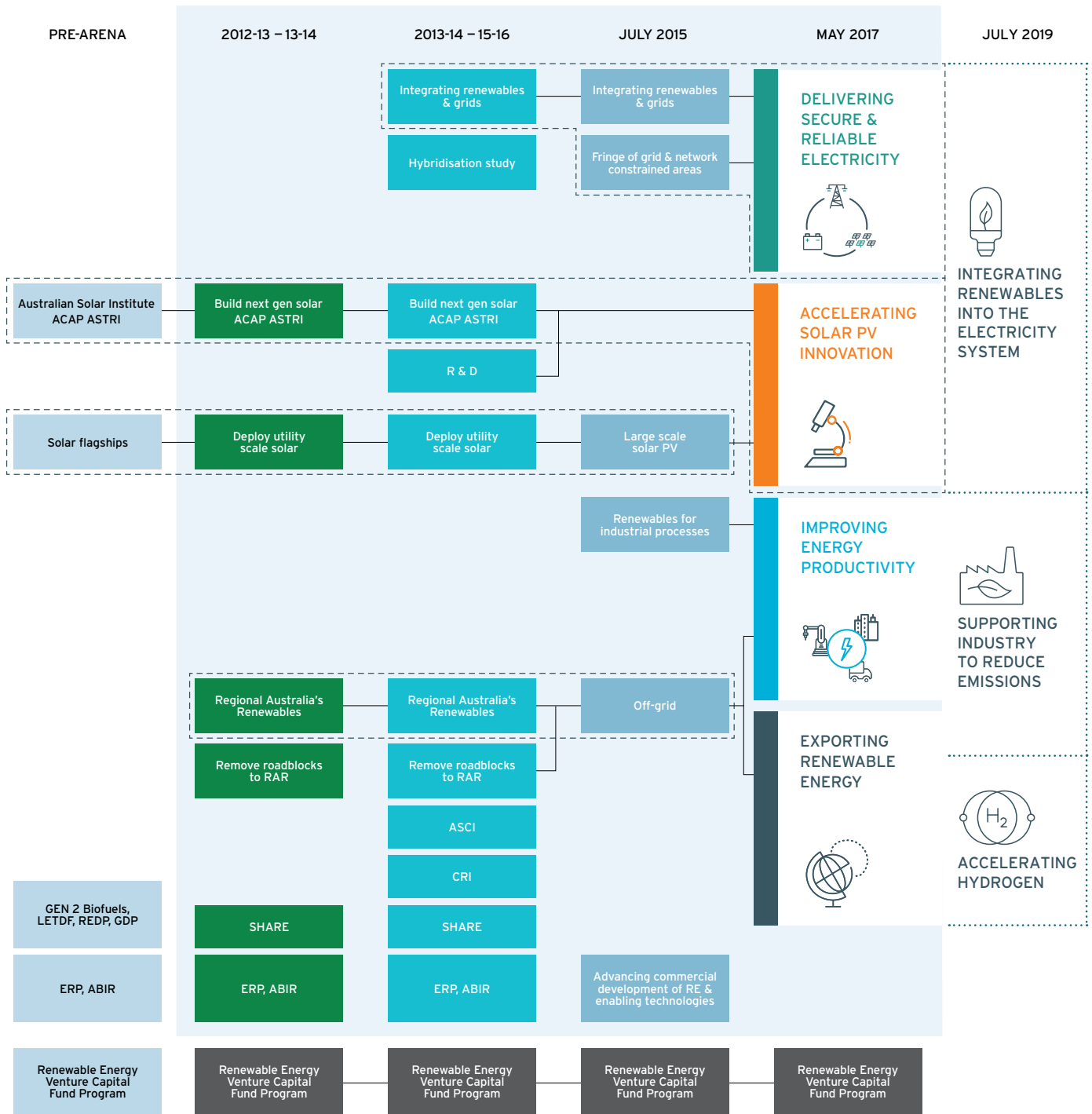
ARENA's three investment priorities reflect an overarching pathway to reducing emissions by growing the share of renewables in the electricity mix, fuel switching to electricity, and developing other solutions for hard-to-abate sectors where the electrification pathway is expensive or unworkable.

