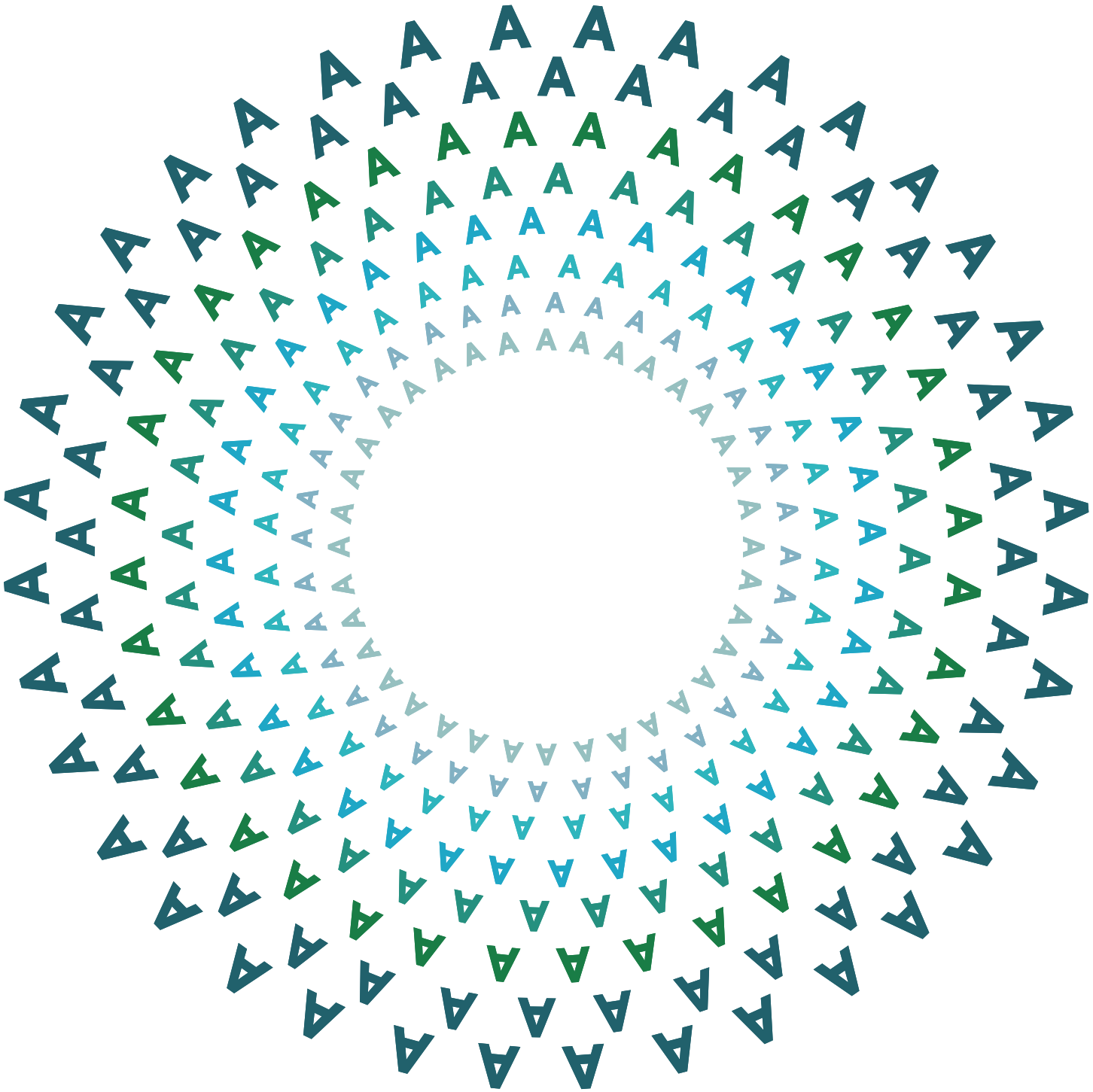
ANNUAL REPORT

2020–2021



ARENA

Australian Government
Australian Renewable Energy Agency

WE ARE ARENA

THE AUSTRALIAN RENEWABLE ENERGY AGENCY

We support the global transition to net zero emissions by accelerating the pace of pre-commercial innovation, to the benefit of Australian consumers, businesses and workers.

ARENA is an Australian Government statutory agency, established in 2012 by the *Australian Renewable Energy Agency Act 2011* (ARENA Act).

OUR PURPOSE

is to support the global transition to net zero emissions by accelerating the pace of pre-commercial innovation, to the benefit of Australian consumers, businesses and workers.

OUR VALUES

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

OUR WORK

is to support renewable energy technologies to become commercially viable by investing in innovation and knowledge. We invest throughout the innovation chain, balancing investment in emerging commercial technologies with earlier-stage research, development and demonstrations to address long-term needs.

Image credit: ARENA.

ARENA'S IMPACT SO FAR

Since ARENA was established in 2012, we have played an instrumental role in delivering significant improvements in the competitiveness of renewable energy technologies such as large-scale solar, grid-scale batteries, bioenergy, distributed energy and hydrogen.

Image credit: EDL.

At 30 June 2021, ARENA had committed $1.77 billion to 602 renewable energy projects across Australia, which has leveraged nearly $6 billion in additional private and public sector investment.

As technologies have matured, our focus has evolved from supporting renewable energy generation to assisting with the integration of these technologies. This will support the operation of an energy system with ever-increasing shares of variable renewable energy.

ARENA has been directly responsible for many renewable energy success stories including:

› World-leading solar photovoltaic (PV) research, principally through our funding of the Australian Centre for Advanced Photovoltaics (ACAP), and by helping to halve the cost of large-scale solar projects through our competitive auction process and $92 million of financial assistance in our large-scale solar round

› Successful Demand Response and Virtual Power Plant (VPP) pilots to help pave the way for a better understanding of consumer behaviour and identify opportunities to reduce consumer costs

› Demonstrating high penetration of renewables in off-grid sites including energy intensive mining operations

› Rapid commercialisation of bioenergy and energy-from-waste projects spanning electricity and biogas production, biofuels, efficient feedstock harvesting technology and projects that aim to capture energy from a range of waste materials

› Supporting a number of electric vehicle (EV) projects including charging infrastructure, which will generate significant data on how EVs are driven, charged and impact the electricity system, helping to prepare the energy and transport sectors for the electrification of transport

› Demonstrating how large-scale batteries can provide different benefits to the electricity system, including improving grid stability and power quality, and how they can help integrate more variable renewable energy into the grid

› Supporting research and development into new ways of producing hydrogen, providing funding to many of Australia's early electrolysis demonstration plants, and studies into larger renewable hydrogen opportunities.

These activities, supported by our work with organisations like the CSIRO, CEFC, energy sector peak bodies, consumer groups, universities, major energy companies and startup businesses, continue to assist with the transition to cleaner and cheaper energy.

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ABOUT THIS REPORT

THE ARENA ANNUAL REPORT 2020-21 PROVIDES INFORMATION ABOUT OUR ACTIVITIES, PROGRESS AND ACHIEVEMENTS DURING THE YEAR FROM 1 JULY 2020 TO 30 JUNE 2021.

This report also details our governance, management and accountability practices, our workforce and financial performance, and provides the audited ARENA financial statements for the reporting period.

You can also read the ARENA Annual Report 2020-21 online at arena.gov.au/about/publications/.

Image credit: ARENA.

Australian Government
Australian Renewable Energy Agency

ARENA

OFFICE OF THE CHAIR

27 September 2021

THE HON ANGUS TAYLOR MP

Minister for Energy and Emissions Reduction
PO Box 6022
Parliament House CANBERRA ACT 2600

DEAR MINISTER

ARENA ANNUAL REPORT 2020-21

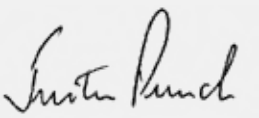
I am pleased to present to you the Australian Renewable Energy Agency (ARENA) Annual Report for the financial year 2020-21, in accordance with the requirements of the *Australian Renewable Energy Agency Act 2011* and the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

The ARENA Board is responsible for preparing the report and providing it to you in accordance with s46 of the PGPA Act. The report was approved by a resolution of ARENA's Board on 27 September 2021.

This report incorporates ARENA's Annual Performance Statement (APS) for 2020-21, as required by s39 of the PGPA Act. In the opinion of the Board, the APS accurately presents information about ARENA's performance for the reporting period and complies with s39(2) of the PGPA Act.

The report also includes ARENA's audited financial statements prepared according to s42 of the PGPA Act.

Yours sincerely



JUSTIN PUNCH
Chair

CHAIR AND CEO REVIEW

Image credit: Stock.

ARENA'S YEAR IN CONTEXT

In 2020-21 the global transition to renewable energy continues to accelerate. Consumers, corporations and governments are not only stepping up their emissions reduction ambitions, but also the investment in renewable energy technologies and infrastructure needed to achieve them.

Australia is well positioned to play an important role in this global shift, being endowed with some of the world's best conditions to produce, use and supply renewable energy. We have an abundance of renewable energy resources, land availability, proven export capabilities and infrastructure, and strong trading relationships.

In 2020, renewables accounted for around 28 per cent of Australia's total electricity generation. Solar and wind are now the cheapest sources of new, unfirmed, bulk electricity supply. For the rapid shift towards renewables to continue, Australia will need a corresponding step up in investment in low emissions firm generation and transmission infrastructure.

ARENA'S IMPORTANCE CONTINUES

ARENA continues to play an instrumental role in increasing the supply of Australia's renewable energy resources and delivering significant improvements in the competitiveness of renewable energy technologies.

Since 2012, we have committed $1.77 billion to 602 renewable energy projects across Australia, driving innovation in solar photovoltaic (PV), batteries and other forms of energy storage, biofuels, hydrogen, solar thermal, ocean energy, pumped hydro energy storage (PHES), distributed

energy and demand response. Every dollar of ARENA funding has unlocked an average of $3.38 of co-funding from the private and public sectors for a total project value of $7.75 billion.

As technologies have matured, ARENA's focus has evolved from directly supporting renewable energy generation technologies to assisting with the integration of these technologies to support the operation of an energy system with ever-increasing shares of variable renewable energy.

ARENA's investment priorities in 2020-21 – which have now been reviewed and updated for the future – have been geared towards future-proofing Australia's energy system and economy by unlocking its renewable resources.

Under these investment priorities, funding has been directed towards projects that support the integration of renewables in the electricity system, accelerate the development of Australia's hydrogen industry for domestic use and export, and support industry to reduce emissions.

SUPPORTING THE INTEGRATION OF RENEWABLES

As solar and wind generation are installed at record rates, the challenges for Australia include ensuring the grid is kept stable and reliable, along with shaping energy use to better match the variable nature of this electricity generation. There are also further gains to be made in driving down the cost of renewable energy generation, which will put downward pressure on electricity prices and unlock further emissions reduction opportunities in heavy industry and renewable energy exports.

Approximately 2.7 million households have already installed rooftop solar to reduce their electricity costs and emissions, and an increasing number of large-scale solar and wind farms are being built. We are developing ways to store variable renewable energy to keep the grid strong as we integrate increasing amounts of these renewables into the electricity network. Energy storage solutions such as grid-scale batteries and PHES will play a key part in providing backup power and grid stability, making it possible for more low-cost solar and wind-generated electricity to enter the grid.

ARENA has to date committed around $60 million to six large-scale batteries, which combined have the ability to store and dispatch over 200 megawatts (MW) of energy. We supported Tesla's Virtual Power Plant trial in South Australia, which will control and optimise up to 3000 rooftop solar and home

battery systems, and a trial by Yadlamalka Energy that involves a new type of energy storage technology - known as a flow battery - which uses liquid electrolytes instead of lithium-ion.

This year ARENA has also been a driving force behind electric vehicle (EV) charging infrastructure, supporting trials of smart charging and vehicle-to-grid charging to maximise the benefit of EVs to the electricity grid and, through the Future Fuels Fund, expanding the public fast-charging network by funding more than 400 charging stations nationwide, increasing the existing network seven-fold.

ACCELERATING THE DEVELOPMENT OF RENEWABLE HYDROGEN

ARENA is leading the way in Australia with support for renewable hydrogen technologies and projects. We have already committed over $60 million to accelerate the development of 'green' hydrogen, and approved a further $103 million in 2020-21 to fund three projects that will build and operate some of the world's largest hydrogen electrolysers.

Other projects in our hydrogen portfolio include research and development (R&D) activities, feasibility studies for large-scale projects such as ammonia production and power-to-gas, and smaller-scale demonstrations in areas such as mobility and microgrids.

HELPING INDUSTRY TO REDUCE EMISSIONS

A lower-cost, renewable energy dominated electricity grid also enables emissions reduction through higher electrification of other harder-to-abate sectors such as transport, buildings and industry.

Reflecting our priority to help Australian industry reduce emissions by investing in technologies and processes that increase the adoption of renewable energy, in 2020-21 we committed $11.3 million to Alcoa to investigate low emissions alumina, and $3.9 million to support Renergi in moving its energy-from-waste technology to the pre-commercialisation demonstration stage.

All these projects, and others, are featured in the Showcase section of this Annual Report.

NEW ARENA FUNDING AND EXPANDED MANDATE

In September 2020, the Australian Government released its first *Low Emissions Technology Statement* (LETS) to guide the public and private sectors on the Government's priorities for future energy and emissions reduction technologies.

In support of the LETS, and in recognition of ARENA's role as a key delivery agent, the Government announced new long-term funding and an expanded mandate for ARENA that will secure our future beyond 2022. This funding was confirmed in the 2020-21 Federal Budget, when it was announced that ARENA would receive additional funding of $1.62 billion, made up of baseline funding of $1.43 billion

Image credit: Edify Energy.

to 2032 and $193 million to deliver targeted programs.

The Government also introduced a regulation to expand ARENA's functions to allow us to invest in a broader range of technologies.

The changes will allow ARENA to continue our work, together with energy industry participants, the Clean Energy Finance Corporation, research institutions and other agencies, to support a broader set of low emissions technologies across the innovation chain.

A COLLABORATIVE EFFORT

ARENA's impact is based on our strong partnerships built with industry, regulators, investors and innovators, working collaboratively to maximise the benefits of renewable energy for Australian consumers and the economy.

We thank the individuals and organisations that worked with us and supported ARENA's efforts in 2020-21. We also wish to recognise the important contributions of the ARENA team and our project proponents.

ARENA's Board members made an important contribution to ARENA's efforts, and we thank them for their leadership and governance. We also thank retiring Board member, Dougal McOmish, for his three years of service as an ARENA Board member and welcome Stephen McIntosh, who commenced as a Board member in July 2021.

We also thank our Minister, the Hon Angus Taylor MP, for his support and ongoing interest in ARENA's work.

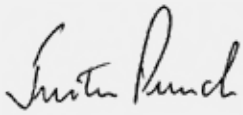
ARENA'S FUTURE

Technology and innovation are critical to maintaining energy affordability and reliability and to Australia's efforts to reduce emissions and create new economic opportunities.

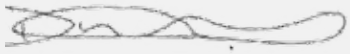
ARENA has played a key role in reducing the cost and increasing the supply of renewable energy for the past nine years, and we look forward to continuing this important work with the next generation of energy technologies.

It is critically important that, through agencies such as ARENA, we bring to bear the most effective tools and technologies to support clean energy, to help Australia reduce its emissions and to support other countries in their pursuit of lower emissions.

There is still much work to be done, but with our experienced team, industry knowledge and strong networks across a range of technologies and sectors, ARENA is well positioned to support Australia's energy transformation and emissions reduction goals.



JUSTIN PUNCH
CHAIR

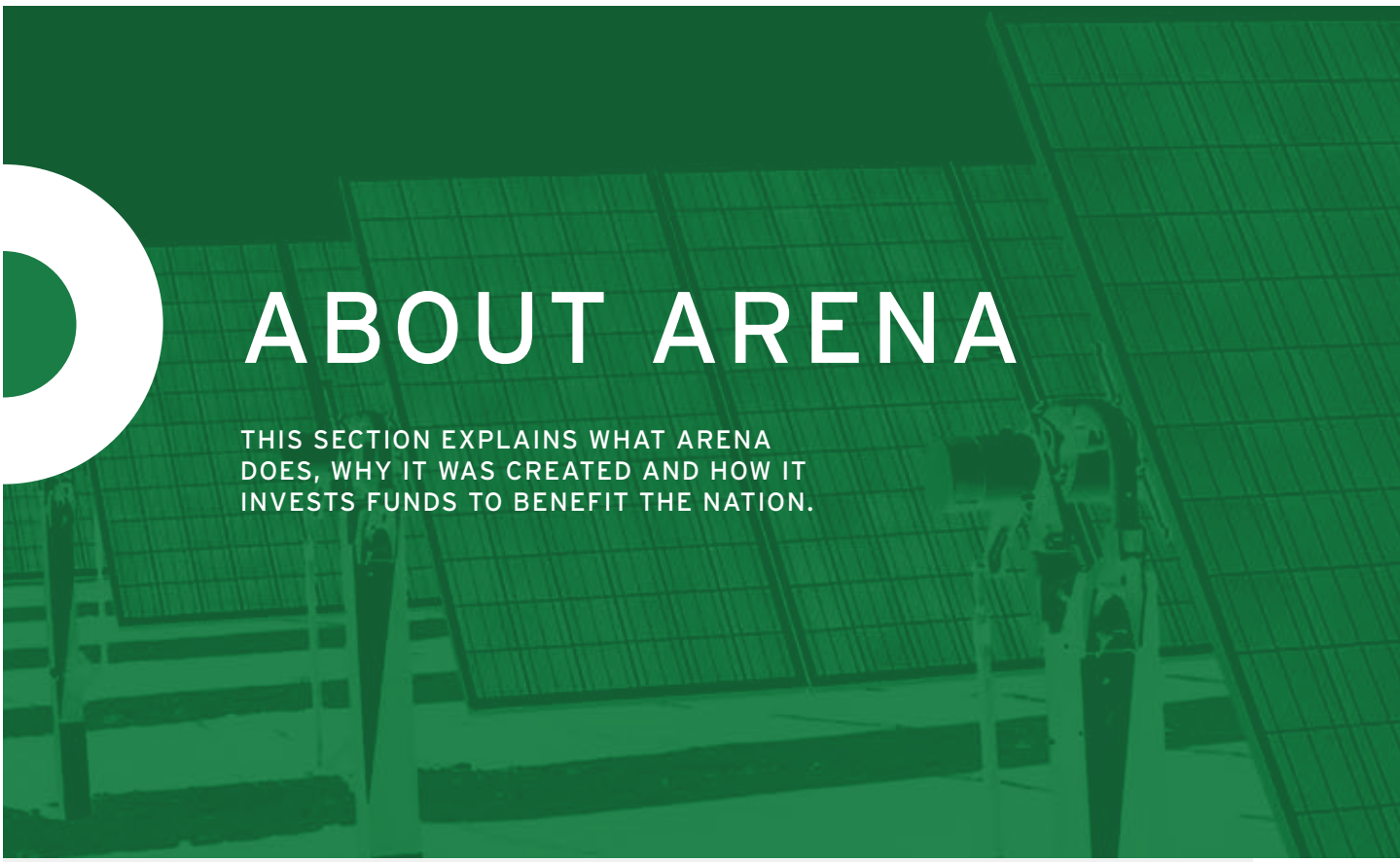


DARREN MILLER
CHIEF EXECUTIVE OFFICER

ARENA's investment priorities in 2020-21 have been geared towards future-proofing Australia's energy system and economy by unlocking its renewable resources.

Image credit: Stock.

FIGURE 1: ARENA HIGHLIGHTS 2020-21



ABOUT ARENA

THIS SECTION EXPLAINS WHAT ARENA DOES, WHY IT WAS CREATED AND HOW IT INVESTS FUNDS TO BENEFIT THE NATION.

OBJECTIVES AND PURPOSE

ARENA, as established by the ARENA Act, has the dual objectives of improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.

Our purpose for the reporting period was to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation that benefits Australian consumers and businesses.

For information on proposed changes to ARENA's functions see History (below) and New ARENA Funding and Announcement of Expanded Mandate (page 78).

HISTORY

ARENA was established by the Australian Government on 1 July 2012. At this time, a number of the Government's existing renewable energy programs and projects were also brought together under the ARENA umbrella, including those previously managed by the Australian Centre for Renewable Energy, the Solar Flagships Program and the Australian Solar Institute.

In September 2020, the Government released the first *Low Emissions Technology Statement* (LETS) developed as part of the Technology Investment Roadmap process.

In support of the LETS, the Government announced new long-term funding and an expanded mandate for ARENA. This funding was confirmed in the 2020-21 Federal Budget along with additional funds to deliver targeted programs.

The Government recently introduced a regulation to expand ARENA's functions to allow us to invest in a broader range of technologies.

UNIQUE ROLE

ARENA has a unique role in Australia's energy transition. We invest in projects spanning the innovation chain, from research to early-stage deployment. We focus on finding and demonstrating first-of-a-kind renewable energy technologies and business models that can reduce technical and commercial risks and grow Australia's renewable energy supply, knowledge and expertise.

We have the skills, experience and industry knowledge to help projects bridge the gap to commerciality. Without our support, the pathway to commercialisation would be blocked for many new technologies and businesses.

ARENA's expertise, deep understanding of the renewable energy sector and willingness to fund innovative and ground-breaking projects means we can support the pathway to commercialisation for many new technologies and businesses that might otherwise struggle to get off the ground or be potentially lost to overseas markets.

Image credit: ARENA.

CORE ACTIVITIES

ARENA provides grant funding to support projects that meet our investment priorities.

We apply a rigorous approach when assessing the merit of projects for funding, taking into account risk and value for money. We do not fund projects that might otherwise proceed without ARENA support.

We invest along the innovation chain, balancing investment in emerging commercial technologies with research, development and demonstration to address long-term needs. We also collaborate with industry and share knowledge to accelerate learning, thereby reducing future costs.

FUNDING

In September 2020, ARENA received additional funding of $1.62 billion, made up of baseline funding of $1.43 billion to 2032 and $193 million to deliver targeted programs announced in the 2020-2021 Federal Budget.

The Government also announced that ARENA will have the ability to provide financial assistance in the form of concessional debt and equity.

PROJECTS FUNDED TO DATE

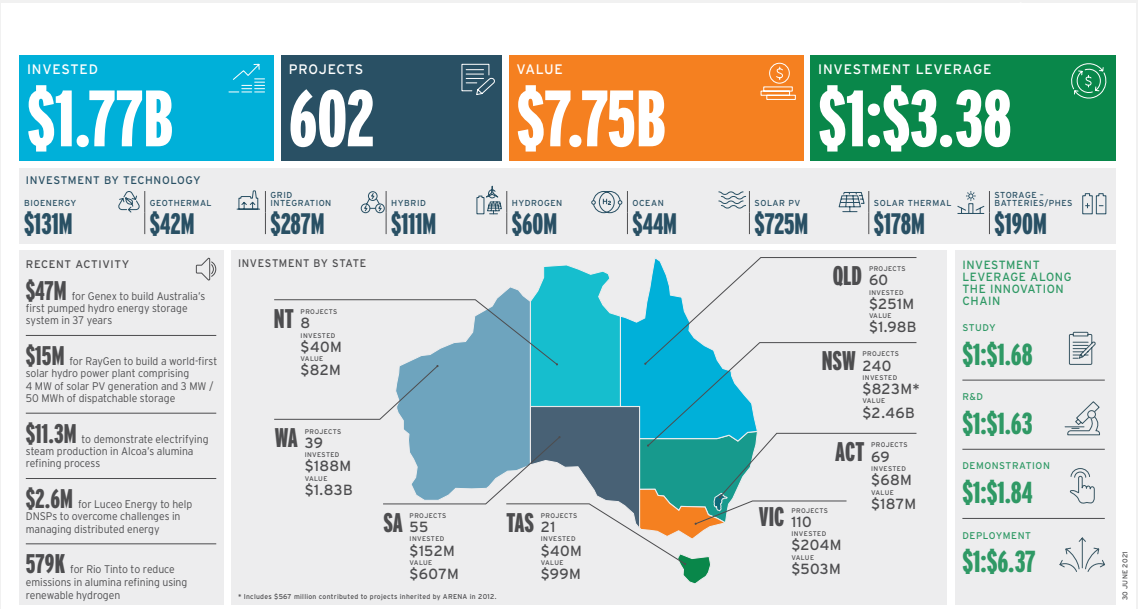
The impact of our work is significant. Since 2012, ARENA has committed $1.77 billion to 602 renewable energy projects, driving innovation in solar photovoltaic (PV), batteries and other forms of energy storage, biofuels, hydrogen, solar thermal, ocean energy, pumped hydro, distributed energy and demand response. Every dollar of ARENA funding has unlocked an average of $3.38 of co-funding from the private and public sectors for a total project value of $7.75 billion across Australia (Figure 2).

FUNDING COMMITMENTS IN 2020-21

In 2020-21, ARENA contractually committed $185.9 million to 59 new projects worth a total of $1.27 billion. Overall, we managed 289 active projects during the period, of which 49 were completed and three terminated.

Details of all active projects during 2020-21 are provided in Appendix 1.

FIGURE 2: ARENA AT A GLANCE - FUNDING COMMITMENTS TO PROJECTS 2012-2021



HOW WE WORK

ACCORDING TO OUR VALUES

ARENA's values empower our people to take an agile, commercially-oriented and outcome-driven approach to achieving our purpose.

BRINGING PEOPLE AND IDEAS TOGETHER

ARENA has a skilled, productive and highly motivated team drawn from diverse backgrounds. Our leadership team and staff have expertise and experience in energy policy, Australia's electricity market, energy technology and project finance. We blend public and private sector expertise, innovation and accountability in the design and delivery of our activities.

A strong culture of mutual support, teamwork and collaboration has been central to our 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.

We also work with innovators in support of projects to generate the knowledge needed to bring about transformative change.

OUR STRATEGIC APPROACH

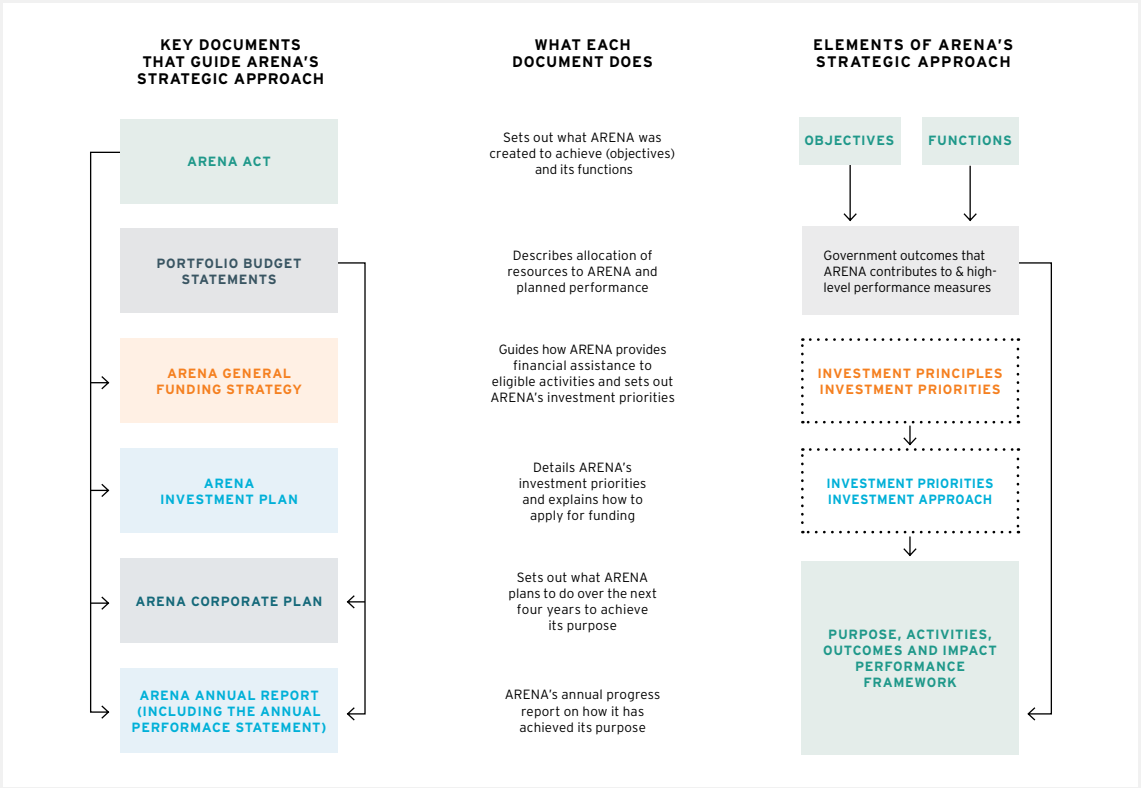
ARENA strives to achieve maximum impact and value from the projects we fund.

We provide financial assistance to recipients for innovative renewable energy technologies and business models to enable a path to commercialisation. We are prepared to take risks on new ideas and technologies that are not yet proven, while considering whether the solution being tested has the potential to reach commercial maturity.

We have the skills, experience and industry knowledge to invest funds for the greatest impact. We apply commercial rigour to our funding decisions and ensure that each of ARENA's activities is focused on achieving the objectives and performing the functions stated in our legislation, Portfolio Budget Statements and business plans.

Figure 3 demonstrates how we keep a line of sight from the ARENA Act through the Corporate Plan to the Annual Performance Statement in this Annual Report.

FIGURE 3: LINE OF SIGHT FROM ARENA ACT TO OTHER ELEMENTS OF ARENA'S STRATEGIC APPROACH



GENERAL FUNDING STRATEGY AND INVESTMENT PLAN

ARENA contributes funding to renewable energy activities in accordance with our General Funding Strategy (GFS) and Investment Plan (IP). Current editions of the GFS and IP are available on our website at arena.gov.au.

The GFS guides how ARENA provides financial assistance for eligible activities, in accordance with the ARENA Act, associated regulations and the requirements of the PGPA Act.

We use the principles in the GFS to identify investment priorities, which are provided in the IP along with information on our funding programs and initiatives.

The IP builds on the work, achievements and knowledge we have gained to date. Within each of the investment priorities, we define focus areas to target investments to achieve specific outcomes. Focus areas also inform our knowledge sharing strategies and the design of the performance measures that will enable our stakeholders to assess ARENA's impact.

CORPORATE PLAN

Each year ARENA develops and publishes a Corporate Plan, which is required under the PGPA Act and is our primary planning document.

The Corporate Plan sets out:

- ARENA's strategy as a whole, covering the full suite of activities (including making new investments and maximising benefits from existing financial assistance contracts)
- the context within which ARENA operates
- the organisational capability that underpins delivery
- how we assess and report performance
- our identification of strategic risks and how they are managed.

Over time, our Corporate Plans have built upon ARENA's considerable experience, and our priorities have evolved to anticipate and address the longer-term needs of the changing energy system.

Sharing what we learn is a fundamental part of ARENA's functions. We are focused on maximising the benefits from past and ongoing projects through knowledge sharing and collaboration.

Image credit: ARENA.

PERFORMANCE REPORTING

ARENA's Corporate Plan sets out our approach to performance reporting, demonstrating that:

- financial assistance is being allocated in accordance with the strategy
- private sector capital is ensuring taxpayers' dollars are spent effectively
- technologies are progressing towards commercial readiness
- projects are leading to industry learning that will be reflected in increases in supply of renewable energy.

We also track whether knowledge sharing is informing industry decisions, accelerating learning and helping to lower costs.

GRANT FUNDING

ARENA's financial assistance is generally provided through grants. In certain circumstances we may negotiate a recoupment mechanism that sees some or all of our grant funding returned.

The Government has announced that ARENA will also have the ability to provide financial assistance in the form of concessional debt and equity. We will use these instruments alongside, or in addition to, grants to provide the most appropriate type of funding to innovative projects and companies and maximise value for money for taxpayers.

To identify the projects that will make a critical difference, ARENA assesses funding proposals that fit with our objectives and investment priorities – this forms part of the merit assessment for our funding programs.

KNOWLEDGE SHARING AND COLLABORATION

Sharing what we learn is a fundamental part of ARENA's functions. We are focused on maximising the benefits from past and ongoing projects through knowledge sharing and collaboration.

Knowledge sharing through the collection, storage, analysis, curation and sharing of information, experience and know-how gained from these and related projects allows the industry to learn faster and direct efforts and funding to the most important and prospective technologies.

Collaboration across the full project lifecycle is critical to success, so we bring together key stakeholders to share knowledge both during the front-end design stage and as projects reveal insights.

ELIGIBLE TECHNOLOGIES

Eligible technologies are indicated by the investment priorities outlined in the ARENA Investment Plan. We take these priorities into account when assessing funding proposals.

Image credit: Stock.

OUR COMPLEMENTARY ROLE

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

To ensure ARENA's activities have the greatest impact, we strive to complement other elements of the Australian Government's support for clean energy and low emissions innovation (see Figure 4).

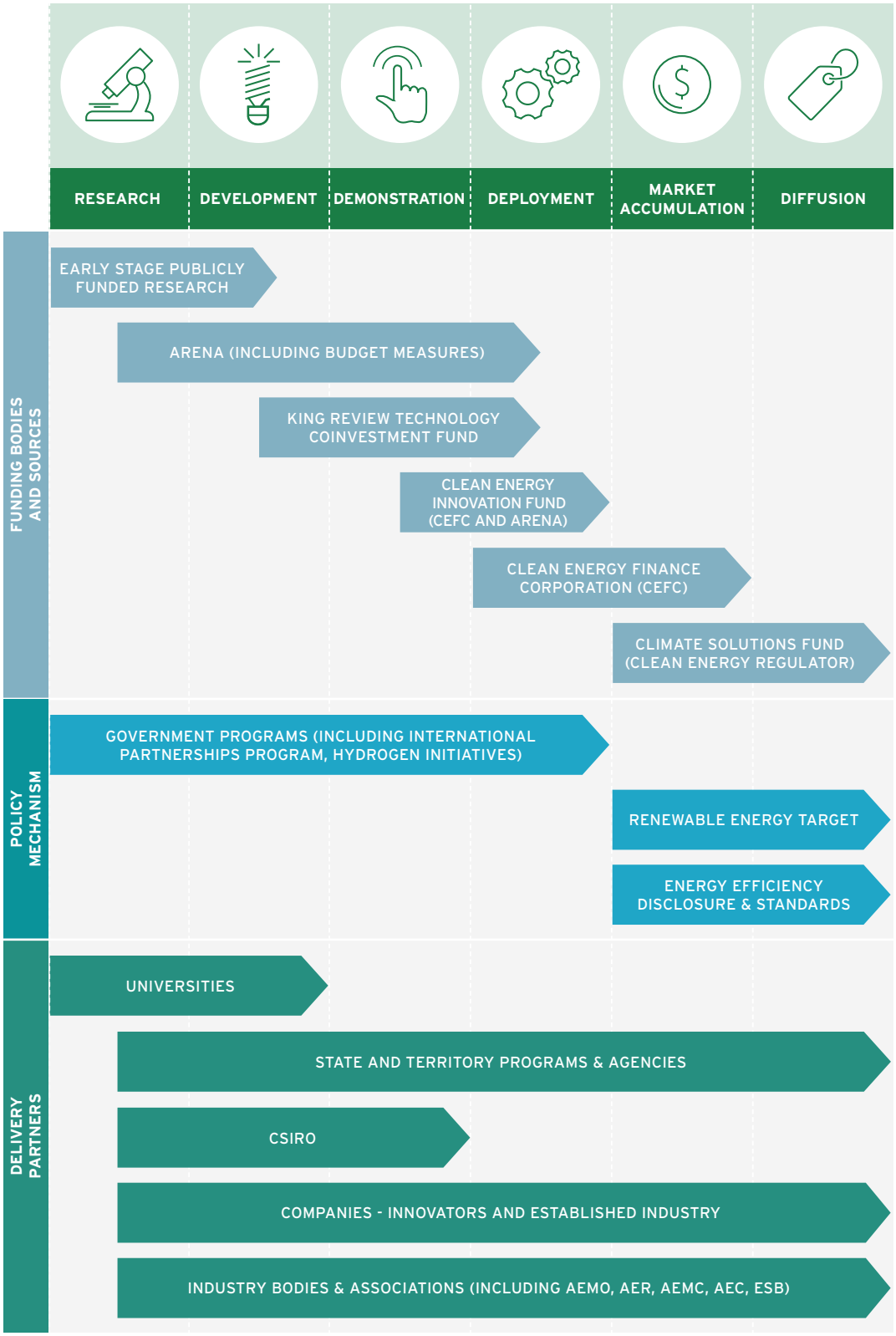
We collaborate with organisations such as the Clean Energy Finance Corporation (CEFC), CSIRO, Australian Energy Market Operator (AEMO), Australian Energy Market Commission (AEMC), Australian Energy Regulator (AER), Energy Security Board (ESB) and innovators in industry.

In 2018 we established the Distributed Energy Integration Program (DEIP) alongside other regulatory, industry and consumer bodies. The DEIP has been successful in sharing knowledge and understanding and guiding efforts in distributed energy technologies such as rooftop solar, home batteries and electric vehicles.

We also liaise and collaborate with government agencies delivering complementary initiatives such as the Regional and Remote Communities Reliability Fund, Climate Solutions Fund and Renewable Energy Target.

We stay connected with all State and Territory governments, and continuously look for opportunities to collaborate, share knowledge and co-invest in renewable energy innovation.

FIGURE 4: ARENA'S COMPLEMENTARY ROLE



BOARD

RESPONSIBILITIES

The Board is the Accountable Authority, with overall responsibility for ARENA's operations. It is a skill-based, decision making body responsible for recommending ARENA's annual General Funding Strategy to the Minister, setting investment priorities, approving investments, overseeing the running of the organisation and approving funding for projects up to $50 million.

ARENA's Portfolio Minister approves funding of more than $50 million for projects recommended by the Board, while the ARENA CEO has board-delegated authority to approve funding up to $1 million.

