

2015  
16

ARENA  
ANNUAL  
REPORT

ARENA

Accelerating Australia's shift to renewable energy



Australian Government  
Australian Renewable  
Energy Agency



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Australian Government  
Australian Renewable Energy Agency

ARENA

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5 September 2016

The Hon Josh Frydenberg  
Minister for the Environment and Energy  
PO Box 6022  
Parliament House  
CANBERRA ACT 2600

Dear Minister

### ARENA ANNUAL REPORT 2015-16

I am pleased to present to you the annual report of the Australian Renewable Energy Agency (ARENA) for the financial year 2015-16, 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 annual report and providing it to you in accordance with s46 of the PGPA Act.

For the first time, this annual report incorporates ARENA's Annual Performance Statement (APS) for 2015-16, as required by s39(1) 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.

This annual report was approved by a resolution of ARENA's Board on 5 September 2016.

Yours sincerely

**Martijn Wilder AM**  
Chair

## REPORT FROM THE CHAIR - MARTIJN WILDER AM



We are in the midst of one of the most important economic transitions in a generation - the transition to a low carbon economy reinforced by commitments made under the Paris Agreement.

Last year a new record was set for global investment in renewables, and the biggest ever annual increase in renewables installed. For the first time, there was more renewables-based energy generation installed than new fossil fuel-based capacity.

This was the tipping point in the world's transition from traditional fossil fuel-based energy to a suite of clean energy options that will also provide affordable and reliable energy, but with less greenhouse gas emissions.

There are many drivers that have brought us to this point. The cost of renewable energy technologies has fallen and private investors are becoming more comfortable with funding renewable energy projects and technologies.

Many of these investors see change as inevitable with renewables and supporting technologies such as batteries being the future of energy infrastructure, particularly as old fossil fuel plants are retired. Governments and businesses are also recognising the benefits of renewable energy in providing a more predictable and secure energy supply.

In addition, communities in cities, rural areas and remote locations have embraced renewables to source reliable, clean and affordable energy - sometimes for the first time.

Australians are adopting renewable energy for many of the same reasons. Our nation has more rooftop solar units per person than any other country in the world, as well as five significant solar farms, 76 wind farms and a wave energy installation that are all connected to the electricity network.

Yet there is still a long way to go before the nation's renewables future is fully realised.

Renewable energy generation in Australia is expected to continue growing through the combination of the Renewable Energy Target, state-based measures and consumer demand for rooftop PV.

The Clean Energy Council (CEC) reported that five new wind farms and eight solar farms larger than one megawatt were completed in Australia during 2015. The three biggest of those solar installations, AGL's Nyngan and Broken Hill facilities and the Moree Solar Farm, were all established with ARENA funding support.

In fact, according to the CEC, ARENA or state-based renewables programs provided support for almost all the past year's major renewable energy projects, in which \$1.2 billion was invested.

ARENA supported these projects not only to increase the supply of renewables in Australia, but also to speed up the commercialisation of promising renewable energy technologies or solutions so that Australians can have affordable access to these energy options as soon as possible. These are the two objectives set out in ARENA's legislation.

Accordingly, ARENA takes a commercially-rigorous and strategic approach to its funding programs and the projects it selects for support. We also fund projects that improve business models or reduce overall industry costs.

ARENA considers the commercialisation pathway in a holistic context so that barriers can be overcome and opportunities realised. Our work spans the innovation chain, from research and development through to early-stage commercial deployment.

We particularly understand the connection between research and development and the ultimate delivery of a commercial solution. Without research and development, innovation cannot occur.

ARENA's grant funding has been instrumental in helping emerging renewables technologies progress towards commercialisation. Research and development projects often need "patient funding", or finance that is not commercially available in the market, because of the long lead times involved.

Public funding such as that provided by ARENA is a critical enabler of research and development, and a necessary precursor to the private sector being prepared to invest in research and development to build competitive advantage. It also plays a critical role in reducing costs over time as seen with the recent large-scale solar funding round.

The growing list of ARENA-supported projects with world-first or Australian-first achievements is testament to the tangible value that ARENA adds by speeding up the commercialisation of renewables innovation or easing the integration of renewables into Australia's existing energy networks, while at the same time bringing down the costs of such energy.

Going forward ARENA will also play an active role in supporting further research and development, including the integration of batteries, storage and renewable energy.

In early 2016 the Government announced the establishment of the Clean Energy Innovation Fund (Innovation Fund) to be jointly-managed by ARENA and the Clean Energy Finance Corporation (CEFC). The Innovation Fund sets aside an allocation of CEFC funds to be provided to projects and investments in the form of higher risk equity and debt rather than grants.

ARENA will also continue to provide grant funding to support eligible projects. After this reporting period, in September 2016, the Australian Parliament amended the ARENA Act to reduce the agency's unallocated grant funding by \$461 million.

During the reporting period the terms of ARENA's Directors expired and a new Board was appointed by the responsible Minister at the time, the Hon Greg Hunt MP.

ARENA's Board is a skills-based decision making body, responsible for recommending the agency's annual General Funding Strategy to the Minister, setting detailed investment priorities, overseeing the running of the organisation and approving project funding.

I am honoured to be Greg Bourne's successor as ARENA Chair, and given the complementary role that I hold at the CEFC, aim to promote the synergies that exist between the two organisations, which will be enhanced by the Innovation Fund.

ARENA is indebted to all former Board members for their dedication, knowledge and guidance during the agency's formative years.

On behalf of the Board I also wish to acknowledge the ongoing leadership of the agency's CEO Ivor Frischknecht and his executive team, who along with the rest of ARENA's dedicated staff have continued to notch up a succession of impressive achievements over the past year despite operating within an uncertain and challenging environment.

The year ahead looks no less exciting, as we expect even more ARENA-supported projects to make technological breakthroughs at the research level, prove innovative approaches through pilots and demonstrations, and inspire the Australian community with breathtaking large-scale renewables.

I am excited to have taken the helm to steer ARENA through these challenges and to work with our valued partners to embrace the opportunities that continue to abound in the Australian renewable energy sector.

A handwritten signature in dark ink, appearing to read 'Martijn Wilder', with a long horizontal stroke extending to the right.

**Martijn Wilder AM**  
Chair



## REPORT FROM THE CHIEF EXECUTIVE OFFICER - IVOR FRISCHKNECHT



Just as there was a tipping point for renewable energy on the international scene over the past year, ARENA helped to deliver a number of breakthroughs in Australia during this period. These achievements, made by ARENA-supported projects, have set the nation firmly on the road to a future where renewable energy is not only inevitable but accessible, affordable and reliable.

We have the technology, householders and businesses want the benefits, and ARENA has identified the challenges that must be overcome. ARENA has been developing and demonstrating the solutions to those challenges.

In doing so, ARENA is accelerating Australia's shift to renewable energy.

In practical terms, this means ARENA is helping to speed up the progress of the most promising renewable energy solutions towards commercialisation, so they can be affordably accessed by those who want to tap into the benefits that renewables offer. We do this by reducing costs, helping to ease the transition, and building industry capacity and capability.

The end of the reporting period marked the fourth year of operations for ARENA. Over that time the agency committed almost \$1 billion in support of 272 renewable energy projects worth a total of \$2.2 billion. During 2015-16, ARENA supported 193 projects with commitments of \$836 million.

The achievements made by ARENA-supported projects over the past year demonstrate that our assistance is making a material difference to reducing the cost of renewables in Australia and removing barriers to the use of clean energy.

### **Renewables that reached commercialisation**

Given ARENA's ultimate aim is to ensure that Australians have access to affordable and reliable renewables, it is particularly noteworthy when a technology developed through an ARENA-supported project becomes fully commercialised.

Over the past year a number of our projects reached that goal.

- Weipa Solar Farm became Australia's first commercial solar-diesel off-grid facility. It powers Rio Tinto's bauxite mine, processing facilities, port and township.
- Laing O'Rourke's SunShift redeployable solar hybrid system became commercially available, as a result of ARENA's support for the feasibility study and pilot project needed to prove the technology.
- Fulcrum3D sold its first CloudCAM cloud tracking system to utility-scale solar customers, following a pilot project supported by ARENA.

### **Renewables that progressed along the innovation chain**

While not yet fully commercial, a number of other technologies supported by ARENA made progress along the innovation chain during the past year.

- Carnegie Wave Energy used data collected by the CETO 5 wave generators successfully deployed with ARENA's help in 2015 to further develop the next generation of its technology, the CETO 6, in a subsequent ARENA project. It is advanced enough to make credible proposals for commercial deployment.
- RayGen Resources moved to the next stage of commercialising its ground-breaking solar PV Ultra technology following the success of its world-first pilot plant. ARENA supported the pilot and a successive RayGen project to make the product cheaper and more efficient, while also scaling-up its manufacturing line.