ARENA's current investment priorities will help make progress towards the stretch goals in energy storage, hydrogen and low carbon materials set out in the Government's Low Emissions Technology Statement. ARENA's priorities also allow for early and continued progress on the Statement's emerging and enabling technologies that relate to renewable energy.

Subject to the Australian Parliament's consideration of amendments to the ARENA Act, ARENA will design and deliver initiatives to contribute to other priority low emissions technologies identified in the Statement.

Figure 2 shows how ARENA's investment priorities have evolved and how they build on earlier efforts.

FIGURE 2 - HOW ARENA'S INVESTMENT PRIORITIES HAVE EVOLVED



- ASCI: Australian Step Change Initiative
- SHARE: Supporting high-value Australian Renewable Energy Knowledge Initiative
- CRI: Commercial Readiness Index
- ERP: Emerging Renewables Program
- ABIR: Advanced Biofuels Investment Readiness Program
- GEN 2 Biofuels: Second Generation Biofuels Program
- REDP: Renewable Energy Development Program
- GDP: Geothermal Drilling Program
- LETDF: Low Emissions Technology Demonstration Fund
- RAR: Regional Australia's Renewables
- RE: Renewable Energy

PRIORITY 1

INTEGRATING RENEWABLES INTO THE ELECTRICITY SYSTEM



By investing in innovative ways to use, store, manage and share renewable energy, ARENA will enable higher shares of renewables in the electricity sector while helping provide affordable, secure and reliable electricity for Australians through the energy transition.

ARENA's investments in energy storage are expected to help make progress towards the First Low Emissions Technology Statement stretch goal of electricity from storage for firming under \$100 per MWh.

PROVIDING FINANCIAL ASSISTANCE

MAXIMISING BENEFITS FROM EXISTING INVESTMENT

We have built a strong portfolio of projects across technologies that will integrate renewable energy into the electricity system. ARENA is focused on managing these projects so that benefits and lessons flow through to Australian consumers and businesses. These projects will:

- › show how solar and wind farms can accurately forecast output into the AEMO central dispatch system to improve grid operations and reduce costs
- › demonstrate how large batteries, flexible loads, wind farms, and distributed resources, such as household batteries, can provide frequency control and other essential electricity system services
- › improve demand response by sharing knowledge and consumer insights from ARENA's three-year demand response trial
- › advance the commercial feasibility of pumped hydro and battery storage projects
- › identify ways to coordinate distributed energy resources at scale and increase network hosting capacity
- › increase the number of electric vehicle charging units, enabling drivers to travel between major cities
- › develop industry understanding of how to integrate electric vehicle charging into the electricity system and renewable electricity supply
- › demonstrate how higher shares of renewable electricity can be enabled through energy efficiency improvements, thermal storage and energy management systems
- › demonstrate how bioenergy projects can divert thousands of tonnes of waste from landfill each year and reduce greenhouse gas emissions.

The experience of industry participants will deliver long-term benefits by informing future investment decisions, helping reduce costs and improving the value proposition for future and larger-scale projects.

NEW INVESTMENT

ARENA will continue to invest in large-scale batteries, pumped hydro energy storage, concentrated solar thermal and hydrogen where there is benefit over and above existing projects. We will also continue to look for innovative technologies and approaches that demonstrate how system security can be maintained affordably with higher shares of variable renewable energy.

Given the major shift toward distributed energy resources, ARENA will look for projects that support growth in the use and management of these resources and maximise benefits for owners and for the electricity system. We will focus on batteries, electric vehicles and other resources such as home appliances.

COLLABORATION AND KNOWLEDGE SHARING

ARENA showcases technology potential to key energy market decision-makers, financiers and policy-makers, and provides opportunities for these people to learn from project outcomes, insights and trends.

We partner with energy market bodies to help us prioritise new investment. We also support grant recipients to collaborate with other agencies so that their decisions are informed by project results. For example, AEMO is able to draw on the experience of proof-of-concept projects to improve its systems and processes and connect with market participants.