The Board may also delegate to the CEO specific powers or functions, subject to any directions specified by the Board and any applicable ARENA policies and legislation.

BOARD GOVERNANCE

The Board's business and meetings were conducted during the reporting period in accordance with the requirements of applicable legislation and in line with best practice. Its members regularly review the Board's operation as part of their responsibility to continually improve the efficiency and effectiveness of governance processes.

MEMBERS

The Board consists of up to six appointed members as well as the Secretary of the Portfolio Department (ex officio). With the exception of the ex-officio member, Board members are appointed by the Minister for a term of up to two years, and may be reappointed for a total of up to six continuous years.

At 30 June 2021, members of the ARENA Board were:

- Mr Justin Punch (Chair)
- Mr Justin Butcher
- Mr John Hirjee
- Ms Anna Matysek
- Mr Dougal McOmish
- Ms Stephanie Unwin
- Mr David Fredericks PSM, Secretary of the Portfolio Department or nominated delegate (ex officio).

With the exception of the Secretary of the Portfolio Department and any nominated delegate, these Board members were appointed by the Portfolio Minister as follows:

- Mr Justin Punch was appointed to commence as ARENA Chair on 18 July 2020
- Mr Dougal McOmish and Ms Stephanie Unwin were re-appointed as continuing members from 18 July 2020
- remaining Board members were appointed by the Minister to commence on 24 July 2020.

Image credit: ARENA.

Image credit: Stock.

The Secretary of the Portfolio Department during the reporting period was Mr David Fredericks, Secretary of the Department of Industry, Science, Energy and Resources. Ms Jo Evans was the nominated delegate for Mr Fredericks during the reporting period. Ms Evans took long service leave for part of the reporting period and the Secretary was represented by alternative delegates during that time.

BOARD CHANGES AFTER 30 JUNE 2021

On 15 July 2021, the Portfolio Minister announced:

- Ms Stephanie Unwin was re-appointed as a continuing Board member from 18 July 2021 for a further two years
- Mr Stephen McIntosh was appointed as a Board member to commence on 18 July 2021 for a two-year term following the completion of Mr Dougal McOmish's term on 17 July 2021.

MEETINGS

The Board formally met seven times during 2020-21. Board member attendance is shown in Table 1.

TABLE 1: DETAILS OF ARENA BOARD 2020-21

NAME	QUALIFICATIONS	EXPERIENCE	POSITION TITLE / POSITION HELD	DATE OF COMMENCEMENT / DATE OF CESSATION	NUMBER OF BOARD MEETINGS
Mr Justin Punch	Bachelor of Commerce, Bachelor of Law, MBA	Experienced environmental investor focused on decarbonisation and conservation 30-year career working across private equity, line management and management consulting Co-founder, Assembly Climate Capital Director, Tasman Environmental Markets Chairman, Karrkad Kanjdji Trust	Chair, Non-executive ARENA Board member	Commenced 18 July 2020	7/7
Mr Justin Butcher	Bachelor of Education, Master of Education	CEO and Founder, MXA Consulting Entrepreneur and business investor Experienced strategy consultant and advisor to executive leaders in government Specialist in government business cases, business models, design thinking, benefits management, data strategy and technology strategy	Non-executive ARENA Board member	Commenced 24 July 2020	6/7
Mr John Hirjee	Bachelor of Engineering (Chemical Engineering)	Executive Director, Resources, Energy and Infrastructure at ANZ Banking Group Experienced company research analyst, banker and senior adviser, specialising in Australasian energy and utility industries and companies	Non-executive ARENA Board member	Commenced 24 July 2020	7/7
Ms Anna Matysek	Bachelor of Economics, Master of Environment	Head of Climate Change, BlueScope Steel A lead author for IPCC. Council Member of Australian Institute of Marine Science. Economist and strategy specialist in the resources, energy and infrastructure sectors	Non-executive ARENA Board member	Commenced 24 July 2020	6/7
Mr Dougal McOmish	Tertiary qualifications in economics	Director, Eco Advisory Former Chief Operating Officer, Sundrop Farms	Non-executive ARENA Board member	Commenced 18 April 2018	6/7
Ms Stephanie Unwin	LLB, B Econ Advanced mgmt program (191) Harvard	CEO, Horizon Power Senate member, Murdoch University Significant experience at executive and board level across a variety of sectors including renewable energy	Non-executive ARENA Board member	Commenced 18 April 2018	7/7
Ms Jo Evans		Nominated delegate of Secretary of the Portfolio Department Deputy Secretary, Department of Industry, Science, Energy and Resources Significant experience in climate change and emissions reduction policy	Ex-officio member		7/7*

*An alternative delegate for the Secretary attended the Board meeting on 20 December 2020.

Image credit: Stock.

BOARD MEMBER PROFILES

Members of the ARENA Board must have experience or knowledge in renewable energy technology, commercialisation, business investment or corporate governance.

MR JUSTIN PUNCH

CHAIR / NON-EXECUTIVE MEMBER

Term: 18 July 2020 - 17 July 2022
Appointed 2020

Justin Punch is an experienced environmental investor focused on decarbonisation and conservation, with a 30-year career in private equity, line management and management consulting. He is a co-founder of Assembly Climate Capital, a Director of Tasman Environmental Markets and a co-founder of biodiversity offset provider Meridolum. He was previously a Partner at Archer Capital, where he led investments across a diverse range of sectors, and has extensive experience in the management of operating businesses as well as consulting experience with the Boston Consulting Group.

Justin serves as the Chairman of the Karrkad Kanjdji Trust. The Trust supports the work of Indigenous ranger groups in Arnhem Land on projects including assisting with landscape-scale carbon abatement programs, conserving endangered landscapes and species, conserving Indigenous knowledge and cultural heritage, and improving education outcomes.

Justin holds Bachelor of Commerce and Bachelor of Laws degrees from the University of NSW and a Master of Business Administration from Harvard Business School.

MR JUSTIN BUTCHER

NON-EXECUTIVE MEMBER

MEMBER, PEOPLE & CULTURE COMMITTEE

Term: 24 July 2020 - 23 July 2022
Appointed 2020

Justin Butcher is CEO of MXA, a strategy consulting firm advising government executives on implementing policy initiatives and managing the complexities of data, information and technology.

Justin's diverse career has spanned science teaching and technology training, software development and systems architecture, business and technology strategy, advice to senior executives of government agencies, and mentoring to business startups.

Justin has helped government agencies identify and implement improvements across a wide range of programs and operational areas.

MR JOHN HIRJEE

NON-EXECUTIVE MEMBER

MEMBER, RISK & AUDIT COMMITTEE

Term: 24 July 2020 - 23 July 2022
Appointed 2020

John Hirjee is an experienced company research analyst, banker and senior adviser, specialising in Australasian energy and utility industries and companies. He is currently Executive Director, Resources, Energy and Infrastructure at ANZ Banking Group.

John has a significant track record with high-level achievements in equity research, analysing the development of company strategies and financial metrics. John's career has included working with key stakeholders across private and public institutions, and the fostering of strong links with senior executives, professionals and government officials.

John has a Bachelor of Engineering specialising in Chemical Engineering from Monash University.

MS ANNA MATYSEK

NON-EXECUTIVE MEMBER

Term: 24 July 2020 - 23 July 2022
Appointed 2020

Anna Matysek is an economist and strategy specialist in the resources, energy and infrastructure sectors, and is currently the Head of Climate Change at BlueScope Steel.

Anna was previously an executive at Rio Tinto and TransGrid, has worked in various consulting firms and government agencies including the Australian Bureau of Agricultural and Resource Economics and the Productivity Commission. She has been a Lead Author for the Intergovernmental Panel on Climate Change (IPCC) and is a Council Member of the Australian Institute of Marine Science.

Anna holds a Master of Environment from the University of Melbourne, and a Bachelor of Economics from the University of Tasmania.

MR DOUGAL MCOMISH

NON-EXECUTIVE MEMBER

MEMBER, RISK & AUDIT COMMITTEE

Term: 18 April 2018 - 17 July 2021
Re-appointed from 2020 to 2021

Dougal McOmish has more than twelve years of experience in senior management across the agriculture and financial advisory sectors, as well as large-scale infrastructure project delivery and stakeholder management.

Dougal is a Director of Eco Advisory, a corporate and strategic advisor focused on the food and agribusiness sectors. Prior to founding Eco Advisory, Dougal was Chief Operating Officer for Sundrop Farms. Sundrop Farms is a world-first $200 million horticulture and energy infrastructure development, financed by the world's largest private equity investor KKR. As COO of Sundrop Farms Dougal was responsible for the establishment and execution of Sundrop's operational strategy and commercial targets.

Prior to Sundrop Farms Dougal spent a decade

working in the finance sector as an investment banker, predominantly with Macquarie Group in Australia and Asia. Dougal's investment banking and project management experience stretches across the infrastructure, utilities, resources and oil and gas sectors, both in Australia and overseas.

He now lives in the Adelaide Hills, and is an economics graduate of the University of Adelaide.

MS STEPHANIE UNWIN

NON-EXECUTIVE MEMBER

CHAIR, PEOPLE & CULTURE COMMITTEE

Term: 18 April 2018 - 17 July 2023
Re-appointed in 2020 and 2021

Stephanie Unwin is Chief Executive Officer of Horizon Power. She was previously General Manager Transformation and Technology of CBH Group, where she was responsible for information technology and overseeing the transformation of CBH to a low-cost, efficient supply chain from paddock to port. Prior to that she was Chief Executive Officer of Phylogica, a biotech and medical devices company in Western Australia.

Stephanie has significant executive and board-level experience across a variety of sectors, and is a former General Manager Commercial at energy generator and retailer Synergy. During her time at Synergy, Stephanie was responsible for strategy and innovation, modelling and analytics, corporate affairs and communication, policy and regulation, corporate development and continuous improvement.

Stephanie has considerable experience with renewable energy, including being a key negotiator at Synergy and then the General Manager with oversight for the construction and commissioning of the Greenough River Solar Farm and Mumbida Wind Farm. She also conceived of and developed a renewables infrastructure fund to initial commercial close, took the Alkimos Beach Community Battery Storage project through funding to commissioning and into delivery, and developed the company's forward strategy for innovation and renewables.

She was also the Chair and operational Board member for the joint venture companies supplying renewable energy from the solar and wind farms.

MS JO EVANS

EX-OFFICIO MEMBER

MEMBER, PEOPLE & CULTURE COMMITTEE
(Delegate for Secretary of Portfolio Department)

Jo Evans is a Deputy Secretary at the Department of Industry, Science, Energy and Resources and the nominated delegate for the Secretary on the ARENA Board.

Jo has worked in a number of portfolios including the Department of Agriculture and Water Resources, the Department of the Prime Minister and Cabinet and the Department of the Environment and Energy. Prior to joining the Australian Public Service in 2000, Jo worked for management consultants McKinsey & Company.

Jo has a Masters of Public Policy from the Woodrow Wilson School of Public and International Affairs, Princeton University; a Masters in Environmental Science from the University of Melbourne; and a combined bachelor degree in Asian Studies and Economics (Hons) from the Australian National University.

BOARD COMMITTEES

RISK AND AUDIT COMMITTEE

The Board's Risk and Audit Committee (RAC) was established as a sub-committee of the Board in compliance with section 45 of the PGPA Act. The RAC Charter is available on the ARENA website at arena.gov.au/charter.

The RAC is responsible and accountable to the ARENA Board for the performance of its functions, which are to review and provide written advice as assurance to the Board about the appropriateness of ARENA's financial reporting, performance reporting, system of risk oversight and management, and system of internal control.

RAC members are expected to understand and observe the requirements of the PGPA Act and PGPA Rules.

The Committee also provides a forum for communication between the Board and the internal auditor (PWC), as well as the external auditor (Australian National Audit Office).

The Board has authorised the RAC, within the scope of its responsibilities, to:

- seek any information that it requires from an ARENA official, consultant or external party (subject to any legal obligation to protect information)
- discuss any matters with the external auditor or other external parties (subject to confidentiality considerations)
- obtain legal or other independent professional advice, as considered necessary to meet its responsibilities, at ARENA's expense and in accordance with its Charter.

Following commencement of the current Board in July 2020, members of the RAC during 2020-21 were:

- Mrs Jenny Morison (RAC Chair and Independent member)
- Ms Karen Hogan (Independent member)
- Mr Dougal McOmish
- Mr John Hirjee (from 25 August 2020).

During the reporting period, the RAC formally met four times. Meeting attendance is provided in Table 2.

Refer to Board member profiles and Board Committee Independent member profiles for details of each RAC member's experience and qualifications.

FIGURE 5: ARENA BOARD AND MANAGEMENT COMMITTEES 2020-21

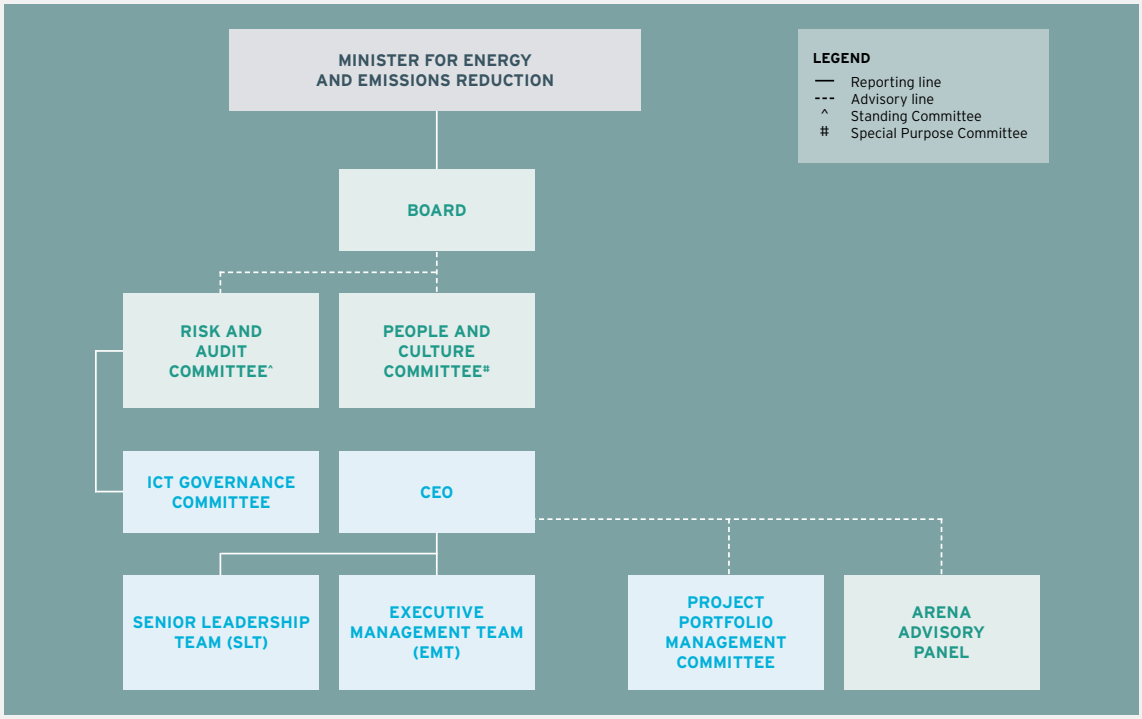


Image credit: Genex Power.

TABLE 2: DETAILS OF ARENA RISK AND AUDIT COMMITTEE (RAC) 2020-21

NAME	QUALIFICATIONS, KNOWLEDGE, SKILLS OR EXPERIENCE OF RAC MEMBERS	POSITION TITLE / POSITION HELD	NUMBER OF RAC MEETINGS ATTENDED
Mrs Jenny Morison	FCA, BEc 38 years of broad experience in the accounting profession, commerce and government	RAC Chair, Independent Committee member	4/4
Ms Karen Hogan	Bachelor of Commerce (Accounting) Fellow CPA Australia, GAICD Over 30 years' experience in governance with expertise in finance, human resources and information and communication technology	Independent Committee member	4/4
Mr John Hirjee (from 25 August 2020)	Bachelor of Engineering (Chemical Engineering) Executive Director, Resources, Energy and Infrastructure at ANZ Banking Group Experienced company research analyst, banker and senior adviser, specialising in Australasian energy and utility industries and companies	Non-executive ARENA Board member	3/3
Mr Dougal McOmish	Tertiary qualifications in economics Director, Eco Advisory Former Chief Operating Officer, Sundrop Farms	Non-executive ARENA Board member	3/4

PEOPLE AND CULTURE COMMITTEE

The People and Culture Committee (PCC) was created as a Board committee under section 48 of the ARENA Act to assist the Board by reviewing, reporting on and, if required, making recommendations to the Board or management on matters relating to human resources, culture and diversity, including the representation of women, compensation policy, and continuity and development of senior management for the Agency.

The PCC met once in 2020-21 prior to the current Board commencing in mid July. At that time, members of the PCC were:

- Ms Meg McDonald (PCC Chair)
- Ms Susan Jeanes
- Ms Stephanie Unwin
- Secretary of the Portfolio Department or delegate (ex officio).

Following commencement of the current Board, members of the PCC during 2020-21 were:

- Ms Stephanie Unwin (PCC Chair)
- Mr Justin Butcher
- Secretary of the Portfolio Department or delegate (ex officio).

This configuration of the PCC met three times during the reporting period. Meeting attendance is provided in Table 3.

Refer to Board member profiles for details of each PCC member's experience and qualifications.

Image credit: Chargefox.

TABLE 3: DETAILS OF ARENA PEOPLE AND CULTURE COMMITTEE (PCC) 2020-21

NAME	POSITION TITLE / POSITION HELD	NUMBER OF PCC MEETINGS - NEW BOARD	NUMBER OF PCC MEETINGS - PREVIOUS BOARD*
Ms Stephanie Unwin	PCC Chair, non-executive Board member	3/3	1/1
Mr Justin Butcher	Non-executive Board member	3/3	
Ms Jo Evans	Ex-officio member	3/3**	1/1
Ms Meg McDonald	Previous PCC Chair, previous non-executive ARENA Board member		1/1
Ms Susan Jeanes	Previous non-executive ARENA Board member		1/1

* A meeting of the PCC was held prior to the new Board taking effect on 18 July 2020.

** A proxy for Ms Evans attended one meeting of the PCC.

BOARD COMMITTEE INDEPENDENT MEMBER PROFILES

MRS JENNY MORISON
RAC CHAIR / INDEPENDENT COMMITTEE MEMBER

Jenny Morison FCA, BEc (Sydney Uni) has 38 years of broad experience in the accounting profession, commerce and government.

She was a National Board Member of the Chartered Accountants of Australia and New Zealand for four years, CFO of a public company, and has held senior positions in the major international accounting firms.

Jenny founded Morison Consulting Pty Limited in 1996, specialising in government financial reforms, governance and consulting. She was awarded a Centenary medal in 2000 for services to women and accounting.

Jenny brings a wealth of experience having held roles as an independent member and chair of Commonwealth audit and risk committees and financial statement sub-committees for large and small government entities for the past 17 years.

MS KAREN HOGAN
RAC INDEPENDENT COMMITTEE MEMBER

Karen Hogan has more than 30 years' experience in governance with expertise in finance, human resources and information and communication technology. Karen has held roles in a variety of sectors such as fast moving consumer products, manufacturing, tourism, government regulation, agriculture and cultural institutions.

Karen was the Chief Financial Officer at the Museum of Australian Democracy, Old Parliament House from 2009 until 2015. She is now a Director of EGA Insights and provides strategic consulting advice on governance, accounting, internal controls and business improvement opportunities.

In addition, Karen is an Independent member of several public sector Audit and Risk Committees. In addition to being a member of the ARENA RAC, she is Deputy Chair of the Murray Darling Basin Authority (MDBA) and Chair of the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS).

Karen has a Bachelor of Commerce (Accounting), is a Fellow of CPA Australia and a Graduate of the Institute of Company Directors.

SENIOR LEADERSHIP TEAM PROFILES

Image credit: Alcoa of Australia.

MR DARREN MILLER
CHIEF EXECUTIVE OFFICER

Darren Miller commenced as ARENA's CEO on 27 August 2018, and was re-appointed for an additional three-year term in July 2021. He has more than 25 years' experience across a range of sectors including renewable energy, electricity retail, technology, finance, media and entertainment.

Darren was co-founder, CFO and then CEO of Mojo Power, an innovative electricity retailer, from 2015 until July 2018. He was previously the Director of Asset Finance at Sungevity Australia in 2014, and co-founder and CEO of Sumwise, a technology and services company from 2007 to 2013.

Darren's other previous experience includes positions as investment manager for Publishing and Broadcasting Limited (PBL) and Consolidated Press Holdings (CPH) and as an analyst with Ernst & Young.

Darren is a Graduate of the Australian Institute of Company Directors, and is a Chartered Accountant with a Bachelor of Commerce (Hons) from the University of New South Wales.

MR IAN KAY
CHIEF FINANCIAL OFFICER

As CFO, Ian Kay leads ARENA's Business Development and Transactions and Finance teams. His focus is on optimising the use of ARENA's grant money to help project proponents secure the sponsor equity, third-party equity and project finance debt needed to bring projects to financial close.

Ian possesses 27 years' experience leading investment in infrastructure, development and commercialisation of renewable energy projects, including at Origin Energy and Macquarie Group.

He has particular skill in managing joint venture partnerships and a track record of designing innovative transaction structures. Ian brings a depth of experience to ARENA and has originated, developed and led projects totalling more than $12 billion in enterprise value and $3.7 billion total required equity commitment. He has experience of a broad range of renewable energy projects.

Ian holds a Master of Arts (Hons) in Economic Science from Aberdeen University and is a member of the Institute of Chartered Accountants (England and Wales).

MS NICOLA MORRIS
CHIEF OPERATING OFFICER*

Nicola Morris commenced as COO for ARENA in July 2016. She provides oversight of the Strategy, Human Resources, Information Technology, Legal and Project Delivery teams and leads ARENA's digital transformation agenda.

Nicola also worked at ARENA as General Manager and General Counsel until early 2014 and was responsible for the Big Solar team. She was also the head of the ARENA Establishment Team in the lead up to the commencement of ARENA in July 2012.

Nicola was previously Acting Head of Division of Innovation Programs Division – AusIndustry in the Department of Industry, Innovation and Science. She was also General Manager of the Business Management element of the Entrepreneurs' Program.

Previously Chief Lawyer for the Department of Resources, Energy and Tourism, and a lawyer in private practice, Nicola has transitioned to program management, with a particular interest in innovation programs, and the intersection between public sector programs and private sector expertise and delivery models.

* Ms Morris commenced a period of Long Service Leave on 12 March 2021, following which the position of COO was held by Alison Reeve (15 March - 21 April 2021) and Erika Taduran (3 May - 23 July 2021).

FINANCIAL PERFORMANCE

THIS SECTION PROVIDES AN OVERVIEW OF ARENA'S FINANCIAL PERFORMANCE. ARENA'S AUDITED FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2021 ARE PROVIDED IN THE FINANCIAL STATEMENTS SECTION.

Image credit: Stock.

ARENA reports an operating surplus of $52.4 million for the year, with a lower level of grant spending, $164.5 million compared to last year's $193.3 million.

Grant expenditure was 15 per cent lower than the prior year and less than the budget. The COVID-19 pandemic has impacted existing grant projects, resulting in delays in completion of milestones throughout the year.

Administration expenses in 2020-21 were 11 per cent lower than the previous year, attributable to a reduction in business activity under the COVID-19 lockdown and some genuine savings from improved efficiency. Part of the administration expenses were funded by the Portfolio Department through the secondment of departmental staff to ARENA. This funding is included in the table below as Resources received free of charge.

In October 2020 the Federal Government continued the commitment to ARENA by providing $1.4 billion in funding to continue the current program of work to 2032. A further $193 million was awarded for new policy initiatives.

The Renewable Energy Venture Capital Fund drew down a net amount of $0.2 million from ARENA during the financial year. On 30 June 2021, the investment recorded a fair value gain of $1.6 million, which was reported in the Other Comprehensive Income section of the financial statements. The carrying value of the investment at 30 June 2021 was $31.6 million.

ARENA is retaining cash returned from project grants and investing the surplus cash in term deposits in accordance with the ARENA Act. With the Federal Government budget now providing ARENA with funding to 2032, the cash reserves will be used to fund new projects and to complete those projects committed from legislated funding under the ARENA Act.

TABLE 4: KEY FINANCIAL RESULTS

	2016-17 $M	2017-18 $M	2018-19 $M	2019-20 $M	2020-21 $M
Revenue from Government	192.1	209.1	174.0	231.4	227.5
Resources Received Free of Charge	7.3	6.7	5.5	4.9	4.9
Return of Grants	2.8	0	5.1	3.1	9.7
Interest and Other Income	1.2	1.5	1.6	1.6	1.0
Grant Expenses	**(160.7)**	**(176.3)**	**(138.7)**	**(193.3)**	**(164.5)**
Administration Expenses	(28.0)	(30.9)	(30.7)	(29.2)	(26.2)
Operating Surplus	**14.7**	**10.1**	**16.8**	**18.5**	**52.4**
Cash and Term Deposits	55.7	56.4	85.6	87.8	139.0
Investments	22.5	30.6	29.3	29.8	31.6
Total Equity	79.2	89.0	103.3	119.2	173.2

ARENA SHOWCASE

Each year, the ARENA showcase features a selection of our new projects that demonstrate the critical role that ARENA plays in increasing the supply of Australia's renewable energy resources and delivering significant improvements in the competitiveness of renewable energy technologies.

FOCUSED ON MAXIMUM IMPACTS AND VALUE

ARENA is committed to achieving maximum impact and value from the projects we fund. To do this, we set investment priorities, which guide our funding decisions.

During 2020-21, ARENA's investment priorities were:

- integrating renewables into the electricity system
- accelerating hydrogen
- supporting industry to reduce emissions.

These 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.

More information on our funding priorities can be found on the ARENA website www.arena.gov.au.

FIGURE 6: ARENA'S INVESTMENT PRIORITIES 2020-21

INTEGRATING RENEWABLES INTO THE ELECTRICITY SYSTEM
Delivering technology and business model solutions to enable higher shares of renewables in the electricity sector

ACCELERATING HYDROGEN
Supporting the growth of Australia's hydrogen industry for domestic applications and export

SUPPORTING INDUSTRY TO REDUCE EMISSIONS
Progressing technologies to reduce costs and reduce emissions

Image credit: Stock.

Image credit: Stock.

PRIORITY 1: INTEGRATING RENEWABLES INTO THE ELECTRICITY SYSTEM

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

WHY IS THIS A PRIORITY FOR ARENA?

Australia's electricity system is undergoing a rapid transition. Wind and solar PV are increasingly competitive, ageing fossil fuel generation is becoming uneconomic and being retired, and more Australians are choosing to install rooftop solar and other distributed energy technologies such as battery storage.

Already, approximately 2.7 million Australian households have installed rooftop solar to help manage their electricity costs and lower emissions.

Even as the problems of today are solved, new challenges and opportunities will arise in this transition.

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

USING HYDRO TO DELIVER 'BASELOAD' RENEWABLES

Large-scale energy storage – in bodies of water such as dams or huge battery farms – will play a key role in keeping Australia's electricity system secure and reliable as we transition to renewables.

Experts have identified pumped hydro as an important large-scale energy storage technology for this purpose. Pumped hydro energy storage (PHES) that uses renewables such as solar and wind energy to pump water into dams, can then dispatch the 'stored' renewable energy using a hydroelectric turbine back into the grid during the evening and other times of peak demand.

ARENA already has a track record in supporting projects that explore this important renewable energy innovation. To date, we have supported 16 PHES projects with more than $28 million including the feasibility studies for Snowy 2.0 and Tasmania's Battery of the Nation.

In 2016 we provided funding for the first stage of a 50 megawatt (MW) solar project by Genex Power that would power a PHES facility using two flooded mining pits from the old Kidston Gold Mine in North Queensland.

Now in 2020-21, ARENA has committed up to $47 million in funding towards the next stage of the Genex project, a PHES facility that will be co-located with the existing solar farm at the Kidston Clean Energy Hub.

The $777 million project (including required transmission infrastructure) will be the first pumped hydro plant to be built in Australia since 1984, and the first to be used specifically to support the integration of variable renewable energy generation from solar and wind into the grid.

The PHES facility will produce approximately 250 MW / 2000 MWh of baseload power, equivalent to eight hours of energy storage. It uses the two mining pits as the upper and lower reservoirs to minimise construction time and costs. During peak power demand periods, water will be released from the upper to the lower reservoir, passing through reversible turbines to generate electricity. During off-peak periods and when the sun is abundant, water will be pumped back from the lower reservoir to the upper reservoir using electricity imported from the grid.

A 187 km transmission line, supported by the Queensland Government and Genex, is required to connect the Kidston Renewable Energy Hub to the national electricity market (NEM). This transmission line is also expected to facilitate the connection of further renewable generation projects in the region.

The project will demonstrate and share knowledge on the technical and commercial effectiveness of the development, as well as the construction and operation of the PHES facility. It will also share lessons on the broader economic costs and benefits of the project, including appraisal of the value to consumers and market participants of situating PHES projects at disused mine sites and elsewhere around Australia.

ARENA previously provided $9 million in funding for the feasibility and development of the PHES project, as well as initially providing $8.9 million towards the 50 MW Kidston Solar Project in 2016. The project is also supported with $610 million in concessional debt finance from the Northern Australia Infrastructure Facility (NAIF).

Construction is expected to be completed by 2024. The project is expected to generate 500 construction jobs and a further 20 ongoing operation roles.

Image credit: Genex Power.

FAST FACTS

- **250 MW of dispatchable renewable energy**
- **8 hours of energy storage**
- **Delivers on-call renewables to keep the grid stable and strong**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The Kidston PHES project is a landmark project that paves the way for renewables to play a larger role in Australia's electricity grid. It will help to progress Australia's energy transition by supplying dispatchable, renewable energy to the grid when and where it is needed and providing a blueprint for how we store excess solar and wind energy on a large scale.

Storage solutions such as pumped hydro and large-scale batteries are a key part in providing backup power and grid stability. The first LETS highlighted the importance of large-scale energy storage solutions to facilitate more low-cost solar and wind generated electricity into the grid.

PROJECT NAME:
Kidston Stage 2 Pumped Hydro Energy Storage

LEAD ORGANISATION:
Genex Power Limited

ARENA FUNDING:
$47 million

TOTAL PROJECT COST:
$777 million

LOCATION:
Queensland

GAME-CHANGING SOLUTION TO EXTEND GRID-SCALE BATTERY TECH

Energy storage solutions such as grid-scale batteries and pumped hydro energy storage will play a key part in providing backup power and grid stability, making it possible for more low-cost solar and wind-generated electricity to enter the grid and benefit the nation. However, most of the grid-scale battery innovations explored until recently in Australia have used existing lithium-ion technology, which degrades over time and limits battery life.

This challenge led ARENA to commit $5.7 million in 2020-21 to trial an emerging battery technology that has the potential to transform the way energy is stored.

The $20.3 million project by Yadlamalka Energy will build, test and operate Australia's first large-scale vanadium flow battery (VFB) near the Neuroodla substation in Hawker, regional South Australia. The 2 MW / 8 MWh VFB will be charged by a 6 MW solar farm co-located on site and linked to the grid to demonstrate the potential for grid-connected VFB to provide energy as well as grid support known as frequency control ancillary services (FCAS).

While flow batteries can be produced from an array of different materials, the Invinity vanadium system used in this project benefits from a long operating life, is made from recyclable materials, and unlike other batteries is non-flammable. The liquid vanadium solution has a 25-year life and can be reused in other energy storage or metallurgical applications.

This project will stack hundreds of VFBs large enough to store energy from the nearby solar farm, and connect the battery to the electricity grid to demonstrate the ability of grid-connected VFB to provide energy, FCAS and other grid support services. It will also share lessons on the technical and commercial operations of a grid-connected VFB, and how these could improve outcomes for future projects.

A comprehensive study on the project will be undertaken by the University of Adelaide and learnings will be disseminated publicly through a range of knowledge sharing activities.

WHAT IS A FLOW BATTERY?

Flow batteries use liquid electrolytes that are pumped – or flow – through the device to release energy. The electrolyte does not degrade with recharging like lithium-ion batteries, making it possible for the flow battery to be charged and discharged many times without losing strength or reliability over many years.

This ability to store energy for longer makes flow batteries ideal for providing medium-term energy storage. Due to the way they work, flow batteries are larger and heavier than the short-term lithium-ion battery storage used in homes and cars. They are therefore well-suited for energy storage and backup in data centres, remote mining sites and microgrids.

Flow batteries are modular, so they can also be easily expanded in size, and have more location options than PHES, which may increase the potential applications of this technology.

Image Credit: Invinity.

FAST FACTS

- **Australia's first grid-scale vanadium flow battery**
- **Increased energy storage**
- **Long operating life**
- **Low environmental impact**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The Yadlamalka Energy project will demonstrate the benefits of flow batteries connected to the grid, particularly their ability to store renewable energy generated during the day and then dispatch it into the grid in the evening when consumer demand is highest. The long lifespan and low environmental impact of the VFB sets it apart from other renewable energy storage technologies.

The project aims to prove the flow battery concept at a commercial scale, helping to boost energy storage capacity as more renewable energy comes online.

PROJECT NAME:
Co-located Vanadium Flow Battery Storage and Solar

LEAD ORGANISATION:
Yadlamalka Energy

ARENA FUNDING:
$5.7 million

TOTAL PROJECT COST:
$20.3 million

LOCATION:
South Australia

NEW LIFE FOR ELECTRIC VEHICLE BATTERIES

Electric vehicle (EV) batteries are often considered to have reached end of life when they are no longer able to store more than 80 per cent of their original capacity. While EV drivers may seek a new battery to improve driving range, the 'old' battery could gain a second life by being repurposed for use in stationary storage applications.

Recognising that second-life batteries have a significant potential to drive down the cost of battery storage for use in commercial buildings and industry, ARENA committed $1.49 million in 2020-21 to support the Melbourne startup Relectrify to deliver a battery and inverter system that will dramatically extend the lifespan of old EV batteries.

The technology for the Battery Management System and inverter solution (BMS+Inverter) was originally developed with support from ARENA in 2018.

The $3.3 million project will finalise development of a 35 kW / 120 kWh commercial-scale modular battery product, around ten times the size of a Tesla Powerwall 2, before rolling out 20 of the battery units for demonstration trials in commercial and industrial applications across Australia.

The project will help to reduce the cost of battery storage products through using second-life batteries, explore how any customer concerns can be addressed, and increase knowledge about the technology's costs, applications and benefits to customers.

Image credit: Relectrify.

FAST FACTS

- **Extends battery lifespan**
- **Reduces battery storage costs**
- **Provides backup power suitable for farms, remote mining sites and microgrids**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

Once commercialised, the second-life battery could be used in a range of applications including solar integration, providing backup power on farms, remote mining sites and microgrids, thereby deferring the need for network upgrades and replacing diesel generators.

PROJECT NAME:
Relectrify Second-Life Battery Trial

LEAD ORGANISATION:
Relectrify Holdings

ARENA FUNDING:
$1.49 million

TOTAL PROJECT COST:
$3.3 million

LOCATION:
Victoria

UNLOCKING MORE RENEWABLE ENERGY FOR ALICE SPRINGS

The Central Australian town of Alice Springs faces complex challenges to increasing the amount of variable renewable energy in its local power system. To help overcome these challenges, ARENA committed $2.17 million to the Alice Springs Future Grid project.

Future Grid brings together a diverse group of organisations that have historically tended to operate independently. This multi-stakeholder collaborative project encompasses a series of trials and activities that work together to transform the town's electricity system to integrate more renewable energy.

The $9.34 million project has also received $3.19 million in funding support from the Australian Government's $50 million Regional and Remote Communities Microgrid Fund, with additional support from the Northern Territory (NT) Government.

Delivery is being coordinated by the Intyalheme Centre for Future Energy, a flagship project of Desert Knowledge Australia.

Potential solutions to be explored across five sub-projects include: adding a large-scale battery storage system for a microgrid; coordinating household solar and battery storage through a Virtual Power Plant, trialling different tariff options; solar forecasting for system operations; and monitoring wind resources in the region.

A key outcome of the project is development of a roadmap for increasing integration of renewable energy into the Alice Springs grid.

Recognising that achieving rapid growth in renewable energy requires buy-in from the local community, the project also aims to demonstrate ways to collaborate with residents that will educate, inspire and empower people to continue to drive the energy transition.

Lessons learned in Alice Springs will be transferable to the NT's other major electricity grids, as well as larger interstate networks and microgrids. To preserve knowledge generated through the project, a website (alicespringsfuturegrid.com.au) has been established to support knowledge sharing and tell Central Australia's unique and innovative renewables story.

ARENA's in-house innovation lab, A-Lab, played an important role in helping Intyalheme to develop the Future Grid project. In 2018, ARENA and Intyalheme co-hosted the first regional A-Lab workshop involving more than 50 energy experts from across Australia, to develop ideas that could help Alice Springs to reach its renewable energy goals.