RayGen also secured funding for the project from its Chinese joint venture partner, JuYe Solar, and an agreement with the Chinese Government's China Three Gorges to use the PV Ultra technology.

### **Renewables that became more affordable**

Every ARENA-supported project helps in some way to make renewables cheaper, but the most significant drop in the cost of renewable energy achieved this year was through our large-scale solar (LSS) competitive funding round.

In 2013, the average grant asked for the Broken Hill, Nyngan and Moree solar farms was \$1.60 per watt. Other proposals cost more. Two years later, when expressions of interest were submitted for the LSS round, the average grant ask dropped to 43 cents per watt.

As we moved closer to the final stages of the bidding process, proponents that lodged full applications asked for an average grant of 28 cents per watt.

This means LSS is now on the cusp of being commercial in Australia, and it did not happen by accident. ARENA worked hard to share knowledge and skills from early projects as well as carefully managing the timing of support so that the industry could gain and maintain momentum.

### **Breakthroughs, new approaches and new technologies**

Equally exciting for ARENA were the ten ARENA-supported projects involving innovations that achieved world records, world-firsts or Australian-firsts during the reporting period. These bring the number of such projects in our investment portfolio to 14.

The year's successful projects involved research breakthroughs in the laboratory, innovative approaches to powering and empowering communities and businesses, and the further development of new technologies.

Particularly significant was the new world record for efficiency set by Australian researchers at the University

of New South Wales (UNSW) for getting even more energy out of solar cells, which ultimately reduces the cost of the technology.

### **Keeping energy options open for the future**

Moving an innovative technology from the research and development stage through to demonstration, pre-commercial deployment and ultimately commercialisation is a challenging and sometimes unpredictable process.

For example, no-one would have foreseen at the time ARENA was established that rooftop solar PV would continue to be taken up so rapidly by Australian households even after the end of attractive feed-in tariffs. And there was no real appreciation that batteries could be an important element of making renewables mainstream.

ARENA's technology-neutral approach and ability to provide support over longer timeframes allows us to create several options for Australians to have access to viable renewable energy technologies. This ability positions the agency as a central player in accelerating the nation's transition to renewable energy.

A core function of ARENA is to extract knowledge, or intellectual capital, from the projects we support, and make the knowledge widely available. This helps future projects benefit from the positive outcomes of earlier projects but also, and equally importantly, avoid making similar mistakes.

As well as disseminating knowledge from projects, ARENA supports industry-wide knowledge-building such as the Australian Renewable Energy Mapping Infrastructure (AREMI) project, which is a publicly-accessible repository for information on energy infrastructure, renewable resources and projects.

A detailed account of ARENA's work over the past year is contained within these pages, along with our performance statement and financial reports.

I would like to thank ARENA's new Board members for the expertise and wise counsel they have already provided in the short time since their appointment, and also to thank members of the outgoing Board for their valued contributions.

Similarly, I thank ARENA's staff for the high standards of professionalism and business acumen they bring to the assessment, management and promotion of the agency's priorities and projects.

Finally I would like to acknowledge the strong support and contributions from the renewables sector, the broader energy industry, the investment community, governments and the Australian people to the work being done by ARENA.

I look forward to continuing that work.



**Ivor Frischknecht**  
Chief Executive Officer

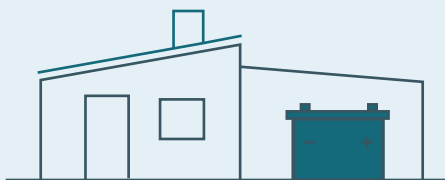


# 01

## ARENA Overview



*Fulcrum3D's CloudCAM cloud tracking system enables cheaper renewable energy by forecasting the power output of solar PV plants. Following support from ARENA to develop the technology, it has now been commercialised.*



Large-scale residential community

## battery

the first trialled  
in Australia



**\$ 2.2 billion**

in total project  
value facilitated  
by almost \$1 billion  
in ARENA investment

Active projects worth  
\$3.5 billion in the ARENA  
pipeline seeking



**\$800  
million**  
in grants



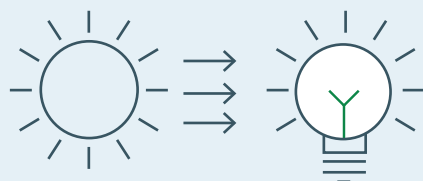
World record for

**highest  
temperature**

steam ever produced  
using energy from the sun

## World-leading

hybrid solution developed  
for King Island now being  
installed in other remote  
Australian  
locations



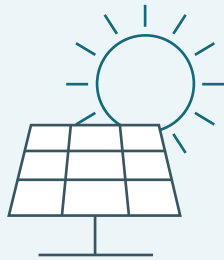
**World record**

for sunlight-to-electricity  
systems conversion efficiency  
using unfocused sunlight



# ARENA highlights

Three of Australia's  
biggest large-scale  
**solar farms**  
now sending  
electricity to  
the grid



**193 projects**

supported with  
commitments of

**\$836 million**

during 2015-16



Remote mining  
operation powered by

**largest**

off-grid solar PV  
system in the world

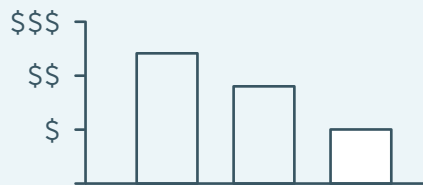


almost **\$1 billion**  
committed to support  
**272 projects**  
since ARENA commenced

Green crude produced  
from microalgae by

**Australia's  
first**

integrated  
demonstration-scale  
plant



**Lower-cost solar**

through large-scale solar PV  
competitive funding round

## About ARENA

The Australian Renewable Energy Agency, or ARENA, is an independent Australian Government agency created in 2012 to increase the competitiveness of renewable energy and increase its supply in Australia.

### Accelerating the shift to renewable energy

ARENA is accelerating the nation's shift towards a sustainable, affordable and reliable energy future.

It does this by helping the most promising renewable energy technologies advance more quickly to the commercial market where they can compete with other energy sources for household and business customers. The agency provides assistance in a number of ways, including financial support for high-merit projects, analysis and advice, and the sharing of related knowledge and information.

By taking a strategic and commercial approach to selecting projects, ARENA supports those that identify and address barriers to energy system transformation, minimise investment risk and overcome the higher costs of doing business that usually face early adopters of a new technology or approach.

These projects also increase Australian experience in constructing and operating renewable energy facilities, developing a skilled workforce and establishing local supply chains.

### ARENA's unique role

ARENA's approach to providing assistance is unlike any other government agency. It is well-placed to deal with technological uncertainty, partly through its commercial approach, and also due to its operating scope, which extends across the innovation chain with a timeframe to 2022.

The agency's Board and staff bring considerable technological and commercial expertise to ARENA's decision-making processes, including recognition that the shift to Australia's energy future will take time for the most prospective renewables to progress along the innovation chain and reach commercialisation.

ARENA is also different because it can invest where private investors will not due to the timeframes being too long, the cost of capital too high, or the rate of return too low. The agency is flexible about how grants can be applied, either for up front capital support or throughout a project's life. Many of ARENA's grants are recoupable or share risk with the recipient.

However, to ensure that ARENA provides support only to projects of the highest merit, every project considered for assistance must have an identified pathway to commercialisation and co-investment from the project proponent and/or other financial supporters.

ARENA is able to support projects at almost any point on the innovation chain, up to pre-commercial deployment. In some cases the agency has provided assistance at successive points as a technology successfully moves through the stages of commercial readiness.





\$2.2 billion

in total project  
value facilitated by  
almost \$1 billion in  
ARENA investment

370 MW

of electricity generation  
deployed with almost  
\$1 billion funds committed

almost  
\$1 billion

committed  
to support  
272 projects  
since ARENA  
commenced

*Laboratory technician working  
on Muradel's project to produce  
biofuel from marine microalgae.*

### Changes to ARENA's role

In March 2016, the Australian Government announced its decision to retain ARENA, broaden the agency's role and change the way ARENA provides funding support.

As part of that announcement, the Government flagged that it would establish a Clean Energy Innovation Fund (Innovation Fund), to be jointly managed by ARENA and the Clean Energy Finance Corporation (CEFC). The Innovation Fund would provide equity and/or debt to clean energy, low emissions and energy efficiency projects.

The announcement signalled an extension of ARENA's mandate to include energy efficiency and low emission technologies, which was brought into effect by regulation on 10 May 2016.