The involvement of regulatory agencies such as the AEMC and the AER maximise knowledge sharing across the market by, for example, supporting change to policy and regulation or clarifying how policies and regulations apply to new technologies.

We are also working to improve collaboration among organisations involved in the energy transition - including network operators, market bodies and retailers - and increase innovation across the energy sector to support energy transition. In particular, we will continue to support the DEIP.

PRIORITY 2

ACCELERATING HYDROGEN



ARENA will drive innovation in hydrogen supply chains, from production to end use, to reduce costs, create opportunities across the domestic economy and position Australia to become a major renewable energy exporter.

ARENA's investments in hydrogen are expected to make progress towards the First Low Emissions Technology Statement stretch goal of clean hydrogen under \$2/kg.

PROVIDING FINANCIAL ASSISTANCE

MAXIMISING BENEFITS FROM EXISTING INVESTMENT

ARENA is supporting demonstration-scale renewable hydrogen projects and 16 research and development projects that will drive innovation and development across the entire supply chain.

The outcomes from these projects will benefit Australia's hydrogen industry. These projects will:

- › introduce renewable hydrogen into the natural gas distribution network to test technical, regulatory, environmental and economic barriers, and show the network's energy storage potential
- › assess how to blend renewable hydrogen into gas distribution networks in Victoria and South Australia
- › demonstrate how renewable hydrogen can fuel passenger vehicles, heavy vehicles and forklifts, and test the operation of hydrogen forklifts in a warehouse
- › show how to reduce the cost of producing renewable hydrogen through electrolysis, thermochemical, biological and photocatalytic methods
- › improve the conversion of hydrogen into a carrier suitable for export, such as ammonia
- › determine if green hydrogen can be produced at commercial scale to feed into an existing ammonia chemical facility
- › research more efficient ways to use hydrogen as an energy source.

NEW INVESTMENT

ARENA will continue to invest in the renewable hydrogen energy industry to improve its cost-competitiveness and increase its scale.

We will seek strong and innovative proposals to:

- › demonstrate the feasibility of large electrolyser projects

- › drive commercialisation of electrolysers where there is untapped potential demand for hydrogen (e.g. ammonia production and power to gas)
- › demonstrate new applications for key component technologies - for example, in transport, remote area power systems with onsite hydrogen production and fuel cells or turbines
- › support the implementation of the National Hydrogen Strategy.

In 2020-21, ARENA's initial focus will be commercial-scale deployment projects selected through the \$70 million hydrogen deployment round (announced in 2019-20).

ARENA will also investigate opportunities to support the development of new hydrogen technologies that can address short- to medium-term needs of the hydrogen sector.

COLLABORATION AND KNOWLEDGE SHARING

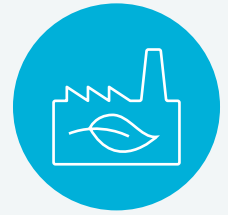
There has been significant international interest in the role of hydrogen as a low emissions energy commodity in the transition to renewable energy. Australia is recognised as a leading player in the domestic development of hydrogen and as a future exporter.

ARENA will continue to bring together research, industry and government innovators to identify and address barriers to commercially-competitive renewable hydrogen and inform the development of future standards and regulatory frameworks. This will include collaboration with the Hydrogen Project Team³ and sharing knowledge with speciality focus groups, such as the APEC Sub-Committee on Standards and Conformance, to explore the feasibility of an international standard for the production of low-carbon hydrogen.

³ The Hydrogen Project Team was announced by the COAG Energy Council in March 2020 to implement the Australian National Hydrogen Strategy

PRIORITY 3

SUPPORTING INDUSTRY TO REDUCE EMISSIONS



ARENA will help Australian industry reduce emissions by investing in new and replicable technologies and processes that increase the adoption of renewable energy (including renewable electricity, renewable fuels, solar thermal, hydrogen and bioenergy).

Relevant ARENA investments are expected to contribute to the First Low Emissions Technology Statement stretch goal of low emissions steel under \$900 per tonne and low emissions aluminium under \$2,700 per tonne.