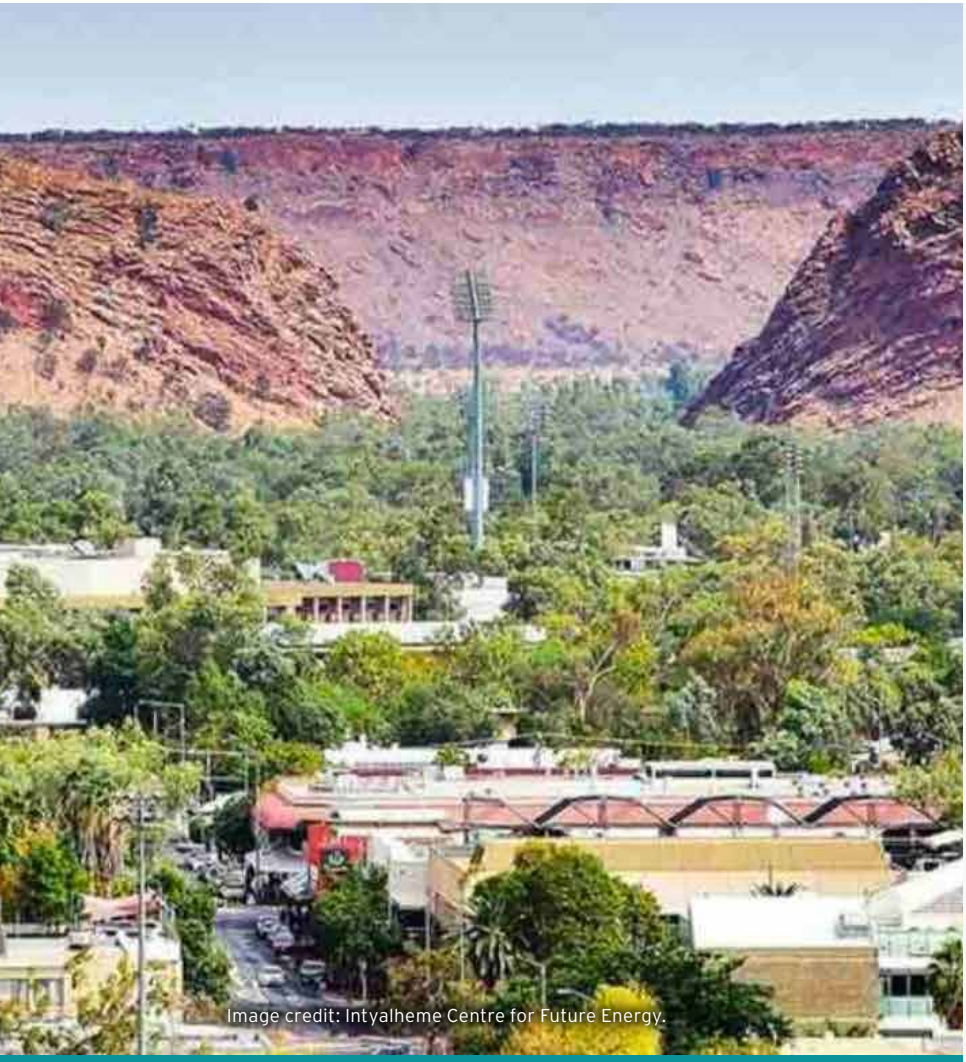


Image credit: Intyalheme Centre for Future Energy.

ARENA's in-house innovation lab, A-Lab, played an important role in helping Intyalheme to develop the Future Grid project.

PROJECT NAME:
Alice Springs Future Grid

LEAD ORGANISATION:
Desert Knowledge Research Institute Ltd

PROJECT PARTNERS:
Led by the Intyalheme Centre for Future Energy on behalf of Desert Knowledge Australia, Ekistica, Power and Water Corporation, Power Generation Corporation t/a Territory Generation, Power Retail Corporation t/a Jacana Energy, Arid Lands Environment Centre and CSIRO

ARENA FUNDING:
$2.17 million

TOTAL PROJECT COST:
$9.34 million

LOCATION:
Northern Territory

FAST FACTS

- **Focused on increasing variable renewable energy in local power system**
- **Five projects working on the one objective**
- **Knowledge will be shared to help NT's other major electricity grids, as well as larger interstate networks and microgrids**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The project will deliver a roadmap for increased integration of renewable energy into the Alice Springs electricity system. By sharing lessons learned during the project, it will also help other remote Australian communities to overcome similar challenges and plan their transition to renewable energy.

04

ARENA SHOWCASE

BENEFITS OF RENEWABLES UNLOCKED FOR RENTERS IN VPP TRIAL

Approximately 2.7 million Australian households already own rooftop solar and more than 60,000 home battery systems have been installed. Connecting groups of these rooftop solar and battery systems into a network known as a Virtual Power Station (VPP) can help not only to benefit electricity customers with lower costs but also keep the grid strong.

To help deliver this technology to Australians, ARENA added the next phase in Tesla's VPP this year to our portfolio of projects focused on commercialising the technology, committing $8.2 million to the project.

Led by Tesla Motors Australia in collaboration with the South Australian Government and electricity retailer Energy Locals, the project is part of the South Australian VPP, and is supported by $10 million from the South Australian Government's Grid Scale Storage Fund in ongoing payments and $30 million debt finance from the Clean Energy Finance Corporation.

It is also part of Tesla's broader initiative to create the world's largest VPP generating 250 MW of rooftop solar PV from 50,000 solar and storage systems.

In this project, Tesla will install 5 kilowatts (kW) of rooftop solar PV and a 13.5 kWh Powerwall battery storage system at up to 3000 residential properties owned by the state government's social housing provider Housing SA. Each system will provide approximately 80 per cent of average household energy use.

Together with 1100 systems already installed in a previous phase, the combined 20 MW / 54 MWh of residential energy storage will be used by Tesla in a centrally controlled VPP trial. Tesla will use WiFi technology and sophisticated software to centrally manage and control the systems, charging or discharging energy from the batteries into the grid and trading it on the National Electricity Market (NEM).

With many systems working together, small amounts of energy in the Powerwall home batteries can become large amounts of energy sent to the grid, demonstrating how VPPs can provide a range of grid stability services and create a path for other distributed energy resources in the future to provide important grid services that until now have only been provided by centralised, more traditional equipment.

The project aims to demonstrate the pathway to commercialisation of VPPs by validating their technical ability to provide energy market services such as contingency FCAS, reactive power voltage support and fast frequency response and inertia. It will also deliver electricity bill savings to the Housing SA tenants while delivering increased grid reliability to the wider community.

WHAT IS A VIRTUAL POWER PLANT?

A VPP is a collection of distributed energy resources such as home rooftop solar and battery systems, that are connected and can all work together, creating a single virtual power generator. A VPP can sometimes match or even exceed the amount of energy generated by a traditional power station.

FAST FACTS

- **Involves up to 3000 social housing tenants**
- **Renewables to meet 80% of average household energy use**
- **Demonstrates how VPPs can provide grid stability services**
- **Next phase of world's largest VPP**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The Tesla VPP project will take the technology a significant step closer to commercialisation, which is required for VPPs to play their part in reducing energy costs and increasing the use of renewable energy while keeping the grid strong.

PROJECT NAME:
Tesla Virtual Power Plant

LEAD ORGANISATION:
Tesla Motors Australia

ARENA FUNDING:
$8.2 million

CEFC FUNDING:
$30 million debt finance

TOTAL PROJECT COST:
$64.17 million

LOCATION:
South Australia

SOLAR PV R&D FUNDING ROUND

This year ARENA committed $15.14 million in funding to 16 research projects to help address solar PV panel efficiency, overall cost reductions and end-of-life issues.

The funding was awarded to research teams from six Australian universities: Australian National University, Macquarie University, University of Melbourne, University of New South Wales, University of Sydney and Swinburne University.

ARENA opened the funding round for applications in December 2019 with an initial commitment of $15 million. The round received over 50 applications with a total project value of over $150 million.

The two-year R&D projects will support solar PV in the following areas:

- advanced silicon: improvements to the overall cost-effectiveness of silicon-based panels already in mass market production, and their production processes
- tandem silicon: increasing the cost-effectiveness of silicon-based solar PV through the use of tandem materials
- new materials: development of new materials with the potential to either reach breakthrough cost-efficiencies, or the potential for new deployment applications
- end-of-life: new solutions, including upfront solar PV panel designs and end-of-life processing, that increase the cost-effectiveness of sustainable end-of-life management of solar PV panels.

The 16 projects selected will strengthen Australia's world-leading solar PV R&D sector, which ARENA has helped to establish through its previous funding.

This was the first time ARENA had sought applications for addressing solutions to end-of-life solar PV issues. Our funding support for new research into this area recognises the need to ensure that materials used in solar panels can be recycled or repurposed for future use.

In addition to end-of-life issues, selected projects aim to improve the efficiency and cost-effectiveness of solar PV for new or established applications and develop new materials with the potential to either reach breakthrough cost-efficiencies, or the potential for new deployment applications.

More efficient and lower cost solar PV can underpin the growth of a renewable hydrogen industry, drive the electrification of transport and industrial processes, and reduce the costs of delivering secure and reliable renewable electricity.

This was ARENA's third funding round specifically in support of solar PV R&D.

Image credit: ARENA.

LEAD ORGANISATION:
Australian National University

NUMBER OF R&D PROJECTS:
5

LOCATION:
Australian Capital Territory

LEAD ORGANISATION:
Macquarie University

NUMBER OF R&D PROJECTS:
1

LOCATION:
New South Wales

LEAD ORGANISATION:
University of Melbourne

NUMBER OF R&D PROJECTS:
1

LOCATION:
Victoria

LEAD ORGANISATION:
University of New South Wales

NUMBER OF R&D PROJECTS:
6

LOCATION:
New South Wales

LEAD ORGANISATION:
University of Sydney

NUMBER OF R&D PROJECTS:
2

LOCATION:
New South Wales

LEAD ORGANISATION:
Swinburne University

NUMBER OF R&D PROJECTS:
1

LOCATION:
Victoria

FAST FACTS

- **$15.14 million awarded to 16 R&D projects**
- **Run by six Australian universities**
- **Addresses solar PV panel efficiency, overall cost reductions and end-of-life issues**

NEW MARKETPLACE FOR CONSUMER ENERGY TRADING

Australian households are installing distributed energy resources (DER) at record rates. The Australian Energy Market Operator (AEMO) forecast in its *2020 Integrated System Plan* that by 2040, around 13-22 per cent of energy consumption in the national energy market (NEM) will be met by rooftop solar.

The continued uptake of rooftop solar, home batteries, home energy management systems, electric vehicles (EVs) and smart appliances will transform our electricity system. While DER devices and technologies such as these can make the grid more reliable, renewable energy more affordable, and emissions lower, the rapid uptake is also affecting how the grid is managed and highlighting the limitations of our existing electricity market frameworks.

Changes are required to address potential system security risks and integrate DER efficiently.

In 2020-21 ARENA committed $12.9 million to AEMO for Project EDGE (Energy Demand and Generation Exchange), the development of a major Victorian distributed energy resources marketplace to allow energy generated behind-the-meter to be traded in the NEM.

Project EDGE is led by AEMO in partnership with electricity network AusNet Services and retailer Mondo Power.

The trial will initially involve around 50 residential customers, then scale up to 1000 residential, commercial and industrial customers. It will provide AEMO, AusNet and Mondo with visibility and enable control of the customers' rooftop solar systems, home batteries, EVs and other DER assets to participate in wholesale energy markets and provide grid services. This will help to both reduce electricity costs for customers and manage the challenges associated with a decentralised grid.

Once the project is scaled up to 1000 customers, it will develop a model that can be replicated and expanded across the NEM.

The three-year trial will create Australia's first real-world prototype DER market, using customers' DER assets to strengthen the grid by reducing demand or increasing energy supply when there are shocks to the system, such as those caused by unexpected increases in demand, voltage spikes or generator outages.

The trial also forms part of AEMO's DER Program, which is focused on enabling a smooth transition from a one-way energy supply chain (from the generator to the consumer), to a world-leading two-way system (both to and from the consumer) that maximises the value of DER for all consumers through effectively integrating DER into Australia's power systems and electricity markets.

ARENA's funding will assist the development of the software and systems that will underpin the DER marketplace, providing necessary insight and visibility over the distribution electricity system to AEMO and network operators to balance the provision of grid services, ancillary services and energy from DER within the operational constraints of the network.

The project also involves a number of knowledge sharing activities to ensure all learnings are shared with the wider industry and consumers. A consumer insights study will also be conducted.

ARENA has already committed over $100 million to support projects that are helping to integrate behind-the-meter energy assets into the electricity system. We also established the Distributed Energy Integration Program (DEIP), a collaboration of government agencies, market authorities, industry and consumer associations, to share information and navigate the growth of distributed energy.

Image credit: Stock.

WHAT IS DISTRIBUTED ENERGY?

Distributed energy resources, or DER, are energy devices or systems commonly located at houses or businesses. In contrast to energy resources located in one place, such as a solar or wind farm or power station, DER systems can be 'distributed' across communities, industries and regions. DER includes rooftop solar, home batteries, inverters, electric vehicle charging points, smart appliances and systems, and relevant enablers such as smart meters and data services.

FAST FACT

› **World-first, two-way energy system and market for consumers to participate in the NEM**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

Project EDGE is a landmark trial that will provide the blueprint for integrating DER into the grid. It will help to develop trading mechanisms to maximise the economic benefits to customers and the system and minimise the costs of supply to all energy customers.

By developing a marketplace for the services that DER technologies can provide, this project will help to pave the way for widespread adoption of DER across Australia.

PROJECT NAME:
Victorian Distributed Energy Resources Marketplace Trial (Project EDGE)

LEAD ORGANISATION:
Australian Energy Market Operator Limited

ARENA FUNDING:
$12.9 million

TOTAL PROJECT COST:
$28 million

LOCATION:
Victoria

04

ARENA SHOWCASE

DRIVERLESS EV TO BE POWERED WITH SOLAR ROOFTOP

"We appreciate ARENA's support for AEV, providing both funding and valuable expertise along the way. With ARENA's assistance, we'll be able to take our design to the next stage of development in utilising renewables for our autonomous electric vehicle and provide something potentially game changing in the low-speed EV market."

JULIAN BROADBENT, CEO, APPLIED ELECTRIC VEHICLES

Electric vehicles (EVs) are expected to play an important role in the coming decade by reducing the carbon footprint of transport. There are also significant opportunities emerging for the use of low-speed vehicles in cities, campuses and factories.

Recognising this importance, ARENA committed $2 million in 2020-21 to Applied Electric Vehicles (AEV) to produce a lightweight, energy efficient, autonomous EV that incorporates a solar photovoltaic (PV) roof and lithium-ion battery system.

The $7.65 million project will develop a prototype that demonstrates AEV's technologies and is able to advance to the final stages of design and testing.

It is being delivered in partnership with Japanese company Teijin Limited, which is helping to develop the vehicle's lightweight materials and manufacturing methods.

AEV, a Melbourne-based robotics startup, has spent four years developing its innovative Modular Vehicle System (MVS) to transport people and deliveries around urban areas.

The vehicles are designed for short trips at low speed, and are built on a lightweight robotic base that can operate in either direction. A variety of 'pods' sit on the base, tailored to a range of purposes such as transporting passengers, delivering goods or providing emergency assistance.

The vehicle will also generate up to 60 per cent of its energy requirements from the sun, depending on the application, and use a small battery pack that can be charged using a common 240V wall socket.

AEV showcased an early-stage prototype of its driverless EV platform at the world-leading future tech convention CES 19. This project involves the company taking the innovation to the next stage of development, refining the design and engineering of the prototype vehicle to optimise energy efficiency.

ARENA's funding is going towards solving energy related challenges such as selection of the most appropriate solar PV technology for the roof, and optimising the mass, energy efficiency, solar gain and safety of the vehicle.

While the project focuses on making passenger vehicles cost effective, pedestrian friendly and gentle on the environment, AEV will share the learnings for application to other vehicles, helping to reduce the need for charging infrastructure as EVs roll out globally.

Image credit: Applied Electric Vehicles.

FAST FACTS

- **Australian startup**
- **Electric, self-charging and autonomous vehicle**
- **Charges from solar panels in roof or everyday wall socket**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

By focusing on transport for short trips at low speed, AEV aims to create a vehicle that is much more energy efficient than a typical EV. If successful, the homegrown innovation will be among the first to unlock the global driverless EV market, potentially contributing to an increase in the adoption of renewables and decrease in emissions from the transport sector.

The project could also unlock new applications for solar, such as integrating it into curved surfaces and demonstrating that solar PV can directly power high-efficiency EVs.

PROJECT NAME:
Energy Freedom Solar EV Pilot

LEAD ORGANISATION:
Applied Electric Vehicles Pty Ltd

ARENA FUNDING:
$2 million

TOTAL PROJECT COST:
$7.65 million

LOCATION:
Victoria

NEW PROJECTS UNLOCKING ELECTRIC VEHICLE POTENTIAL

Electric vehicles (EVs) could play a huge role in Australia's future, allowing renewables to power our cars, reduce fossil fuel consumption for transport and reduce the cost of car ownership.

In 2018, ARENA and CEFC published a report that predicted the uptake of EVs would increase significantly in the next decade. The report said EVs would reach the same cost levels as petrol cars by the early to mid 2020s when looking at upfront cost, and sooner than this on a total cost of ownership basis.

As more Australians switch to EVs, it will be important to efficiently manage the transition to avoid potentially costly impacts on peak demand, associated network charges and grid stability.

ARENA is focused on accelerating the commercialisation of technologies that can aid the integration of EVs into the electricity system. In the previous reporting period, we committed funding support to the rollout of two ultra-fast charging EV networks across Australia by Chargefox and Evie Networks, which focused mainly on enabling travel on major highways between capital cities.

Smart charging enables charging at times when demand is lowest and electricity is cheapest, reducing the burden on the network and improving the economics for the customer.

This year, we committed funding to Jemena, Origin, AGL and ActewAGL to trial different technologies and approaches to managed EV charging, smart charging and vehicle-to-grid services (see Table 5). These trials explore both charging at optimum times of day for lowest cost and to reduce peak demand, as well as exporting power back to the grid.

Together, these ARENA-funded EV projects are not only helping to address consumer range anxiety for EVs but also demonstrating and informing the market on how EV charging can be managed at higher levels of uptake, with the lowest cost and greatest benefit to consumers.

As outlined in the first LETS, ARENA will also be supporting consumers to choose new vehicle technologies through the Future Fuels Fund. The fund will help businesses and regional communities take advantage of opportunities offered by hydrogen, electric and bio-fuelled vehicles.

Image credit: Stock.

TABLE 5: ARENA FUNDING COMMITMENTS IN 2020-21 TO SMART CHARGING AND RELATED PROJECTS

PROJECT FUNDING DETAILS	PROJECT SUMMARY
PROJECT NAME: Dynamic Electric Vehicle Charging Trial **LEAD ORGANISATION:** Jemena **ARENA FUNDING:** $1.6 million **TOTAL PROJECT COST:** $3.4 million **LOCATION:** NSW, Victoria, ACT and Tasmania	First-time trial to demonstrate use of hardware-based smart charging directed by signals from electricity distribution network service providers.
PROJECT NAME: Electric Vehicles Smart Charging Trial **LEAD ORGANISATION:** Origin Energy **ARENA FUNDING:** $838,000 **TOTAL PROJECT COST:** $2.9 million **LOCATION:** NSW, Victoria, Queensland and SA	Trial of smart EV chargers at residential, commercial and industrial properties that are remotely monitored and controlled to minimise their impact on the grid.
PROJECT NAME: Electric Vehicle Orchestration Trial **LEAD ORGANISATION:** AGL Energy Services **ARENA FUNDING:** $2.9 million **TOTAL PROJECT COST:** $8.25 million **LOCATION:** NSW, Victoria, Queensland and SA	A large-scale EV home charging trial to demonstrate a range of smart and managed charging solutions. First time trial for vehicle-to-grid EVs in an Australian residential setting. Also the first time smart charging has been deployed in Australia using software.
PROJECT NAME: Realising Electric Vehicle-to-Grid Services **LEAD ORGANISATION:** ActewAGL **ARENA FUNDING:** $2.4 million **TOTAL PROJECT COST:** $6.26 million **LOCATION:** ACT	One of the largest vehicle-to-grid trials in the world, demonstrating how the technology allows EVs to discharge electricity back to the grid and provide services to improve grid security.

ACT: Australian Capital Territory, NSW: New South Wales, SA: South Australia

Image credit: Stock.

PRIORITY 2: ACCELERATING HYDROGEN

ARENA is helping to 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.

WHY IS THIS A PRIORITY FOR ARENA?

While much of the emissions reduction of Australia's energy consumption can be achieved with renewable electricity, not all applications are well suited to electrification.

Renewable hydrogen is expected to play a crucial role in decarbonising heavy industry, heavy and long-distance transport and other hard-to-abate sectors.

Hydrogen can be combusted to produce heat, stored for long periods and transported large distances overseas. Hydrogen is a versatile energy carrier with potential uses as a transport fuel (particularly in heavy transport), in domestic and industrial heating, as an industrial feedstock for the production of important chemicals such as ammonia and fertilisers, and in the electricity sector.

Overseas demand for hydrogen is also projected to grow strongly.

ARENA is helping to 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.

Developing domestic applications of hydrogen will grow Australia's experience with hydrogen technology, regulations and operation, helping to establish an export industry. By growing a significant export industry, we can also help to drive production costs down, providing benefits for domestic applications.

POWERING REMOTE AUSTRALIA WITH RENEWABLE HYDROGEN

Renewable energy has the potential to provide cheaper, more reliable electricity to remote and other off-grid communities, which have traditionally relied on expensive diesel for their electricity generation. ARENA has developed an extensive portfolio of projects focused on delivering renewable energy solutions for remote communities and industries.

In 2020-21 we committed $2.6 million to the Horizon Power Denham Hydrogen Demonstration project to build Australia's first remote microgrid using renewable hydrogen generation.

Horizon will design, construct and operate the hydrogen generation plant, which includes a dedicated solar farm to power the hydrogen equipment.

The remote tourist destination of Denham, in the Shark Bay World Heritage Area, was selected for the demonstration project due to its proximity to quality wind and solar resources, availability of land, access to water and the need to find a solution to replace the region's 40-year-old diesel power generators.

The project aims to demonstrate that reliable, dispatchable energy can be achieved by converting excess renewable energy to green hydrogen, which can then be converted to electricity for use when needed.

The first-of-its-kind, $8.9 million demonstration plant has also received $5.7 million from the Western Australian Government's Recovery Plan, including $1 million from the Renewable Hydrogen Fund.

It consists of a 348 kW electrolyser and storage, a 100 kW hydrogen fuel cell to generate electricity from the hydrogen, and solar panels delivering 704 kW to power the electrolyser. Being able to use the hydrogen at any time in the fuel cell to deliver dispatchable electricity will make it possible to generate up to 526 MWh of dispatchable renewable energy, enough to power the equivalent of 100 homes.

The demonstration plant will also be connected to the Denham diesel-hybrid power station, which is supplemented by a wind farm and rooftop solar and supplies 30 per cent of Denham's energy. The use of hydrogen to capture and store excess renewable energy and then convert it into electricity will provide a viable alternative to using diesel.

If the project is successful, Horizon aims to expand the plant with increased hydrogen and solar, and replicate the technology in some of its other remote power systems across Western Australia.

WHAT IS DISPATCHABLE ENERGY?

Dispatchable energy is energy – usually electricity – that can be quickly sent into the grid when needed. This rapid response is used to keep electricity supply and demand in balance, which keeps the grid stable and strong. Dispatchable renewable energy includes hydropower and PHES, large-scale and home batteries storing renewable energy, and potentially renewable hydrogen.

Image credit: Stock.

FAST FACTS

- **First remote microgrid using renewable hydrogen**
- **Dedicated solar PV farm will power hydrogen electrolyser**
- **Hydrogen will provide enough dispatchable renewable energy to power the equivalent of 100 homes**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The project will be a test case for assessing the potential for renewable hydrogen to replace diesel for energy generation in remote communities across Australia.

The potential for such communities to generate, store and use their own renewable energy could reduce costs and emissions without sacrificing the reliability of energy supply, and potentially transform remote area power systems into state-of-the-art renewable energy hubs.

PROJECT NAME:
Horizon Power Denham Hydrogen Demonstration

LEAD ORGANISATION:
Horizon Power

ARENA FUNDING:
$2.57 million

TOTAL PROJECT COST:
$8.9 million

LOCATION:
Western Australia

RENEWABLE HYDROGEN DEPLOYMENT FUNDING ROUND

In 2020-21 ARENA finalised a competitive funding round focused on accelerating the commercialisation of renewable hydrogen production in Australia.

We opened the Renewable Hydrogen Deployment Funding Round during the previous reporting period (April 2020), invited shortlisted applicants to submit their proposals by January 2021 and announced the successful finalists in May 2021.

Three projects received conditional approval of funding and will now deploy some of the world's largest hydrogen electrolysers. Engie Renewables Australia (Engie), ATCO Australia (ATCO) and Australian Gas Networks (AGIG) were selected to each install 10 MW electrolysers at sites in Western Australia and Victoria.

The three projects were selected from seven shortlisted applicants vying for $70 million offered in the funding round. To support three instead of two finalist projects, as originally planned, we increased the funding allocation to $103.3 million.

- Engie will receive up to $42.5 million to produce renewable hydrogen in a partnership with Yara Pilbara Fertilisers at their existing ammonia factory in Karratha, Western Australia.
- ATCO will receive up to $28.7 million to produce hydrogen for gas blending at their Clean Innovation Park in Warradarge, Western Australia.
- AGIG will receive up to $32.1 million for a gas blending project at their Murray Valley Hydrogen Park in Woodonga, Victoria.

ARENA opened the Renewable Hydrogen Deployment Funding Round in early 2020 to help fast track the development of renewable hydrogen in Australia.

The round invited funding applications from advanced hydrogen electrolysis projects that would produce renewable hydrogen at scale. To be eligible, applicants were required to deploy electrolysers powered by electricity from renewable sources, with a minimum capacity of 5 MW and preference for 10 MW or more.

The funding committed to projects in this funding round will build on the $57 million ARENA has already invested in hydrogen research and development, demonstrations and studies. The projects are expected to play a significant role in supporting commercial-scale deployments of renewable hydrogen in Australia.

Following on from ARENA's critical role in helping to make large-scale solar commercially competitive, we aim to help bring down the cost of producing renewable hydrogen, building Australia's skills and capacity, creating jobs and activity in regional areas and helping Australia to further reduce emissions.

Image credit: Yara Pilbara Fertilisers.

LEAD ORGANISATION:
Engie Renewables Australia

ARENA FUNDING:
up to $42.5 million

LOCATION:
Western Australia

LEAD ORGANISATION:
ATCO Australia

ARENA FUNDING:
up to $28.7 million

LOCATION:
Western Australia

LEAD ORGANISATION:
Australian Gas Networks

ARENA FUNDING:
up to $32.1 million

LOCATION:
Victoria

FAST FACTS

- **Up to $103.3 million for three selected projects**
- **Among largest renewable hydrogen demonstrations in the world**
- **Aim to accelerate commercialisation of renewable hydrogen**

Image credit: Stock.

PRIORITY 3: SUPPORTING INDUSTRY TO REDUCE EMISSIONS

ARENA is helping Australian industry reduce emissions by investing in new and replicable technologies and processes that increase the adoption of renewable energy.

WHY IS THIS A PRIORITY FOR ARENA?

Industry accounts for about 40 per cent of all energy used in Australia, with about three quarters of that use being mostly gas, coal and diesel.

Accelerating the uptake of renewable energy for this sector is therefore a critical part of helping Australia meet its long-term emissions reduction commitments. Increased load flexibility and energy efficiency to make greater use of variable renewable electricity and fuel switching to replace fossil fuels used for process heating can all play a role and also help to mitigate energy price risk.

ARENA is helping 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).

With much of Australia's industry supplying global supply chains, a faster transition to renewables will help meet market needs as global demand for low carbon products grows, which along with lower energy costs will support jobs in the industrial sector.

REDUCING EMISSIONS IN HEAVY INDUSTRY

The 16 companies participating in the program account for approximately 21 per cent of Australian industrial emissions and a quarter of the total value of the Australian stock market.

In 2020-21, ARENA continued to provide funding support to help some of Australia's hard-to-abate industries decarbonise their energy intensive processes and products.

We committed up to $2 million to assist ClimateWorks with the next stage of the Australian Industry Energy Transitions Initiative (ETI), a program that brings together major Australian businesses to reduce emissions in hard-to-abate industries. ARENA also provided $300,000 to help establish the initiative in 2020.

This stage of the Australian Industry ETI focuses on the challenge of decarbonising the supply chains of five heavy industry sectors: iron and steel; alumina and aluminium; other metals including lithium, copper and nickel; liquified natural gas; and chemicals including plastics, fertilisers and explosives. Between them, these supply chains produce exports worth around $160 billion.

Work undertaken earlier by the initiative identified green hydrogen, green steel and carbon capture as key technologies to reduce emissions in hard-to-abate sectors. It has also been investigating a hub approach for supplying energy for manufacturing in existing industrial precincts.

The ETI is built on collective action, recognising that getting to net zero in hard-to-abate sectors will not only require shifts in production but also in finance, investment and other service providers. The 16 companies participating in the program account for approximately 21 per cent of Australian industrial emissions and a quarter of the total value of the Australian stock market.

Two independent not-for-profits, ClimateWorks and Climate-KIC Australia, are running the project in collaboration with the global Energy Transitions Commission. Key knowledge partners include CSIRO, Rocky Mountain Institute and Bloomberg NEF.

Image credit: Stock.

FAST FACTS

- **Helping to decarbonise hard-to-abate industries**
- **Focused on five energy-intensive supply chains**
- **16 companies involved**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The Australian Industry ETI highlights the commitment of some of Australia's biggest companies to be a part of the solution to reducing emissions. This second phase project will help the program to build momentum and give more heavy industry companies confidence that they can benefit from a low carbon Australian economy.

PROJECT NAME:
Australian Industry ETI Delivery Stage Project

LEAD ORGANISATION:
Monash University (ClimateWorks Australia)

ARENA FUNDING:
up to $2 million

TOTAL PROJECT COST:
$4 million

LOCATION:
Victoria

GREENER GAS FROM MALABAR WASTEWATER PLANT

Currently, biogas produced in facilities such as landfills and wastewater treatment plants is flared (burnt off) or used to generate electricity or heat for the site. If captured, that energy could be used as a dispatchable resource to help to reduce emissions, lower energy costs and balance the electricity grid.

ARENA committed $5.9 million in funding support in 2020-21 to the Malabar Biomethane Injection Project to help find solutions to this challenge. The $13.8 million joint initiative is installing gas cleaning and upgrading equipment at Sydney Water's Malabar wastewater treatment plant that will convert biogas to biomethane and inject the 'green gas' through a connection into Jemena's natural gas network.

Sydney Water will initially supply 95 terajoules (TJs) each year of zero-emissions biomethane. Under a long-term agreement, this amount will be scaled up to 200 TJs annually, the equivalent to the gas demand of around 13,300 homes.

The project will also investigate trading opportunities for renewable gas, linking gas users with renewable gas production facilities, which if successful could provide trading mechanisms for green gas markets in other networks.

The project aims to produce the first biomethane for injection into the gas network in early 2022. If successful, it is expected to lead to wider uptake of biomethane technology by the Australian waste industry and could be more broadly adopted for use in other sectors.

In addition to biomethane, renewable hydrogen can be used as a complementary gas to displace natural gas and reduce emissions. The injection of both hydrogen and biomethane allows for further decarbonisation than hydrogen alone due to the blending limits of hydrogen in current gas infrastructure. ARENA has previously funded a Jemena trial that is producing renewable hydrogen for injection into the Sydney gas network.

ARENA is also developing the national Bioenergy Roadmap on behalf of the Australian Government to identify the role that the bioenergy sector can play in accelerating Australia's energy transition, stimulating regional development, enhancing energy security and helping Australia further reduce emissions.

Image credit: Jemena

Image credit: Sydney Water.

FAST FACTS

- **Australian-first project to supply biomethane to the gas network**
- **Unlock opportunities for biomethane to be captured from organic waste**
- **Supplement domestic gas supplies**
- **Decarbonise the gas network**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

Displacing natural gas with biomethane and renewable hydrogen is recognised as the likely pathway to decarbonising natural gas networks. However, the use of biomethane in this way is currently unproven in Australia due to a range of technical, regulatory and commercial factors. By successfully demonstrating the production and injection of biomethane into a gas network, this project could lead to the use of biomethane across Australia.

PROJECT NAME:
Malabar Biomethane Injection Project

LEAD ORGANISATION:
Jemena

ARENA FUNDING:
$5.9 million

TOTAL PROJECT COST:
$13.8 million

LOCATION:
New South Wales

PATH TO COMMERCIALISATION FOR HOMEGROWN ENERGY-FROM-WASTE PROCESS

Diverting waste from Australia's landfills has become an even greater challenge since restrictions were placed on the export of waste materials. Technologies that create energy from waste offer a solution that not only reduces waste materials but displaces fossil fuels and helps to reduce emissions.

In 2020-21 ARENA committed $3.9 million to Renergi to scale up its system of converting waste organic materials into liquid fuels using a thermal treatment process. The project involves Renergi designing, building and operating a pre-commercial demonstration energy-from-waste plant in Collie, Western Australia (WA).

The new demonstration plant will incorporate Renergi's patented 'grinding pyrolysis' process that converts organic materials into biochar, bio-gases and bio-oil by applying heat in an environment with limited oxygen. The process was initially developed at Curtin University's Fuels and Energy Technology Institute with support from both ARENA and the WA Government.

The facility will convert 4000 tonnes each year of municipal solid waste that would otherwise go to landfill, along with 8000 tonnes each year of forestry and agricultural waste, into crude pyrolysis oil and biochar. The crude pyrolysis oil will be sold as a liquid fuel for local industry, and the biochar sold as soil conditioner.

Renergi is developing the plant in partnership with the Shire of Collie and with $2 million from the WA Government's Collie Futures Industry Development Fund.

The project builds on ARENA's support in 2015 for Renergi's successful pilot of the technology, moving the technology from early-stage research to demonstration and onto the path to commercialisation.

ARENA has previously funded energy-from-waste projects in Kwinana and East Rockingham in WA, as well as Southern Oil's pilot plant for the production of renewable fuels in Gladstone, Queensland, and MSM Milling's biomass boiler in central west New South Wales.

Image credit: Renergi.

FAST FACTS

- **Demonstration plant to incorporate patented 'grinding pyrolysis' process**
- **Diverts waste from landfill and displaces fossil fuels to reduce emissions**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

Other energy-from-waste projects are focused on incineration at large centralised plants, however, Renergi's technology is a potential waste treatment solution for regional and smaller towns. This project will demonstrate and share lessons on the economic costs and benefits of both small modular-scale energy-from-waste plants and larger commercial-scale deployments.

PROJECT NAME:
Energy from Waste through Pyrolysis

LEAD ORGANISATION:
Renergi Pty Ltd

ARENA FUNDING:
$3.9 million

TOTAL PROJECT COST:
$9.4 million

LOCATION:
Western Australia

TAKING THE FIRST STEP TOWARDS LOW EMISSIONS ALUMINA

The Government's first *Low Emissions Technology Statement* highlights the importance of developing a low emissions steel and aluminium industry to help reduce emissions and stimulate economic activity. Innovation in metals refining can improve the competitiveness and emissions intensity of Australia's steel and aluminium production.

In support of such innovation, ARENA committed $11.3 million this year to Alcoa of Australia to demonstrate technology that uses renewable energy to electrify the production of steam in its alumina refining process. This first-of-its-kind deployment in Australia will be undertaken at Alcoa's existing alumina refining facility at Wagerup in Western Australia.

High-pressure steam is used to produce the heat required to process bauxite into alumina, which can then be smelted into aluminium. This project will demonstrate the technical and commercial feasibility of using Mechanical Vapour Recompression (MVR) powered by renewable energy to produce the process heat instead of a boiler run on fossil fuels.

Approximately 70 per cent of the fossil fuels consumed in alumina refining relates to the production of steam in boilers. MVR is a potential alternative to produce steam using renewable electricity, by recompressing waste steam that would otherwise be exhausted to the atmosphere and recycling it in the refining process. This technology has the potential to improve efficiency, reduce costs and reduce emissions.

Stage 1 of the project will investigate the feasibility of integrating MVR at the refinery. If proven to be feasible, Alcoa will design, build and operate a 3 MW MVR module to be powered using renewable energy for Stage 2 of the project.

Image credit: Alcoa of Australia.

FAST FACTS

- **First-of-its-kind deployment in Australia**
- **Aims to displace use of fossil fuels to process bauxite into alumina**

HOW DOES ARENA MAKE A DIFFERENCE BY SUPPORTING THIS PROJECT?

The project will make a significant step towards making low emissions alumina in Australia. If successful, it will be an important step towards decarbonising metals production, which is an energy-intensive and hard-to-abate process.

PROJECT NAME:
Mechanical Vapour Recompression for Low Carbon Alumina Refining

LEAD ORGANISATION:
Alcoa of Australia Limited

ARENA FUNDING:
$11.3 million

TOTAL PROJECT COST:
$28.2 million

LOCATION:
Western Australia

GOVERNANCE

THIS SECTION EXPLAINS ARENA'S GOVERNANCE ARRANGEMENTS.

KEY GOVERNANCE EVENTS IN 2020-21

NEW ARENA FUNDING AND ANNOUNCEMENT OF EXPANDED MANDATE

In September 2020, the Government released the first *Low Emissions Technology Statement* (LETS) developed as part of the Technology Investment Roadmap process. In support of the LETS, the Government announced new long-term funding and an expanded mandate for ARENA to secure the Agency's future beyond 2022.

ARENA received additional funding of $1.62 billion, made up of baseline funding of $1.43 billion to 2032 and $193 million to deliver targeted programs announced in the 2020-2021 Federal Budget.

The Government recently introduced a regulation to expand ARENA's functions to allow us to invest in a broader range of technologies.

RISK MANAGEMENT

We have embedded risk management into our culture to support well-informed decision-making and project management.

As a taxpayer-funded entity, we seek to maximise the value of the financial assistance that we provide.

Value is maximised when our activities strike the optimal balance between risks and opportunities, and when we can effectively and efficiently deploy resources towards achieving our purpose.

RISK MANAGEMENT FRAMEWORK

ARENA's Risk Management Framework, principles and processes are based on the International Standard for Risk Management (ISO 31000:2018). We apply five principles to our risk management activities to create and protect value for all Australians. The principles test if our risk management activities are:

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

RISK IDENTIFICATION AND REPORTING

ARENA's risks are identified and assessed through a consistently applied and replicable methodology. This follows a structured approach

Image credit: Stock.

that 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.

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

BOARD OVERSIGHT, MANAGEMENT AND CONTROL OF RISK

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 (see page 33).