### ARENA and the Clean Energy Finance Corporation

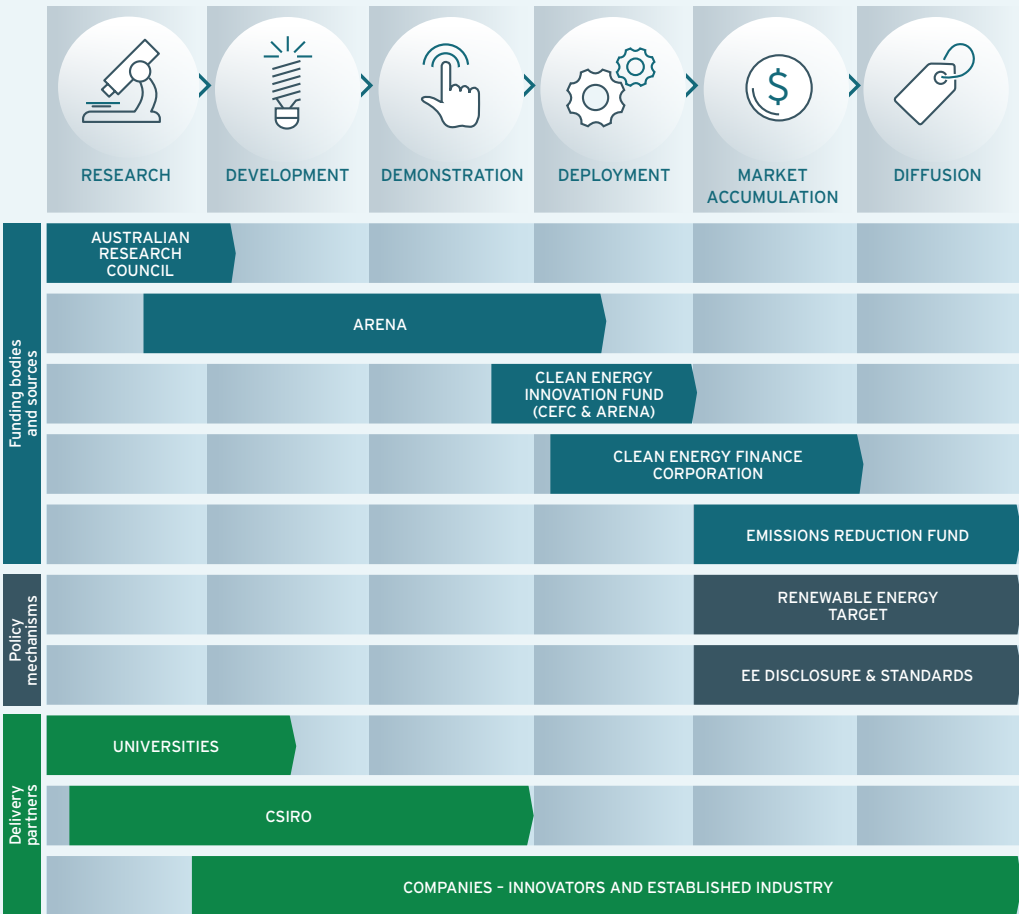
ARENA plays a complementary role to the CEFC in advancing Australia's renewable energy potential, in addition to working together on the new Innovation Fund.

ARENA provides the support needed to accelerate the development of promising technologies towards commercialisation, while the CEFC provides finance to de-risk and demonstrate bankability, which helps to bring near-commercial and commercial projects to reality.

These roles are separate to the Renewable Energy Target (RET), which drives the uptake of the cheapest mature renewable energy technologies.

ARENA sometimes co-invests with the CEFC in later-stage projects that are not yet fully commercially competitive. These projects are also generally eligible for the RET, which reduces the amount of CEFC and ARENA funding required.

Figure 1: A partnership across the innovation chain



## ARENA showcase

During the reporting period, ARENA supported 193 projects that aim to increase the competitiveness and/or supply of renewable energy. Twenty-eight of those projects were new commitments during 2015-16.

Summary information on each of the projects is provided in the Investment Portfolio section of this report. More detailed project profiles are available at [arena.gov.au/projects](http://arena.gov.au/projects)

Each year in its annual report ARENA showcases a number of the projects it supports to demonstrate how the agency is making a material difference by helping Australia's shift to renewables quicker and easier.

This year's showcase highlights:

- ARENA's investment footprint across Australia and along the innovation chain
- 14 world or Australian-firsts achieved by ARENA-supported projects, ten of which occurred in 2015-16
- ARENA-supported projects that are tackling the biggest challenges and opportunities for renewables in Australia.

## 193 projects

supported with commitments of \$836 million during 2015-16

## World record

for sunlight-to-electricity systems conversion efficiency using unfocused sunlight

Large-scale residential community battery the first trialled in Australia

## Three of Australia's biggest

large-scale solar farms now sending electricity to the grid

# ARENA's investment footprint

(Funds committed or spent by ARENA during 2015-16)

Figure 2: Across Australia

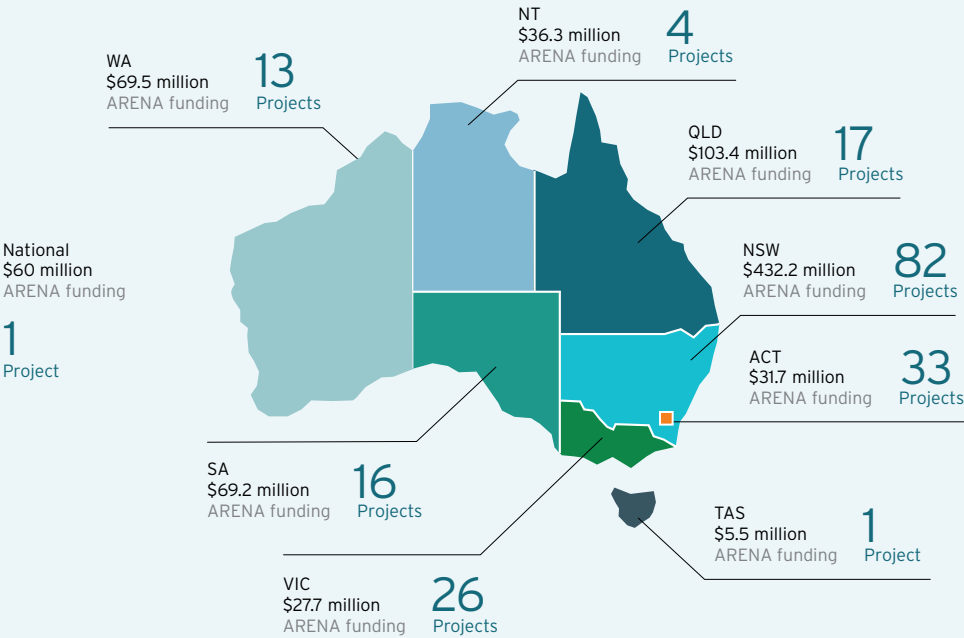
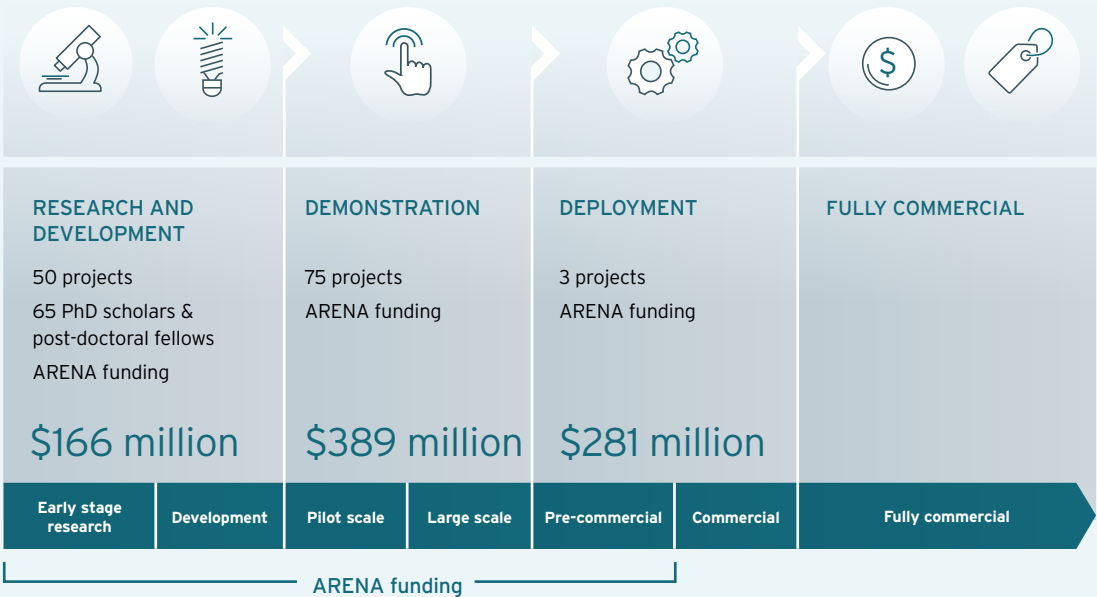


Figure 3: Across the innovation chain



## World and Australian-firsts

Ten ARENA-supported projects achieved world records, world-firsts or Australian-firsts during the reporting period. These bring the number of such projects in ARENA's investment portfolio to 14. Details of those projects are provided in the table below.