PROVIDING FINANCIAL ASSISTANCE

MAXIMISING BENEFITS FROM EXISTING INVESTMENT

ARENA's projects initially focused on high-value off-grid and remote mining applications to offset the relatively high cost of diesel generation. More recently, ARENA has funded projects for manufacturing and processing facilities. Outcomes from these projects are shared to increase the potential for affordable, secure and reliable renewable energy for Australian industry.

Projects include:

- › integration of PV generation into remote and off-grid mining to demonstrate the potential of renewables in baseload operations
- › biomass boilers replacing fossil fuel fired boilers for industrial heating applications
- › creating biogas to produce electricity to meet on-site industrial process requirements
- › feasibility studies into renewable energy for process heating across different manufacturing sites
- › analyses of the potential to integrate renewable energy, energy storage and load management technologies in select industrial and commercial sites.

NEW INVESTMENT

ARENA will fund projects that advance renewable energy in industrial processes, including with large energy users.

We will focus on renewable solutions and technologies that could address substantial energy use, either at individual sites (such as steel, alumina and aluminium) or across multiple sites and sectors (such as process heating).

We will continue to support projects across bioenergy, solar thermal, renewable hydrogen and renewably powered electrification technologies and processes.

Enabling technologies will also be supported where they increase uptake and use of renewable energy in industrial processes. These technologies include energy efficiency, energy storage (electrical, thermal or material), electrification, demand side flexibility to match renewable energy supply and mechanical alternatives to process heating.

COLLABORATION AND KNOWLEDGE SHARING

The transition of industrial processes to renewable energy is at an earlier stage than the transition of the electricity sector. Accordingly, ARENA will support the development of the knowledge base and industry skills required for a successful transition.

We will work with industry representatives and organisations to share what has been learned from projects that can be replicated or adapted by other companies and will support this process by analysing project results and the implications for sectors and technologies.

ARENA will foster collaboration among industry, technology providers, government and academia to accelerate the transition to renewable energy.

2020-21 BUDGET MEASURES

ARENA will administer funding under the following measures announced in the Budget:

FUTURE FUELS FUND

The purpose of the Future Fuels Fund is to invest in areas that reduce barriers for businesses and fleets to choose new vehicle technologies in the road transport sector. The Fund will encourage co-investment, at scale, in charging and refuelling infrastructure projects for future fuels, including electricity, hydrogen or biofuels. The Fund will encourage businesses to bring forward co-investment proposals that:

- › reduce barriers to business fleets choosing new vehicle technology through vehicle and infrastructure trials, and electrical upgrades
- › help commercialise the public charging industry by increasing the national charging network
- › reduce barriers to greater transport use of hydrogen and biofuels through co-investing in refuelling infrastructure
- › leverage ARENA investment with the CEFC, private sector, and state deals to maximise co-investment in projects that have national benefits.

REGIONAL AND REMOTE COMMUNITIES RELIABILITY FUND (MICROGRIDS)

The purpose of the Expanding the Regional and Remote Communities Reliability Fund (Microgrids) to Pilot Studies is to support pilot studies for microgrids in regional and remote areas. It complements the Business Grants Hub's Regional and Remote Communities Reliability Fund program, which supports microgrid feasibility studies for off-grid and fringe-of-grid communities in regional and remote areas.

AS PART OF THE KING REVIEW TECHNOLOGY CO-INVESTMENT FUND:

INDUSTRIAL ENGINEERING STUDIES GRANT FUND

Industrial Engineering Studies Grant Fund for businesses to undertake detailed engineering studies to support energy efficiency investment decisions.

FREIGHT ENERGY PRODUCTIVITY PROGRAM

The Program aims to increase the use of new truck technology to improve fuel efficiency in the road freight sector, increase productivity and reduce emissions.

OTHER MAJOR FOCUS AREAS

Bioenergy can contribute to one or more of our priority areas, making it a cross-cutting area of focus. We also have a portfolio of projects funded under previous programs where there remains benefit to be gained for the sector as lessons are learned in coming years.