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

CONFLICT OF INTEREST

CONFLICT OF INTEREST POLICY

In 2020-21, the Board continued to manage any conflicts in accordance with its Conflict of Interest policy, which sets out:

- the duties in respect to the disclosure of actual or potential conflicts applying to:
  - all ARENA workers, including the Chief Executive Officer and the Chief Financial Officer, consultants, contractors, external service providers and employees of the Department who are made available to ARENA
  - the Board (including committee and advisory panel members)
- how individuals are to discharge their duties under the policy, how conflict of interest declarations are made and material conflicts managed.

DECLARATION OF CONFLICT OF INTEREST

In accordance with the requirements of ARENA's Conflict of Interest policy, all Board and committee members are required to complete a conflict of interest declaration upon appointment and on an annual basis. Advisory Panel members are required to submit a declaration prior to involvement with a funding proposal. All members are also required to provide updated declarations in the event that new conflicts arise or the circumstances of their original notification change.

PROCESS TO MANAGE CONFLICTS OF INTEREST

The declaration of conflicts is a standing item at all Board and Committee meetings. At least two days prior to the meeting date, the Secretariat circulates to members a list of all entities to be discussed in a material manner in the upcoming meeting. If the member notifies the Secretariat that he or she has a conflict of interest with one of the entities then the declaration is referred to the delegate (ARENA Chair) to determine materiality and, if so, how such a conflict will be managed.

Conflicts are typically managed by excluding the conflicted member from discussions and decisions relating to the paper dealing with the entity with which they have notified a conflict. The ARENA Chair determines the materiality of any conflicts of interests notified by Board members. The other Board members (who are not conflicted) determine the materiality and management of conflicts of the Chair.

If a conflict arises during the meeting, the matter will be similarly referred to the Chair in order that it can be managed. Probity advice is procured as required as part of this process.

In the previous reporting period, the Board considered concerns that can arise due to the small pool of Australian expertise in cutting edge technologies. Some members of the ARENA Advisory Panel are associated with universities that often put forward R&D projects for assessment. In the solar R&D round this was addressed by using predominantly overseas experts, with a smaller number of Australian experts to provide the context of the Australian research landscape. The Board is satisfied that this addressed any perceptions of conflict.

CONFLICT OF INTEREST REGISTER

All conflict declarations, including any management action agreed, are recorded in a conflict of interest register maintained by ARENA's Legal, Governance and Secretariat team.

FRAUD CONTROL

The Agency's fraud control arrangements comply with section 10 of the PGPA Rule.

ARENA's Fraud Control Plan is regularly reviewed by the Board to ensure that ARENA has in place appropriate mechanisms for preventing, detecting incidents of, investigating and otherwise dealing with, and recording of fraud. ARENA has taken all reasonable measures to minimise the incidence of fraud. ARENA's ongoing adherence to the Plan encompasses annual fraud risk assessments. In addition, reporting on fraud is a standard item at all Board and RAC meetings.

Annual fraud awareness training and conflict of interest training is a mandatory requirement for all of ARENA's workers as part of ARENA's governance training, which is conducted each quarter.

INDEMNITIES AND INSURANCE PREMIUMS OF OFFICERS

During 2020-21, ARENA was a member of the Comcover self-managed fund, which includes cover for directors and officers against liability claims. The premium paid for ARENA's insurance policy was $142,098 (excluding GST).

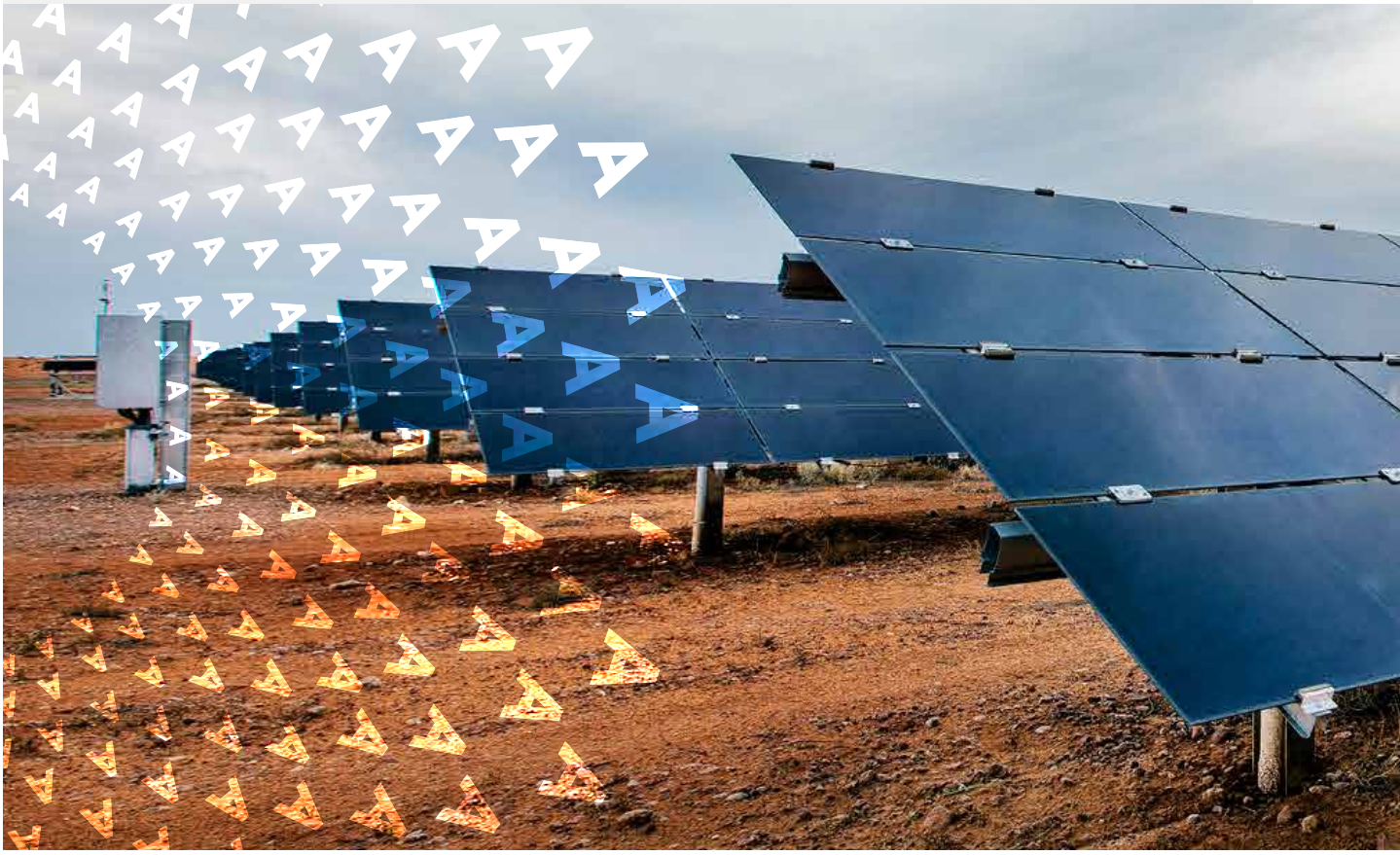
REMUNERATION

Details of the ARENA Board, Board Committee and Executive Remuneration is provided in Note 3.2 of the Financial Statements and Appendix 3.

Image credit: Stock.

LEGISLATIVE, GOVERNMENT AND OTHER INFORMATION

THIS SECTION CONTAINS ADDITIONAL INFORMATION THAT ARENA IS REQUIRED TO REPORT.



ENABLING LEGISLATION

Our enabling legislation is *the Australian Renewable Energy Agency Act 2011* (ARENA Act).

ARENA, as established by the ARENA Act, has the dual objectives of improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.

ARENA's functions are to:

- provide financial assistance for:
  - research into renewable energy technologies
  - the development, demonstration, commercialisation or deployment of renewable energy technologies
  - the storing and sharing of information and knowledge about renewable energy technologies
- collect, analyse, interpret and disseminate information and knowledge on renewable energy technologies
- provide advice to the Portfolio Minister on renewable energy and related technologies including:
  - improving the competitiveness of renewable energy technologies
  - increasing the supply of renewable energy in Australia
  - improving the development of skills in the renewable energy technology sector
  - increasing the use of renewable energy technologies
- liaise with State and Territory governments and other authorities to facilitate ARENA renewable energy projects
- any other functions prescribed by regulations or contained in the ARENA Act or other Commonwealth law.

PORTFOLIO MINISTER ENGAGEMENT

ARENA's Portfolio Minister is the Hon Angus Taylor MP, the Minister for Energy and Emissions Reduction.

MINISTERIAL APPROVAL

The Australian Government included safeguards in the ARENA Act to ensure that we are transparent and accountable in our funding decisions.

Accordingly, the Portfolio Minister must approve ARENA's GFS and any guidelines for programs that could grant funding in excess of $15 million for projects. The Minister is the delegate for approving grants of more than $50 million to individual projects.

Image credit: EDL.

MINISTERIAL REQUESTS AND DIRECTIONS

In September 2020, the Minister announced new long-term funding and an intention to expand ARENA's mandate to a broader set of low emissions technologies (see New ARENA Funding and Announcement of Expanded Mandate, page 78).

The Government recently made regulations to expand ARENA's functions.

In 2020-21 the Minister issued one request under section 11 of the ARENA Act, which was to request that ARENA consider providing funding for 27 carbon capture, utilisation and storage (CCUS) projects received under the Department of Industry, Science, Energy and Resources' CCUS Development Fund.

The Minister made no directions under section 13 of the Act during the reporting period.

Under section 22 of the PGPA Act, the Finance Minister may make a government policy order that specifies a policy of the Government that is to apply to an agency. No such orders were made that apply to ARENA during 2020–21.

REPORTS TO THE MINISTER

ARENA kept the Minister informed about its operations during the year by providing updates on the Agency's progress towards meeting the objectives of the ARENA Act.

It also provided the Minister with reports following each ARENA Board meeting, including key deliberations, meeting outcomes, any material conflicts and significant correspondence. There were no significant issues reported to the Minister under paragraph 19(1)(e) of the PGPA Act, which includes compliance with Finance law.

ENGAGEMENT WITH OUR STAKEHOLDERS

ARENA SERVICE CHARTER

ARENA aims to provide a high standard of service to all our stakeholders, focusing on the achievement of honest and ethical working relationships that are underpinned by genuine consultation and feedback. As the Agency continues to help drive the development and deployment of renewable energy in Australia, it anticipates an increase in the volume of contact with stakeholders. ARENA aims to continue to deliver professional and timely services to an expanded customer base.

COMPLAINTS HANDLING

ARENA has an established internal complaints and review process. Our complaints policy is published on the ARENA website, enabling reviews of ARENA decisions and complaints about service quality to be resolved fairly. Information on the complaints and review process is available at arena.gov.au/making-a-complaint.

FREEDOM OF INFORMATION

Australian Government entities that are subject to the *Freedom of Information Act 1982* (FOI Act) are required to publicly publish information as part of the Information Publication Scheme. All ARENA publications covered by the scheme are accessible from the ARENA website at arena.gov.au.

There was one request for information related to ARENA under the FOI Act received in 2020-21.

Information on how to make a request under the FOI Act is available on the Department of Industry, Science, Energy and Resources' website at www.industry.gov.au/about-us/what-we-do/freedom-of-information.

The Department can be contacted the following ways:

- Email: FOI@industry.gov.au
- Phone: +61 2 6102 8104
- Write: FOI Coordinator, Legal Branch, GPO Box 2013, Canberra ACT 2601

PUBLIC INTEREST DISCLOSURE

ARENA has a Public Interest Disclosure Procedure to address disclosures under the *Public Interest Disclosure Act 2013*. No disclosures were made in 2020–21.

ENVIRONMENTAL PERFORMANCE

Section 516A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires Commonwealth entities and Commonwealth companies such as ARENA to report on:

- how the activities of, and the administration (if any) of legislation by, ARENA during the reporting period accorded with the principles of ecologically sustainable development (ESD)
- how the outcomes (if any) specified for ARENA in an Appropriations Act relating to the reporting period contribute to ESD
- the effect of ARENA's activities on the environment
- any measures ARENA is taking to minimise the impact of its activities on the environment
- the mechanisms, if any, for reviewing and increasing the effectiveness of those measures. Table 6 provides this information.

Image credit: ARENA.

TABLE 6: ARENA'S ENVIRONMENTAL PERFORMANCE

REPORTING CRITERIA	PERFORMANCE
Accordance with and contribution to ecologically sustainable development (ESD), including the development and implementation of policies, plans, programs and legislation	ARENA is specifically tasked with facilitating research, development, demonstration and deployment of renewable energy technologies with a view to driving the commercialisation and reducing the cost of renewable energy. ARENA's policies, plans and programs all accord with and contribute to the ESD principles by: › helping to foster the long-term sustainability of Australia's energy sector while promoting the reduction of energy-related greenhouse gas emissions › taking into account economic, environmental and social considerations when developing renewable energy measures.
Environmental performance, including the impact of the agency's activities on the natural environment, how any impacts are mitigated and how they will be managed	ARENA meets our property and security obligations within government (i.e. whole-of-government property changes from the Department of Finance) or through regulatory processes (e.g. changes to the *Building Code 2016*). For the duration of 2020–21, ARENA's Canberra offices were located in the NewActon Nishi Building. The offices in the Nishi Building have a six-star Green Star Design rating and NewActon Nishi is considered to be Canberra's most sustainable mixed use building complex. Some renewable energy projects may have environmental impacts. ARENA takes a risk-based approach to identifying and managing potential environmental impacts from the projects it funds.

Image credit: ARENA.

JUDICIAL DECISIONS AND REVIEWS BY OUTSIDE BODIES

During 2020–21 ARENA was not subject to any judicial decisions or reviews by administrative tribunals, the Australian National Audit Office, the Commonwealth Ombudsman or the Office of the Australian Information Commissioner.

FINANCIAL AUDIT

ARENA received an unqualified audit report on its financial statements for 2020–21. The Auditor-General's independent report is presented in the Financial Statements section of this Annual Report.

LEGAL EXPENDITURE

Legal services are provided by a small team of lawyers provided from a law firm and sole practitioner firms. Legal services are generally only outsourced where transactions involve complex project finance arrangements, with the process managed by the General Counsel.

During 2020–21 ARENA incurred $1,316,285 (excluding GST) in external legal services expenditure. ARENA will report the expenditure to the Office of Legal Services Coordination in accordance with the Legal Services Directions 2017.

MATERIAL MATTERS

ARENA did not have any 'material' matters disclosed in the financial statements as defined in paragraph 7 of the Public Governance, Performance and Accountability (Financial Reporting) Rule 2015.

RELATED ENTITY TRANSACTIONS

Refer to Note 3.3 in the Financial Statements.

SERVICE LEVEL AGREEMENT

The Portfolio Department provides corporate support for ARENA's day-to-day operations, with a service level agreement setting out the services to be provided by the Department to ARENA along with the applicable services standard. The service level agreement is subject to annual review.

SUBSIDIARIES

ARENA did not have any subsidiaries during 2020-21.

WORKFORCE

ARENA is a dynamic, adaptable and outcomes-oriented agency, with a highly qualified and experienced workforce. Our aim is to be agile, with the ability to respond quickly to any changes in our operating environment.

VALUES

The Agency has a strong commitment to modelling our values (see Figure 7) and significant efforts have been made in the reporting period to embed them into ARENA's organisational culture. This has been accomplished through a variety of initiatives such as values-based recognition awards and through regular ARENA-wide communication.

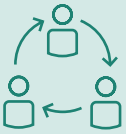
FIGURE 7: ARENA VALUES

1. IMPACT DRIVEN

We make a significant positive impact on Australia's energy sector, economy, environment and society. We take a bold, innovative approach to give us the best chance of achieving our goals.

2. STAKEHOLDER-FOCUSED

We deliver excellent service. Our approach is marked by responsiveness, clarity and flexibility.



3. COLLABORATIVE

We collaborate across teams and with our partners to achieve our goals.

4. ACCOUNTABLE

We are accountable to each other and, in following our processes, to the Minister, the Parliament and the Australian public. We work transparently to ensure public funds are spent in a responsible and efficient manner.

5. RESPECTFUL OF PEOPLE

We support and respect each other. We cultivate a diverse team to access the best talent, broaden our thinking and foster a culture of innovation.

Image credit: ARENA.

EMPLOYEES AND OTHER STAFF

ARENA has two employees, as stipulated by the ARENA Act. These are the Chief Executive Officer (CEO) and Chief Financial Officer (CFO). Other ARENA workers are employed by the Portfolio Department under the *Public Service Act 1999* and made available to ARENA by the Secretary of the Department. The Agency also engages specialist consultants, contractors and service providers as necessary.

At 30 June 2021, ARENA had two employees (CEO and CFO) and 24 departmental staff (22.7 FTE) including staff in non-ongoing positions.

DIVERSITY

For the reporting period, the gender ratio for the ARENA Board and senior personnel within ARENA was:

- of the seven Board members, two were female (this number increased to three when the nominated delegate for the Secretary of the Department attended Board meetings on his behalf)
- of the fourteen personnel in ARENA's Executive Management Team, five were female.

ENGAGEMENT

Engagement initiatives continued throughout the year with a significant focus on health, wellbeing and morale. The Agency has maintained a flexible and adaptable approach to working arrangements in response to COVID-19. The 2021 Change and Wellbeing People Pulse survey demonstrated that worker engagement is positive, especially in regards to workplace flexibility, work-life balance and commitment to delivering on Agency priorities.

PLANNING

ARENA's Strategic Workforce Plan was updated to reflect the increased funding and changes to priorities and strategic objectives. This work also included a review of the skills and capabilities ARENA will need in the future to ensure the organisation is ready to implement and deliver on legislative requirements. Our People & Culture team has also been reviewing our internal practices to ensure they are contemporary and contribute to a work environment that retains the talent we have and attracts the talent we need. This work will continue in 2021-22.

WORK HEALTH AND SAFETY

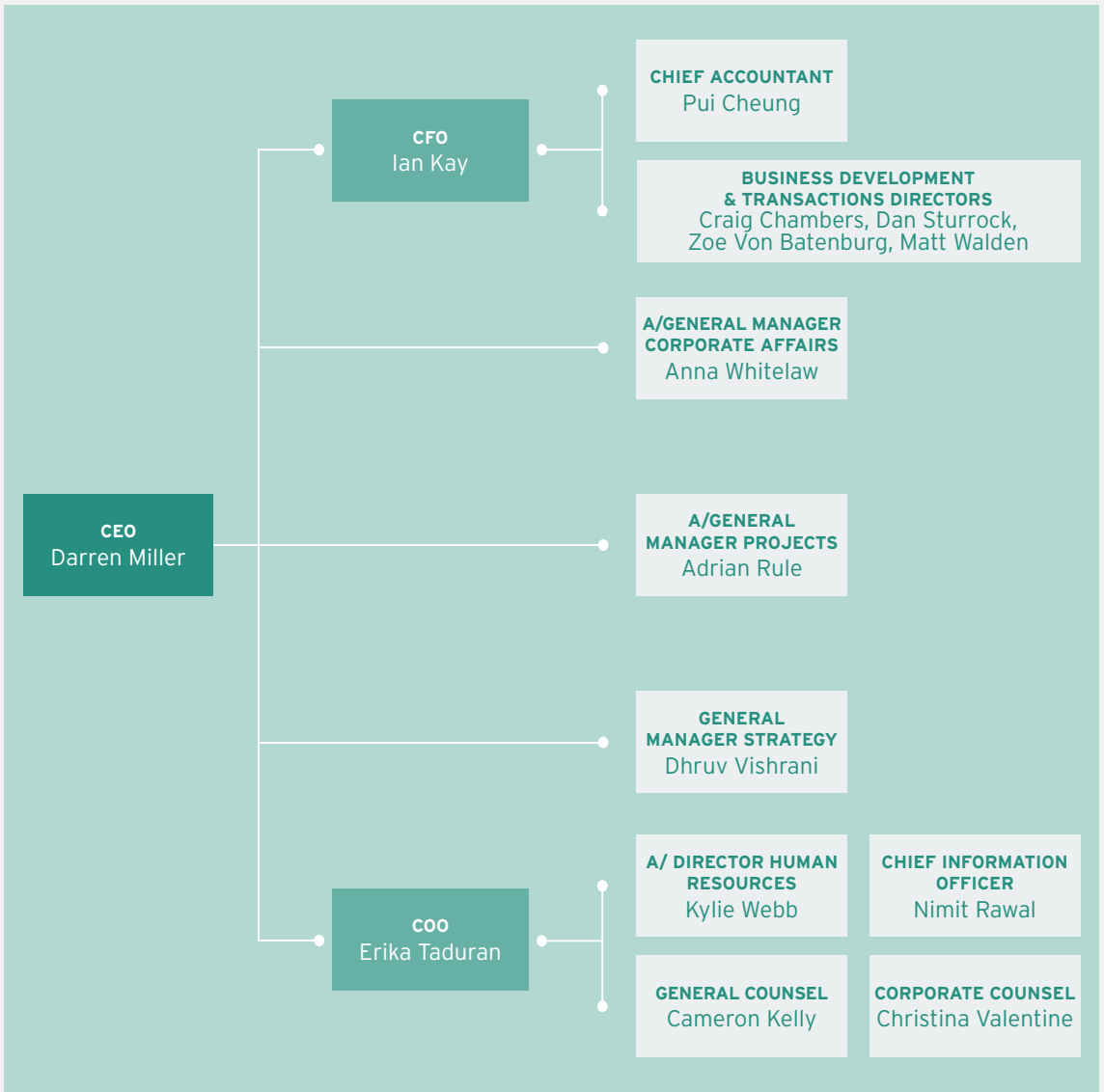
In accordance with the *Work Health and Safety Act 2011* (WHS Act), ARENA aims to ensure - so far as reasonably practicable - the health and safety of the workforce (who are engaged by us or whose work is influenced or directed by us).

The Board closely monitors health and safety in ARENA workplaces. ARENA considers health and safety throughout the lifecycle of the funding process and our officials promote a positive safety culture at ARENA.

The health and safety of ARENA's workforce during day-to-day operations is safeguarded through ARENA's Work Health and Safety Management System, while also supported by the Portfolio Department.

In respect of ARENA workers, no WHS investigations were conducted and no notifiable WHS incidents were reported during 2020–21. Reporting in respect of Departmental staff made available to ARENA is covered in the Portfolio Department's annual reports for 2021-22.

FIGURE 8: ARENA ORGANISATIONAL STRUCTURE AT 30 JUNE 2021



FINANCIAL STATEMENTS

Image credit: Infigen.

Australian National Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Minister for Energy and Emissions Reduction

Opinion

In my opinion, the financial statements of the Australian Renewable Energy Agency ('the Entity') for the year ended 30 June 2021:

(a) comply with Australian Accounting Standards – Reduced Disclosure Requirements and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and

(b) present fairly the financial position of the Entity as at 30 June 2021 and its financial performance and cash flows for the year then ended.

The financial statements of the Entity, which I have audited, comprise the following as at 30 June 2021 and for the year then ended:

- Statement by the Board, Chief Executive and Chief Financial Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Cash Flow Statement; and
- Notes to the financial statements, comprising a Summary of Significant Accounting Policies and other explanatory information.

Basis for opinion

I conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of my report. I am independent of the Entity in accordance with the relevant ethical requirements for financial statement audits conducted by the Auditor-General and his delegates. These include the relevant independence requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants (including Independence Standards)* (the Code) to the extent that they are not in conflict with the *Auditor-General Act 1997*. I have also fulfilled my other responsibilities in accordance with the Code. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Accountable Authority's responsibility for the financial statements

As the Accountable Authority of the Entity, the Board is responsible under the *Public Governance, Performance and Accountability Act 2013* (the Act) for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards – Reduced Disclosure Requirements and the rules made under the Act. The Board is also responsible for such internal control as the Board determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board is responsible for assessing the ability of the Entity to continue as a going concern, taking into account whether the Entity's operations will cease as a result of an administrative restructure or for any other reason. The Board is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the assessment indicates that it is not appropriate.

GPO Box 707, Canberra ACT 2601
38 Sydney Avenue, Forrest ACT 2603
Phone (02) 6203 7300

Auditor's responsibilities for the audit of the financial statements

My objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian National Audit Office Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with the Australian National Audit Office Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control;
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Accountable Authority;
- conclude on the appropriateness of the Accountable Authority's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern; and
- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with the Accountable Authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

Australian National Audit Office

Peter Kerr

Executive Director

Delegate of the Auditor-General

Canberra

27 September 2021

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Australian Renewable Energy Agency

STATEMENT BY THE BOARD, CHIEF EXECUTIVE AND CHIEF FINANCIAL OFFICER

In our opinion, the attached financial statements for the year ended 30 June 2021 comply with subsection 42(2) of the Public Governance, Performance and Accountability Act 2013 (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Australian Renewable Energy Agency will be able to pay its debts as and when they fall due.

This statement is made in accordance with a resolution of the directors.

Justin Punch Chair of the Board	Darren Miller Chief Executive Officer	Ian Kay Chief Financial Officer
27 September 2021	27 September 2021	27 September 2021

Statement of Comprehensive Income

for the period ended 30 June 2021

	Notes	2021 $'000	2020 $'000	Original[1] Budget $'000
NET COST OF SERVICES				
Expenses				
Employee benefits	1.1A	**1,150**	1,101	1,165
Suppliers	1.1B	**23,397**	26,266	27,658
Grants	1.1C	**164,474**	193,293	315,268
Depreciation and amortisation	2.2	**1,651**	1,830	1,478
Finance costs		**10**	25	18
Losses from asset sales		**-**	1	-
Total expenses		**190,682**	222,516	345,587
Own-source revenue				
Interest	1.2A	**836**	1,425	800
Other revenue	1.2B	**14,733**	8,188	14,480
Total own-source revenue		**15,569**	9,613	15,280
Net cost of services		**(175,113)**	(212,903)	(330,307)
Revenue from Government	1.2C	**227,535**	231,368	344,807
Surplus on continuing operations		**52,422**	18,465	14,500
OTHER COMPREHENSIVE INCOME				
Items not subject to subsequent reclassification to net cost of services				
(Increase) / Decrease in the value of investment	2.1C	**(1,565)**	2,851	988
Total other comprehensive income		**(1,565)**	2,851	988
Total comprehensive income		**53,987**	15,614	13,512

The above statement should be read in conjunction with the accompanying notes.

[1] ARENA's budget as published in the 2020-21 Portfolio Budget Statements.

Statement of Financial Position

as at 30 June 2021

	Notes	2021 $'000	2020 $'000	Original[1] Budget $'000
ASSETS				
Financial assets				
Cash and cash equivalents	2.1A	**139,033**	87,832	98,897
Trade and other receivables	2.1B	**5,507**	2,716	2,391
Investments	2.1C	**31,611**	29,813	33,306
Total financial assets		**176,151**	120,361	134,594
Non-financial assets				
Buildings - right of use assets	2.2	**1,032**	2,065	1,020
Leasehold improvements	2.2	**500**	896	500
Plant and equipment	2.2	**231**	160	124
Prepayments		**201**	130	179
Total non-financial assets		**1,964**	3,251	1,823
Total assets		**178,115**	123,612	136,417
LIABILITIES				
Payables				
Suppliers - trade creditors and accruals		**1,634**	1,373	1,373
Grants	2.3A	**1,291**	286	500
Other payables	2.3B	**57**	67	61
Total payables		**2,982**	1,726	1,934
Interest bearing liabilities				
Leases	2.5	**998**	2,035	1,092
Total interest bearing liabilities		**998**	2,035	1,092
Provisions				
Employee provisions	3.1	**309**	233	259
Other provisions	2.4	**651**	439	439
Total provisions		**960**	672	698
Total liabilities		**4,940**	4,433	3,724
Net assets		**173,175**	119,179	132,693
EQUITY				
Asset revaluation reserve		**247**	238	238
Retained surplus		**172,928**	118,941	132,455
Total equity		**173,175**	119,179	132,693

The above statement should be read in conjunction with the accompanying notes.

[1] ARENA's budget as published in the 2020-21 Portfolio Budget Statements.

Statement of Changes in Equity

for the period ended 30 June 2021

	Retained earnings			Asset revaluation surplus			Total equity		
	2021	2020	Original Budget[1]	**2021**	2020	Original Budget[1]	**2021**	2020	Original Budget[1]
	$'000	$'000	$'000	**$'000**	$'000	$'000	**$'000**	$'000	$'000
Opening balance									
Balance carried forward from previous period	**118,941**	103,104	119,181	**238**	238	-	**119,179**	103,342	119,181
Adjustment on initial application of AASB 16	**-**	223	-	**-**	-	-	**-**	223	**-**
Adjusted opening balance	**118,941**	103,327	119,181	**238**	238	-	**119,179**	103,565	119,181
Comprehensive income									
Surplus for the period	**52,422**	18,465	13,512	-	-	-	**52,422**	18,465	13,512
Other comprehensive income & revaluation	**1,565**	(2,851)	-	**9** [2]	-	-	**1,574**	(2,851)	-
Total comprehensive income	**53,987**	15,614	13,512	**9**	-	-	**53,996**	15,614	13,512
Closing balance as at 30 June	**172,928**	118,941	132,693	**247**	238	-	**173,175**	119,179	132,693

The above statement should be read in conjunction with the accompanying notes.

[1] ARENA's budget as published in the 2020-21 Portfolio Budget Statements.

[2] Revaluation undertake at 30 June 2021

	$'000
Increment in assets - as shown Note 2.2	221
Increment in provision for make-good - as shown in Note 2.4	(212)
Net increment in asset revaluation reserve	9

Cash Flow Statement

for the period ended 30 June 2021

	Notes	2021 $'000	2020 $'000	Original[1] Budget $'000
OPERATING ACTIVITIES				
Cash received				
Receipts from Government		**227,535**	231,368	344,807
Interest		**1,022**	1,466	950
Net GST received		**14,271**	17,035	-
Return of grant funds from prior years		**10,638**	3,370	9,500
Other		**199**	226	3,205
Total cash received		**253,665**	253,465	358,462
Cash used				
Employees		**(1,084)**	(1,378)	(1,445)
Suppliers		**(20,244)**	(22,521)	(22,140)
Grants		**(179,785)**	(223,009)	(319,358)
Interest paid		**(10)**	(20)	(18)
Total cash used		**(201,123)**	(246,928)	(342,961)
Net cash from operating activities		**52,542**	6,537	15,501
INVESTING ACTIVITIES				
Cash received				
Proceeds from sales of assets		**1**	10	-
Proceeds from sales of investments		**2,198**	-	-
Total cash received		**2,199**	10	-
Cash used				
Purchase of property, plant and equipment		**(72)**	-	-
Investments		**(2,431)**	(3,315)	(3,493)
Total cash used		**(2,503)**	(3,315)	(3,493)
Net cash used by investing activities		**(304)**	(3,305)	(3,493)
FINANCING ACTIVITIES				
Cash used				
Principal payments of lease liabilities		**(1,037)**	(984)	(943)
Total cash used		**(1,037)**	(984)	(943)
Net cash from/(used by) financing activities		**(1,037)**	(984)	(943)
Net increase in cash held		**51,201**	2,248	11,065
Cash and cash equivalents at the beginning of the reporting period		**87,832**	85,584	87,832
Cash and cash equivalents at the end of the reporting period	2.1A	**139,033**	87,832	98,897

The above statement should be read in conjunction with the accompanying notes.

[1] ARENA's budget as published in the 2020-21 Portfolio Budget Statements.

Overview

Objectives of the Australian Renewable Energy Agency

The Australian Renewable Energy Agency (ARENA) is an Australian Government controlled entity under the *Public Governance, Performance and Accountability Act 2013* (PGPA Act). It is a not-for-profit entity. The objective of ARENA is to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy in Australia.

ARENA is structured to meet the following outcome:

Outcome 1: To support improvements in the competitiveness of renewable energy and related technologies and the supply of renewable energy by administering financial assistance, developing analysis and advice about and sharing information and knowledge with regard to renewable energy and related technologies.

ARENA operates under the following legislation:

- *Australian Renewable Energy Agency Act 2011 (as amended);*
- *Australian Renewable Energy Agency (Consequential Amendments and Transitional Provisions) Act 2011;*
- *Australian Renewable Energy Agency (Consequential Amendments and Transitional Provisions) Act 2012;*
- *Australian Renewable Energy Agency Determination No 1 of 2013; and*
- *Australian Renewable Energy Agency Regulation 2016.*

ARENA is governed by an independent, decision-making Board. The members of the Board draw together skills in renewable energy technology, commercialisation, business investment and corporate governance to provide expert administration of ARENA funds.

Basis of preparation

The financial statements are general purpose financial statements and are required by section 42 of the PGPA Act.

The financial statements have been prepared in accordance with:

a) *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015* (FRR); and
b) Australian Accounting Standards and Interpretations - Reduced Disclosure Requirements issued by the Australian Accounting Standards Board that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position. The financial statements are presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

ARENA has assessed the impact of COVID-19 on its economic activity. Projects funded from ARENA expenditure grants have been assessed with a number of variations resulting in delays to milestone deliverables , however the excepted completion dates remain on target. There has been an impact on the operating expenditure with reductions in travel, meetings and industry engagement related expenditure. In the October 2020 Federal Budget ARENA received funding to continue the current program of work to June 2032, with $1.4 billion in ARENA baseline funding. A further $193 million was provided for new policy initiatives.

New Australian Accounting Standards

All new and revised standards and interpretations that were issued prior to the sign-off date and are applicable to the current reporting period did not have a material effect, and are not expected to have a material effect, on ARENA's financial statements for the current and future reporting periods.

Taxation

ARENA is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST).

Events after the reporting period

ARENA is not aware of any subsequent events that have a potential to significantly affect its ongoing structure or financial activities.

Financial Performance

This section analyses the financial performance of the ARENA for the year ended 2021.

1.1 Expenses

	2021 $'000	2020 $'000
1.1A: Employee Benefits		
Board remuneration fees	**215**	175
Salaries and wages	**788**	833
Superannuation - defined contribution plans	**70**	55
Leave and other entitlements	**77**	38
Total employee benefits	**1,150**	1,101

Accounting Policy
Accounting policies for employee related expenses is contained in the People and Relationships section.

1.1B: Suppliers		
Goods and services supplied or rendered		
Audit fees	**82**	89
Consultants	**15,030**	16,821
Department support costs (resources received free of charge)[1]	**4,865**	4,898
IT services	**1,202**	1,098
Legal fees	**1,265**	1,830
Travel	**129**	376
Other	**820**	1,151
Total goods and services supplied or rendered	**23,393**	26,263
Other suppliers		
Workers compensation expenses	**4**	3
Total other suppliers	**4**	3
Total suppliers	**23,397**	26,266

[1] Department support costs represent the cost of staff and associated costs made available by the Secretary of the Portfolio Department (also refer to resources received free of charge in note 1.2B).

1.1 Expenses (contd.)

	2021 $'000	2020 $'000
1.1C: Grants		
Public sector		
Australian Government entities	**10,804**	9,416
Private sector		
Australian companies	**123,767**	132,859
Australian not-for-profit entities	**591**	15,529
Other entities[1]	**29,312**	35,489
Total grants	**164,474**	193,293

[1] This includes grants to Australian universities and the Australian Government's contribution to the International Renewable Energy Agency.

Accounting Policy

Grants are recognised to the extent that services required to be performed by the grantee have been performed or the grant eligibility criteria has been satisfied. A commitment is recorded when ARENA has a binding agreement to make these grants but services have not been performed or criteria satisfied. Where grant monies are paid in advance of performance or eligibility, a prepayment is recognised. Grants payable are settled within twelve months of recognition.

Certain grants provided by ARENA include the potential for ARENA to recoup all, or part, of its grant expenditure. The amount of any future recoupment may in some instances even exceed that of the initial grant expense depending on the realisation of specified future events and/or other commercial indicators, and in some cases Ministerial approval.

Recoverability will in certain instances be predicated on formulas that have been agreed as part of the terms and conditions of the relevant grant funding agreement.

ARENA has no quantifiable contingent assets at reporting date as the amount and likelihood cannot be measured reliably.

Locked Box Arrangements

ARENA's Locked Box funding arrangements relate to grant funding agreements whereby ARENA deposits the total amount of the grant into a prescribed bank account, in the recipient's name, after the execution of a legally binding funding agreement. ARENA retains sole control of the Locked Box until withdrawal conditions precedent (WCPs) have been satisfied.

At the time of payment by ARENA into the prescribed bank account, the transaction is recorded as a Prepayment in the Statement of Financial Position. After all WCPs have been met, ARENA relinquishes sole control over the Locked Box and the recipient is able to withdraw money from the Locked Box in accordance with the funding agreement. At this point, the Prepayment is expensed as a Grant in the Statement of Comprehensive Income.

Withdrawals from Locked Boxes require joint signatures from the recipient and ARENA. ARENA can only refuse the release of funds if there is a breach of conditions in the funding agreement. ARENA continues to be responsible and accountable for ensuring that the funds are only released from the Locked Boxes when conditions specified in the grant funding agreement have been met. Accordingly, the value of Locked Boxes at balance date is deemed to be held by ARENA in trust and is disclosed under Note 5.2: Assets Held in Trust.

1.2 Own-Source Revenue and Gains

	2021 $'000	2020 $'000
Own-Source Revenue		
1.2A: Interest		
Bank deposits	**836**	1,425
Total interest	**836**	1,425

Accounting Policy
Interest revenue is recognised using the effective interest method.

1.2B: Other Revenue		
Resources received free of charge - Department of the Environment and Energy	**-**	2,765
Resources received free of charge - Department of Industry, Science, Energy and Resources	**4,865**	2,133
Return of grants	**9,671**	3,064
Other	**197**	226
Total other revenue	**14,733**	8,188

Accounting Policy
Resources Received Free of Charge
Resources received free of charge are recognised as revenue when, and only when, a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense (see Note 1.1B: Suppliers). Resources received free of charge are recorded as either revenue or gains depending on their nature.