**Table 1: World and Australian-firsts**

Project	Achievement	Location	Technology	ARENA commitment / Total project cost
Advanced steam-generating receivers for high concentration solar collectors  Lead organisation: CSIRO	World record for highest temperature steam ever produced using energy from the sun	NSW	Solar thermal	ARENA: \$2.8m Total: \$6.0m
Advancing established marine microalgae biofuel to commercialisation  Lead organisation: Muradel	Australia's first integrated demonstration-scale plant to sustainably convert microalgae into green crude	SA	Bioenergy	ARENA: \$4.4m Total: \$10.7m
AGL Solar Farm  Lead organisation: AGL	Australia's biggest solar farm	NSW	Solar PV	ARENA: \$166.7m Total: \$439.0m
Alkimos Beach residential trial of community storage  Lead organisation: Synergy	Australia's first large-scale community battery	WA	Solar PV + storage	ARENA: \$3.3m Total: \$6.7m
DeGrussa renewable mining project  Lead organisation: Neoen	Largest off-grid solar PV system in the world and one of the largest solar plants providing peak power load to a mining operation	WA	Solar PV + storage	ARENA: \$20.9m Total: \$40.0m
Grid-connected multi-module concentrating solar thermal plant with thermal storage  Lead organisation: Vast Solar	First of its kind to use sodium as the heat transfer fluid	NSW	Solar thermal	ARENA: \$7.9m Total: \$18.6m
Karratha Airport Solar Plant  Lead organisation: SunEdison Australia	Australian-first solar energy project to use Cloud Predictive Technology to anticipate solar energy output	WA	Solar PV	ARENA: \$2.3m Total: \$7.1m

Project	Achievement	Location	Technology	ARENA commitment / Total project cost
King Island Renewable Energy Integration Project Lead organisation: Hydro Tasmania	World-leading off-grid renewable energy solution incorporating demand management and storage	TAS	Hybrid	ARENA: \$6.1m Total: \$18.3m
Moree Solar Farm Lead organisation: Moree Solar Farm	First large-scale solar project in Australia to be built without offtake agreement and first to use single-axis horizontal tracking	NSW	Solar PV	ARENA: \$101.7m Total: \$164.0m
Perth Wave Energy Project Lead organisation: Carnegie Wave Energy	World-first array of wave power generators connected to a grid	WA	Ocean	ARENA: \$13.1m Total: \$40.0m
Power Cube receiver Lead organisation: UNSW	World record for sunlight-to-electricity conversion efficiency (34.5%) using unfocused sunlight	NSW	Solar PV	ARENA: \$1.4m Total: \$3.0m
RayGen Resources concentrated solar PV demonstration plant Lead organisation: RayGen Resources	World-first pre-commercial pilot using central receiver concentrating solar PV	VIC	Solar PV	ARENA: \$1.8m Total: \$3.6m
Rio Tinto's Weipa Solar Farm Lead organisation: First Solar	Australia's first renewables-powered mine, processing facilities, port and township	QLD	Solar PV + storage	ARENA: \$11.3m Total: \$23.4m
Solar cooling and heating Lead organisation: CSIRO	World-first high-efficiency solar thermal desiccant air conditioning system	VIC	Solar	ARENA: \$520,000 Total: \$1.2m

## Australia's shift to renewables - tackling the challenges and opportunities

To maximise the benefit for taxpayers from ARENA's financial support for projects, the agency makes investment decisions according to its Investment Plan, which is developed in accordance with the principles outlined in the General Funding Strategy.

The 2015 Investment Plan identified investment priorities where ARENA could make the most impact, including some of the greatest challenges and opportunities for the nation as it shifts to renewables.

Provided below is a selection of projects supported by ARENA that made progress tackling those challenges and opportunities in 2015-16.

### Large-scale solar photovoltaics

During the reporting period, three ARENA-supported large-scale solar farms commenced operation, and a competitive funding round was held to drive down the cost of the next generation of large-scale solar farms in Australia.

## AGL Solar Farm

Just six months after its sister solar plant in Nyngan, NSW was switched on in early 2015, the last of 678,000 solar panels were installed at the second site in Broken Hill of AGL's dual-location solar farm. Days later, in mid October, the Broken Hill solar plant ramped up to full generation for the first time.

The speed with which the second solar plant was installed and commissioned demonstrated the value of ARENA's knowledge sharing approach. By drawing on the experience and expertise gained from installing and commissioning the Nyngan solar plant, AGL was able to accelerate development of the Broken Hill operation.

During that time, \$15 million was injected into the local Broken Hill community for direct construction activities as well as indirectly through workers purchasing accommodation, food, petrol and other supplies locally.

The 53 megawatt plant at Broken Hill became Australia's second-largest solar farm, after the 102 megawatt plant at Nyngan. When combined, the two plants make the AGL Solar Farm, which has more than two million solar panels and is now feeding power into the national electricity grid.

If the solar farm generates more revenue than expected by AGL, ARENA is able to recoup its investment to maximise government funding for other renewable energy projects in Australia.



## AGL Solar Farm

Lead organisation: AGL

Technology: Solar PV

Location: New South Wales

ARENA funding: \$166.7 million

Total project cost: \$439.0 million

ARENA funding

**\$166.7**  
million



*AGL Solar Farm  
under construction.*

## Large-scale solar PV competitive funding round

Technology: Solar PV

Location: Across Australia

ARENA funding: up to \$100 million

Having supported Australia's first large-scale solar (LSS) projects, ARENA spurred on the next generation of solar power plants during the reporting year by holding a competitive funding round for LSS.

In June 2016, ARENA received 20 eligible applications from the 22 projects invited in January to progress to the next stage of the competitive round. The projects sought \$211 million in ARENA funding for \$1.6 billion worth of projects generating 757 megawatts of capacity.

The results of the competitive round will be known after the reporting period in September 2016, however it is already clear that the cost of LSS is rapidly falling due to ARENA support, which increases confidence, lowers finance costs and creates a more supportive market for power purchase agreements.

AGL and Moree solar farms required \$1.60 per watt of public support whereas the average amount requested by the 20 applicants was 20 cents per watt.

To ensure that successful bidders in the LSS competitive round benefit from the knowledge gained during other ARENA-supported projects, the agency hosted a knowledge sharing forum during the reporting period where the developers of existing ARENA-supported projects passed on their experience to the short-listed LSS proponents.

## Moree Solar Farm

Another Australian-first was achieved by a different type of large-scale solar farm during 2015-16. The Moree Solar Farm (MSF), also supported by ARENA, became the first utility-scale solar project in the country to use single-axis horizontal tracking, which allows its solar panels to follow the sun for maximum efficiency.

The first of MSF's 223,000 solar panels were installed in June 2015, and the plant successfully achieved first generation in March 2016. Later in March, MSF's developer Fotowatio Renewable Ventures (FRV) secured a commercial agreement under which Origin Energy will purchase all of the electricity and large-scale generation certificates (LGCs) produced by the plant until 2030.

This power purchase agreement (PPA) brought to fruition the project's commercial potential, made possible by FRV taking on the project risk with support provided by ARENA and CEFC.

The MSF project is now generating at full capacity and is expected to reach practical completion towards the end of 2016.

MSF is also notable because FRV reached financial close on the project including debt finance in July 2014 by being willing to sell electricity and LGCs in the spot market instead of obtaining a PPA first. In doing so, FRV pioneered an alternate PPA pathway for project developers in the development and construction phase of solar PV projects. This approach could encourage other renewables developers to consider taking on market risk, and therefore result in more large-scale renewables being developed.



## Moree Solar Farm

Lead organisation: Moree Solar Farm

Technology: Solar PV

Location: New South Wales

ARENA funding: \$101.7 million

Total project cost: \$164.0 million

ARENA funding

**\$101.7**  
million

*Solar panels on horizontal axis  
at Moree Solar Farm.*

### Storage

Australia is seen as a key pioneering market for the commercialisation of energy storage technologies and business models. With over five gigawatts of rooftop solar PV in Australia, local households and businesses may become battery owners, and participate in energy markets or provide network support.

ARENA identified early that storage would play a central role in accelerating the penetration of renewable energy into the grid, and has supported projects involving storage at the research and development level as well as the demonstration stage.

### Alkimos Beach residential trial of community storage

This year ARENA supported a ground-breaking residential battery storage trial, which combined community-scale battery storage with rooftop solar PV.