BIOENERGY AND ENERGY FROM WASTE INVESTMENTS

Bioenergy uses organic renewable materials (known as biomass) to produce heat, electricity, biogas and liquid fuels. The most cost-effective and environmentally-beneficial sources of biomass are typically wastewater, municipal waste and waste streams from the agricultural, forestry and industrial sectors.

To identify what role bioenergy can play in Australia's energy transition, ARENA is supporting the development of a bioenergy roadmap. The roadmap will help to inform the next series of investment and policy decisions in the bioenergy sector in Australia. The Bioenergy Roadmap is intended to complement the First Low Emissions Technology Statement.

Over the past eight years, ARENA has provided approximately \$118 million in funding towards bioenergy projects across Australia. Our investment spans electricity and biogas production, biofuels, efficient feedstock harvesting technology and projects that aim to capture energy from a range of waste materials. The projects supported by ARENA will:

- › demonstrate ways to lower cost, increase performance, or advance operating capability of low emissions, flexible capacity technologies
- › address issues with the use of bioenergy and energy from waste in industrial processes, using technologies such as biomass or biogas boilers.

LARGE-SCALE SOLAR

Between 2012 and 2018, ARENA contributed close to \$400 million to 18 large-scale solar projects across Australia and supported the establishment of 12 large-scale solar farms under its large-scale solar competitive funding round. This investment successfully addressed barriers to deployment of large-scale solar in the electricity sector.

As the sector has matured, ARENA has turned its focus to ensuring that data being collected from these projects will support solar farm operators and grid operators to increase output and reliability, reduce costs and contribute to better integration of large scale solar in the grid.

RENEWABLE ENERGY VENTURE CAPITAL FUND

ARENA's Renewable Energy Venture Capital Fund program was designed to support the development of renewable energy and enabling technologies in Australia and address the need for venture capital in the Australian renewable energy sector. The program is expected to increase the number of renewable energy and enabling technology companies in Australia.

The Southern Cross Renewable Energy Fund (Fund) was established under this program and has invested more than \$76 million in 12 energy start-ups since it opened for new investments in 2012. ARENA has provided half of this funding.

In the management phase of the Fund, the Fund manager will continue to provide management expertise to help investee companies develop technologies, increase skills and forge international connections. The Fund manager may also make follow-on investments into existing investee companies during the life of the fund. Over the final phase, the Fund manager will exit investments made in start-ups and return funds to investors including ARENA.

OUR PERFORMANCE FRAMEWORK

Our performance framework outlines our activities and the results they aim to achieve. ARENA will work with other key agencies to review and update this framework, as required, to support the coordinated approach to impact evaluation that will be developed as part of the First Low Emissions Technology Statement.