Return of Grants
Return of grant is reported as other revenue if the grant was fully expensed in previous financial year(s).

1.2C: Revenue from Government		
Payments from Portfolio Department - Department of Environment and Energy	**-**	148,868
Payments from Portfolio Department - Department of Industry, Science, Energy and Resources	**227,535**	82,500
Total revenue from Government	**227,535**	231,368

Accounting Policy
Amounts appropriated to ARENA are recognised as Revenue from Government when ARENA receives the cash from the Portfolio Department.

Financial Position

This section analyses the ARENA's assets used to conduct its operations and the operating liabilities incurred as a result. Employee related information is disclosed in the People and Relationships section.

2.1 Financial Assets

	2021 $'000	2020 $'000
2.1A: Cash and Cash Equivalents		
Cash at bank	**3,180**	8,641
Cash on deposit	**135,853**	79,191
Total cash and cash equivalents	**139,033**	87,832

Accounting Policy

Cash is recognised at its nominal amount. Cash and cash equivalents include:

a) cash on hand; and

b) demand deposits in bank accounts with an original maturity of 12 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value.

2.1B: Trade and Other Receivables		
GST receivable from the Australian Taxation Office	**5,157**	2,042
Interest receivable	**211**	398
Other	**139**	276
Total other receivables	**5,507**	2,716
Total trade and other receivables	**5,507**	2,716

There is no impairment allowance for receivables as at 30 June 2021 (2020: 0).

2.1C: Investments		
Opening balance	**29,813**	29,349
Net payment into the investment fund, including management fees	**233**	3,315
Increase / (Decrease) in value of investment at 30 June	**1,565**	(2,851)
Total investments - REVC Fund Commonwealth Participation Trust	**31,611**	29,813

Accounting Policy

Investments are expected to be recovered in more than 12 months.

At 30 June 2021 ARENA held 47,738,392 (2020: 47,505,505) fully paid "A" class units in the Renewable Energy Venture Capital (REVC) Fund Commonwealth Participation Trust (Trust).

The Trust is an investor pursuant to the REVC Co-Investment Arrangement. The principal activity of the REVC Co-Investment Arrangement, which is independently managed, is investing in early stage technology companies consistent with governing documents, including the Co-Investment Deed signed in 2011.

The investments of the REVC Co-Investment Arrangement comprise traded debt, equity and unlisted equity investments; these are valued in accordance with the guidelines published by the Australian and Venture Capital Association Limited (AVCAL).

The valuation is assessed to be materially consistent with AASB 13 Fair Value Measurement as the AVCAL methodology adopts market-based and observable inputs to the maximum extent possible in arriving at the values for the investments shown.

The REVC Co-Investment Arrangement recognises investments on the date it becomes party to the underlying contractual agreement and recognises any changes in value from this date. The value of ARENA's investment at 30 June 2021 is based on annual audited financial statements of the REVC Co-Investment Arrangement at that reporting date.

2.2 Non-Financial Assets

2.2: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment and Intangibles

	Buildings (ROU assets) $'000	Leasehold Improvements $'000	Plant and Equipment $'000	Total $'000
As at 1 July 2020				
Gross book value	**3,098**	**2,097**	**308**	**5,503**
Accumulated depreciation, amortisation and impairment	**(1,033)**	**(1,201)**	**(148)**	**(2,382)**
Total as at 1 July 2020	**2,065**	**896**	**160**	**3,121**
Additions:				
Purchases	-	-	72	72
Revaluations recognised in asset revaluation reserve [1]	-	133	88	221
Write back of asset purchase value on revaluation	**-**	**-**	**(3)**	**(3)**
Write back of depreciation and amortisation on disposal of assets	**-**	**-**	**3**	**3**
Depreciation and amortisation	**(1,033)**	**(529)**	**(89)**	**(1,651)**
Total as at 30 June 2021	**(1,033)**	**(396)**	**71**	**(1,358)**
Total as at 30 June 2021 represented by				
Gross book value	**3,098**	**500**	**231**	**3,829**
Accumulated depreciation, amortisation and impairment	**(2,066)**	**-**	**-**	**(2,066)**
Total as at 30 June 2021 represented by	**1,032**	**500**	**231**	**1,763**

No indicators of impairment were found for property, plant and equipment.

[1] A revaluation of the leasehold, plant and equipment and provision for leasehold make-good was undertaken by an independent valuer, Jones Lang LaSalle, for the purpose of the financial reporting ending 30 June 2021. A previous revaluation of these assets was undertaken by ARENA at 30 June 2018.

Accounting Policy

Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Buildings - Right-of-Use Assets

Leased ROU assets are capitalised at the commencement date of the lease and comprise the initial lease liability amount, initial direct costs incurred when entering into the lease, less any lease incentives received. These assets are accounted for by Commonwealth lessees as separate asset classes to corresponding assets owned outright, but included in the same column as where the corresponding underlying assets would be presented if they were owned.

On initial adoption of AASB 16, ARENA did not identify any onerous leases and no adjustment to the ROU assets was required. Following initial application, an impairment review is undertaken for any right of use lease asset that shows indicators of impairment and an impairment loss is recognised against any right of use lease asset that is impaired. Lease ROU assets continue to be measured at cost after initial recognition in Commonwealth agency, GGS and Whole of Government financial statements.

Leasehold Improvements

Leasehold improvements are carried at fair value.

Plant and Equipment

Plant and equipment are valued at cost in accordance with the FRR.

Impairment

All assets are assessed for impairment at the end of each reporting period. When indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

Revaluations

Following initial recognition at cost, all asset classes except for Intangibles are carried at fair value less subsequent accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets did not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depended upon the volatility of movements in market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under the heading of Asset Revaluation Reserve except to the extent that it reversed a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit. Revaluation decrements for a class of assets are recognised directly in the surplus/deficit except to the extent that they reversed a previous revaluation increment for that class. Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to revalued amount.

Depreciation

Depreciable plant and equipment assets are written off to their estimated residual values over the estimated useful lives to ARENA, using, in all cases, the straight-line method of depreciation.

Leasehold improvements are depreciated over the lease term.

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

2.3 Payables

	2021 $'000	2020 $'000
2.3A: Grants		
Private sector		
Australian companies	**1,291**	-
Other entities	**-**	286
Total grants	**1,291**	286
2.3B: Other payables		
Accrued salaries and income tax withheld	**57**	67
Total other payables	**57**	67

2.4 Other Provisions

2.4 Other provisions

	Provision for restoration $'000
Opening balance as at 1 July 2020	**439**
Additional provisions made	
Amounts recognised in asset revaluation reserve	**212**
Total as at 30 June 2021	**651**

ARENA currently has three (2020: three) agreements for the leasing of premises which have provisions requiring ARENA to restore the premises to their original condition at the conclusion of the lease. ARENA has made a provision to reflect the present value of these obligations.

2.5 Interest Bearing Liabilities

	2021 $'000	2020 $'000
2.5 Leases		
Lease liabilities	**998**	2,035
Total leases	**998**	2,035

Total cash outflow for leases for the year ended 30 June 2021 was $1,046,478

Maturity analysis - contractual undiscounted cash flows		
Within 1 year	**998**	1,037
Between 1 to 5 years	**-**	998
More than 5 years	**-**	-
Total leases	**998**	2,035

Accounting Policy
For all new contracts entered into, ARENA considers whether the contract is, or contains a lease. A lease is defined as 'a contract, or part of a contract, that conveys the right to use an asset (the underlying asset) for a period of time in exchange for consideration'.

Once it has been determined that a contract is, or contains a lease, the lease liability is initially measured at the present value of the lease payments unpaid at the commencement date, discounted using the interest rate implicit in the lease, if that rate is readily determinable, or the department's incremental borrowing rate.

Subsequent to initial measurement, the liability will be reduced for payments made and increased for interest. It is remeasured to reflect any reassessment or modification to the lease. When the lease liability is remeasured, the corresponding adjustment is reflected in the right-of-use asset or profit and loss depending on the nature of the reassessment or modification.

People and Relationships

This section describes a range of employment and post employment benefits provided to our people.

3.1 Employee Provisions

	2021 $'000	2020 $'000
Employee provisions		
Leave	**309**	233
Total employee provisions	**309**	233

Accounting policy

Employee related expenses are recognised in the period that employee services are received.
Liabilities for short-term employee benefits and termination benefits expected within twelve months of the end of the reporting period are measured at their nominal amounts. Other long-term employee benefits are measured as net total of the present value of the defined benefit obligation at the end of the reporting period.

Leave

The liability for employee benefits includes provision for annual leave and long service leave. Changes in the measurement of the liability are recognised in the Statement of Comprehensive Income.
The leave liabilities are calculated on the basis of employees' remuneration at the estimated salary rates that will be applied at the time the leave is taken, including the entity's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the 'short hand method' as per the FRR. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

3.2 Key Management Personnel Remuneration

Key management personnel (KMP) are those persons having authority and responsibility for planning, directing and controlling the activities of an entity, directly or indirectly, including any director (whether executive or otherwise) of that entity. ARENA has determined the KMP to be the Directors, the Chief Executive Officer, Chief Financial Officer and the Chief Operating Officer. The Chief Operating Officer is seconded from the Portfolio Department to provide services to ARENA free of charge.

	2021 $	2020 $
Short-term employee benefits	**1,064,451**	1,046,054
Post-employment benefits	**70,577**	69,166
Other long-term employee benefits	**14,721**	(14,374)
Total KMP remuneration expenses, paid by ARENA, as per Note 1.1	**1,149,749**	1,100,846
Add KMP provided by the Department, resources received free of charge	**261,817**	289,162
Less Portfolio Department charges for Acting CEO	**-**	(25,628)
Total KMP remuneration expenses as per Executive Remuneration Disclosure table	**1,411,566**	1,364,380

The total number of KMP that are included in the above table are 12 individuals (2020: 9) and includes 9 ARENA Directors (2020: 6). In July 2020 there was a change in the Board membership, with four members departing and four new members appointed. One of the outgoing Board members did not claim fees during the year.

The above KMP remuneration excludes the remuneration and other benefits of the Portfolio Minister. The Portfolio Minister's remuneration and other benefits are set by the Remuneration Tribunal and are not paid by ARENA.

3.3 Related Party Disclosures

Related party relationships:
ARENA is an Australian Government controlled entity. Related parties of ARENA include:

i) Key Management Personnel (See Note 3.2: KMP)
ii) Portfolio and Cabinet Ministers;
iii) Close family members of the persons identified in (i) and (ii) above; and
iv) An entity which is controlled or jointly controlled by a member of the KMP.

Transactions with related parties:
Given the breadth of Government activities, related parties may transact with the Government sector in the same capacity as ordinary citizens. Such transactions include payment of taxes, use of public infrastructure and public services that are available to all citizens. These transactions have not been separately disclosed in this note.

Related party transactions are managed in accordance with ARENA's conflict of interest policy with regular use of independent probity advice services during major grant and procurement processes.

Giving consideration to relationships with related entities, and transactions entered into, it has been determined that ARENA entered into five (2020: six) transactions with related parties during the reporting period. It should be noted that in all transactions the KMP affected by a relationship excluded themselves from all decision processes and/or management of the contract or arrangement. All transactions were on normal business terms and conditions.

An ARENA Board Member, who retired from the Board on 17 July 2021, was the Chief Investment Officer for 5 Pillars Capital. During the reporting period ARENA conducted the following transactions, with which 5 Pillars Capital has a financial relationship. ARENA committed to these transactions prior to the ARENA Board Member commencing the role with 5 Pillars Capital.

Grant payments totalling $2,071,994 were made to Greensync Pty Ltd for the purpose of developing a decentralised energy exchange program. Total approved funding for the this program is $11,000,000 with a remaining balance of $1,851,906 at 30 June 2021.

No new grant payments were made to Nectar Farms Management Limited for the purpose of developing high efficiency off grid glasshouse. Nectar Farms Management Limited went into liquidation during 2020-21, ARENA terminated the contract and the remaining grant balance of $203,677 directed to ARENA available project funds for new projects.

Grant payments totalling $871,240 were made to Energy Saving Networks Group Pty Ltd for the purpose of developing 'My Energy Marketplace' (MEM) platform to securely accept consumer energy data from multiple energy meter devices. The total ARENA funding for this project is $2,970,000 with a remaining balance of $1,808,098 at 30 June 2021.

Grant payments totalling $137,500 were made to The Trustee for Sustainable Australia Fund for the purpose of developing a new finance product; Environmental Upgrade Agreements. Total approved ARENA funding for this project is $693,000 with a remaining balance of $5,500 at 30 June 2021.

An ARENA Board Member is the CEO of Horizon Power. During the reporting period ARENA conducted the following transactions:

Grant payments totalling $441,017 were made to Horizon Power for the purpose of a pilot project to develop decentralised high penetration renewables to towns across regional Australia. Total approved ARENA funding for this project is $2,112,000. The project was completed by 30 June 2021, no further payments are due to this project.

No grants payments were made to Horizon Power for the purpose of developing the Denham Hydrogen Demonstration project which is to provide renewable energy sources to remote areas of Western Australia. Total approved ARENA funding for this project is $2,830,378, with a remaining balance of $2,830,378 at 30 June 2021.

All amounts shown in Note 3.3 are GST inclusive.

Managing Uncertainties

This section analyses how ARENA manages financial risks within its operating environment.

4.1 Contingent Assets and Liabilities

	Grant recoupment	Total
Contingent assets	**$'000**	$'000
Balance at 30 June 2020	**9,500**	**9,500**
Amounts received during the reporting period	**(9,500)**	**(9,500)**
New contingent assets recognised	**-**	**-**
Total contingent assets at 30 June 2021	**-**	**-**

ARENA did not have any contingent liabilities at 30 June 2021 (2020: nil).

Quantifiable Contingencies

The contingent assets are in respect of recoupment of grants from ARENA funded projects. Certain ARENA funded projects have funding agreements that include the potential for ARENA to recoup all, or part, of its funding provided to the grant recipient. Recoupment is generally tied to the success of a project and determined by formulas agreed as part of the terms and conditions of the funding agreement. ARENA is not expecting any project to meet the recoupment conditions in 2021-22 (2020-21: $9.5 million). The estimate of the recoupable amount is based on an assessment of the recoupment conditions of each relevant project and the probability of a recoupment occurring within the next financial year.

Accounting Policy

Contingent assets and contingent liabilities are not recognised in the statement of financial position but are reported in the notes. They may arise from uncertainty as to the existence of an asset or liability or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

Grant Recoupment

ARENA assesses the likelihood of recoupment on a project by project basis and estimates the amount recoupable within the next 12 months. The estimate is based on interpretation of the relevant market conditions and the probability of the recoupment trigger occurring under the circumstances.

4.2 Financial Instruments

	2021	2020
	$'000	$'000
Financial Assets		
Financial assets at amortised cost		
Cash and cash equivalents	**139,033**	87,832
Trade and other receivables	**350**	674
Total financial assets at amortised cost	**139,383**	88,506
Financial assets at fair value through other comprehensive income		
Investments	**31,611**	29,813
Total available-for-sale financial assets	**31,611**	29,813
Total financial assets	**170,994**	118,319
Financial liabilities		
Financial liabilities measured at amortised cost		
Trade creditors	**1,634**	1,373
Grant payables	**1,291**	286
Total financial liabilities measured at amortised cost	**2,925**	1,659
Total financial liabilities	**2,925**	1,659

4.2 Financial Instruments (contd.)

Accounting Policy

Financial Assets

ARENA classifies its financial assets in the following categories:

a) financial assets at fair value through other comprehensive income; and
b) financial assets measured at amortised cost.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Financial assets are recognised and derecognised upon trade date.

Financial Assets at Amortised Cost

Financial assets included in this category need to meet two criteria:

1. the financial asset is held in order to collect the contractual cash flows; and
2. the cash flows are solely payments of principal and interest (SPPI) on the principal outstanding amount.

Amortised cost is determined using the effective interest rate.

Effective Interest Method

Income is recognised on an effective interest rate basis for financial assets that are recognised at amortised cost.

Financial Assets at Fair Value Through Other Comprehensive Income (FVOCI)

Financial assets measured at fair value through other comprehensive income are held with the objective of both collecting contractual cash flows and selling the financial assets and the cash flows meet the SPPI test.

Any gains or losses as a result of fair value measurement or the recognition of an impairment loss allowance is recognised in other comprehensive income.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period based on expected credit losses, using the general approach which measures the loss allowance based on an amount equal to lifetime expected credit losses where risk has significantly increased, or an amount equal to 12-month expected credit losses if risk has not increased.

The simplified approach for trade, contract and lease receivables is used. This approach always measures the loss allowance as the amount equal to the lifetime expected credit losses.

A write-off constitutes a derecognition event where the write-off directly reduces the gross carrying amount of the financial asset.

Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities. Financial liabilities are recognised and derecognised upon 'trade date'.

Financial liabilities at Amortised Cost

Trade creditors and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

	2021	2020
	$'000	$'000
4.2B Net Gains or Losses on Financial Assets		
Financial assets at amortised cost		
Interest revenue	**836**	1,425
Net gains on financial assets at amortised cost	**836**	1,425
Financial assets at fair value through other comprehensive income		
Fair value changes	**1,565**	(2,851)
Net losses on available-for-sale financial assets	**1,565**	(2,851)
Net gains/(losses) on financial assets	**2,401**	(1,426)

Other Information

5.1 Aggregate Assets and Liabilities

	2021 $'000	2020 $'000
Assets expected to be recovered in:		
No more than 12 months	**145,760**	90,581
More than 12 months	**32,355**	33,031
Total assets	**178,115**	123,612
Liabilities expected to be settled in:		
No more than 12 months	**(4,193)**	(2,924)
More than 12 months	**(747)**	(1,509)
Total liabilities	**(4,940)**	(4,433)

5.2 Assets Held in Trust

	2021 $'000	2020 $'000
Cash held in Locked Boxes		
Balance as at 1 July	**16,998**	1,490
Receipts[1]	**30,867**	73,136
Payments[2]	**(18,372)**	(57,628)
Balance as at 30 June	**29,493**	16,998
Total monetary assets held in trust	**29,493**	16,998

This note should be read in conjunction with Note 1.1C : Grants. The transaction values mentioned above are not linked to any other Statement or Note within these documents.

This note has been added to the Financial Statements for information purposes only. It provides the reader with an indication of Locked Box funding levels where ARENA continues to be responsible and accountable for ensuring that the funds are only released when conditions specified in the grant funding agreement have been met.

[1] Receipts are the amounts paid into Locked Boxes by ARENA. These amounts include interest received from the balances of the Locked Boxes.

[2] Payments are those amounts which have been withdrawn by the projects in accordance with agreed milestones.

Note 5.3: Budget Variance Commentary

ARENA's financial performance is measured against its original budget as published in the 2020-21 Portfolio Budget Statements.

Variances are considered to be 'major' if they are core to ARENA's activities and based on the following criteria:
• the variance between budget and actual is greater than +/- 10% of the original budget for a line item; and
• the variance between budget and actual is greater than $1,000,000; or
• an item is below this threshold but is considered important for the reader's understanding or is relevant to an assessment of the discharge of accountability and to an analysis of the ARENA's performance.

Budget Variance Commentary	Affected statements and line items
Due to the complex nature of ARENA's projects, which deal with emerging and developing technologies, there are regular project variations. These variations are difficult to predict and therefore material variances to original budget are possible. The variance in grants expenditure is due in part to the impact of COVID-19, with variations of projects milestone deliverables to future years. These variations are timing differences, the projects are expected to meet agreed completion dates. Revenue from Government is accounted for on a cash basis and is drawn down against future commitments. A reduction in expenditure and cash paid results in a corresponding reduction in receipts from Government. The supplier variance is impacted by COVID-19 with lower travel costs, meeting expenses, industry engagement and worker expenses. Cash and cash equivalents includes cash held in the operating bank accounts and surplus cash placed, in accordance with s59 of the PGPA Act, in demand deposits in Australian bank accounts. The significant increase in cash balance against budget was due to money returning to ARENA and timing differences on grant expenditure commitments. Trade and other receivables exceeded budget due to higher than expected GST receivable, $5.1 million, at 30 June 21.	**Statement of Comprehensive Income:** - Suppliers - Grants - Revenue from Government **Statement of Financial Position:** - Cash and cash equivalents - Trade and other receivables **Cash Flow Statement:** - Receipts from Government - Grants cash used
ARENA invested an additional $2.2 million into the Renewable Energy Venture Capital Fund during the financial year. The principal activity of the Fund is to invest in the early stage renewable energy technology companies. Movement in the fair value of the investment is driven by the market. A gain of $1.6 million in the fair value of the investment was recorded at 30 June 2021. All investment decisions are to be made by the Fund Manager within an agreed timeframe ending in 2024.	**Statement of Comprehensive Income:** - Increase in the value of investment **Statement of Financial Position:** - Other investments
Net GST received was not separated out from cash used for Suppliers and Grants at the time of budget.	**Cash Flow Statement:** - Net GST received

Image credit: ARENA.

ANNUAL PERFORMANCE STATEMENT 2020-21

INTRODUCTION

Image credit: Advanced Energy Resources.

STATEMENT OF PREPARATION

I, Justin Punch, on behalf of the Board, and in my capacity as the accountable authority of the Australian Renewable Energy Agency, present the Annual Performance Statement of the Agency covering the 2020-21 financial year as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

In my opinion, the Annual Performance Statement is based on properly maintained records, accurately reflects the performance of the entity, and complies with subsection 39(2) of the PGPA Act.

ARENA PURPOSE

ARENA, as established by the ARENA Act, has the dual objectives of improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.

ARENA's purpose for the reporting period was to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy through innovation that benefits Australian consumers and businesses.

PERFORMANCE FRAMEWORK

ARENA's performance is assessed against the measures published in the Corporate Plan (see Figure 9) and Portfolio Budget Statements. This Annual Performance Statement provides performance results for each measure and an analysis of what these results indicate about ARENA's performance in achieving its purpose.

ANNUAL PERFORMANCE STATEMENT

This Annual Performance Statement is presented in three sections.

- The first section presents ARENA's performance against the performance measures set out in the 2020-21 performance framework. These comprise measures of output, effectiveness and efficiency.
- The second section presents the findings of the evaluations that were scheduled to be conducted in 2020-21. The findings report the results achieved on a program or project portfolio basis.
- The third section outlines how significant events during the year affected ARENA's operations, funded projects and results.

Figure 10 shows how the results presented in this Annual Performance Statement enable a clear read between the ARENA Act, Portfolio Budget Statements for 2020-21 and Corporate Plan.

The results presented below use baselines to provide a clear read across time. Reporting performance by using technology and commercial readiness indicators aims to enable a clear read across entities that contribute to renewable energy technology development.

FIGURE 9: ARENA CORPORATE PLAN 2020-21 TO 2023-24

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			
	INTEGRATING RENEWABLES INTO THE ELECTRICITY SYSTEM **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. **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.	ACCELERATING HYDROGEN **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. **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.	SUPPORTING INDUSTRY TO REDUCE EMISSIONS **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. **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).

FIGURE 10: HOW THE ANNUAL PERFORMANCE STATEMENT ENABLES A CLEAR READ BETWEEN THE ARENA ACT, PORTFOLIO BUDGET STATEMENTS 2020-21 AND CORPORATE PLAN

Image credit: EDL.

RESULTS ACHIEVED

THIS SECTION PRESENTS ARENA'S PERFORMANCE AGAINST THE MEASURES SET OUT IN THE 2020-21 PERFORMANCE FRAMEWORK. THESE COMPRISE MEASURES OF OUTPUT, EFFECTIVENESS AND EFFICIENCY.

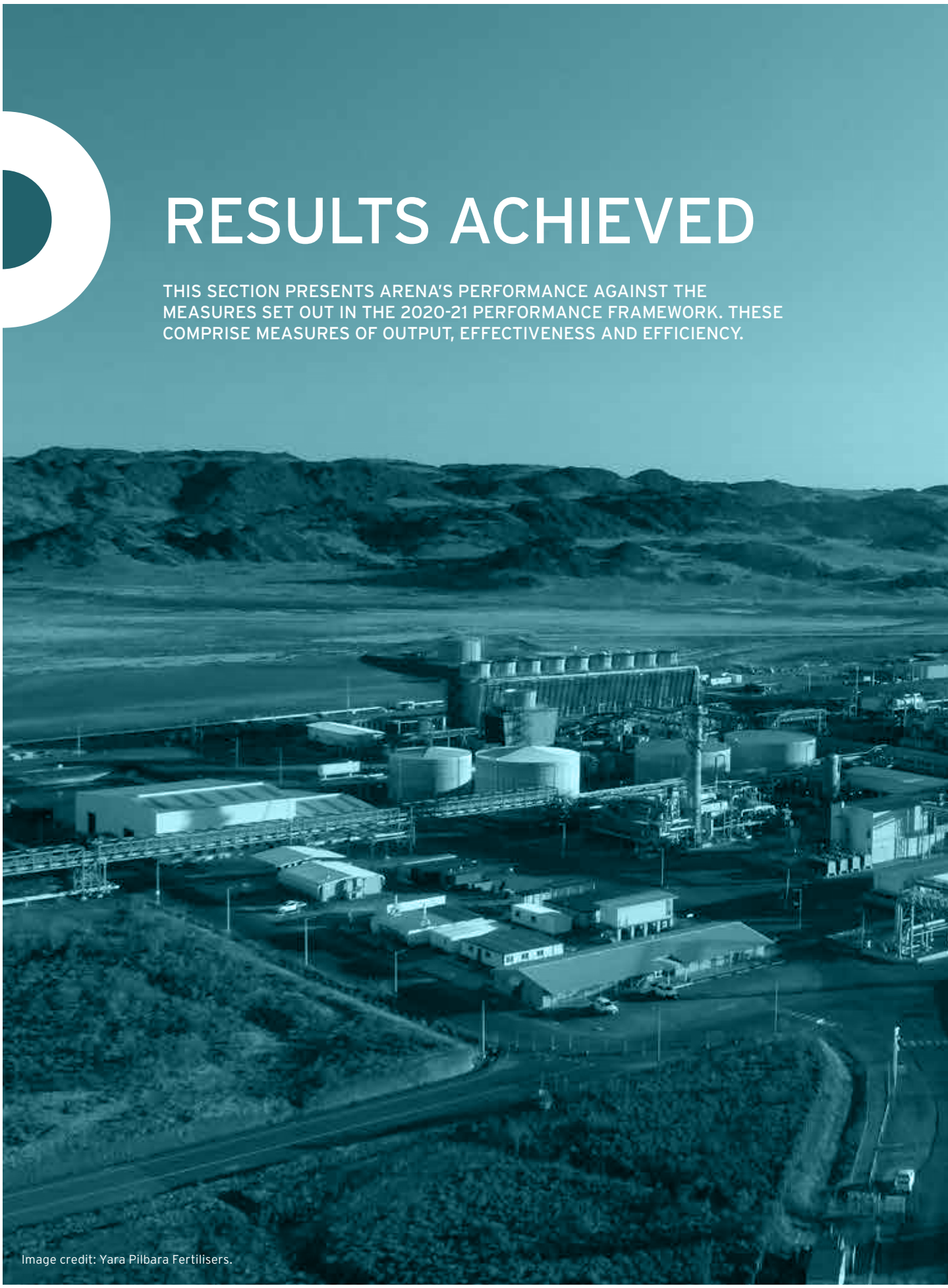


Image credit: Yara Pilbara Fertilisers.

1. ACTIVITY: Providing financial assistance to Australian scientists, innovators and businesses

EXPECTED RESULTS:

More competitive renewable energy choices for Australian consumers and businesses.

WHO BENEFITS:

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.

1.1 PERFORMANCE MEASURE

ARENA provides financial assistance to support renewable energy technologies across the Agency's priority areas.

$m ARENA funds approved

TARGET: $167.7million in 2020-21

$m ARENA funds committed

TARGET: $165.7 million in 2020-21

SOURCE

ARENA Corporate Plan 2020-21 - 2023-24 p20

RATIONALE FOR MEASURE

This is a short-term indicator of the level of financial assistance. A breakdown by investment priority shows that grant funds are contributing to ARENA's investment priorities.

RESULT

FUNDS APPROVED[1]

ACHIEVED: In 2020-21 ARENA approved a total of $220.2 million, exceeding its target by 31.3 per cent.

FUNDS COMMITTED[2]

ACHIEVED: In 2020-21 ARENA committed a total of $185.9 million, exceeding its target by 12 per cent.

[1]The value of ARENA funds that the Board or CEO has approved to be offered to an applicant subject to successful negotiation of a contract.

[2]The value of funds in executed funding contracts.

1.2 PERFORMANCE MEASURE

Private sector capital makes taxpayers' dollars go further and achieve greater impact.

TARGET: Leverage falls between 1:2 and 1:3 across the portfolio.

SOURCE

ARENA Corporate Plan 2020-21 – 2023-24 p20

RATIONALE FOR MEASURE

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 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.

RESULT

ACHIEVED: In 2020-21 ARENA's overall investment leverage was 1:5.81. That is, for every dollar of ARENA funding provided to new projects, third parties contributed $5.81.

The overall investment leverage of $5.81 of third-party funds for every dollar of ARENA funds achieved in 2020-21 was lower than that achieved in 2019-20. The largest reduction was in Deployment Projects.

The overall investment leverage is heavily influenced by a single large deployment project (the Genex Kidston Pumped Hydro Storage Project) where commercial funders are funding the majority of the cost. The leverage ratio excluding this project is 1:2.52.

ARENA committed funds to one feasibility study in 2020-21, the Centennial Pumped Hydro Energy Storage Project. ARENA committed $995,000 to this $13.03 million project, which explains the high leverage ratio for this innovation stage. The leverage ratio excluding both the Genex Kidston Pumped Hydro Storage Project and the Centennial Pumped Hydro Energy Storage Project is 1:2.45.

Table 9 shows investment leverage in 2020-21 by innovation stage.

TABLE 7: INVESTMENT LEVERAGE BY INNOVATION STAGE

INNOVATION STAGE	INVESTMENT LEVERAGE
R&D projects	**2.42**
Demonstration projects	**1.56**
Deployment projects	**8.48**
Feasibility Studies	**12.10**
Other Studies	**1.09**
All projects	**5.81**

For every dollar of ARENA funding provided to new projects, third parties contributed $5.81

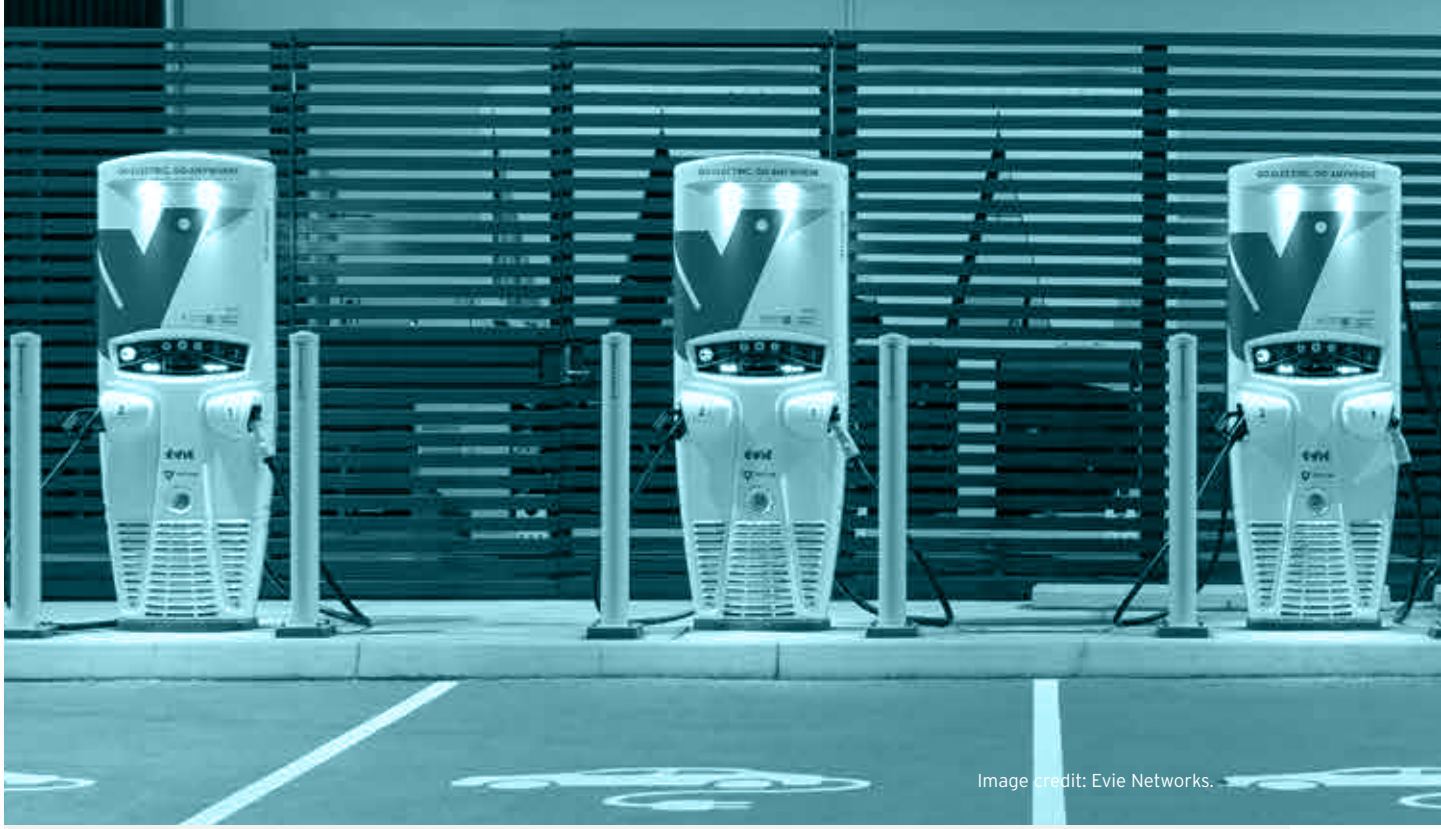


Image credit: Evie Networks.

1.3 PERFORMANCE MEASURE

ARENA-funded projects advance renewable energy technology, enabling technology and energy business models.

TARGET: 80 per cent of completed projects achieve an advance in Technology Readiness Level or Commercial Readiness Index indicators over the life of the project.

SOURCE

ARENA Corporate Plan 2020-21 – 2023-24 p20

RATIONALE FOR MEASURE

This medium-term measure indicates progress along the innovation pathway towards improved competitiveness.

The Technology Readiness Level (TRL) tracks progress from blue sky research to technical maturity. It applies to research, development and demonstration projects.

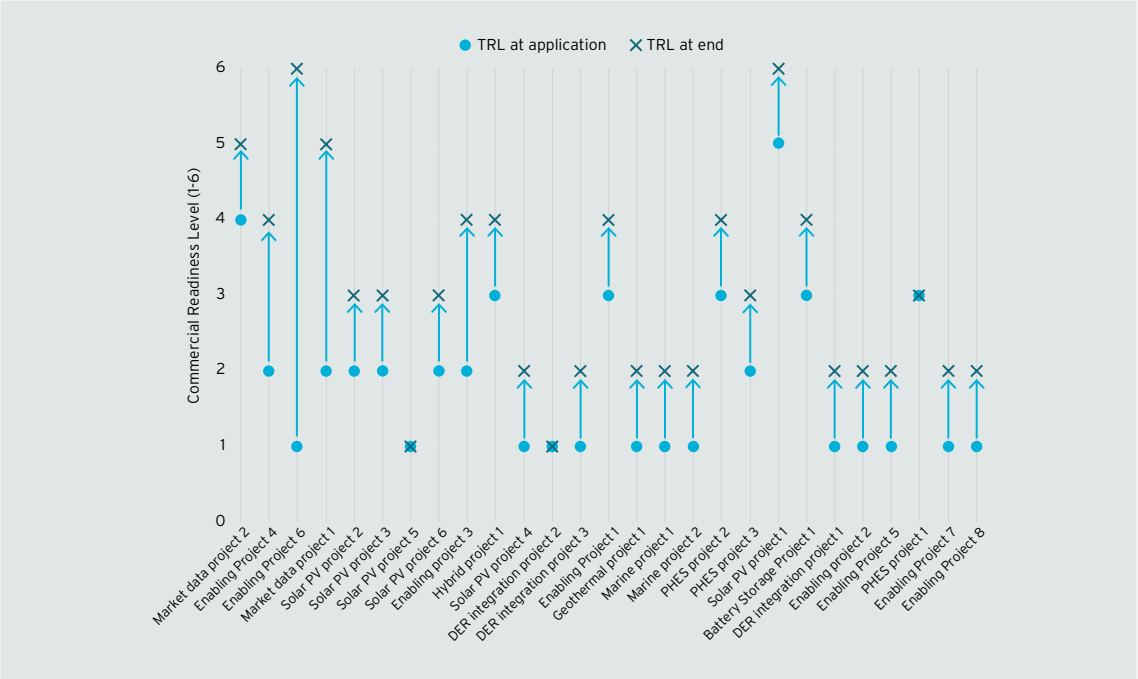
The Commercial Readiness Index (CRI) measures progress towards commercial viability. It applies to a range of projects including studies, pre-commercial deployment projects and knowledge sharing.

RESULT

ACHIEVED: In 2020-21, 100 per cent of the 27 completed projects that were independently assessed achieved an advance in TRL or CRI indicators over the life of the project. This exceeded the target by 20 percentage points.