Lithium-ion batteries installed in two shipping containers located within the Western Australian suburb of Alkimos Beach will store power from more than 100 rooftop solar PV systems installed on nearby homes. This will provide the households with the benefits of storage without the need for on-site installation and maintenance, while also lowering the suburb's demand for electricity from the grid.

This approach also has the potential to offer participating households lower electricity bills and reduce grid connection costs for new residential developments.

The project will shed light on the operation of solar combined with community-scale storage within traditional electricity networks. Lessons learnt from the project are being shared with the industry to address gaps in existing knowledge and potentially pave the way for similar projects.





ARENA funding

**\$3.3**  
million

### Alkimos Beach residential trial of community storage

Lead organisation: Synergy

Technology: Solar PV + storage

Location: Western Australia

ARENA funding: \$3.3 million

Total project cost: \$6.7 million

*Image Credit: Synergy.*

**Off-grid areas**

ARENA continued to identify and support projects during 2015-16 that aim to overcome the challenges associated with integrating renewables into off-grid locations. Those challenges include unclear costs, higher up-front costs which favour longer projects, and the operational challenges of incorporating new technology, particularly in remote areas.

**King Island Renewable Energy Integration Project**

King Island, located in the Bass Strait near Tasmania, used to rely exclusively on diesel to generate power but now has a world-leading power system that consists of solar, wind, diesel, storage and enabling technologies such as demand management and sophisticated controls.

The hybrid energy system, developed by Hydro Tasmania with ARENA's support, supplies more than 65 per cent of King Island's energy needs and, when the conditions are right, can deliver 100 per cent renewable energy to the island.

The renewable energy solution has proven to be so successful that it is being applied to other isolated locations in Australia.

This year ARENA committed funds to establish renewable energy hybrid systems based on that created for King Island in the remote opal mining town of Coober Pedy (South Australia) and on Rottnest Island (Western Australia).

A similar ARENA-supported project is already underway on Flinders Island, also in the Bass Strait.

Up to \$3 million of ARENA's funding for the Rottnest Island project may be recouped over the life of the \$7.3 million project if it is successful.





ARENA funding

**\$6.1**  
million

## King Island Renewable Energy Integration Project

Lead organisation: Hydro Tasmania

Technology: Hybrid

Location: Tasmania

ARENA funding: \$6.1 million

Total project cost: \$18.3 million

## Yulara Solar Project

Located alongside the Ayers Rock Resort near Uluru in the Northern Territory, the Yulara Solar Project is integrating solar PV into the existing power system, which is fuelled by compressed natural gas (CNG). The CNG is delivered daily by truck from Alice Springs, located around 450 km away from the site.

The 1.8 megawatt solar PV system consists of five ground and roof-mounted solar PV systems ranging in size from 150 kilowatts to 1 megawatt. The combined system will provide approximately 15 per cent of Yulara's average electricity demand and 30 per cent of peak daytime demand.

The integration of solar PV into the power system was identified as a way to manage the resort's energy expenditure over the long term, reduce exposure to energy price volatility and decrease carbon emissions.

An innovative tendering process was used for construction of the solar installation, an Availability Leasing model that more effectively shares the long-term risks and opportunities of running solar PV systems in remote areas.

As a result, ARENA funding was required only for the knowledge sharing component of the project, which will share information and experience on the use of the innovative tendering process, as well as the advantages of integrating solar PV with existing mini-grids.





ARENA funding

**\$0.45**  
million

## Yulara Solar Project

Lead organisation: Voyages  
Indigenous Tourism Australia

Technology: Solar PV

Location: Northern Territory

ARENA funding: \$450,000

Total project cost: \$6.5 million

*One of the five solar PV systems integrated into the existing power system, and now providing up to 30 per cent of Ayers Rock Resort's electricity demand.*

*Image credit: Voyages Indigenous Tourism Australia.*

## DeGrussa renewable mining project

The DeGrussa off-grid renewable mining project was successfully completed during the reporting period.

More than 34,000 solar PV panels were installed at the copper-gold mine in remote Western Australia alongside 6 megawatts (1.8 megawatt hours) of new battery storage, making it the largest off-grid solar PV system in the world and one of the largest solar plants providing peak power load to a mining operation.

The project was constructed in ten months and delivered on budget, despite being located in remote Australia. It involves cutting-edge technology, with advanced lithium-ion batteries to store the solar power, sun-tracking solar PV panels to maximise output, and smart control systems linking these with the existing diesel plant.

Solar PV will provide the majority of the mine's daytime electricity requirements, offsetting around five million litres of diesel currently being used by the mine each year.

The inclusion of battery storage was a vital piece of the puzzle, guaranteeing reliable supply to the mine when clouds pass over.

Renewable energy company juwi developed and will operate the solar plant, which is owned by Neoen.


The mine's owner, Sandfire Resources, has already fielded inquiries from other miners looking to take advantage of renewable energy in their own operations and tap into Sandfire's experience.

ARENA supports first-of-a-kind projects like this to increase experience within industry, and the confidence of project developers, investors and financiers.

Performance data from the project will make it easier for mining companies to evaluate the risks of integrating renewables with existing diesel generation and illustrate the potential diesel and cost savings that can be achieved.

Power is being provided to the mine under a six year power purchase agreement. If the mine continues operating past this point, ARENA funding will be paid back as the power plant continues to generate solar energy.





## DeGrussa renewable mining project

Lead organisation: Neoen

Technology: Solar PV + storage

Location: Western Australia

ARENA funding: \$20.9 million

Total project cost: \$40.0 million

ARENA funding

**\$20.9**  
million

*DeGrussa processing facility.*

*Image credit: Sandfire Resources.*

## Redeployable solar hybrid

Lead organisation: Laing O'Rourke

Technology: Hybrid

Location: Queensland

ARENA funding: \$450,000

Total project cost: \$1.8 million

The world's first fully-redeployable large-scale solar-diesel hybrid power plant was successfully piloted with ARENA support during 2015-16, and has since been commercialised.

The hybrid power plant consists of containerised modules, including a control centre and inverters with external, pre-wired connections to allow fast, easy set-up and pack down. It can be delivered, unpacked and fully-functional in a week, with the solar panels being re-used over their lifespan. This solution is suitable for a range of off-grid applications where temporary power is required, such as construction sites, mine operations and disaster relief.

ARENA provided Laing O'Rourke with funding for the feasibility and design work before supporting the demonstration project. The successful pilot gave Laing O'Rourke the confidence to commit to further developing the technology, and was a crucial step in proving the technical and commercial viability of moveable, modular renewable energy concepts more broadly.

ARENA's support for the project demonstrated that funding for early-stage renewable energy solutions can pave the way for new products and companies to enter the Australian market.

## Weipa solar-powered mine site and community

The first renewables mining project supported by ARENA successfully commenced commercial operation during 2015-16.


The commercial diesel displacement solar plant is now generating electricity for Rio Tinto's Weipa bauxite mine, processing facilities, port and township located on the western Cape York Peninsula in Queensland.

The 1.7 megawatt solar plant generates up to 20 per cent of the township's daytime electricity demand, helping to reduce diesel usage at Weipa's power station and save up to 600,000 litres of diesel each year.

This is the first time a remote Australian mining operation has been supplied with power from solar PV on such a scale, and it had to overcome a number of integration issues. The project has created a precedent for the mining industry by demonstrating that solar PV is a viable option for powering off-grid locations such as mine sites.

ARENA is funding the project in two stages. Stage one is complete and its lessons are being incorporated into the much higher penetration second stage. When complete, the solar farm will provide 6.7 megawatts of off-grid power, and offset up to 2,300,000 litres of diesel each year. It will include a significant storage component and be capable of meeting up to 100 per cent of daytime power demand at certain times.





## Weipa solar-powered mine site and community

Lead organisation: First Solar

Technology: Solar PV + storage

Location: Queensland

ARENA funding: \$11.3 million

Total project cost: \$23.4 million

ARENA funding

**\$11.3**  
million

*Weipa Solar Farm is made up of 18,000 solar PV panels.*

*Image credit: First Solar.*

### **Fringe-of-grid and network-constrained areas**

Communities and businesses located on the fringes of the nation's electricity grids or in network-constrained areas can be adversely affected by poor quality or unreliable electricity supply.

Furthermore, the long powerlines needed to service fringe-of-grid areas can be costly to maintain.

ARENA supported projects during 2015-16 that helped to demonstrate how renewable energy installations at such locations can alleviate the need for expensive network augmentation, reduce electricity losses and/or increase reliability.

### **Barcaldine Remote Community Solar Farm**

Lead organisation: Elecnor Australia Pty Ltd

Technology: Solar PV

Location: Queensland

ARENA funding: \$22.8 million

Total project cost: \$69.0 million

Late in 2015, ARENA committed to support the construction of a 20 megawatt single-axis tracking solar plant in Barcaldine to demonstrate how renewables can provide network benefits in locations at the edge of electricity grids. The Barcaldine area experiences voltage and frequency control issues as well as load management challenges.