ACTIVITY	EXPECTED RESULTS	WHO BENEFITS	PERFORMANCE MEASURE	RATIONALE	DATA SOURCE	BASELINE	TARGET
OUTPUTS AND EFFECTIVENESS							
Providing financial assistance to Australian scientists, innovators and businesses	More competitive renewable energy choices for Australian consumers and businesses	Grant recipients such as scientists, researchers, technology developers, businesses and innovators. Australian consumers and businesses who will benefit in the long term from cost-effective options to meet their future energy needs. Australians who will benefit through more options to reduce emissions and grow the economy in a global context.	OUTPUT ARENA provides financial assistance to support renewable energy technologies across the Agency's priority areas	This is a short-term indicator of the level of financial assistance. A breakdown by investment priority shows that grant funds are contributing to the investment priorities approved by the Minister. It aligns with the Portfolio Budget Statement performance measure to 'provide assistance to new projects across the Agency's approved priority areas'.	Funding availability report. Grants management system.	\$292.6m funds approved in 2018-19 \$188.1m funds committed in 2018-19 Detailed breakdown in Annual Performance Statement.	Funds approved 2020-21 - \$167.7m Funds committed 2020-21 - \$165.7m ⁴
			EFFECTIVENESS Private sector capital makes taxpayers' dollars go further and achieve greater impact	Private sector capital contributes to ARENA's purpose, and shows genuine interest in commercialising technologies in the longer term. The expected leverage ratio varies by innovation stage, so leverage is reported for each stage and as an average across newly active projects in a year. ARENA's leverage target is lower than the Government's overall target of between \$3 and \$5 under the First Low Emissions Technology Statement because ARENA is the early stage investor.	Grants management system.	For ARENA's history to 2018-19 leverage across the portfolio was 1:2.83 (breakdown by innovation stage in Annual Performance Statement).	Leverage falls between 1:2 and 1:3 across the portfolio.
			EFFECTIVENESS ARENA-funded projects advance renewable energy technology, enabling technology and energy business models	This medium term measure indicates progress along the innovation pathway towards improved competitiveness. The <u>Technology Readiness Level</u> (TRL) tracks progress from blue sky research to technical maturity. It applies to research, development and demonstration projects. The <u>Commercial Readiness Index</u> (CRI) measures progress towards commercial viability. It applies to a range of projects including studies, pre-commercial deployment projects and knowledge sharing.	Grants management system (drawing on independent assessment of outcomes at project completion and project finalisation reports).	Analysis in ITP's solar RD&D synthesis (July 2018) showed that 97% of projects that intended to make a TRL advance had achieved a TRL advance of at least one.	80% of completed projects achieve advance in TRL or CRI indicators over the life of the project.
			EFFECTIVENESS ARENA-funded projects increase supply of renewable energy	ARENA-funded demonstration and deployment projects build renewable energy capacity to support industry learning in emerging technology areas. Because the primary objective of demonstration and deployment-stage projects is to build industry experience, leading to increases in supply through follow-on projects, ARENA does not provide an overall target in advance of project commitments.	Grants management system and ARENA analysis.	From 50 out of 479 projects, cumulative total capacity as at Dec 2019 was 945 MW for projects generating electricity.	Total energy production from ARENA-funded demonstration and deployment projects is at least 80% of that intended at time of commitment.

⁴ Targets for funds approved and funds committed in future years will be set following ARENA's review of its strategy to properly account for new funding allocated in the 2020-21 Budget as well as the Low Emissions Technology Statement.

ACTIVITY	EXPECTED RESULTS	WHO BENEFITS	PERFORMANCE MEASURE	RATIONALE	DATA SOURCE	BASELINE	TARGET
Collaboration and knowledge sharing to make information and data available to a diverse audience and help increase the spread of ideas.	Industry learns more quickly. Government, regulatory bodies and the public are better informed to navigate the energy transition.	Industry, energy market bodies, policy makers, consumers and businesses benefit through a faster, smoother and less expensive energy transition.	OUTPUT ARENA funds or produces, and makes available, new knowledge products	This short-term measure indicates the level of knowledge sharing activity. Grant recipients share knowledge to help others learn from their experience. ARENA also commissions and publishes complementary reports.	Grants management system.	In 2018-19 grant recipients completed 156 knowledge sharing deliverables and ARENA produced 243 knowledge sharing products.	Total knowledge sharing deliverables completed and knowledge sharing products produced: 2020-21: 440 2021-22: 484 2022-23: 532 2023-24: 585
			EFFECTIVENESS ARENA shares knowledge to enhance the competitiveness of renewable energy technologies	Sharing knowledge about renewable energy technologies should help industry learn more quickly and can inform regulatory change. This measure provides evidence that knowledge is being shared with people who can (and do) use it.	Event participant survey and ARENA stakeholder reputation research findings (extending beyond grant recipients).	In 2019 79% of stakeholders surveyed reported that knowledge shared by ARENA has informed part of their decision making processes.	At least 75% of stakeholders surveyed report that knowledge shared by ARENA has informed part of their decision making processes.
			EFFECTIVENESS The public is better informed about renewable energy technologies and the role they can play in Australia's energy transition	Australian consumers and businesses are the long-term beneficiaries of a smooth transition to a low-carbon energy system. Their choices also influence the take-up of renewable energy. ARENA uses several communication methods to inform the public and drive deeper engagement via our website. Visitor traffic is a measurable indicator of the overall level of engagement.	Google Analytics. Media monitoring statistics.	767,000 website unique page views for 2018-19 37 project-related media releases reached 37 million people in 2018-19.	10% increase in visitor traffic (unique page views) to ARENA website.
			EFFECTIVENESS Partners value collaboration with ARENA	Positive feedback and tangible outcomes demonstrate that collaboration is relevant, useful and facilitated effectively.	ARENA stakeholder research report.	In 2019 86% of survey respondents rated ARENA's performance as "good" or better. ⁵	85% of survey respondents rate ARENA's performance as "good" or better.
EFFICIENCY			EFFICIENCY ARENA operates efficiently in the administration of public funds	This efficiency measure demonstrates efficient use of taxpayer resources. A trailing five-year average will even out project delivery variance.	Financial management information system.	In the five years to 2018-19 operating costs were 13.51% of total expenditure.	Operating costs do not exceed 12% of total expenditure over a rolling five year period. ⁶