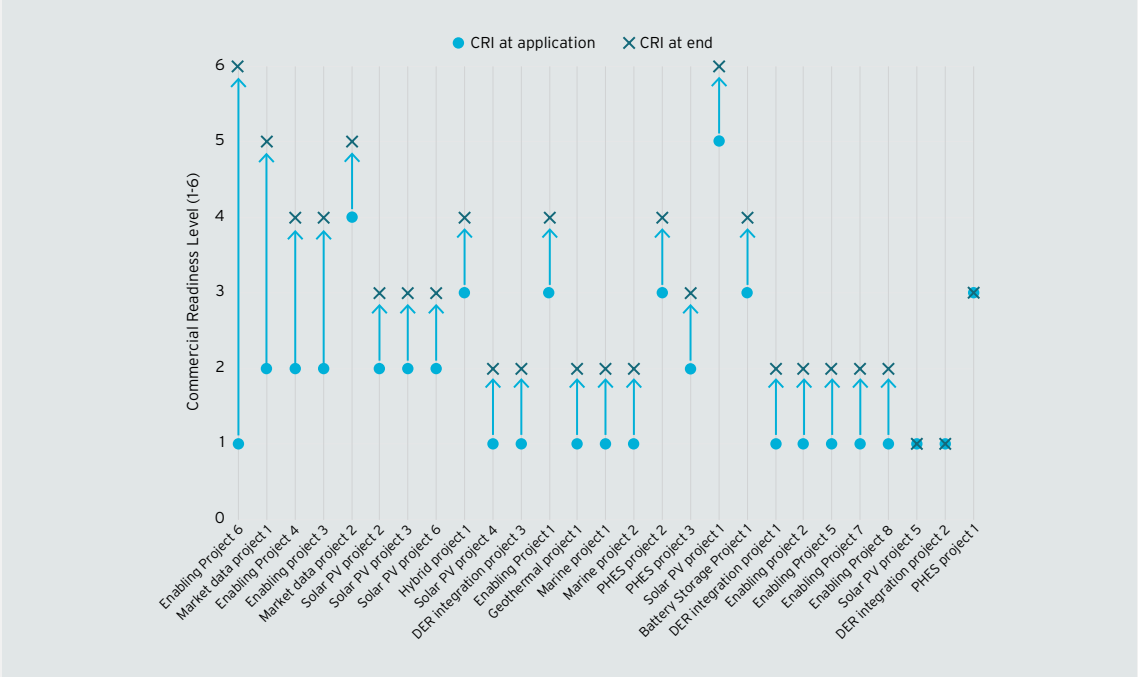
- 84 per cent of projects that set out to improve technological readiness succeeded in improving Technology Readiness by one or more levels.
- 44 per cent of projects improved technological readiness by two or more levels.
- 37 per cent of projects were able to achieve system prototyping in an operational environment (TRL5).
- All but four of the projects advanced the CRI summary status level. All projects have advanced at least one CRI indicator.

FIGURE 11: IMPROVEMENT IN TECHNOLOGY READINESS LEVEL OF INDIVIDUAL PROJECTS



Each project is shown along the horizontal axis. The TRL levels are shown on the vertical axis. For each project the change in TRL is shown by a circle (TRL at start of application) and a cross (TRL at the end of the project). Of the 27 assessed projects, two are not shown because TRL is not a relevant measure. One project was already at the maximum level of TRL 9 at the start of the project; these and the other three projects that did not progress TRL all improved at least one indicator of commercial readiness.

FIGURE 12: IMPROVEMENT IN OVERALL COMMERCIAL READINESS LEVEL OF INDIVIDUAL PROJECTS

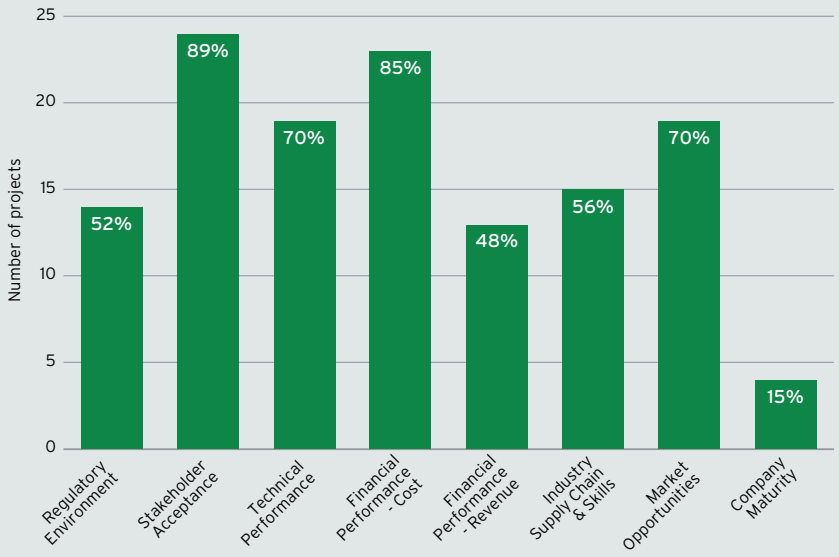


Each project is shown along the horizontal axis. The commercial readiness level is shown on the vertical axis. For each project the change in CRI is shown by a circle (CRI at application) and a cross (CRI at the end of the project).

Understanding technology/commercial readiness levels

TECHNOLOGY READINESS LEVELS	LEVELS OF THE COMMERCIAL READINESS INDEX
1. Transition from scientific research to applied research 2. Applied research 3. Proof of concept validation 4. Standalone prototyping implementation and test 5. Thorough testing of prototyping in representative environment 6. Prototyping implementations on full-scale realistic problems 7. System prototyping demonstration in operational environment 8. End of system development 9. Actual system has been thoroughly demonstrated and tested in its operational environment	1. Hypothetical commercial proposition 2. Commercial trial 3. Commercial scale up 4. Multiple commercial applications 5. Market competition driving widespread deployment 6. (Most mature) Bankable asset class The commercial readiness index is a composite of eight indicators, which are: • Regulatory environment • Stakeholder acceptance • Technical performance • Financial performance (costs) • Financial performance (revenue) • Industry supply chain and skills • Market opportunities • Company maturity

FIGURE 13: NUMBER OF PROJECTS IMPROVING COMMERCIAL READINESS INDICATORS



Each bar represents one indicator of commercial readiness, and shows how many projects (of the 27 assessed in 2020-21) contributed to improving that indicator. Most projects contribute to improving more than one indicator. The average across all indicators determines the overall level of the commercial readiness index for a particular technology.

Image credit: RayGen Resources

Construction Begins On RayGen World-First Dispatchable Solar PV Thermal Plant

Construction has begun on RayGen Resources' first-of-a-kind 'solar hydro' power plant with 4 MW of solar PV generation and 3 MW / 50 MWh (equivalent to 17 hours) of dispatchable storage capacity at Carwarp in Victoria's north-west.

RayGen describes the technology as a "low cost, large scale, long duration energy storage system" able to compete with more familiar technologies such as large-scale batteries and pumped hydro.

Confirmation that the project will proceed to the construction phase came as RayGen announced it had closed a $42 million capital raise, including $27 million of private investment led by AGL, Photon Energy, Schlumberger and Chevron. This is one of the largest independent capital raises of any ARENA-funded project to date. The project will create up to 70 jobs during construction and commissioning and three ongoing jobs.

ARENA has committed $15 million towards construction of the facility, building on $3 million in funding provided towards the feasibility study into the project in early 2020.

1.4 PERFORMANCE MEASURE

ARENA-funded projects increase supply of renewable energy.

TARGET: Total energy production from ARENA-funded demonstration and deployment projects is at least 80% of that intended at time of commitment.

SOURCE

ARENA Budget Statements 2020-21 p164

ARENA Corporate Plan 2020-21 – 2023-24 p20

RATIONALE FOR MEASURE

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.

RESULT

ACHIEVED: Overall, nominal annual electricity generation at 30 June 2021 was tracking slightly above that expected at the time of commitment.

Note: The methodology for 2020-21 is based on nominal annual electricity production with key variables being plant start date, capacity and an assumed capacity factor. The scope includes only the 45 projects that directly produce electricity.

FIGURE 14: NOMINAL ENERGY PRODUCTION - EXPECTED VS ACTUAL

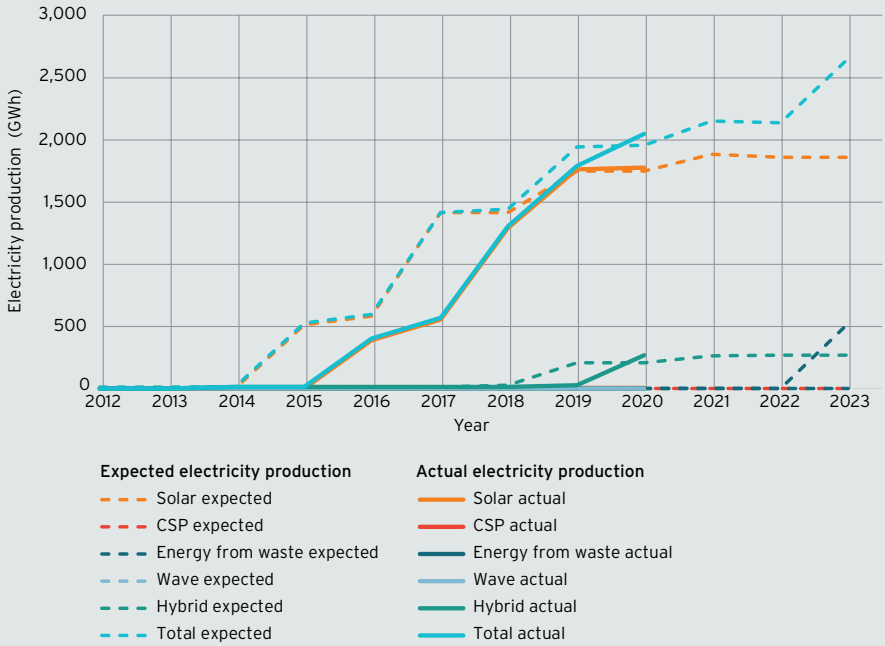


Image credit: APA.

2. ACTIVITY: Collaboration and knowledge sharing to make information and data available to a diverse audience and help increase the spread of ideas.

EXPECTED RESULTS:

Industry learns more quickly. Government, regulatory bodies and the public are better informed to navigate the energy transition.

WHO BENEFITS:

Industry, energy market bodies, policy makers, consumers and businesses benefit through a faster, smoother and lower cost energy transition.

2.1 PERFORMANCE MEASURE

ARENA funds or produces, and makes available, new knowledge products.

Target: Total of 440 knowledge sharing deliverables completed and knowledge sharing products produced.[3]

SOURCE

ARENA Corporate Plan 2020-21 – 2023-24 p21

RATIONALE FOR MEASURE

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.

RESULT

ACHIEVED: A total of 1119 knowledge sharing deliverables were completed and knowledge sharing products were produced.

- A total of 125[4] knowledge sharing deliverables were produced in 2020-21.
- A total of 994 knowledge sharing products were produced in 2020-21.

Table 8 provides a breakdown of knowledge sharing products.

[3]A knowledge sharing deliverable is something that a funding recipient is contractually obliged to provide, some of which may be confidential and some of which may be public. A knowledge sharing product is a public piece of work, either a deliverable from a project or a commissioned piece of work by a consultant.

[4]Please note that knowledge sharing surveys are not included in this year's total of knowledge sharing products, in order to focus on publicly available products.

TABLE 8: KNOWLEDGE SHARING PRODUCTS BY CATEGORY

PRODUCT	NUMBER
ARENAWIRE newsletter editions	**12**
Insights newsletters	**10**
Public reports uploaded to Knowledge Bank	**224**
Public presentations uploaded to Knowledge Bank	**8**
Public reports commissioned or prepared by ARENA Knowledge Sharing team and uploaded to the ARENA Knowledge Bank	**14**
Blog posts	**66**
Videos	**29**
Infographics	**8**
Project pages	**55**
Podcasts[5]	**0**
Policy submissions	**11**
Media releases	**42**
Social media posts (LinkedIn - 134; Facebook - 185; Twitter - 196)	**515**
TOTAL	**994**

[5]There were no podcasts scheduled to be published in 2020-21.

2.2 PERFORMANCE MEASURE

ARENA shares knowledge to enhance the competitiveness of renewable energy technologies.

TARGET: At least 75 per cent of stakeholders surveyed report that knowledge shared by ARENA has informed part of their decision making processes.

SOURCE

ARENA Budget Statements 2020-21 p164

ARENA Corporate Plan 2020-21 – 2023-24 p21

RATIONALE FOR MEASURE

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.

RESULT

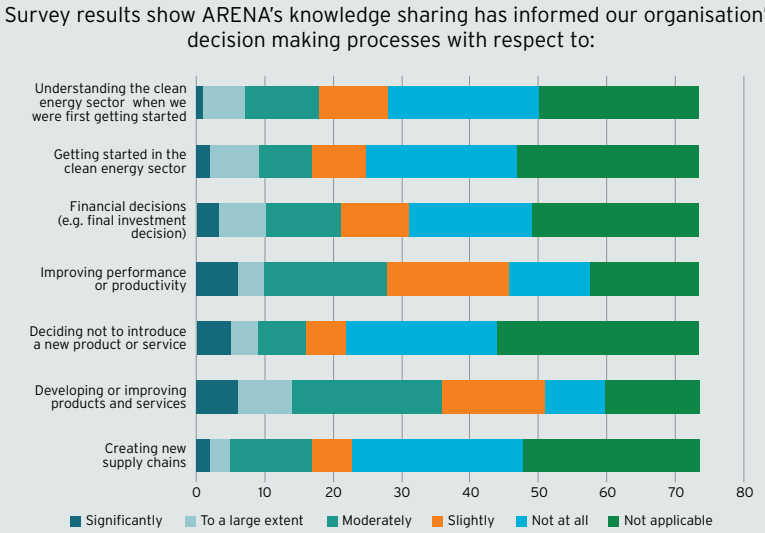
ACHIEVED: 84 per cent of stakeholders surveyed annually (per May 2021 results) reported having used ARENA resources and information to support decision making within their organisation. This includes responses of "slightly", "moderately", "to a large extent" and "significantly".

METHODOLOGY

ARENA refined the survey question to elicit more detailed information on how stakeholders use knowledge to inform their activities and decision making processes. Survey respondents were asked to rate the extent to which knowledge sharing informed decisions and actions across seven domains.

The results were gathered using a quarterly 15-minute ARENA survey of funding recipients. The five point rating scale was "not at all", "slightly", "moderately", "to a large extent" and "significantly". Respondents could also answer "not applicable". Data gathering was undertaken during April and May 2021. The total sample size for the survey was 74.

FIGURE 15: FURTHER INFORMATION ON ARENA'S IMPACT ON DECISION MAKING



2.3 PERFORMANCE MEASURE

The public is better informed about renewable energy technologies and the role they can play in Australia's energy transition.

TARGET: 10 per cent increase in visitor traffic (unique page views) to ARENA website.

SOURCE

ARENA Corporate Plan 2020-21 – 2023-24 p21

RATIONALE FOR MEASURE

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.

RESULT

ACHIEVED: There was a 16 per cent increase in visitor traffic (unique page views) to the ARENA website. A range of indicators demonstrate that ARENA achieved good results in better informing the public about renewable energy technologies and the role that they can play in Australia's energy transition. The table below provides evidence of ARENA's performance.

TABLE 9: ARENA'S PERFORMANCE IN BETTER INFORMING THE PUBLIC

PERFORMANCE INDICATOR	Percentage change 2019-20 to 2020-21
Unique page views	**16% increase**
Unique document downloads The number of times a visitor downloads an ARENA website document once	**16% increase**
ARENAWIRE subscribers The number of emails subscribed to the ARENAWIRE monthly e-newsletter	**34% increase**
Video views The number of times an ARENA video has been watched	**2% increase**

2.4 PERFORMANCE MEASURE

Partners value collaboration with ARENA.

TARGET: 85 per cent of survey respondents rate ARENA's performance as "good" or better.

SOURCE

ARENA Corporate Plan 2020-21 – 2023-24 p21

RATIONALE FOR MEASURE

Positive feedback and tangible outcomes demonstrate that collaboration is relevant and useful and that it is facilitated effectively.

RESULT

ACHIEVED: 98 per cent of respondents to ARENA's May Quarterly Survey rated ARENA's performance as good or better.

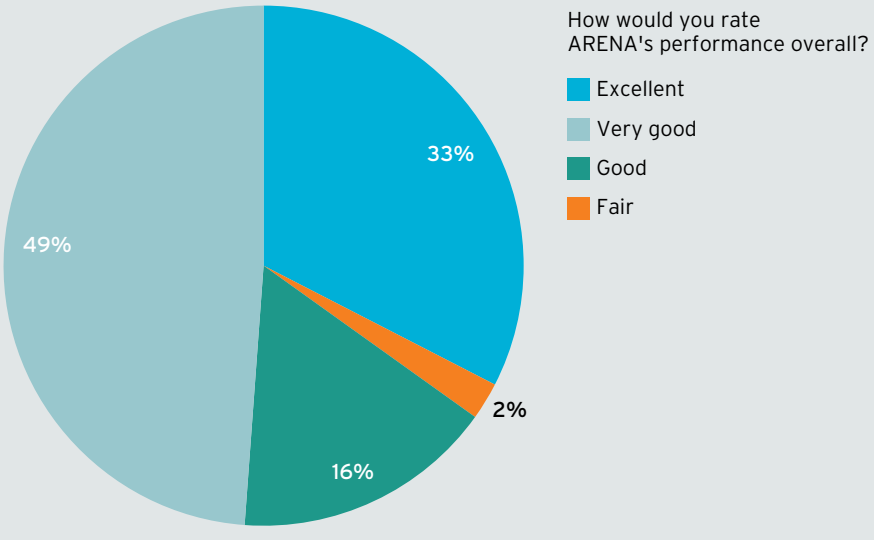
ARENA's overall performance is supported by its funding, knowledge sharing and collaboration activities. ARENA engages with a diverse range of stakeholders from various sectors including all levels of government, industry associations, finance providers, university researchers, media, think tanks, funding recipients and service providers, workshop attendees and online subscribers.

METHODOLOGY

ARENA refined the survey question to elicit more detailed information on how stakeholders use knowledge to inform their activities and decision making processes. Survey respondents were asked to rate ARENA's performance in advancing clean energy technologies across four domains.

The results were gathered using a quarterly 15-minute ARENA survey of funding recipients. Respondents were asked to rate ARENA's performance on a five point scale of "poor", "fair", "good", "very good" or "excellent". Data gathering was undertaken during April and May 2021. The total sample size for the survey was 129.

FIGURE 16: SURVEY RESULTS - ARENA'S OVERALL PERFORMANCE[6]



[6] No respondents rated ARENA's performance as "poor".

2.5 PERFORMANCE MEASURE

ARENA operates efficiently in the administration of public funds.

TARGET: Operating costs do not exceed 12 per cent of total expenditure over a rolling five-year period.

SOURCE

ARENA Corporate Plan 2020-21 – 2023-24 p21

RATIONALE FOR MEASURE

This efficiency measure demonstrates efficient use of taxpayer resources. A trailing five-year average will even out project delivery variance.

RESULT

NOT ACHIEVED: ARENA's operating costs over the five-year period to 2020-21 were 14.6 per cent of total expenditure.

The efficiency metric was introduced a number of years ago when it was expected that ARENA would have fully committed its legislated funding by now and would have started to wind down certain parts of its operations.

With the welcome news that ARENA would be funded for a further 10 years, the Board and Management made the decision not to wind down the market-facing functions of the Agency, and the retention of these skills and resources has impacted this metric.

Rather than indicating a level of inefficiency, Management views this expense as a necessary and prudent investment in the future of the Agency as we are being asked to play an important role in Australia's energy transition over the next decade.

Furthermore, Management is of the view that the efficiency measure is no longer fit for purpose and has been exploring alternative measures to demonstrate the efficient use of public funds.

Included in operating expenses are: expenditure related to our involvement in DEIP, producing knowledge sharing products, hosting knowledge sharing events, and commissioning studies and reports to inform the market. These are all important impact-related activities and while the costs of these activities are included in operating expenses and therefore in the numerator of the efficiency metric, we do not believe that this treatment is fair or informative.

METHODOLOGY

The measure is calculated as a trailing average of the preceding five years. This year's result is consistent with the 2019-20 result of 14.8 per cent.

FINDINGS OF EVALUATIONS

Image credit: Entura.

In 2020-21, ARENA commissioned evaluations on the two topics identified in the evaluation schedule published in the 2020-21 Corporate Plan.

Below are the evaluation findings as they relate to ARENA's purpose. The objective of the evaluation was to assess whether, and to what extent, the projects and funding programs have contributed to improvements in the competitiveness of renewable energy technologies and an increase in the supply of renewable energy.

Evaluation of ARENA's Demand Response (DR) competitive round

CONDUCTED BY CUTLERMERZ[7]

ABOUT THE PROGRAM

In 2017, ARENA embarked on a three-year partnership with the Australian Energy Market Operator (AEMO) to run a demand response (DR) trial to demonstrate the ability of DR to assist in managing the reliable supply of renewable energy at peak times. AEMO's Short Notice Reliability and Emergency Reserve Trader (SN RERT) panel was the mechanism with which to test participants' ability to reliably provide DR.

A portfolio of ten DR projects were selected across Victoria, New South Wales and South Australia to be funded over a three year period (2017-20).

The projects aimed to deliver 200 megawatts (MW) of flexible capacity by 2020 using a range of technologies and innovative behaviour change approaches. The projects covered both residential and commercial and industrial (C&I) energy users.

FINDINGS

The allocation of funding to ARENA's portfolio of DR projects was appropriate, effective, and efficient.

The portfolio of projects brought forward the market for DR services by approximately three years. This yielded an implied Benefit Cost Ratio for the ARENA funding of 1.25.

The use of DR is also estimated to have led to a reduction of between 55 to 75 kilotonnes of greenhouse gas (GHG) emissions which would have otherwise been emitted from gas peaking plants or diesel generators.

The trial accelerated the commercial readiness of the DR technologies, helping to establish a functioning and competitive market for DR services, predominantly for C&I DR services in New South Wales, South Australia and Victoria, and in Australia more broadly.

The trial also provided critical lessons to the industry in the applicability of residential programs for DR. A learning curve for trial participants was evident as their ability to provide DR improved throughout the trial.

ARENA's portfolio of projects as a whole was effective in delivering the trial's objective of 200 MW of tested DR capacity for the RERT.

[7]CutlerMerz is specialist management, economic and engineering consultancy to the power and energy sector.

FIGURE 17: NPV OF DR COSTS AND BENEFITS FROM 2017 TO 2030 (WITH ARENA FUNDING SCENARIO)

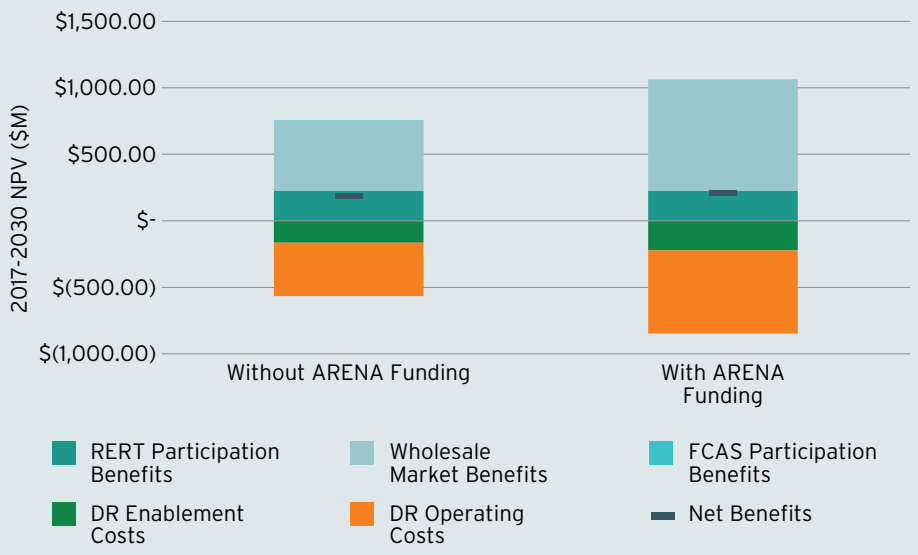


FIGURE 18: DR PORTFOLIO PROGRAM LOGIC

INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES	IMPACTS
	YEARS 2017 - 2020		YEARS 2016 - 2025	YEARS 2025 and beyond
ARENA funding to various projects in the DR trials	Funding recipients undertake their projects to achieve each project's objective Knowledge sharing	Funding recipients acquired capability and customers to deliver DR and participate in DR activities Key findings from the DR trials outlined in various reports to ARENA	Increased uptake on DR customers and capacity Development of the Wholesale Demand Response Mechanism	Increased revenue gained for DR participants from participating in the RERT Market Reduced cost of providing emergency services Avoided cost of paying for wholesale energy during peak events Reduced cost of producing wholesale energy Reduced GHG emissions through the avoided usage of gas peaker plant during peak events

Image credit: Stock.

Evaluation of ARENA's Virtual Power Plant (VPP) portfolio

CONDUCTED BY CUTLERMERZ

ABOUT THE PORTFOLIO

Since 2014, ARENA has been investing in VPPs to support the growth of technical expertise and development of commercial models to increase their scale and sophistication. Overall, ARENA has to date established a group of 11 projects to invest in VPPs, which together form ARENA's portfolio of VPP projects.

With most of the 11 projects now completed or nearing the end of their contract, ARENA engaged CutlerMerz to undertake an evaluation of the portfolio of projects in terms of the value provided to ARENA's stakeholders, the energy industry and the wider public as well as to identify lessons learned that may be applied to future programs.

FINDINGS

ARENA's funding of its portfolio of VPP projects was appropriate, effective, and efficient.

The funding helped support the development of programs that increased the competitiveness of VPPs and the renewable energy technologies supporting them. Similarly, ARENA deployed funding to support the supply of hardware and actively increased the support of renewable energy in Australia. Additionally, the program supported projects within both industry and universities, and in doing so, helped drive collaboration and knowledge sharing.

The portfolio of projects was effective in validating VPP technologies and testing the VPP's ability to access market benefits. In part, this was achieved through ARENA's funding strategy of progressively investing in VPP projects rather than a single funding round. This allowed projects to learn from one another over time.

The projects validated the ability of VPPs to access and effectively participate in FCAS markets and provide network benefits. The outcomes of the test FCAS market has informed the development of AEMO's Market Ancillary Services Specification (MASS), which the evaluators estimated has brought forward access to the FCAS market for VPPs by approximately three years.

A quantitative cost benefit assessment found that where VPPs can effectively participate in FCAS markets, they may avoid the capital cost of deploying large scale batteries to provide FCAS services. Overall, the resulting Benefit Cost Ratio (BCR) comparing the total benefits of bringing forward VPPs by three years to the total costs over the modelled period is 1.35.

FIGURE 19: NPV OF VPP COSTS AND BENEFITS FROM 2017 TO 2030 (WITH ARENA FUNDING SCENARIO)

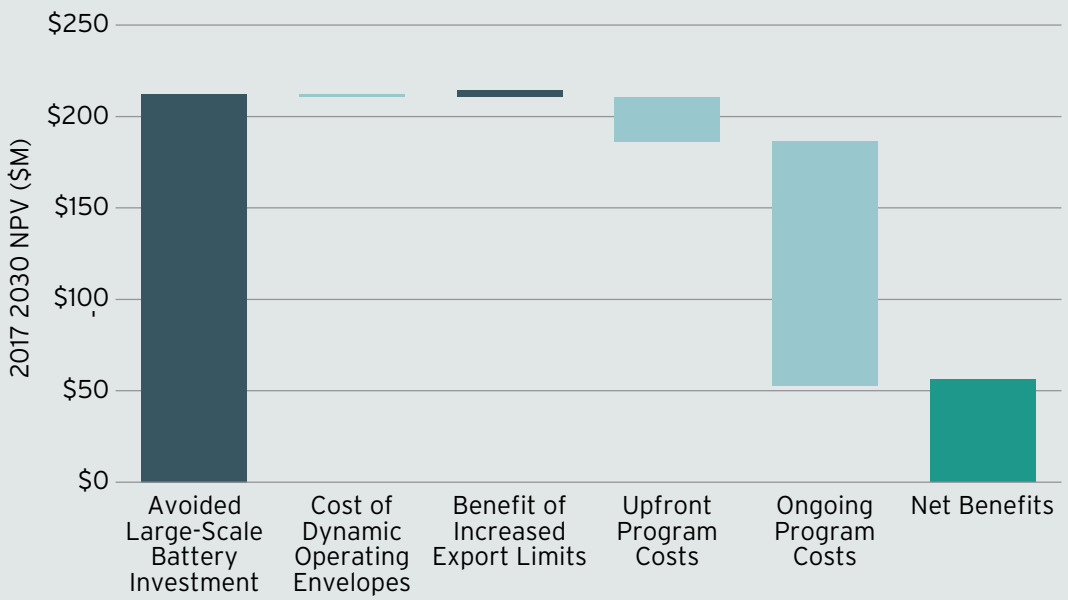


FIGURE 20: VPP PORTFOLIO PROGRAM LOGIC

INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES	IMPACTS
YEARS 2014 - 2021		YEARS 2018 - 2025		YEARS 2025 and beyond
ARENA funding to various projects in the VPP portfolio	Funding recipients undertake their projects to achieve each project's objective Knowledge sharing	Funding recipients additional understanding of VPP capability, functionality and barriers, and roll out of batteries to deliver and participate in VPP activities Key findings from the VPP trials outlined in various reports to ARENA	Development of the MASS Development of an API to enable VPPs to consistently access dynamic export limits from DSOs (networks)	Avoided cost of large-scale battery systems installed to participate in the FCAS markets Increased benefits from VPP participants exporting due to earlier adoption of dynamic export limits in selective states

ANALYSIS

THIS SECTION OUTLINES HOW SIGNIFICANT EVENTS DURING THE YEAR AFFECTED ARENA'S OPERATIONS, FUNDED PROJECTS AND RESULTS.

KEY DEVELOPMENTS AFFECTING PROGRAM IMPLEMENTATION AND PROJECT DELIVERY

COVID-19 continued to affect ARENA's program implementation and the delivery of ARENA-funded projects.

The demonstration and deployment portfolios reported challenges with overseas supply chains, travel restrictions affecting access to work sites, and restricted access to potential customers for projects that needed to sign up residential market participants.

Projects involving universities reported availability of key overseas resources, access to specialty equipment due to travel restrictions and the availability of funding as major challenges.

Image credit: ARENA.

APPENDICES

APPENDIX 1: FINANCIAL ASSISTANCE AGREEMENTS AND PROGRESS

Image credit: Genex Power.

ARENA is required under the ARENA Act to publish details of financial assistance agreements and an assessment of the extent to which these agreements have progressed, or are expected to progress, the principal objectives and priorities as stated in the general funding strategy in force for the year.

The *Australian Renewable Energy Agency (Consequential Amendments and Transitional Provisions) Act 2011* also requires ARENA to report details of people to whom financial assistance is provided under a transferred Australian Government funding agreement or Australian Solar Institute agreement.

During the reporting period, 289 active projects were managed by ARENA. Of those projects, 49 were completed in 2020-21 and three were terminated during the course of the year.

ARENA contractually committed funds to 59 new projects in 2020-21 (Table 10). As with previous years, some of the projects contractually committed during 2020-21 were approved by the Board in the previous financial year, while other projects approved by the Board during 2020-21 will be contractually committed in 2021-22. This is reflective of ARENA's approval processes.

Details of all active projects (including new commitments) during 2020-21 are provided in Table 11.

ARENA invested funds in 10 organisations under the Renewable Energy Venture Capital Fund (REVC) Program in 2020-21. Details of those investments are provided in Table 12.

TABLE 10: ARENA FUNDS CONTRACTUALLY COMMITTED TO NEW PROJECTS IN 2020-21

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
AGL Energy Services Pty Limited	Active	AGL Electric Vehicle Orchestration Trial	$2,893,638	VIC	Integrating renewables into the electricity system	Enabling	Deployment
Alcoa of Australia Limited	Active	Mechanical Vapour Recompression for Low Carbon Alumina Refining Project	$11,285,293	WA	Supporting industry to reduce emissions	Enabling	Demonstration
Australian Energy Council Limited	Active	Double-sided Causer Pays Study	$164,550	NSW	Integrating renewables into the electricity system	Enabling	Other Study
Australian Energy Market Operator	Active	Project EDGE (Energy Demand & Generation Exchange)	$12,927,065	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Australian National University	Active	Physical vapour deposited passivating contacts for high efficiency silicon solar cells	$404,177	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Perovskite modules that are stable under real-world conditions	$735,288	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Advanced multifunctional dielectric layers enabling simplified production of high-efficiency silicon solar cells	$455,322	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Heterocontact-Polysilicon Hybrid IBC Solar Cells	$507,820	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Monolithic Si/perovskite tandem solar cell: advanced designs towards high-efficiency at low-cost	$1,130,542	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Brimbank City Council	Active	St Albans Leisure Centre Replacement - Carbon Neutral Deployment Project	$1,530,000	VIC	Supporting industry to reduce emissions	Enabling	Deployment
Canadian Solar (Australia) Pty Limited	Active	Connection studies at Carwarp Solar Farm	$270,500	QLD	Integrating renewables into the electricity system	Battery storage	Demonstration

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
Centennial Newstan Pty Limited	Active	Pumped Hydro Energy Storage Project	$995,000	NSW	Integrating renewables into the electricity system	Pumped hydro energy storage	Feasibility Study
Chargefox Pty Ltd	Active	Future Fuels Public Fast Charging Adelaide Project	$600,000	SA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Chargefox Pty Ltd	Active	Future Fuels Public Fast Charging Perth Project	$800,000	WA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Desert Knowledge Foundation Ltd	Active	Alice Springs Future Grid Project, deployment	$2,171,917	NT	Integrating renewables into the electricity system	Enabling	Deployment
Diffuse Energy Pty Ltd	Active	Resilient Wind Energy for Telecommuni-cations Sites	$341,990	NSW	Foundation portfolios	Wind	Demonstration
Edify Energy Pty Ltd	Active	Darlington Point Energy Storage System	$6,600,000	NSW	Integrating renewables into the electricity system	Battery storage	Deployment
Electric Highway Tasmania Proprietary Limited	Active	Hobart EHT Fast Charger Network Project	$400,000	TAS	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Darwin	$300,000	NT	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Hobart	$400,000	TAS	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Canberra	$500,000	ACT	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Adelaide	$600,000	SA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Perth	$800,000	WA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Brisbane	$1,500,000	QLD	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Melbourne	$2,250,000	VIC	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Sydney	$2,500,000	NSW	Integrating renewables into the electricity system	Electric vehicles	Deployment
Genex Power Limited	Active	Kidston Pumped Hydro Energy Storage Project	$47,000,000	QLD	Integrating renewables into the electricity system	Pumped hydro energy storage	Deployment

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Adelaide	$600,000	SA	Integrating renewables into the electricity system	Electric vehicles	Deployment
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Melbourne	$2,250,000	VIC	Integrating renewables into the electricity system	Electric vehicles	Deployment
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Brisbane	$1,500,000	QLD	Integrating renewables into the electricity system	Electric vehicles	Deployment
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Sydney	$2,500,000	NSW	Integrating renewables into the electricity system	Electric vehicles	Deployment
Jemena Electricity Networks (VIC) Ltd	Active	Dynamic Electric Vehicle Charging Trial Project	$1,558,590	VIC	Integrating renewables into the electricity system	Electric vehicles	Demonstration
Jemena Gas Networks (NSW) Ltd	Active	Biomethane Injection Demonstration	$5,900,000	NSW	Accelerating hydrogen	Bioenergy	Demonstration
Macquarie University	Active	Substitution of niche-market PV production tools with cost-effective consumer-electronics technology	$420,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
Monash University	Active	Australian Industry ETI Delivery Stage Project	$2,000,000	VIC	Supporting industry to reduce emissions	Enabling	Other Study
Origin Energy Limited	Active	Electric Vehicle Smart Charging Trial	$838,400	NSW	Integrating renewables into the electricity system	Electric vehicles	Demonstration
RayGen Resources Pty Ltd	Active	Solar Power Plant Demonstration Project	$15,000,000	VIC	Integrating renewables into the electricity system	Solar thermal	Deployment
Redback Operations Pty Ltd	Active	SHIELD - Synchronising Heterogeneous Information (to) Evaluate Limits (for) DNSPs Project	$2,629,500	QLD	Integrating renewables into the electricity system	Enabling	Demonstration
Regional Power Corporation	Active	Denham Hydrogen Demonstration	$2,573,071	WA	Accelerating hydrogen	Hydrogen	Demonstration
Relectrify Holdings Pty Ltd	Active	Second-Life Battery Trial	$1,488,560	VIC	Foundation portfolios	Battery storage	Demonstration
Rio Tinto Aluminium Limited	Active	Rio Tinto Pacific Operations Hydrogen Program	$579,787	QLD	Supporting industry to reduce emissions	Hydrogen	Other Study
SA Power Networks	Active	Flexible exports for solar PV trial	$2,085,337	SA	Integrating renewables into the electricity system	Solar PV	Demonstration

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
Sundrive Solar Pty Ltd	Active	Copper Metallisation Demonstration Project	$3,000,000	NSW	Integrating renewables into the electricity system	Solar PV	Demonstration
Swinburne University of Technology	Active	Electrically-Enhanced Recycling Process for EoL Si PV-Cells	$404,000	VIC	Integrating renewables into the electricity system	Solar PV	R&D
The Trustee for Yadlamalka Land Trust	Active	Yadlamalka Station co-located Vanadium redox battery storage solar project	$5,695,000	SA	Integrating renewables into the electricity system	Battery storage	Demonstration
TransGrid	Active	Wallgrove Battery	$10,147,919	NSW	Integrating renewables into the electricity system	Battery storage	Deployment
United Energy Distribution Pty Limited	Active	LV Battery Trial	$4,000,000	VIC	Integrating renewables into the electricity system	Battery storage	Demonstration
University of Melbourne	Active	Singlet Fission enhanced silicon solar cells	$1,290,333	VIC	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Project MATCH - Distributed energy resources (DER)	$981,241	NSW	Integrating renewables into the electricity system	Enabling	Other Study
University of New South Wales	Active	Closed-loop recycling & remanufacturing end-of-life silicon photovoltaic modules: towards a circular economy	$1,560,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Next-generation selective-emitters for commercial PERC and TOPCon solar panels	$1,232,429	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Reduced Solar Module Temperature R&D project	$1,767,730	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Earth-abundant, RoHS-compliant antimony chalcogenide: top cell alternative for silicon tandem cells	$693,388	NSW	Integrating renewables into the electricity system	Solar PV	R&D