The solar farm will help to alleviate peak demand pressures and provide voltage control, resulting in more reliable power supply to customers in the region.

The potential to add battery storage to create additional network benefits will also be explored, which would allow the solar plant to work in tandem with the existing gas plant during a line outage, operating as an "island" network independent of the main grid.

The project will be a test case to show how network benefits from distributed renewables can improve network efficiency, and potentially enable solar plants to access an extra revenue stream through network support payments.

It will also use the solar tracking technology already installed at the Moree Solar Farm, providing a further benchmark for the technology and additional information on its installation and operation that will be shared with the industry.

ARENA's funding for the project is partly recoupable.



## Renewables for industrial processes

During the year ARENA explored the potential for heat-generating renewables to replace the use of gas in industrial processes, including the use of concentrating solar thermal and waste-to-energy. ARENA organised four workshops with industry to explore options for saving money and lowering emissions.

### Integrating concentrating solar thermal into Bayer alumina process

**Lead organisation:** University of Adelaide

**Technology:** Solar thermal

**Location:** South Australia

**ARENA funding:** \$4.5 million

**Total project cost:** \$15.1 million

ARENA announced funding for a concentrating solar thermal (CST) project this year that will evaluate the potential for energy produced from CST to be integrated into the Bayer alumina refining process.

The project will develop technologies and process knowledge to enable the progressive integration of low temperature CST, the solar reforming of natural gas, and high temperature CST into the existing Bayer process.

By enabling CST to be integrated into processes used by large industrial energy end users operating in Australia, the project will help to address Australia's exposure to anticipated rises in the price of natural gas, while also helping to meet greenhouse gas emission targets.

## Other projects

### National bioenergy database

**Lead organisation:** RIRDC

**Technology:** Bioenergy

**Location:** Australian Capital Territory

**ARENA funding:** \$3 million

**Total project cost:** \$6.3 million

ARENA committed funding this year for the Rural Industries Research and Development Corporation (RIRDC) to create a national database bringing together data on biomass resources across Australia to provide a clearer picture of where untapped resources are available.

The project was developed in response to the bioenergy industry's need for a central, national source of data to uncover new opportunities and make it easier to develop biomass generation and biofuel projects in Australia.

RIRDC is working with the states and territories to collect data on location, volumes and availability of biomass for inclusion on the ARENA-supported Australian Renewable Energy Mapping Infrastructure (AREMI) platform. AREMI is a centrally-accessible repository for ARENA project information that shares mapping data and information with the renewables industry.

## Perth Wave Energy Project

Work continued this year on two Carnegie Wave Energy projects supported by ARENA.

The first, involving the design, deployment and testing of three CETO 5 wave energy units off the coast of Garden Island in Western Australia, further cemented Australia's position as a leader in the development of wave power. The CETO 5 project is the world's first commercial-scale wave energy array connected to an electricity grid.

The CETO 5 units were retrieved after being deployed off-shore for twelve months, breaking a world record for completing 14,000 cumulative operating hours, and providing electricity and potable desalinated water to Australia's largest naval base, HMAS Stirling.

Carnegie completed the conceptual design phase of the next generation CETO 6 units during 2015-16, incorporating data collected from the CETO 5 units, as well as information from wave testing in Scotland, internal design and modelling studies, and design work undertaken with Carnegie's supply chain.

The CETO 6 design has four times greater rated capacity than its predecessor at one megawatt, simplified installation and maintenance, and more advanced control systems.

The project is a prime example of how, with the right stewardship and support, improvements can be made on previous iterations of a technology to progress it along the innovation chain towards commercialisation.

The learning and experience gained from both projects is being shared with the rest of the industry to help reduce hurdles facing other wave energy projects.

## Wave energy cost reduction through location and configuration optimisation

Lead organisation: University of Western Australia

Technology: Ocean

Location: Western Australia

ARENA funding: \$994,000

Total project cost: \$3.6 million

Carnegie Wave Energy has also partnered with the University of Western Australia (UWA), which secured funding support this year through ARENA's Research and Development Program to investigate the optimal number, size, arrangement and location of wave energy device arrays to minimise the cost of installation and infrastructure while maximising power output.

The outcomes of the UWA project will be validated using Carnegie Wave's CETO 5 wave energy module at Garden Island, Western Australia and then applied to the development of the CETO 6 array in 2020.



*One of Carnegie Wave Energy's three CETO 5 wave power generators being deployed off the coast of Western Australia.*

*Image credit: Carnegie Wave Energy.*

ARENA funding

**\$26.1**  
million

## Perth Wave Energy Project

Lead organisation: Carnegie Wave Energy

Technology: Ocean

Location: Western Australia

ARENA funding: \$13.1 million (CETO 5)  
\$13.0 million (CETO 6)

Total project cost: \$40.0 million (CETO 5)  
\$46.0 million (CETO 6)

## Research and development

In addition to demonstration and pre-commercial deployment projects, ARENA continued to support research and development projects this year that offer the best hope of improving the competitiveness or supply of renewable energy.

ARENA does this because research and development is the place where innovation begins – the laboratory, the workbench, the greenfield site – and without the initial research and development phase, innovation cannot occur.

Emerging technology needs funding that is not typically available in the commercial market. ARENA's ability to provide such funding allows the agency to stimulate new industries by enabling research and development until the private sector sees the competitive advantage in doing so.

In 2015-16 ARENA continued to support 115 research and development projects, PhD scholarships and postdoctoral fellowships with funding support totalling \$166 million.

## Research and development industry-researcher collaboration

ARENA funding: \$17 million

Total project cost: \$54 million

ARENA committed funding support for nine cutting-edge research and development projects selected through an industry-researcher collaboration round this year. The aim of the round was to clear pathways for renewable energy technologies to move from laboratory to field by fostering collaboration between research institutions and industry.

Each successful project proposal focused on delivering commercially-viable solutions for current industry challenges. Research institutions joined resources, agriculture, finance and property development industries to deliver the projects and will work alongside utilities, power companies and renewable energy businesses.

Technologies covered by the projects include storage, biofuels, wave power, solar PV and solar thermal.



*By supporting research and development with grant funding, ARENA helped the Victorian Organic Solar Cell Consortium develop its innovative thin-film solar cell technology. The consortium is a research collaboration between CSIRO, Monash University, the University of Melbourne, BlueScope Steel, Innovia Films, Innovia Security and Robert Bosch SEA.*

Without research and development, innovation cannot occur. In 2015-16 ARENA supported 115 research and development projects, PhD scholarships and postdoctoral fellowships.



## Renewable Energy Venture Capital Fund Program (Southern Cross Renewable Energy Fund)

ARENA's Renewable Energy Venture Capital Fund (REVC) Program was created to foster skills and management capability in innovative companies in the sector and to invest in such companies on a commercial basis to strengthen their chance of success.

ARENA's investment commitment of up to \$60 million is matched by Softbank China Venture Capital, creating the up to \$120 million Southern Cross Renewable Energy Fund (SCREF), which is managed by Southern Cross Venture Partners Pty Ltd.

During the year SCREF made over \$9 million of new commitments, including to an innovative energy retailer and a battery technology company.

Information about investments made by SCREF is available at [arena.gov.au/revcf](http://arena.gov.au/revcf)



*With funding support initially provided by ARENA in 2014 through the Southern Cross Renewable Energy Fund, Sunverge Energy's world-leading residential energy storage system was backed this year with a USD \$20 million commitment from AGL. This will accelerate the roll out of battery storage systems to Australian households.*

*Image credit: Sunverge Energy.*



# 02

## Annual Performance Statement 2015-16







*CSIRO Energy Centre in Newcastle, NSW, where CSIRO and Abengoa Solar set a new world record for achieving the highest temperature steam ever produced using energy from the sun.*

## Introductory statement

The Board, as the accountable authority of the Australian Renewable Energy Agency, presents the 2015-16 Annual Performance Statement of the Australian Renewable Energy Agency, as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act). In the Board's opinion, this 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.

## Entity purpose

ARENA's purposes for this 2015-16 Annual Performance Statement are those described in the 2015-16 Corporate Plan.

During the reporting period the Government announced its intention to expand ARENA's role to include energy efficiency and low emissions technology. To become effective, these changes need to pass through the Australian Parliament. This Annual Performance Statement relates to ARENA's purposes prior to any such changes becoming effective.

Also during the reporting period the Government, by regulation, expanded ARENA's mandate to include jointly managing the Clean Energy Innovation Fund with the Clean Energy Finance Corporation. This, however, did not affect ARENA's purposes during the reporting period.