5 The data used for setting this target relates to ARENA's overall performance against its purpose. Supplementary qualitative analysis is required to link the overall result to collaboration.

6 This efficiency measure is calculated as a trailing average of the preceding five years. Performance in 2020-21 will be significantly influenced by the preceding four years which range from 12.9% to 17.8%. By 2021-22 performance should converge to 12%.

The performance framework is complemented by independent evaluation of ARENA's contribution to improvements in the competitiveness of technologies across our priority areas and other major focus areas from previous years.

Evaluations follow a rolling three-year schedule (set out in Table 2) and findings are reported as part of the Annual Performance Statement.

TABLE 2: EVALUATION SCHEDULE

2020-21	2021-22	2022-23
Demand response (funding announcement) Virtual Power Plants portfolio	R&D including solar PV R&D, Australian Centre for Advanced Photovoltaics and Australian Solar Thermal Research Institute System security and reliability (including large-scale batteries, pumped hydro energy storage, concentrated solar thermal, bioenergy and energy from waste, and short-term forecasting) Renewable hydrogen (including R&D round)	Remote Area Renewables (including RAR program) Renewable Energy Venture Capital Fund

Evaluations are expected to review the extent to which projects funded by ARENA, and knowledge shared, are achieving desired outcomes and long-term impacts.

Quantitative modelling is expected to draw on standard modelling techniques set out in CSIRO's Impact Framework Guide. The modelling approach is expected to take into account an estimate of:

- › the magnitude of the impact, including estimated 'baseline' supply of renewable energy (i.e. counterfactual) and extent and timing of change to supply
- › the likelihood of the change occurring (if impacts are expected to occur in the future)
- › ARENA's contribution to the change occurring.

OUR RISKS

ARENA embeds risk management into its culture to support well-informed decision-making.

As a taxpayer-funded entity, we seek to maximise the value of the financial assistance we provide in the short and long term.

Value for ARENA is maximised when our strategies and objectives strike the optimal balance between risks and opportunities, and when we can effectively and efficiently deploy resources towards achieving our statutory objectives.

ARENA's Risk Management Framework, Principles and Processes are based on the International Standard for Risk Management and we apply five general principles to our risk management activities to create and protect value for all Australians.

Our principles test if risk management activities are:

- ① proportionate to the level of risk faced by the organisation
- ② aligned with other activities in the organisation
- ③ embedded within the organisation
- ④ comprehensive in order to be fully effective
- ⑤ dynamic and responsive to emerging and changing risks.

Risks are identified and assessed through a consistently applied and replicable methodology. This follows a structured approach which encompasses the context, identification, assessment, analysis and treatment of risks. The framework also features effective communication and monitoring of the portfolio risk profile and risk management activities.

ARENA's Board has a duty to establish and maintain systems relating to risk and control. It is responsible for the appropriateness of ARENA's system of risk oversight and management, and systems of internal control. The Risk and Audit Committee, a committee of the Board, provides oversight of these systems of risk and control.