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
University of New South Wales	Active	Highly efficient, low-cost and eco-friendly recycling technology for silicon photovoltaic panels	$1,360,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Lower PV cost by a combination of luminescence images and machine-learning	$694,224	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of Sydney	Active	Durable Silicon Perovskite Tandem Photovoltaics	$987,285	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of Sydney	Active	Triple Junction Silicon-Perovskite-Perovskite Tandem Photovoltaics	$1,494,340	NSW	Integrating renewables into the electricity system	Solar PV	R&D
Upowr Pty Ltd	Active	Customer focused design for DER participation demonstration	$446,000	VIC	Integrating renewables into the electricity system	Battery storage	Demonstration
VPP Project 1 (SA) Pty Ltd	Active	South Australia's Virtual Power Plant Phase 3A	$8,200,000	SA	Integrating renewables into the electricity system	Battery storage	Deployment
TOTAL		**59**	**$185,940,236**				

TABLE 11: ALL ACTIVE PROJECTS MANAGED BY ARENA IN 2020-21 (INCLUDING NEW PROJECTS LISTED IN TABLE 10)

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID 2020-21 (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
Advanced Energy Resources	Active	Fringe of Grid Battery Microgrid for Port Gregory (WA) Wind & Solar Farm	$3,000,000	$250,000	WA	Integrating renewables into the electricity system	Battery storage	Demonstration
Advisian Pty Ltd	Active	Wind and Solar Forecasting for the NEM Project	$499,722	$251,240	QLD	Integrating renewables into the electricity system	Market data and information	Demonstration
Aeolius Wind Systems Pty Ltd	Active	Wind Forecasting Demonstration Project	$1,899,000		VIC	Integrating renewables into the electricity system	Market data and information	Demonstration
AGL Energy Services Pty Limited	Active	Application for Demand Response in NSW	$2,624,019	$638,051	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
AGL Energy Services Pty Limited	Active	Virtual Power Plant in South Australia (VPP-SA) Project	$5,300,000	$2,000,000	SA	Integrating renewables into the electricity system	Enabling	Deployment
AGL Energy Services Pty Limited	Active	Electric Vehicle Orchestration Trial	$2,893,638	$613,191	VIC	Integrating renewables into the electricity system	Enabling	Deployment
AGL PV Solar Holdings Pty Limited	Closed	AGL Solar PV project	$166,700,000		NSW	Foundation portfolios	Large-scale solar	Deployment
Alcoa of Australia Limited	Active	Mechanical Vapour Recompression for Low Carbon Alumina Refining Project	$11,285,293		WA	Supporting industry to reduce emissions	Enabling	Demonstration
Alinta Energy Pilbara Finance Pty Ltd	Active	Solar Gas Hybrid Project	$24,200,000		WA	Supporting industry to reduce emissions	Solar PV	Deployment
Allume Energy Pty Ltd	Active	Rooftop Solar Salvation Army Pilot Demonstration Project	$220,000	$78,000	TAS	Integrating renewables into the electricity system	Solar PV	Demonstration
Apace Research Ltd	Active	Cellulosic Ethanol Pilot Plant	$11,960,000		NSW	Foundation portfolios	Bioenergy	Demonstration
Applied Electric Vehicles Pty Ltd	Active	Energy Freedom Solar Electric Vehicle Pilot Project	$2,000,000	$1,588,133	VIC	Integrating renewables into the electricity system	Electric vehicles	Demonstration
APT Facility Management Pty Limited	Active	APA Renewable Methane Demonstration Project	$1,100,000	$320,000	QLD	Accelerating hydrogen	Hydrogen	Demonstration

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
APT Management Services Pty Limited	Active	Emu Downs Solar Farm Project	$5,500,000		WA	Integrating renewables into the electricity system	Large-scale solar	Deployment
APT Management Services Pty Limited	Active	Darling Downs Solar Farm	$20,000,000		QLD	Foundation portfolios	Large-scale solar	Deployment
Australand Residential Edmondson Park Pty Limited	Active	Frasers Property Australia Net Zero Energy Homes	$708,910		NSW	Integrating renewables into the electricity system	Solar PV	Deployment
Australian Alliance for Energy Productivity Limited	Active	Renewable energy for process heat opportunity study (phase 2)	$486,030	$245,430	NSW	Supporting industry to reduce emissions	Industrial heating and cooling	Feasibility Study
Australian Alliance for Energy Productivity Limited	Closed	Renewable energy for process heat	$428,956		NSW	Supporting industry to reduce emissions	Industrial heating and cooling	Other Study
Australian Association for Hydrogen Energy	Active	IEA Technology Collaboration Program - Hydrogen	$494,000		WA	Accelerating hydrogen	Hydrogen	Other Study
Australian Energy Council Limited	Active	Double-sided Causer Pays Study	$164,550		NSW	Integrating renewables into the electricity system	Enabling	Other Study
Australian Energy Market Operator	Active	Virtual Power Plant (VPP) Demonstrations	$3,465,140	$740,000	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Australian Energy Market Operator	Active	Project EDGE (Energy Demand & Generation Exchange)	$12,927,065	$12,927,065	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Australian Energy Market Operator	Closed	National Energy Simulator Feasibility Study	$500,000		VIC	Integrating renewables into the electricity system	Enabling	Other Study
Australian Gas Networks Limited	Active	Blending Hydrogen into Victorian and South Australian Gas Infrastructure	$1,280,000		SA	Accelerating hydrogen	Hydrogen	Feasibility Study
Australian Institute of Refrigeration Airconditioning and Heating	Active	Affordable Heating and Cooling Innovation Hub (i-Hub)	$6,480,870		VIC	Supporting industry to reduce emissions	Enabling	Deployment
Australian National University	Active	Hydrogen Generation by Electro-Catalytic Systems R&D Project	$615,682	$184,705	ACT	Accelerating hydrogen	Hydrogen	R&D
Australian National University	Active	Solar Hydrogen Generation R&D Project	$1,712,303	$491,191	ACT	Accelerating hydrogen	Hydrogen	R&D

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
Australian National University	Active	Direct Water Electrolysis R&D Project	$1,310,407	$370,622	ACT	Accelerating hydrogen	Hydrogen	R&D
Australian National University	Active	Short Term Off-River Energy Storage Stage 2 (STORES 2) Study	$308,736	$103,667	ACT	Integrating renewables into the electricity system	Pumped hydro energy storage	Other Study
Australian National University	Active	Next Generation Industrial Bifacial Silicon Solar Cells	$1,977,845		ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Solar Cells by DESIJN (Deposited Silicon Junctions)	$1,116,142		ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Driving Increased Efficiency and Reliability in Silicon Photovoltaics - from ingots to modules	$2,399,392	$479,878	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Monolithic perovskite – silicon Tandem Cells: Towards Commercial Reality	$672,841		ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Development of Stable Electrodes for Perovskite Solar Cells	$936,732		ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Physical vapour deposited passivating contacts for high efficiency silicon solar cells	$404,177	$202,089	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Perovskite modules that are stable under real-world conditions	$735,288	$367,644	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Advanced multifunctional dielectric layers enabling simplified production of high-efficiency silicon solar cells	$455,322	$227,661	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Active	Heterocontact-Polysilicon Hybrid IBC Solar Cells	$507,820	$253,910	ACT	Integrating renewables into the electricity system	Solar PV	R&D

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Australian National University	Active	Monolithic Si/perovskite tandem solar cell: advanced designs towards high-efficiency at low cost	$1,130,542	$565,271	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Closed	Community Models for Deploying and Operating Distributed Energy Resources Study	$498,650	$199,460	ACT	Integrating renewables into the electricity system	DER integration	Other Study
Australian National University	Closed	A Robotic Vision System for Automatic Inspection and Evaluation of Solar Plant Infrastructure	$444,016		ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian National University	Closed	Tandem PV Micro Concentrator	$837,941	$207,128	ACT	Integrating renewables into the electricity system	Solar PV	R&D
Australian PV Institute Limited	Active	IEA Technology Collaboration Programme - PV Power Systems	$668,000	$141,250	NSW	Integrating renewables into the electricity system	Solar PV	Other Study
Australian PV Institute Limited	Active	IEA Technology Collaboration Programme - Solar Heating and Cooling	$383,500	$63,700	NSW	Supporting industry to reduce emissions	Solar thermal	Other Study
Barcaldine Remote Community Solar Farm	Active	Barcaldine 25MW(DC) Remote Community Solar Project	$22,800,000		QLD	Foundation portfolios	Large-scale solar	Demonstration
Bioenergy Australia	Active	IEA Technology Collaboration Programme - Bioenergy	$885,733	$213,239	ACT	Foundation portfolios	Bioenergy	Other Study
BOC Ltd	Active	Renewable Hydrogen Production and Refuelling Project	$950,000	$600,000	QLD	Accelerating hydrogen	Hydrogen	Demonstration
BP Australia Pty Ltd	Active	Project GERI Feasibility Study	$1,710,000	$812,250	WA	Accelerating hydrogen	Hydrogen	Feasibility Study
Brimbank City Council	Active	St Albans Leisure Centre Replacement - Carbon Neutral Deployment Project	$1,530,000		VIC	Supporting industry to reduce emissions	Enabling	Deployment
BT Imaging Pty Ltd	Active	Solar Module Inspection System Project	$999,999		NSW	Integrating renewables into the electricity system	Solar PV	Deployment

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BTPS 1 Pty Ltd	Active	Transforming Industrial Rooftops with the Bright Thinkers Power Station (BTPS)	$496,857	$49,687	NSW	Integrating renewables into the electricity system	Solar PV	Demonstration
Bundaberg Regional Irrigators Group	Closed	Adapting Renewal Energy Concepts to Irrigated Sugarcane Production at Bundaberg	$442,790		QLD	Integrating renewables into the electricity system	Enabling	Demonstration
Canadian Solar	Active	Canadian Solar connection studies at Carwarp Solar Farm	$270,500		QLD	Integrating renewables into the electricity system	Battery storage	Demonstration
Canadian Solar	Active	Longreach Solar Farm	$1,300,000		QLD	Foundation portfolios	Large-scale solar	Deployment
Canadian Solar	Active	Oakey Solar Farm	$2,162,000		QLD	Foundation portfolios	Large-scale solar	Deployment
Carnegie Wave Energy Limited	Closed	Garden Island Microgrid Project	$2,500,000		WA	Foundation portfolios	Marine	Demonstration
Centennial Newstan Pty Limited	Active	Centennial Pumped Hydro Energy Storage Project	$995,000		NSW	Integrating renewables into the electricity system	Pumped hydro energy storage	Feasibility Study
Chargefox Pty Ltd	Active	Future Fuels Public Fast Charging Adelaide Project	$600,000		SA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Chargefox Pty Ltd	Active	Future Fuels Public Fast Charging Perth Project	$800,000		WA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Chargefox Pty Ltd	Active	Chargefox Electric Vehicle Charging Network Project	$6,000,000	$500,000	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Climate Council of Australia	Active	Cities Power Partnership	$493,150		VIC	Integrating renewables into the electricity system	Other	Other Study
Climate-KIC Australia Ltd	Active	Residential heat pump study	$500,000	$150,000	NSW	Integrating renewables into the electricity system	Geothermal	Other Study
Climate-KIC Australia Ltd	Active	Business Renewables Centre Australia	$500,000	$100,000	NSW	Foundation portfolios	Market data and information	Other Study
CSIRO	Active	Dispatchable, cost effective power from forest and mill waste using the direct injection carbon engine (bioDICE)	$432,000	$220,422	NSW	Foundation portfolios	Bioenergy	Other Study

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CSIRO	Active	National Low-Voltage Feeder Taxonomy Study	$485,025		NSW	Integrating renewables into the electricity system	DER integration	Other Study
CSIRO	Active	Missions Innovation Challenge - Smart Grids	$113,750		NSW	Integrating renewables into the electricity system	Enabling	Other Study
CSIRO	Active	Methane Fuel Carrier R&D Project	$1,085,553	$325,666	NSW	Accelerating hydrogen	Hydrogen	R&D
CSIRO	Active	Hydrogen to Ammonia R&D Project	$1,175,000	$352,500	VIC	Accelerating hydrogen	Hydrogen	R&D
CSIRO	Active	Liquid Fuel Carrier R&D Project	$1,010,081	$303,006	VIC	Accelerating hydrogen	Hydrogen	R&D
CSIRO	Active	Solar Thermochemical Hydrogen R&D Project	$2,007,676	$602,303	NSW	Accelerating hydrogen	Hydrogen	R&D
CSIRO	Active	IEA Technology Collaboration Program - Ocean Energy Systems	$283,500		TAS	Foundation portfolios	Marine	Other Study
CSIRO	Active	Manufacturing of Printed Perovskite PV Modules	$3,310,248		VIC	Integrating renewables into the electricity system	Solar PV	R&D
CSIRO	Active	IEA Technology Collaboration Program - SolarPACES (Solar Power and Chemical Energy Systems)	$364,000		NSW	Integrating renewables into the electricity system	Solar thermal	Other Study
CSIRO	Active	Australian Solar Thermal Research Institute (ASTRI)	$49,958,747	$9,000,000	NSW	Integrating renewables into the electricity system	Solar thermal	R&D
CSIRO	Closed	Australian Renewable Energy Mapping Infrastructure (AREMI)	$2,341,800	$70,000	NSW	Integrating renewables into the electricity system	Enabling	Other Study
Curtin University	Closed	White Gum Valley: Increasing the uptake of solar PV	$900,375	$100,000	WA	Integrating renewables into the electricity system	Enabling	R&D
Desert Knowledge Foundation Ltd	Active	Alice Springs Future Grid Project	$2,171,917		NT	Integrating renewables into the electricity system	Enabling	Deployment
Diffuse Energy Pty Ltd	Active	Diffuse Energy Resilient Wind Energy for Telecommunications Sites	$341,990	$159,437	NSW	Foundation portfolios	Wind	Demonstration

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DNV GL	Active	Multi-Model and Machine Learning Wind Forecast Project	$270,941		VIC	Integrating renewables into the electricity system	Market data and information	Demonstration
DNV GL	Closed	Performance Standard for a Battery Storage System connected to a Domestic/ Small Commercial Solar PV System	$1,440,000	$290,000	VIC	Integrating renewables into the electricity system	Battery storage	Other Study
Dynamic Limits	Active	DER Feasibility Study	$292,213		NSW	Integrating renewables into the electricity system	DER integration	Feasibility Study
Dyno Nobel Moranbah Pty Ltd	Closed	Expansion of Moranbah - Feasibility of Renewable ('Green') Hydrogen	$980,000	$430,000	QLD	Accelerating hydrogen	Hydrogen	Feasibility Study
East Rockingham RRF Project Co Pty Ltd	Active	East Rockingham Waste to Energy Project	$18,000,000		WA	Foundation portfolios	Bioenergy	Deployment
Echuca Regional Health	Active	Rooftop Concentrated Solar Thermal for Hospital Heating/ Cooling Demonstration Project	$136,000		VIC	Integrating renewables into the electricity system	Solar thermal	Demonstration
Edify Energy Pty Ltd	Active	Darlington Point Energy Storage System	$6,600,000		NSW	Integrating renewables into the electricity system	Battery storage	Deployment
EDL Group Operations Pty Ltd	Active	Coober Pedy Renewable Diesel Hybrid	$18,410,879		SA	Foundation portfolios	Hybrid	Demonstration
ElectraNet	Closed	ElectraNet Energy Storage for Commercial Renewable Integration (ESCRI) Phase 2	$12,000,000	$300,000	SA	Integrating renewables into the electricity system	Battery storage	Deployment
Electric Highway Tasmania Proprietary Limited	Active	Hobart EHT Fast Charger Network Project	$400,000		TAS	Integrating renewables into the electricity system	Electric vehicles	Deployment
Electricity Generation and Retail Corporation	Active	Alkimos Beach Energy Storage Project	$3,310,000		WA	Integrating renewables into the electricity system	Enabling	Demonstration
Element 25 Limited	Active	Intermittent Dynamic Electrowinning using renewable energy for The Butcherbird Project	$490,000		WA	Supporting industry to reduce emissions	Enabling	Other Study

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EnergyAustralia Development Pty Ltd	Closed	Demand Response NSW	$1,435,500	$334,950	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
EnergyAustralia Development Pty Ltd	Closed	Demand Response VIC and SA	$6,929,000	$1,616,767	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
EnergyAustralia Development Pty Ltd	Closed	South Australian Pumped Hydro Energy Storage Project - Phase 2	$500,000	$250,000	SA	Integrating renewables into the electricity system	Pumped hydro energy storage	Other Study
Energylab Australia Pty Limited	Closed	Clean Energy Startup Support Programs Project	$480,000	$360,000	NSW	Supporting industry to reduce emissions	Enabling	Demonstration
EnerNOC	Closed	Demand Response NSW	$1,800,000	$420,000	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
EnerNOC	Closed	Demand Response VIC	$5,400,000	$1,260,000	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Enova Energy Pty Ltd	Active	Community Battery Storage and Peer to Peer Trading Platform	$700,000		NSW	Integrating renewables into the electricity system	Battery storage	Demonstration
Entura	Active	IEA Technology Collaboration Program - Hydropower	$280,000		TAS	Foundation portfolios	Enabling	Other Study
Entura	Closed	Flinders Island Hybrid Energy Hub Project	$5,500,000		TAS	Foundation portfolios	Hybrid	Demonstration
Entura	Closed	Rottnest Island Renewable Energy Water Nexus Project	$3,758,010		WA	Foundation portfolios	Hybrid	Demonstration
Entura	Closed	Repurposing the Tarraleah hydropower scheme for the future electricity market	$2,500,000	$1,050,000	TAS	Integrating renewables into the electricity system	Pumped hydro energy storage	Other Study
ERM Power Retail Pty Ltd	Active	Advancing renewables in the manufacturing sector project	$250,000		QLD	Supporting industry to reduce emissions	Enabling	Other Study
Evenergi Pty Ltd	Active	Charge Together Australia - Phase 2	$469,380		NSW	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Darwin	$300,000		NT	Integrating renewables into the electricity system	Electric vehicles	Deployment

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Evie Networks	Active	Future Fuels Public Fast Charging Hobart	$400,000		TAS	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Canberra	$500,000		ACT	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Adelaide	$600,000		SA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Perth	$800,000		WA	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Brisbane	$1,500,000		QLD	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Melbourne	$2,250,000		VIC	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Future Fuels Public Fast Charging Sydney	$2,500,000		NSW	Integrating renewables into the electricity system	Electric vehicles	Deployment
Evie Networks	Active	Fast Cities - Creating a National Ultrafast EV Charging Infrastructure Network	$15,000,000	$2,000,000	QLD	Integrating renewables into the electricity system	Enabling	Demonstration
Evoenergy	Active	DER integration and automation project	$2,056,292	$1,072,807	ACT	Integrating renewables into the electricity system	DER integration	Demonstration
Flow Power	Active	Demand Response NSW	$1,318,250	$430,628	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
Fulcrum3D Pty Ltd	Closed	Wind Forecasting for the NEM	$493,242	$108,860	NSW	Integrating renewables into the electricity system	Market data and information	Demonstration
Fulcrum3D Pty Ltd	Closed	CloudCAM Solar Forecasting for the NEM	$469,800	$80,322	QLD	Integrating renewables into the electricity system	Market data and information	Deployment
Genex Power Limited	Active	Kidston Solar Project	$8,850,000		QLD	Foundation portfolios	Large-scale solar	Deployment
Genex Power Limited	Active	Genex Kidston Pumped Hydro Energy Storage Project	$47,000,000	$27,000,000	QLD	Integrating renewables into the electricity system	Pumped hydro energy storage	Deployment
Genex Power Limited	Active	Kidston Stage 2 Project	$5,000,000		QLD	Integrating renewables into the electricity system	Pumped hydro energy storage	Other Study
GESS Devco Pty Ltd	Active	Gannawarra Energy Storage System (GESS)	$22,735,000		VIC	Integrating renewables into the electricity system	Battery storage	Demonstration

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Glaciem Cooling Technologies Pty Ltd	Active	Advancing Renewables with PCM Thermal Energy Storage Project	$1,962,037	$1,150,237	SA	Supporting industry to reduce emissions	Enabling	Demonstration
Goldwind Australia Pty Ltd	Active	White Rock Solar Farm	$5,400,000		NSW	Foundation portfolios	Large-scale solar	Deployment
Goldwind Australia Pty Ltd	Active	Demonstration of a high penetration renewable microgrid on an operating mine in WA	$13,500,000		WA	Foundation portfolios	Off grid	Deployment
Goldwind Australia Pty Ltd	Active	Virtual Synchronous Generator at Gullen Range Wind Farm	$271,450	$108,580	NSW	Integrating renewables into the electricity system	System security	Demonstration
GreenSync Pty Ltd	Active	Decentralised Energy Exchange (deX) Program	$10,000,000	$1,883,631	VIC	Integrating renewables into the electricity system	Enabling	Deployment
Gullen Solar	Active	Gullen Range Solar Farm	$9,900,000		NSW	Foundation portfolios	Large-scale solar	Deployment
Hazer Group Limited	Active	Hazer Process Demonstration Plant	$9,410,000	$9,410,000	WA	Accelerating hydrogen	Hydrogen	Demonstration
Hivve Technology Pty Ltd	Active	Sustainable Modular Classrooms	$334,650	$36,811	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
Hydrostor Australia Pty Ltd	Terminated	Advanced Compressed Air Energy Storage South Australia Project	$6,000,000		SA	Integrating renewables into the electricity system	Other	Demonstration
Icon Retail Investments Limited and AGL ACT Retail Investments Pty Ltd	Active	Realising Electric Vehicle-to-grid Services Project	$2,403,005	$343,893	ACT	Integrating renewables into the electricity system	Electric vehicles	Demonstration
Indigenous Essential Services Pty Ltd	Active	Northern Territory Solar Energy Transformation Program (SETuP)	$35,000,000	$325,000	NT	Foundation portfolios	Hybrid	Demonstration
Indra Australia Pty Ltd	Active	Smart Microgrid Project	$2,974,162	$1,095,702	VIC	Integrating renewables into the electricity system	DER integration	Demonstration
Industrial Monitoring & Control Pty Ltd	Active	Skycam and Multi-Model Solar Forecasting Project	$1,247,841	$108,888	NSW	Integrating renewables into the electricity system	Market data and information	Demonstration
Intercast & Forge Pty Ltd	Closed	Demand Response SA	$316,102	$75,517	SA	Integrating renewables into the electricity system	Enabling	Demonstration

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IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Adelaide	$600,000		SA	Integrating renewables into the electricity system	Electric vehicles	Deployment
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Melbourne	$2,250,000		VIC	Integrating renewables into the electricity system	Electric vehicles	Deployment
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Brisbane	$1,500,000		QLD	Integrating renewables into the electricity system	Electric vehicles	Deployment
IPAH Client Solutions Australia Pty Ltd	Active	Future Fuels Public Fast Charging Sydney	$2,500,000		NSW	Integrating renewables into the electricity system	Electric vehicles	Deployment
IT Power (Australia) Pty Limited	Active	Testing the performance of lithium-ion batteries	$1,290,000	$45,000	ACT	Integrating renewables into the electricity system	Battery storage	R&D
IT Power (Australia) Pty Limited	Active	Open Source Grid Integration Model for the National Electricity Market	$624,940	$9,500	ACT	Integrating renewables into the electricity system	Enabling	Other Study
Jemalong JSS Project No 1 Pty Limited	Active	Concentrating Solar Thermal power plant with thermal energy storage	$39,500,000	$3,000,000	NSW	Integrating renewables into the electricity system	Solar thermal	Demonstration
Jemena	Active	Innovative grid-based power electronics technology applications to increase network DER hosting capacity	$1,124,985		VIC	Integrating renewables into the electricity system	DER integration	Demonstration
Jemena	Active	Power to Gas Demonstration	$7,500,000	$2,000,000	NSW	Accelerating hydrogen	Hydrogen	Demonstration
Jemena Electricity Networks (VIC) Ltd	Active	Dynamic Electric Vehicle Charging Trial Project	$1,558,590	$318,250	VIC	Integrating renewables into the electricity system	Electric vehicles	Demonstration
Jemena Gas Networks (NSW) Ltd	Active	Malabar Biomethane Injection Demonstration	$5,900,000	$1,090,324	NSW	Accelerating hydrogen	Bioenergy	Demonstration
Jolt Charge Pty Ltd	Active	Metro Advertising Revenue Funded Electric Vehicle Charging Trial Project	$983,776	$822,032	NSW	Integrating renewables into the electricity system	Electric vehicles	Demonstration
Kennedy Energy Park	Active	Kennedy Energy Park (KEP)	$18,000,000		QLD	Integrating renewables into the electricity system	Hybrid	Demonstration

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Laing O'Rourke Australia Pty Ltd	Closed	SunSHIFT Pre-Commercial Deployment	$2,100,396		QLD	Foundation portfolios	Solar PV	Deployment
Lake Bonney BESS Pty Ltd	Active	Lake Bonney BESS	$5,000,000	$100,000	SA	Integrating renewables into the electricity system	Battery storage	Demonstration
Lakeland Solar & Storage Pty Limited	Active	Lakeland Solar & Storage Project	$17,419,000		QLD	Foundation portfolios	Large-scale solar	Demonstration
Lastek Pty Ltd	Active	Measurement guidelines for multi-junction solar cells with perovskite layers	$732,038	$219,611	SA	Integrating renewables into the electricity system	Solar PV	Demonstration
Logan City Council	Active	Loganholme Wastewater Treatment Plant Gasification Facility Demonstration Project	$6,220,898	$375,428	QLD	Foundation portfolios	Bioenergy	Demonstration
Lord Howe Island Board	Active	Lord Howe Island Hybrid Renewable Project	$4,500,000		NSW	Foundation portfolios	Hybrid	Demonstration
Macquarie Capital (Australia) Limited	Active	Kwinana Waste to Energy	$23,000,000		WA	Foundation portfolios	Bioenergy	Deployment
Macquarie University	Active	Biological Hydrogen Production R&D Project	$1,148,455	$344,536	NSW	Accelerating hydrogen	Hydrogen	R&D
Macquarie University	Active	Substitution of niche-market PV production tools with cost-effective consumer-electronics technology	$420,000	$210,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
Manildra Solar Farm Pty Ltd	Active	Manildra Solar Farm	$9,810,000		NSW	Foundation portfolios	Large-scale solar	Deployment
Meridian Energy Australia	Active	Wind Forecasting Demonstration Project	$2,180,155	$600,000	VIC	Integrating renewables into the electricity system	Market data and information	Demonstration
Microbiogen Pty Ltd	Closed	Biocatalyst Project	$3,912,104	$1,216,237	NSW	Foundation portfolios	Bioenergy	Demonstration
Mirvac	Active	Net Zero Energy Homes	$784,000		VIC	Integrating renewables into the electricity system	Hybrid	Deployment
Monash University	Active	IEA Technology Collaboration Program - Demand Side Management	$500,500	$156,700	VIC	Integrating renewables into the electricity system	Enabling	Other Study

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Monash University	Active	Stability-Enhancing Measures for Weak Grids Study	$495,680	$220,950	VIC	Integrating renewables into the electricity system	Enabling	Other Study
Monash University	Active	Australian Industry ETI Delivery Stage Project	$2,000,000		VIC	Supporting industry to reduce emissions	Hydrogen	Other Study
Monash University	Active	Water splitting electrodes R&D Project	$1,054,209	$316,263	VIC	Accelerating hydrogen	Hydrogen	R&D
Monash University	Active	Ammonia production from renewables R&D Project	$913,848	$274,754	VIC	Accelerating hydrogen	Hydrogen	R&D
Monash University	Active	Developing a New Type of High Efficiency Building Integrated PV Cell R&D Project	$744,661		VIC	Integrating renewables into the electricity system	Solar PV	R&D
Monash University	Active	Bringing All-Polymer Solar Cells Closer to Commercialization	$840,000		VIC	Integrating renewables into the electricity system	Solar PV	R&D
Monash University	Closed	Industry ETI Establishment Phase Project	$300,000	$300,000	VIC	Supporting industry to reduce emissions	Hydrogen	Other Study
Musselroe Wind Farm Pty Ltd	Active	Musselroe Wind Farm FCAS Trial	$514,120		TAS	Integrating renewables into the electricity system	Wind	Other Study
Nectar Farms Management Pty Ltd	Active	High Efficiency Off Grid Glasshouse Project	$814,839		VIC	Supporting industry to reduce emissions	Enabling	Feasibility Study
Neoen Australia Pty Ltd	Active	Hornsdale Power Reserve Upgrade Project	$8,000,000		SA	Integrating renewables into the electricity system	Battery storage	Deployment
Neoen Australia Pty Ltd	Active	Griffith Solar Farm	$4,500,000		NSW	Foundation portfolios	Large-scale solar	Deployment
Neoen Australia Pty Ltd	Active	Dubbo Solar Hub	$4,950,000		NSW	Foundation portfolios	Large-scale solar	Deployment
Neoen Australia Pty Ltd	Active	Parkes Solar Farm	$6,750,000		NSW	Foundation portfolios	Large-scale solar	Deployment
NEV Power Pty Ltd	Active	Narara Ecovillage smart grid	$1,388,660	$187,146	NSW	Integrating renewables into the electricity system	Hybrid	Deployment
NOJA Power Switchgear Pty Ltd	Active	NOJA Power Intelligent Switchgear Project	$5,000,000	$1,280,639	QLD	Integrating renewables into the electricity system	Enabling	Demonstration
Normanton Solar Farm	Active	Normanton Solar Farm	$8,380,000		QLD	Foundation portfolios	Large-scale solar	Demonstration

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Oakley Greenwood Pty Ltd	Closed	Pricing and Integration of Distributed Energy Resources Study	$207,000		QLD	Integrating renewables into the electricity system	DER integration	Other Study
OMPS Pty Ltd	Active	New England PHES Benefits Study	$951,000		NSW	Integrating renewables into the electricity system	Pumped hydro energy storage	Other Study
Origin Energy Eraring Pty Limited	Closed	Shoalhaven Pumped Hydro Expansion Opportunity Feasibility Study	$1,600,000		NSW	Integrating renewables into the electricity system	Pumped hydro energy storage	Other Study
Origin Energy Limited	Active	Electric Vehicle Smart Charging Trial	$838,400	$530,000	NSW	Integrating renewables into the electricity system	Electric vehicles	Demonstration
Plumbing Industry Climate Action Centre Ltd	Closed	Net Zero Energy Facility	$500,000		VIC	Integrating renewables into the electricity system	Geothermal	Demonstration
Pooled Energy	Active	Pooled Energy Demand Management and Modulation	$2,500,000		NSW	Integrating renewables into the electricity system	Enabling	Demonstration
Powercor Australia Pty Ltd	Closed	DER Hosting Capacity Study	$164,402	$98,641	VIC	Integrating renewables into the electricity system	DER integration	Other Study
Powershop Australia Pty Ltd	Active	Behavioural demand response program	$1,113,269	$232,222	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Proa Analytics Pty Ltd	Active	Solar Forecasts Project	$773,536	$435,664	QLD	Integrating renewables into the electricity system	Market data and information	Demonstration
Queensland Electricity Transmission Corporation Limited	Active	Cost-effective system strength in North Queensland study	$491,629	$313,800	QLD	Integrating renewables into the electricity system	Enabling	Other Study
Queensland University of Technology	Active	Hydrogen process R&D Project	$3,650,000	$1,005,000	QLD	Accelerating hydrogen	Hydrogen	R&D
Queensland University of Technology	Closed	Integration of biogas from sugarcane residues in sugarcane transport and milling	$2,339,100	$800,396	QLD	Foundation portfolios	Bioenergy	R&D
RATCH - Australia Corporation Limited	Active	Collinsville Solar PV Power Station Stage 1	$9,500,000		QLD	Foundation portfolios	Large-scale solar	Deployment
RayGen Resources Pty Ltd	Active	RayGen Solar Power Plant Demonstration Project	$15,000,000		VIC	Integrating renewables into the electricity system	Solar thermal	Deployment

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
RayGen Resources Pty Ltd	Closed	Solar Power Plant - Phase 1	$3,000,000	$2,000,000	VIC	Integrating renewables into the electricity system	Solar thermal	Other Study
Re.Group Pty Ltd	Active	Mt Piper Energy Recovery Project, Financial Investment Decision Study	$1,180,000	$330,000	NSW	Foundation portfolios	Bioenergy	Other Study
Reactive Technologies Pty Ltd	Active	System Inertia Measurement Demonstration	$1,430,000	$700,032	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
Redback Operations Pty Ltd	Active	SHIELD - Synchronising Heterogeneous Information (to) Evaluate Limits (for) DNSPs Project	$2,629,500	$193,000	QLD	Integrating renewables into the electricity system	Enabling	Demonstration
Regional Power Corporation	Active	Horizon Power Business Model Pilot Project - Phase 1 (Highgarden)	$1,920,000	$400,925	WA	Integrating renewables into the electricity system	Enabling	Deployment
Regional Power Corporation	Active	Horizon Power Denham Hydrogen Demonstration	$2,573,071		WA	Accelerating hydrogen	Hydrogen	Demonstration
Relectrify Holdings Pty Ltd	Active	Second-Life Battery Trial	$1,488,560	$226,639	VIC	Foundation portfolios	Battery storage	Demonstration
Renergi Pty Ltd	Active	Waste to Energy through Pyrolysis	$3,900,000	$1,091,299	WA	Foundation portfolios	Bioenergy	Demonstration
Renewable Developments Australia	Active	Pentland Integrated Biofuels Project	$3,000,000		QLD	Foundation portfolios	Bioenergy	Other Study
Renewable Energy Hub Pty Ltd	Active	Wholesale Renewable Energy Firming Marketplace Demonstration Project	$845,552	$699,417	VIC	Integrating renewables into the electricity system	Enabling	Deployment
ResTech Pty Limited	Closed	The Enverter (Project Aztec)	$700,000	$600,000	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
Rheem Australia	Active	Bringing South Australia"s Hot Water Load Under Active Control	$1,981,000	$191,600	SA	Integrating renewables into the electricity system	Solar PV	Demonstration
Rio Tinto Aluminium Limited	Active	Rio Tinto Pacific Operations Hydrogen Program	$579,787		QLD	Supporting industry to reduce emissions	Hydrogen	Other Study

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
RMIT University	Active	Building Integrated Photovoltaics (BIPV) Enabler	$100,614		VIC	Integrating renewables into the electricity system	Enabling	R&D
RMIT University	Active	Hydrogen Storage and Transport R&D Project	$805,026	$241,508	VIC	Accelerating hydrogen	Hydrogen	R&D
Rural Industries Research & Development Corporation	Active	Australian Biomass for Bioenergy Assessment (ABBA)	$3,160,669	$168,810	ACT	Foundation portfolios	Bioenergy	Other Study
SA Power Networks	Active	Flexible exports for solar PV	$2,085,337	$431,627	SA	Integrating renewables into the electricity system	Solar PV	Demonstration
SA Power Networks	Closed	Advanced VPP grid integration	$1,032,000	$312,599	SA	Integrating renewables into the electricity system	DER integration	Demonstration
Santos	Active	Conversion of remote crude oil beam pumps to solar & battery project	$4,200,000		SA	Supporting industry to reduce emissions	Solar PV	Demonstration
Simply Energy Solutions Pty Ltd	Active	Virtual Power Plant (VPPX) Project	$7,700,000	$2,691,000	SA	Integrating renewables into the electricity system	Solar PV	Deployment
Smart Storage (Ecoult)	Terminated	Project Fulfil	$3,325,000	$250,000	NSW	Integrating renewables into the electricity system	Enabling	R&D
Solar Analytics	Active	Enhanced Reliability through Short Time Resolution Data around Voltage Disturbances	$491,725	$112,000	NSW	Integrating renewables into the electricity system	DER integration	Demonstration
Solar Analytics	Active	Accelerating the growth development of energy monitoring for solar households and small businesses	$1,160,000	$60,000	NSW	Integrating renewables into the electricity system	Enabling	Deployment
Solar Analytics	Closed	Solar Monitoring for Better Energy Outcomes for Residential Solar PV	$2,144,000	$40,000	NSW	Integrating renewables into the electricity system	Solar PV	Deployment
Solar and Storage Modelling Pty Ltd	Active	Gridded Renewables Nowcasting Demonstration over South Australia	$994,685	$508,342	NSW	Integrating renewables into the electricity system	Market data and information	Demonstration

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
Solar and Storage Modelling Pty Ltd	Closed	Solcast nowcasting solutions for solar farms and the Australian energy sector	$781,740	$78,174	NSW	Integrating renewables into the electricity system	Market data and information	Demonstration
Solpod Pty Ltd	Closed	Solar PV Demonstration Project	$975,000	$350,000	VIC	Integrating renewables into the electricity system	Solar PV	Demonstration
Southern Cross REVC Trusco	Active	Southern Cross Renewable Energy Fund	$60,000,000		NSW	Foundation portfolios	Enabling	Demonstration
Southern Oil Refining Pty Ltd	Terminated	Commercialisation of renewable crude oil production from wastewater treatment plant waste	$1,187,340	$562,340	QLD	Foundation portfolios	Bioenergy	Demonstration
Spotless Sustainability Services	Active	Ballarat Terminal Station Battery Energy Storage System (BESS)	$2,265,000		VIC	Integrating renewables into the electricity system	Battery storage	Demonstration
Stanwell Corporation Limited	Active	Hydrogen Mid/Large Scale Electrolysis Deployment Feasibility Study	$913,667	$867,984	QLD	Accelerating hydrogen	Hydrogen	Feasibility Study
Sundrive Solar Pty Ltd	Active	SunDrive Copper Metallisation Demonstration Project	$3,000,000	$1,000,000	NSW	Integrating renewables into the electricity system	Solar PV	Demonstration
Swinburne University of Technology	Active	Electrically-Enhanced Recycling Process for EoL Si PV-Cells	$404,000	$202,000	VIC	Integrating renewables into the electricity system	Solar PV	R&D
Toyota Motor Corporation Australia Ltd	Active	Toyota Ecopark Hydrogen Demonstration	$3,076,000	$1,376,000	VIC	Accelerating hydrogen	Hydrogen	Demonstration
TransGrid	Active	Wallgrove Battery	$10,147,919	$3,047,920	NSW	Integrating renewables into the electricity system	Battery storage	Deployment
TransGrid	Active	Central West NSW Energy Zone Detailed Scoping Study	$5,000,000	$560,000	NSW	Integrating renewables into the electricity system	Enabling	Feasibility Study
Trustee for Blue Op Partner Trust & Others	Closed	Demand Management for Replacement Needs	$443,474	$293,474	NSW	Integrating renewables into the electricity system	Demand response	Demonstration