ARENA's two overarching objectives set out in the *Australian Renewable Energy Agency Act 2011* (ARENA Act) are to:

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

ARENA's investment objectives are to:

- demonstrate renewable energy's role in addressing Australia's current energy issues and/or
- provide renewable energy technology options for the long term.

ARENA's performance measures for 2015-16 are mostly qualitative measures linked to the systems and capabilities necessary to ensure ARENA-funded activities contribute to one or more of ARENA's intended outcomes. These systems and capabilities are grouped into:

- Strategic investment
- Strong project assessment, negotiation and delivery
- Effective knowledge sharing.

# RESULTS

## 1 STRATEGIC INVESTMENT

### Performance criterion

Provide financial assistance to projects that rank highly on our merit criteria, including new commitments in each of our priority areas.

### Performance measure

Number of new project commitments (including breakdown by priority areas), and confirmation that all funded projects rank highly on ARENA's merit criteria, drawing on advice from independent expert assessors.

### Criterion source

Corporate plan

### Result: Achieved

ARENA made commitments for 28 new projects during the reporting period.

Nine projects were supported under the second competitive round for ARENA's Research and Development Program, which focused on developing industry-research partnerships.

All projects ranked highly on ARENA's merit criteria and were assessed through a rigorous process that is described in the results for "Strong project assessment, negotiation and delivery".

Project assessment drew on advice from independent experts and involved financial and technical due diligence.

Because of the time it takes to originate, assess and negotiate a contract for a project, the projects funded during the reporting period reflect investment priorities from previous Investment Plans as well as the current Investment Plan.

Table 2: ARENA funding commitments and investment priorities

CATEGORY	NUMBER OF PROJECTS
Integrating renewables and grids	9
Renewables for industrial processes	4
Off-grid areas	3
Fringe-of-grid and network-constrained areas	2
Solar photovoltaics	17
Concentrating solar thermal	2
Ocean	2
Geothermal	1
Bioenergy	4
Hybrid	2
Enabling	8

*The total number of projects exceeds 28. Some projects have been double counted because they fall into more than one category.*



### Performance criterion

Annually review (and update if required) a General Funding Strategy and Investment Plan outlining the principles and priority areas for new ARENA investments.

### Performance measure

Yes/no

### Criterion source

Corporate plan

### Result: Achieved

The General Funding Strategy for 2015-16 to 2017-18 was reviewed, updated, approved by the Minister and published. A new Investment Plan was developed and launched in 2015.

This was the first General Funding Strategy published for two years and it provided an opportunity to re-focus ARENA's priorities. The new Investment Plan presented more specific priorities than previous years' plans and became formally linked to ARENA's new Advancing Renewables Program. ARENA also prepared for the 2016-17 to 2018-19 General Funding Strategy but delayed publication due to the timing of the federal election.

### Performance criterion

All new ARENA-funded activities have a statement of desired outcomes, with a defined link to ARENA's objectives and program outcomes.

### Performance measure

Yes/no

### Criterion source

Corporate plan

### Result: Partially achieved

The intent behind this performance criterion was to make sure that there is a well-documented statement of every project's outcomes, which provides a clear line of sight to ARENA's objectives and program outcomes. As well as ensuring that there is a clear and consistent understanding of the desired outcomes of a project throughout the assessment and approval stages, this initiative will provide a clear point of reference against which project evaluations will be able to be undertaken. Because the process came into effect in the second half of the financial year, only around 60 per cent of projects committed in the reporting period were included in the improved process. However it is important to note that 100 per cent of ARENA's signed funding agreements have always included a statement of desired outcomes.





ARENA-supported projects increase Australian experience in constructing and operating renewable energy facilities, developing a skilled workforce and establishing local supply chains

*Installation of solar panels at AGL's Broken Hill solar facility.*

## 2 STRONG PROJECT ASSESSMENT, NEGOTIATION AND DELIVERY

### Performance criterion

Maintain robust technical and commercial capabilities and procedures, including access to ARENA's Advisory Panel, experts, commercial specialists, and due diligence procedures.

### Performance measure

Qualitative report on ARENA capability and procedures, incorporating advice from internal audit and other independent sources.

### Criterion source

Corporate plan

### Result: Achieved

#### Operational framework

ARENA's operational framework comprises policies and technical procedures in relation to project assessment, negotiation and delivery. These policies and procedures are developed and implemented within a governance framework that includes the General Funding Strategy, Investment Plan, program guidelines, Corporate Plan and Work Plan.

### ARENA Advisory Panel

#### Role

The role of the ARENA Advisory Panel includes:

- to assess funding applications against the merit criteria in relevant program guidelines and
- to make recommendations to the ARENA Executive about whether to offer funds and the terms and conditions of any funding offer for applications and variations.

#### Composition

The ARENA Advisory Panel consists of a core group of ongoing independent members, with supplementary groups of non-ongoing independent members appointed for the purpose of specific funding rounds. The members of the ARENA Advisory Panel hold expertise across ARENA's priorities for new investment (large-scale solar photovoltaics, integrating renewables and grids, renewables for industrial processes, fringe-of-grid and network constrained areas, off-grid areas), as well as generalist technical, financial and industry sector expertise.

During 2015-16, the ARENA Advisory Panel was composed of 30 ongoing and non-ongoing members with a mix of expertise.

### **Process**

A minimum of three members are selected by the Chair to assess each funding application. This will include at least one member with generalist expertise. The Chair (in consultation with ARENA staff) selects members to assess an application based on required expertise and the management of any conflicts of interest. This ensures that each application is assessed by members with relevant technical and commercial capabilities.

### **Due diligence procedures**

ARENA undertakes due diligence activities during the assessment process, subject to the value, size and complexity of an application. Due diligence includes presentations by applicants to the ARENA Advisory Panel, commissioning of independent research, analysis and modeling to support assessments and consultation with other government agencies and relevant parties.

### **Other technical and commercial capabilities**

ARENA maintains additional technical and commercial capabilities, including via the staff made available to it by the Department of the Environment and Energy and its engagement of consultants and contractors under the ARENA Act.

### **Internal audit**

ARENA operates an annual internal audit program under the oversight of the Risk and Audit Committee. During the reporting period four audits were undertaken, two of which are relevant to this performance statement:

- to review and assess whether ARENA's assessment processes are adequate and in line with internal requirements and better practice, where applicable
- to determine whether ARENA's management of the delivery of projects is in accordance with ARENA policies and procedures, including processes to ensure projects are being delivered in line with project objectives (including knowledge sharing).

The findings of the internal audit in relation to assessment processes were that, overall, they are adequate and in line with internal requirements and better practice. The findings in relation to management of the delivery of projects were that they were low risk and in accordance with ARENA's policies and procedures. ARENA has acted on recommendations by the internal audit.



## Performance criterion

**Effectively manage programs and funding agreements in accordance with agreement terms and to deliver intended outcomes.**

## Performance measure

Report on project management approach and significant outcomes, including project completions and any terminations.

## Criterion source

Corporate plan

## Result: Achieved

### Project management approach

ARENA invested significant effort to ensure that project management systems, processes and capabilities were improved. The agency's management approach balanced the flexibility required by first-of-a-kind projects with accountability in expenditure of public money.

ARENA worked on strengthening good knowledge management practice so that it could quickly identify risks (to ARENA, to the project consortium, to the broader industry) and opportunities (sharing knowledge with key audiences) and act upon them.

ARENA's adaptive approach to project management gave project proponents the greatest chance of successfully delivering outputs and achieving outcomes.

## Project completions

56 projects reached completion.

Case studies describing significant project outcomes are presented in the Showcase section of the Annual Report.

## Project terminations

Twelve projects were terminated and unspent funds returned to ARENA or released for other commitments. ARENA ensures that all projects deliver value for money. The decision to terminate projects reflects a judgment that a project is not meeting, or is unlikely to meet, its intended outcomes, or has achieved its objectives prior to completion of the project.

## Performance criterion

**Efficient, fair, clear and targeted interactions with stakeholders.**

## Performance measure

Stakeholder survey and post-completion surveys on dealing with ARENA.

## Criterion source

Corporate plan

## Result: Achieved

ARENA commissioned Roy Morgan Research to undertake the Annual Stakeholder survey – the fourth such survey conducted. The stakeholder survey included as respondents funding recipients whose projects had been completed.

This annual assessment tracks respondent sentiment regarding the agency and perception of ARENA's performance by its stakeholder cohort. The 2016 survey included an online survey, telephone interviews and face to face stakeholder interviews.

Survey results confirmed that ARENA is well supported by its stakeholders and is maintaining high rates of satisfaction in terms of stakeholder perceptions of the organisation, its engagement and consultation processes, funding initiatives and in communications and the media.

ARENA's stakeholders want the agency to share its insights and results more widely and in more accessible ways. ARENA's resourcing (staffing) challenges were identified by stakeholders as impacting upon applicants and proponents.