The Board also has overall responsibility for the identification, analysis and evaluation of ARENA's strategic risks. Corporate risks are managed by the Executive Leadership Team, while operational risks are managed by line areas.

ARENA's strategic risk reporting addresses the highest level of risk that would impact us achieving our objectives. In line with ARENA's risk management practices, these risks are monitored through the year by the ARENA Board and Risk and Audit Committee. ARENA's risk appetite (the total impact of risk an organisation is prepared to accept in the pursuit of its strategic objectives) is reviewed annually.

ARENA has identified three strategic risks.

1. MAXIMISING IMPACT

ARENA complements other funding bodies and provides financial assistance to renewable energy research, development, demonstration and deployment projects. This necessarily requires ARENA to have a positive risk appetite.

ARENA does not seek to manage all risks in the Australian energy sector or impose overly burdensome conditions on grant recipients so as to stifle creativity, innovation or research.

ARENA takes a proportionate approach and acknowledges that a project failure can also contribute to ARENA's objectives. However, we do not compromise on our robust project management processes and the due diligence conducted on every project, which helps mitigate the levels of project risks that are inherently high.

To maximise the impact of financial assistance provided, the ARENA Board and management continually monitor causes that may lead to a reduction in impact and implement controls to mitigate this risk. Possible causes include:

- › less favourable market conditions
- › projects failing to achieve outcomes
- › failure to fund high quality projects across all investment priorities.

2. EFFECTIVENESS AND EFFICIENCY

ARENA is a small government entity with a highly specialised workforce that provides funding to a rapidly growing and innovative sector. This involves ARENA continually monitoring causes that may lead to a reduction in its effectiveness or efficiency. Possible causes include:

- › inability to attract or retain organisational capacity and/or capability leading to shortages or increasing costs
- › failure to optimise technology and/or not achieving continuous organisational improvements
- › failure to share knowledge in a timely and efficient manner.

3. ALIGNMENT WITH STAKEHOLDERS

Value from the financial assistance that ARENA provides to market participants is maximised when there is strong alignment between stakeholders.

ARENA consults widely and is continually reviewing and adjusting its strategies, including investment priority areas, to maintain close alignment with the needs of the sector. Challenges, or potential causes, of misalignment include:

- › strategies are not adaptive to changes in the market
- › a failure to maintain effective communication
- › a significant change in ARENA's external environment.

OUR PEOPLE

OUR BOARD

Mr Justin Punch (Chair)

Mr John Hirjee

Ms Anna Matysek

Mr Justin Butcher

Mr Dougal McOmish

Ms Stephanie Unwin

Mr David Fredericks PSM
(as represented by Ms Jo Evans)

ARENA's Board sets investment strategies and priorities, oversees the running of the organisation and approves funding for projects.

Board members have experience or knowledge in renewable energy technology, commercialisation, business investment and corporate governance.

The Secretary of the Department of Industry, Science, Energy and Resources is a member ex officio and may nominate an alternate to attend Board meetings.

OUR TEAM

Our values are to be impact-driven, stakeholder-focused, collaborative, accountable and respectful of people.

ARENA has a skilled, productive and highly motivated team drawn from diverse backgrounds in the business, industry, finance, research and government sectors. We work with innovators in support of projects that generate the knowledge needed to bring about transformative change.

ARENA blends public and private sector expertise to ensure that it appropriately balances innovation and accountability in the design and delivery of its activities.

ARENA's leadership team and staff have expertise and experience in energy policy, Australia's electricity market, energy technology and project finance.

A strong culture of mutual support, teamwork and collaboration built on expertise in stakeholder engagement has been central to ARENA's success.

As a small organisation we have developed a highly effective team-based way of working that enables us to make best use of complementary skills and Agency resources and to maintain high efficiency in our business activities.

Our open and collaborative approach enables us to build strategic partnerships and pursue joint initiatives that draw on the complementary strengths of key players in the Australian energy system.

Further information is available at
arena.gov.au

Australian Renewable Energy Agency

To explore potential for funding visit:
arena.gov.au/funding

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Engage with us

ARENAWIRE



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