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
Trustee for Sustainable Melbourne Fund	Active	Scaling up Environmental Upgrade Agreements (EUAs) across Australia	$755,000	$125,000	NSW	Supporting industry to reduce emissions	Enabling	Deployment
Trustee for Transgrid Services Trust	Active	New England Renewable Energy Zone	$995,000	$600,000	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
Trustee for Yadlamalka Land Trust	Active	Yadlamalka Station Co-located Vanadium redox battery storage solar project	$5,695,000	$5,695,000	SA	Integrating renewables into the electricity system	Battery storage	Demonstration
United Energy Distribution Pty Limited	Active	LV Battery Trial	$4,000,000		VIC	Integrating renewables into the electricity system	Battery storage	Demonstration
United Energy Distribution Pty Limited	Closed	Dynamic Voltage Management Demand Response (Product 2)	$5,762,000	$1,613,360	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
United Energy Distribution Pty Limited	Closed	Voltage-Controlled Frequency Regulation System	$900,000	$135,000	VIC	Integrating renewables into the electricity system	Enabling	Demonstration
University of Adelaide	Active	Participation in Mission Innovation - Converting Sunlight Innovation Challenge	$494,000		SA	Foundation portfolios	Solar thermal	Other Study
University of Adelaide	Active	Integrating Concentrating Solar Thermal Energy into the Bayer Alumina Process	$4,490,752	$659,006	SA	Integrating renewables into the electricity system	Solar thermal	R&D
University of Melbourne	Active	Advanced Planning of PV-Rich Distribution Networks Study	$203,867	$81,547	VIC	Integrating renewables into the electricity system	DER integration	Other Study
University of Melbourne	Active	Hydrogen Fuelled Reciprocating Engines R&D Project	$2,594,747	$778,424	VIC	Accelerating hydrogen	Hydrogen	R&D
University of Melbourne	Active	Singlet Fission enhanced silicon solar cells	$1,290,333	$645,166	VIC	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Addressing barriers to efficient renewable integration	$982,000	$50,922	NSW	Integrating renewables into the electricity system	Enabling	Other Study

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
University of New South Wales	Active	Mission Innovation Challenge - Off-Grid Access to Electricity	$228,000		NSW	Foundation portfolios	Enabling	Other Study
University of New South Wales	Active	Project MATCH - Distributed energy resources (DER)	$981,241		NSW	Integrating renewables into the electricity system	Enabling	Other Study
University of New South Wales	Active	Launch of a photothermal absorption spectrometer for cost reduction in PV materials	$100,000		NSW	Integrating renewables into the electricity system	Enabling	R&D
University of New South Wales	Active	Photovoltaic Electrolysis to Generate Hydrogen R&D Project	$1,319,105	$395,732	NSW	Accelerating hydrogen	Hydrogen	R&D
University of New South Wales	Active	Waste Biomass to Renewable Hydrogen R&D Project	$1,045,770	$313,731	NSW	Accelerating hydrogen	Hydrogen	R&D
University of New South Wales	Active	Development and Commercialisation of High Efficiency Silicon Solar Cell Technology	$6,472,980	$681,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Australia-US Institute for Advanced Photovoltaics (AUSIAPV)	$83,999,005	$15,600,890	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Low-cost, high-efficiency Copper-Zinc-Tin-Sulphide (CZTS) on silicon multi-junction solar cells	$2,612,358		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Accelerating industrial solar cells efficiency by development of plasma-enhanced chemical vapour deposition (PECVD)	$503,389		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Metallised Encapsulant for Silicon PV Modules: A Path to Reduced LCOE for PV	$1,160,000		NSW	Integrating renewables into the electricity system	Solar PV	R&D

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
University of New South Wales	Active	Improving World-Record Commercial High-Efficiency n-type Solar Cells through Recombination Analysis and Innovative Passivation	$1,785,000	$535,500	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Hydrogenated bifacial PERL Silicon PV Cells with laser doping and plated contacts R&D Project	$1,100,000	$330,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Hydrogenated and Hybrid Heterojunction p-type Silicon PV Cells R&D Project	$1,735,000	$347,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Development of Beyond 20% Efficiency Kesterite (CZTSSe) Solar Cells: win the PV race with sustainable low-cost, low-toxic and stable materials	$1,331,098		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Advanced high-efficiency silicon solar cells employing innovative atomic scale engineered surface and contact passivation layers	$2,019,456		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Next Generation Silicon sub-cells for high efficiency III-V/Si multi-junction solar cells	$1,144,628		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Integrating industrial black silicon with high efficiency multicrystalline solar cells	$500,000		NSW	Integrating renewables into the electricity system	Solar PV	R&D

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
University of New South Wales	Active	Development of novel hydrogen trapping techniques for breakthrough Si casting and wafering technologies	$1,968,000		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Efficient Adamantine Thin-Film on Silicon Tandem Cells: The Next Step in Commercial Cell Evolution	$3,184,166		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Module Design for Lower Field Operating Temperature and Improved Yield	$285,816	$134,249	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Prototyping a Photoluminescence Imaging Tool for Testing of Fielded Solar Modules	$100,000		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Closed-loop recycling & remanufacturing end-of-life silicon photovoltaic modules: towards a circular economy	$1,560,000	$780,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Next-generation selective-emitters for commercial PERC and TOPCon solar panels	$1,232,429	$616,214	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Reduced Solar Module Temperature R&D project	$1,767,730	$883,865	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Earth-abundant, RoHS-compliant antimony chalcogenide: top cell alternative for silicon tandem cells	$693,388	$346,694	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Active	Highly efficient, low-cost and eco-friendly recycling technology for silicon photovoltaic panels	$1,360,000	$680,000	NSW	Integrating renewables into the electricity system	Solar PV	R&D

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
University of New South Wales	Active	Lower PV cost by a combination of luminescence images and machine-learning	$694,224	$347,112	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Closed	Multi-Junction c-Si Solar Cells Based on Virtual Ge Substrates	$1,455,000		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Closed	40% Efficient Photovoltaic 'Power Cube' Power Tower Receiver	$1,400,000		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of New South Wales	Closed	Towards Ultimate Performance Commercial Silicon Solar Cells	$2,970,702		NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of Queensland	Closed	Pilot project to trial Solar F2D2 at Gatton Solar Farm	$95,912	$47,956	QLD	Integrating renewables into the electricity system	Large-scale solar	R&D
University of South Australia	Active	Displacement of Gas by Thermal Energy Storage	$103,500		SA	Supporting industry to reduce emissions	Enabling	R&D
University of Sydney	Active	Durable Silicon Perovskite Tandem Photovoltaics	$987,285	$493,643	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of Sydney	Active	Triple Junction Silicon-Perovskite-Perovskite Tandem Photovoltaics	$1,494,340	$747,170	NSW	Integrating renewables into the electricity system	Solar PV	R&D
University of Tasmania	Active	Optimal DER Scheduling for Frequency Stability Study	$527,582		TAS	Integrating renewables into the electricity system	DER integration	Other Study
University of Tasmania	Closed	Tidal Energy in Australia - Assessing Resource and Feasibility to Australia's Energy Mix	$2,714,280	$749,240	TAS	Foundation portfolios	Marine	Other Study
University of Western Australia	Active	Methanol from Syngas R&D Project	$1,079,875	$323,962	WA	Accelerating hydrogen	Hydrogen	R&D
University of Western Australia	Active	From single to multiple wave energy converters: Cost reduction through location and configuration optimisation	$994,198		WA	Foundation portfolios	Marine	R&D

PROPONENT NAME	PROJECT STATUS	PROJECT NAME	FINANCIAL ASSISTANCE COMMITTED (EX GST)	FINANCIAL ASSISTANCE PAID (EX GST)	PRIMARY LOCATION	INVESTMENT PRIORITY	PRIMARY TECHNOLOGY	INNOVATION STAGE
University of Wollongong	Active	Smart Sodium Storage System for Renewable Energy Storage	$2,707,000	$363,500	NSW	Supporting industry to reduce emissions	Battery storage	R&D
University of Wollongong	Active	Investigation of the Impact and Management of Harmonic Distortion for Large Renewable Generators	$146,400		NSW	Integrating renewables into the electricity system	Enabling	Other Study
Upowr Pty Ltd	Active	Customer focused design for DER participation	$446,000	$191,300	VIC	Integrating renewables into the electricity system	Battery storage	Demonstration
Vestas Wind Systems A/S	Closed	Vestas Wind Forecasting for the NEM Project	$337,704	$1,436	SA	Integrating renewables into the electricity system	Market data and information	Demonstration
VPP Project 1 (SA) Pty Ltd	Active	South Australia's Virtual Power Plant - Phase 3A	$8,200,000	$500,000	SA	Integrating renewables into the electricity system	Battery storage	Deployment
Wattwatchers	Active	My Energy Marketplace Deployment Project	$2,703,134	$792,036	NSW	Integrating renewables into the electricity system	Enabling	Demonstration
Wave Swell Energy Limited	Active	UniWave200 King Island Project	$4,035,628	$770,000	TAS	Foundation portfolios	Marine	Demonstration
Whitsunday Solar Farm	Active	Whitsunday Solar Farm	$5,359,706		QLD	Foundation portfolios	Large-scale solar	Deployment
Windlab Systems Pty Ltd	Closed	LIDAR for Wind Forecast Projects	$363,207	$2,000	QLD	Integrating renewables into the electricity system	Market data and information	Demonstration
Yara Pilbara Fertilisers Pty Ltd	Active	Yara Pilbara Renewable Ammonia Feasibility Study	$995,000	$547,250	WA	Accelerating hydrogen	Hydrogen	Feasibility Study
Zeppelin Bend Pty Ltd	Active	Publishing operating envelopes to the node to support the integration, orchestration and coordination of high-penetration DER in electricity distribution networks	$4,292,632	$1,468,961	ACT	Integrating renewables into the electricity system	DER integration	Demonstration
TOTAL	**289**		**$1,298,383,397**	**$164,472,990**				

TABLE 12: ARENA INVESTMENT IN ORGANISATIONS UNDER REVC FUND 2020-21

INVESTMENT	COMPANY	INVESTMENT AMOUNT	STATUS
Commercialisation of high-performance anti-reflective coatings to be applied to solar panels to make them more efficient	Brisbane Materials Holdings Inc	$3,833,266	Exited
Commercialisation of a hydrogen storage technology which will enable a new renewable energy storage solution	Hydrexia Pty Ltd	$7,055,766	Exited
Deployment of solar integration system into the Australian market	Sunverge Energy	$18,096,316	Active
Development of advanced lithium-ion battery storage solutions for Australian and global markets	Octillion Power Systems Australia	$6,423,550	Active
Development of an innovative electricity retailing business model	Mojo Power Holdings Pty Ltd	$7,317,494	Active
Deployment into the Australian market of software for the design, integration and operation of network-connected energy storage and micro-grid systems	Growing Energy Labs, Inc	$5,438,452	Exited
Provision of software solutions to Distribution Systems Operators at the utility scale and microgrid	Greensync Holdings Pty Ltd	$5,175,000	Active
Development of an energy measurement technology that helps better manage energy use and costs.	Energy Saving Networks (Wattwatchers)	$2,000,000	Active
Development of intellectual property, knowledge and experience for manufacturing a cost effective, reliable and environmentally friendly sodium-ion battery.	BenAn Energy	$8,629,050	Active
Development of an innovative glass-free lightweight flexible solar panel called eArche which can be fitted on any surface including curved surfaces.	Sunman Energy Co Ltd	$9,316,602	Active

APPENDICES

APPENDIX 2: INDEX OF COMPLIANCE WITH ANNUAL REPORT REQUIREMENTS

The following table lists the information ARENA is required by law to include in this report, and where in the report the information is located.

TABLE 13: INDEX OF COMPLIANCE WITH ANNUAL REPORT REQUIREMENTS

LEGISLATION	ANNUAL REPORT PAGE	REQUIREMENT
Australian Renewable Energy Agency Act 2011 (ARENA Act) (section 70)	140-173 114-139	**Funding provided under ARENA Act** Provide particulars of each person to whom financial assistance was provided or committed during the year: › name of the person › nature and amount of the financial assistance › renewable energy technology or technologies to which the assistance relates Provide an assessment of the extent to which agreements for the provision of financial assistance entered into during the year have progressed, or are expected to progress, the principal objectives and priorities as stated in the general funding strategy in force for the year
ARENA Act (section 11)	84	**Ministerial requests** Provide details of each request made by the Minister under s11 asking ARENA to consider providing financial assistance for a specified project
ARENA Act (section 13)	84	**Ministerial directions** Provide details of each direction made by the Minister under s13 requiring ARENA to provide advice
Australian Renewable Energy Agency (Consequential Amendments and Transitional Provisions) Act 2011 (Schedule 2, Part 2, section 28)	140-173	**Funding provided under a transferred agreement** Provide particulars of each person to whom financial assistance has been provided during the year under a transferred Commonwealth funding agreement, or a transferred ASI Limited funding agreement: › name of the person › nature and amount of the financial assistance › renewable energy technology or technologies to which the assistance relates
Public Governance, Performance and Accountability Act 2013 (PGPA Act) (section 46)	Yes	**Overarching requirements** After the end of each reporting period, the accountable authority of the entity (ARENA Board) must prepare and give an annual report to the entity's responsible Minister, for presentation to the Parliament, on the entity's activity during the period The annual report must include the entity's annual performance statement and financial statements The annual report must be given to the Minister by: › the 15th day of the fourth month after the reporting period for the entity (namely 15 October), or › the end of any further period granted under the Acts Interpretation Act 1901
PGPA Act (section 46), Public Governance, Performance and Accountability Rule 2014 (PGPA Rule) (section 17BB)	9	**Approval of annual report by accountable authority (ARENA Board)** Be approved by the ARENA Board Be signed by the Board, or a member of the Board Include details of how and when approval of the annual report was given State that the Board is responsible for preparing and giving the annual report to ARENA's responsible minister in accordance with s46 of the Act
PGPA Act (section 46), PGPA Rule 2014 (section 17BC)	Yes	**Parliamentary standards of presentation** Comply with the guidelines for presenting documents to the Parliament
PGPA Act (section 46), PGPA Rule 2014 (section 17BCA)	Yes	**Digital reporting tool** As soon as practicable after the annual report has been presented to the Parliament, the annual report must be published using the digital reporting tool administered by the Finance Minister

REFERENCE	WHERE	REQUIREMENT
PGPA Act (section 46), PGPA Rule 2014 (section 17BD)	Yes	**Plain English and clear design** The annual report must be prepared having regard to the interests of the Parliament and any other persons who are interested in the annual report Provide information that is relevant, reliable, concise, understandable and balanced Use clear design Define acronyms and technical terms Use tables, graphs, diagrams and charts Include any additional matters as appropriate
PGPA Act (section 46), PGPA Rule 2014 (section 17BE)		**Contents of annual report**
	83	Details of the legislation that established ARENA
	83	Summary of ARENA's objects and functions as set out in the legislation
	2, 16, 19, 78, 116-118	ARENA's purpose as set out in the corporate plan for the period
	83	Name and title of the responsible Minister(s) during the period
	84	Directions given to ARENA by the Minister under an Act or instrument during the period
	84	Any government policy order that applied to ARENA under s22 of the Act
	84	Particulars of any non-compliance with ministerial directions or government policy orders
	114-139	Annual performance statement for ARENA for the period in accordance with paragraph 39(1)(b) of the Act and s16F of the Rule
	84	Statement of any significant issues reported to the Minister under paragraph 19(1)(e) of the Act that relates to non-compliance with finance law in relation to ARENA
	84	An outline of the action taken to remedy that non-compliance
	27	Information on each member of the ARENA Board during the period, including: › name, qualifications and experience › number of meetings attended during the period › whether executive or non-executive
	89	Organisational structure
	176-177	Statistics on the number of ongoing and non-ongoing employees for this and the previous reporting period in relation to: full-time employees, part-time employees, gender and staff location
	185	Location/s of major activities or facilities
	24, 78-80	Main corporate governance practices used by ARENA during the period
	87 + Note 3.3 in Financials	Information on related entity transactions: › the decision-making process undertaken by the ARENA Board for making a decision if • the decision is to approve ARENA paying for a good or service from another Commonwealth entity or a company, or providing a grant to another Commonwealth entity or a company, and • ARENA and the other Commonwealth entity or the company are related entities, and • the value of the transaction, or if there is more than one transaction, the aggregate value of those transactions is more than $10,000 (incl. GST) › the value of the transaction, and, if there is more than one transaction, the number of transactions and the aggregate value of the transactions
	78	Any significant activities and changes that affected ARENA's operations or structure during the period
	87	Particulars of judicial decisions or decisions of administrative tribunals made during the period that have, or may have, a significant effect on the operations of ARENA
	87	Particulars of any report on ARENA given during the period by: › the Auditor-General › a Parliamentary Committee › the Commonwealth Ombudsman › the Office of the Australian Information Commissioner › any capability reviews of ARENA that were released during the period
		An explanation of required information not obtained from a subsidiary and the effect of not having the information in the annual report
	87	Subsidiaries
	80	Details of any indemnity that applied during the period to the Board, any member of the Board or officer of ARENA against a liability (including premiums paid, or agreed to be paid, for insurance against the Board, Board member or officer's liability for legal costs)
	32, 34, 36, 79, 179	Information on the ARENA audit committee during the period: › direct electronic address of the charter determining the functions of the audit committee › name and qualifications, knowledge, skills or experience of each member › number of meetings attended by each member › remuneration of each member
	178-179 + Note 3.2 of Financials	Information about executive remuneration
	170	An index identifying where the requirements of this section are to be found
PGPA Act (section 39), PGPA Rule (section 16F)	114-139	**Annual performance statement** Statement of preparation Results achieved Analysis of performance
PGPA Act (section 42), PGPA Rule 2015	90-113	**Financial statements** Financial statements are prepared as soon as practicable after the end of the reporting period, and then provided to the Auditor-General as soon as practicable Statements comply with the accounting standards and any other requirements prescribed by the rules, and fairly present ARENA's financial position, financial performance and cash flows Written confirmation from the Board that statements meet these requirements
Environment Protection and Biodiversity Conservation Act 1999 (section 516A)	84-85	**Environmental performance** Information on: › accord between ARENA's activities and ecologically sustainable development (ESD) principles › ARENA's contribution of outcomes to ESD › effects of these activities on the environment › measures to review and minimise effects on the environment
Freedom of Information Act 1982 (Part II)	84	**Information Publication Scheme** Actions taken to comply

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APPENDIX 3: MANDATORY INFORMATION FOR TRANSPARENCY PORTAL

The tables provided in this appendix, along with other tables found elsewhere in this annual report (Tables 1-2), are mandatory and have been prepared for use in the Australian Government's Transparency Portal at transparency.gov.au.

TABLE 14: ALL ONGOING EMPLOYEES CURRENT REPORTING PERIOD (2020-21)

	MALE			FEMALE			INDETERMINATE			TOTAL
	FULL-TIME	PART TIME	*TOTAL MALE*	FULL-TIME	PART TIME	*TOTAL FEMALE*	FULL-TIME	PART TIME	*TOTAL INDETER-MINATE*	
NSW	2		2							2
Total	2		2							2

TABLE 15: ALL NON-ONGOING EMPLOYEES CURRENT REPORTING PERIOD (2020-21)

	MALE			FEMALE			INDETERMINATE			TOTAL
	FULL-TIME	PART TIME	*TOTAL MALE*	FULL-TIME	PART TIME	*TOTAL FEMALE*	FULL-TIME	PART TIME	*TOTAL INDETER-MINATE*	
Total										0

TABLE 16: ALL ONGOING EMPLOYEES PREVIOUS REPORTING PERIOD (2019-20)

	MALE			FEMALE			INDETERMINATE			TOTAL
	FULL-TIME	PART TIME	*TOTAL MALE*	FULL-TIME	PART TIME	*TOTAL FEMALE*	FULL-TIME	PART TIME	*TOTAL INDETER-MINATE*	
NSW	2		2							2
Total	2		2							2

TABLE 17: ALL NON-ONGOING EMPLOYEES PREVIOUS REPORTING PERIOD (2019-20)

	MALE			FEMALE			INDETERMINATE			TOTAL
	FULL-TIME	PART TIME	*TOTAL MALE*	FULL-TIME	PART TIME	*TOTAL FEMALE*	FULL-TIME	PART TIME	*TOTAL INDETER-MINATE*	
Total	2		2							2

TABLE 18: SIGNIFICANT NON-COMPLIANCE WITH FINANCE LAW

DESCRIPTION OF NON-COMPLIANCE	REMEDIAL ACTION
N/A	N/A

BOARD AND COMMITTEE MEMBER REMUNERATION

All ARENA Board members are appointed by the Australian Government through our Portfolio Minister. The Board is governed by the provisions of the ARENA Act.

Fees for the Board members (other than the ex-officio member) are set and paid according to the relevant Remuneration Tribunal Determinations. Statutory superannuation is paid in addition to the fees set by the Tribunal.

Fees for independent Board sub-committee members, including Risk and Audit Committee members, are paid on a fee for service basis under a service contract. Such service is procured on normal business terms and conditions.

EXECUTIVE REMUNERATION

The salary for the ARENA CEO is determined by the Remuneration Tribunal and the role is currently classified as a Full-time Public Officer (FPO) and gazetted in the listing of Government positions.

The salary of the ARENA CFO is guided by the principles set out in our Remuneration Guidelines (the Guidelines), which are monitored and endorsed by the People and Culture Committee, which is a committee of the Board.

Under these guidelines, a transparent process is taken to attract and retain specialist skills at a competitive cost. The process involves using industry surveys and specialists (such as the Financial Institutions Remuneration Group) to review market data and determine benchmarks. This is then considered in the context of public service roles and compensation bands and remuneration is approved by the Board.

The Chief Operating Officer and other senior executives are employees of ARENA's Portfolio Department, where remuneration is determined by the Secretary in accordance with relevant policies of the Department. Executives and other highly-paid staff are remunerated in accordance with their contracts of employment and relevant governing provisions. They are seconded to ARENA free of charge in accordance with section 62 of the ARENA Act.

Details of the ARENA Board and Executive remuneration is provided in Note 3.2 of the Financial Statements and Tables 17 and 18 below.

TABLE 19: EXECUTIVE REMUNERATION DISCLOSURES 2020-21

		SHORT-TERM BENEFITS			POST-EMPLOYMENT BENEFITS	OTHER LONG-TERM BENEFITS		TERMINATION BENEFITS	TOTAL REMUNERATION
NAME	**POSITION**	**BASE SALARY**	**BONUSES**	**OTHER BENEFITS AND ALLOWANCES**	**SUPERANNUATION CONTRIBUTIONS**	**LONG SERVICE LEAVE**	**OTHER LONG-TERM BENEFITS**	**TERMINATION BENEFITS**	**TOTAL REMUNERATION**
Key Management Personnel									
Mr Justin Punch	Chair (appointed 18/07/2021)	$68,917	-	-	$6,547	-	-	-	$75,464
Mr Justin Butcher	Board member, People and Culture Committee member (appointed 18/07/2021)	$28,427	-	-	$2,700	-	-	-	$31,127
Mr John Hirjee	Board member, Risk and Audit Committee member (appointed 18/07/2021)	$37,950	-	-	$3,605	-	-	-	$41,555
Ms Anna Matysek	Board member (appointed 18/07/2021)	$32,492	-	-	$3,086	-	-	-	$35,578
Mr Dougal McOmish	Board member, Risk and Audit Committee member	$15,777	-	-	$1,499	-	-	-	$17,276
Ms Stephanie Unwin	Board member, Chair People and Culture Committee	$23,026	-	-	$2,188	-	-	-	$25,214
Mr Martijn Wilder	Chair (ceased 17/07/2020)	$5,865	-	-	$557	-	-	-	$6,422
Ms Samantha Hogg	Board member (ceased 17/07/2020)	-	-	-	-	-	-	-	-
Ms Susan Jeanes	Board member, People and Culture Committee member (ceased 17/07/2020)	$853	-	-	$81		-	-	$934
Ms Meg McDonald	Board member, Chair People and Culture Committee (ceased 17/07/2020)	$1,279	-	-	$122		-	-	$1,401
Mr Darren Miller	Chief Executive Officer	$386,836	-	-	$25,096	$6,393	-	-	$418,325
Mr Ian Kay	Chief Financial Officer	$463,029	-	-	$25,096	$8,328	-	-	$496,453
Ms Nicola Morris	Chief Operating Officer (ceased 12/03/2021)	$178,253	-	-	$44,682	$38,882	-	-	$261,817
TOTAL		**$1,242,704**	**-**	**-**	**$115,259**	**$53,603**	**-**	**-**	**$1,411,566**

Note 1: Figures in the table are reported on an accrual basis. Base salary includes movements in annual leave liabilities.
Note 2: ARENA does not provide benefits or allowances (such as car parking, motor vehicle benefits, housing and health benefits and the associated fringe benefits tax).
Note 3: ARENA does not provide bonuses, performance pay or incentives to employees and therefore no salary is deemed to be at risk.
Note 4: During the year there were multiple acting arrangements for the CEO and COO positions. These arrangements were either for cover of leave periods or for a caretaker purpose before a permanent replacement could be found. ARENA has determined to exclude acting persons from the Executive and Audit Committee Remuneration Disclosures.
Note 5: The COO is an employee of the Portfolio Department, on secondment to ARENA. Salary for the COO is provided in the resources free of charge to ARENA. Salary information is provided by the Portfolio Department.

TABLE 20: RISK AND AUDIT COMMITTEE (RAC) REMUNERATION DISCLOSURES 2020-21

		SHORT-TERM BENEFITS			POST-EMPLOYMENT BENEFITS	OTHER LONG-TERM BENEFITS		TERMINATION BENEFITS	TOTAL REMUNERATION
NAME	POSITION	BASE SALARY	BONUSES	OTHER BENEFITS AND ALLOWANCES	SUPERANNUATION CONTRIBUTIONS	LONG SERVICE LEAVE	OTHER LONG-TERM BENEFITS	TERMINATION BENEFITS	TOTAL REMUNERATION
Mrs Jenny Morison	Chair, Independent Member, RAC	-	-	$20,716	-	-	-	-	$20,716
Ms Karen Hogan	Independent Member, RAC	-	-	$6,070	-	-	-	-	$6,070
Mr John Hirjee (from 25 August)	Board Member	$5,330	-	-	$506	-	-	-	$5,836
Mr Dougal McOmish	Board Member	$3,198	-	-	$304	-	-	-	$3,502
TOTAL		**$8,528**		**$26,786**	**$810**				**$36,124**

Note 1: Independent RAC members are engaged on fee for service basis; amounts shown are GST exclusive.
Note 2: Board member payments reflect those fees in respect of Risk and Audit Committee meetings. These amounts are included in the total fees reported in Table 19.

TABLE 21: SENIOR EXECUTIVE REMUNERATION DISCLOSURES 2020-21

		AVERAGE SHORT-TERM BENEFITS			AVERAGE POST-EMPLOYMENT BENEFITS	AVERAGE OTHER LONG-TERM BENEFITS		AVERAGE TERMINATION BENEFITS	AVERAGE TOTAL REMUNERATION
TOTAL REMUNERATION BANDS	NUMBER OF SENIOR EXECUTIVES	AVERAGE BASE SALARY	AVERAGE BONUSES	AVERAGE OTHER BENEFITS AND ALLOWANCES	AVERAGE SUPERANNUATION CONTRIBUTIONS	AVERAGE LONG SERVICE LEAVE	AVERAGE OTHER LONG-TERM BENEFITS	AVERAGE TERMINATION BENEFITS	AVERAGE TOTAL REMUNERATION
$0-$220,000	2	$78,641	-	-	$10,279	$31,352	-	-	$120,272

Note 1: Figures in the table are reported on an accrual basis. Base salary includes movements in annual leave liabilities.
Note 2: The table reports the average remuneration for Senior Executives employed during the reporting period. The two staff held positions for only part of the year.
Note 3: The Senior Executive staff were both seconded from the Portfolio Department to ARENA free of charge. Salary information is provided by the Portfolio Department.

INFORMATION ABOUT REMUNERATION FOR OTHER HIGHLY-PAID STAFF

For the reporting period 2020-21, the threshold for other highly-paid staff was $230,000. ARENA did not employ any staff whose salary was equal to or greater than the threshold during the reporting period.

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APPENDIX 4: LIST OF FIGURES AND TABLES

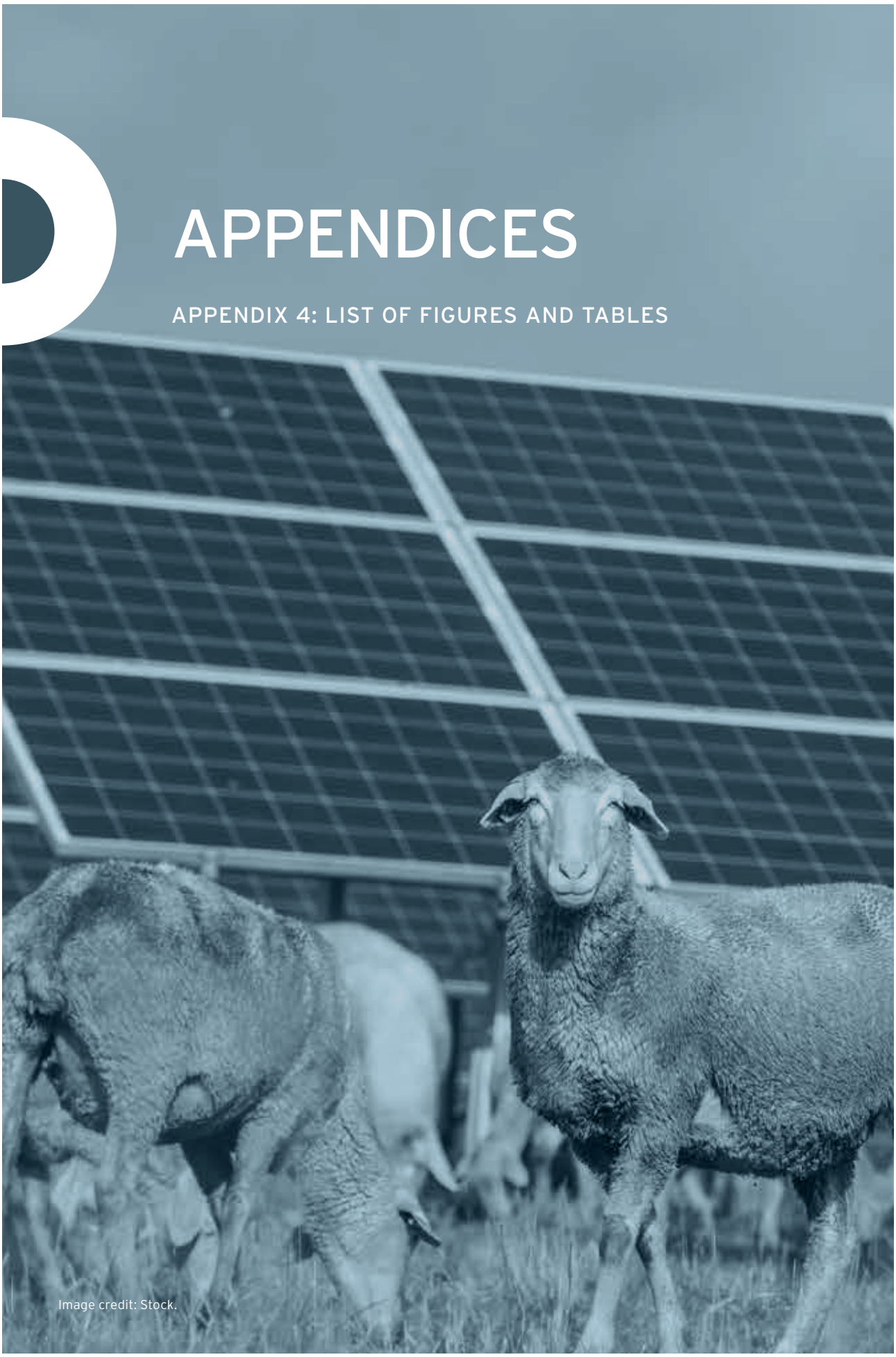

Image credit: Stock.

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APPENDIX 5: GLOSSARY

This is an alphabetical index that explains the acronyms, abbreviations and technical terms used in this Annual Report.

ACAP	Australian Centre for Advanced Photovoltaics
AEMO	Australian Energy Market Operator
ANAO	Australian National Audit Office
approved funds	The amount that ARENA's Board or CEO has approved to be offered to a funding applicant (subject to successful negotiation of a contract, or subject to a final assessment process)
approved projects	Projects that the Board or CEO has approved to be offered ARENA funds subject to successful negotiation of a contract
APS	Australian Performance Statement, Australian Public Service
ARENA	Australian Renewable Energy Agency
ARENA Act	*Australian Renewable Energy Agency Act 2011*
ASI	Australian Solar Institute
behind the meter	Behind-the-meter energy production and storage systems directly supply homes and buildings with electricity - the energy produced and/or stored by these systems is separate from the grid and does not need to be counted by a meter before being used, so they are positioned behind the meter
CEFC	Clean Energy Finance Corporation
committed funds	The value of executed funding contracts
DER	Distributed energy resources: renewable energy units or systems commonly located at houses or businesses Includes rooftop solar, home batteries, inverters, electric vehicle charging points, smart appliances and systems, and relevant enablers such as smart meters and data services
de-risk	Make an innovation less risky, or an investment less likely to involve a financial loss
dispatchable energy	Energy that can be quickly sent - or dispatched - by a power generator or energy system whenever it is needed This rapid response is used to keep electricity supply and demand in balance, which keeps the grid stable and strong. Dispatchable renewable energy includes hydropower and PHES, large-scale and home batteries storing renewable energy, and potentially renewable hydrogen
distributed energy	Renewable energy devices or systems commonly located at houses or businesses Includes rooftop solar, home batteries, inverters, electric vehicle charging points, smart appliances and systems, and relevant enablers such as smart meters and data services
EE	Energy efficiency
energy efficiency	Using less energy to achieve the same outcome - includes energy conservation and demand management technologies
energy productivity	Output or value created per unit of energy used
EOI	Expression of interest
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically sustainable development
EV	Electric vehicle
FCAS	Frequency Control Ancillary Services: services that help to stabilise the grid by either injecting or absorbing power to compensate for excessive drops or rises in frequency
flexible capacity	Energy storage, demand response, and generation that can be quickly drawn upon to help balance energy supply and demand

flow battery	Batteries that use liquid chemicals, which are pumped through the device to release energy
FOI Act	*Freedom of Information Act 1982*
fringe-of-grid	Areas at the edges of an electricity grid
FTE	Full-time equivalent
GFS	General Funding Strategy
GST	Goods and services tax
GW	Gigawatt: 1000 million watts (a 40 W light globe uses 40 watts of electricity)
H2	Hydrogen
hydrogen (green, renewable)	Hydrogen produced using renewable energy
Innovation chain	A framework for describing the stages involved in bringing an idea to the market (R&D, study, demonstration and deployment)
Innovation stage	A position along the innovation chain (i.e. R&D, study, demonstration or deployment)
Investment leverage	Ratio of ARENA funds committed to third party funds invested
IP	Investment Plan
investment priority	An area that ARENA wishes to focus its funding and activities on. Investment priorities are described in ARENA's Investment Plan and help guide funding assessments
KS	Knowledge Sharing
knowledge sharing	Information shared by ARENA or funding recipients to impart knowledge and lessons learned
microgrid	A stand-alone power system that combines energy resources such as solar, diesel, wind and batteries A microgrid may be able to connect and disconnect from the larger grid, operating in either grid-connected or island mode
MW	Megawatt: 1 million watts (a 40 W light globe uses 40 watts of electricity)
NEM	National Electricity Market
off grid	Not connected to the electricity grid, such as in remote areas
PGPA Act	*Public Governance, Performance and Accountability Act 2013*
PBS	Portfolio Budget Statements
PCC	People and Culture Committee
PHES	Pumped hydro energy storage
PV	Photovoltaic: a type of technology that converts energy from the sun into electricity
R&D	Research and development
RAC	Risk and Audit Committee
reliable (grid or power system)	A reliable power system has enough generation, demand response and network capacity to supply customers with the energy that they demand with a very high degree of confidence
secure (grid or power system)	The ability of the power system to continue operating even in the event of the unexpected disruption
tandem (solar cell or materials)	A tandem solar cell involves stacking two solar cells one on top of the other, where the top cell is semi-transparent, which efficiently converts large energy photons into electricity, while the bottom cell converts the remaining or transmitted low energy photons in an optimum manner. This allows a larger portion of the light energy to be converted to electricity The materials used to produce the semi-transparent solar cell are called tandem materials.
variable (energy, generation)	Types of energy generation with output that varies based on the weather
VPP	Virtual power plant: a collection of batteries or other distributed energy resources, managed individually or in unison to support the local or regional electricity grid
WHS	Work health and safety
WHS Act	Work Health and Safety Act 2011

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