Results from the survey are among drivers for the organisation to pursue operational improvements.

**ARENA's technology-neutral approach and ability to provide funding over long timeframes allows the agency to create several options for Australians to have access to affordable renewable energy**





## Performance criterion

Continuous learning and improvement by evaluating programs and major projects.

## Performance measure

Report on outcomes from major projects, and overall program outcomes drawing on evaluations.

## Criterion source

Corporate plan

## Result: Achieved


Outcomes from major projects are presented in the Showcase section of the Annual Report.

During the reporting period ARENA established an evaluation framework and commenced the following evaluation and review activities:

- A review of ARENA's solar RD&D portfolio was commenced. An independent expert panel including leading international experts in the field was established to support this review.
- The independent expert panel also undertook mid-term reviews of the Australian Centre for Advanced Photovoltaics (ACAP) and the Australian Solar Thermal Research Initiative (ASTRI).

- The outcomes of the review of solar RD&D will include an investment framework and a robust approach that will help ARENA shape its future RD&D investment activity towards priority opportunities, challenges and research needs, as well as strengthening the quality of ARENA's investment processes, governance and capabilities.
- An evaluation of the Advanced Biofuels Investment Readiness (ABIR) program commenced in June 2016. This was the first of a series of program evaluations that ARENA will undertake to systematically evaluate the efficiency and effectiveness of its programs.
- ARENA commenced an internal review of its off-grid investment priority.

The final results of these activities will be reported in ARENA's 2016-17 Annual Performance Statement.



ARENA takes a  
commercially-  
rigorous and strategic  
approach to the  
projects it selects  
for support

*Racetrack pond at Muradel's  
integrated demonstration-scale  
plant, in which marine microalgae  
is grown to be converted into  
green crude.*

## 3 EFFECTIVE KNOWLEDGE SHARING

### Performance criterion

Ensure funded activities contribute to knowledge about renewable energy.

### Performance measure

Yes/no

### Criterion source

Corporate plan

### Result: Achieved

Every newly-contracted project during 2015-16 included knowledge sharing outcomes relevant to the project and its desired outcomes. These are set out in a Knowledge Sharing Plan that constitutes part of the funding agreement between ARENA and the funding recipient.

### Performance criterion

Procure, publish and communicate analysis to inform investment priorities and help to lower risks associated with renewable energy.

### Performance measure

Qualitative report on major knowledge sharing products produced and events/activities held during 2015-16.

### Criterion source

Corporate plan

### Result: Achieved

### Directly commissioned and ARENA-produced work

In the reporting period, ARENA supported the development of new knowledge as well as knowledge sharing systems and platforms. ARENA's Knowledge Bank <http://arena.gov.au/resources/> and other digital platforms were used to disseminate new information and knowledge about renewable energy technologies and projects.

Examples of knowledge sharing products produced during the reporting period include:

- an analysis of potential benefits of co-locating wind and solar PV farms, including cost reductions and improved power generation and revenue profiles
- key solar PV data and benchmarks based on aggregated data from 75 expressions of interest received as part of the large-scale solar PV competitive round
- a report on renewable energy options for industrial users of natural gas, including an excel tool to help industrial gas users undertake an economic analysis and estimate the Internal Rate of Return from an investment in renewable energy as an alternative to natural gas
- a report on renewable energy opportunities in the water sector, including water supply and treatment for residential, commercial, industrial and agricultural users
- an update to the Energy Networks Association's online stocktake of 208 renewable energy grid integration projects from across Australia as well as the most relevant international projects from areas including Europe, the US, Korea and Japan.

ARENA helped to build valuable and innovative tools, such as the Australian Renewable Energy Mapping Infrastructure (AREMI) national map. AREMI, developed by CSIRO's Data61 and hosted by Geoscience Australia, provides free and open access to a wide array of Australian renewable energy data through a sophisticated online map that helps project developers and planners find where renewable energy can add the most value.

ARENA also provided support for initiatives that created high-value knowledge products that addressed gaps in information or understanding. These included:

- development of a National Community Energy Strategy by the University of Technology Sydney's Institute for Sustainable Futures, Community Power Agency, Starfish Initiatives, Embark, Alternative Technology Association, and the Total Environment Centre
- CSIRO's Concentrating Solar Fuels Roadmap, which examined the feasibility of hybrid and pure solar driven thermochemical processes for water and carbon dioxide splitting.

ARENA invested significant resources in creating opportunities for people to connect and share information, experience and lessons learned with each other. Some of the notable knowledge sharing events held during the reporting period included:

- the large-scale solar (LSS) PV competitive round knowledge sharing workshop, which brought together the 22 shortlisted applicants from the competitive round, ARENA, the CEFC,

FRV (which developed the Moree Solar Farm), and AGL (which developed the Nyngan and Broken Hill solar farms) to share lessons learnt from the 'first wave' of large-scale solar development with new developers

- a series of renewables for industrial processes workshops to share knowledge and inform the development of ARENA's investment priority. This involved three workshops in Sydney, Brisbane and Melbourne covering solar heat for industrial processes, applications in the brewing industry, and bioenergy from food waste, as well as an additional workshop dedicated to renewable energy replacing gas for the dairy industry
- a biofuel certification workshop hosted by Southern Oil Refining and ARENA to bring together the biofuel supply chain for jet fuel and biodiesel to develop a strategy for certification of bio jet fuel using Australian OEM technologies
- ARENA's innovation lab (A-Lab) initiative, which ran a series of workshops including a pilot workshop that convened 25 industry participants in Canberra for two days to discuss the future of distributed energy markets in Australia. Through a series of facilitated exercises workshop participants devised a number of project ideas to test different approaches to utilising distributed energy resources.

In addition to this, ARENA staff shared knowledge generated by the agency's projects and investment priorities at conferences, workshops and other events during the reporting period.

## Analysis of performance against purpose

ARENA's activities during the reporting period contributed meaningfully to addressing Australia's current energy needs and to supporting innovation that will provide a wider range of options for a cleaner, more diverse and reliable energy sector with more renewable energy.

The main external factors that influenced ARENA's operating environment were government policy and investor sentiment.

In March 2016 the Australian Government announced its intention to retain ARENA and reduce ARENA's funding, expand ARENA's mandate to include energy efficiency and low emissions technology, add a function of jointly administering the Clean Energy Innovation Fund (Innovation Fund) with the Clean Energy Finance Corporation, and move from grant-based financial assistance to predominantly equity and debt.

This announcement was followed in April 2016 with the appointment of six new members to the ARENA Board.

During the reporting period investor sentiment towards renewable energy showed signs of recovery however project developers remained cautious and this meant that the pipeline of new project proposals remained modest.

In the short to medium term, ARENA's activities benefited business across the spectrum from startups to ASX-listed corporations as well as supporting community groups.

In the long term, the outcomes of ARENA's activities will benefit all Australian energy users.

The outcomes of ARENA's activities contributed to the achievement of the agency's purpose in three domains:

- increasing the supply of utility-scale renewable energy
- reducing the cost of renewable energy
- generating and sharing knowledge about renewable energy technologies and projects to reduce the risk and uncertainty associated with pursuing innovative solutions.

ARENA's financial assistance helped businesses developing renewable energy and related technology solutions get over the hurdle of high up front capital expenditure requirements, particularly when developing technologies that have a long lead-time to demonstrate commercial viability. The knowledge, skills and experience gained through the research, development and demonstration projects that ARENA supported enabled innovative businesses to move their products and services towards commercialisation.

ARENA's support for the three largest solar power plants to be constructed and commissioned in Australia demonstrated how the provision of financial assistance and strong project assessment negotiation and delivery benefit Australian industry and energy users. The successful completion of large-scale solar plants at Nyngan (102 MW), Broken Hill (53 MW) and Moree (56 MW) brought significant new sources of renewable electricity on line and laid the foundation for the development of an Australian solar supply chain.

The three solar power plants will annually:

- generate enough electricity to power approximately 65,000 NSW homes and
- reduce greenhouse gas emissions by over 419,000 tonnes of CO<sub>2</sub> equivalent.



During the reporting period ARENA agreed to provide further support to several smaller solar power plants including Barcaldine (20 MW), Lakeland (10.8 MW solar PV with 1.4 MW lithium-ion storage) and Gullen Range (10 MW). The costs of delivering these projects have continued to fall, and the ARENA grant as a proportion of total project costs has fallen commensurately.

A viable utility-scale solar PV sector will see significant new investment, technology and skills development while supporting emissions reduction in the electricity generation sector. ARENA's support for large-scale solar projects is transforming the capability of the sector. It is bringing forward the point in time when the next-cheapest source of energy generation could be a large-scale solar project rather than a wind project. If this point is reached before 2020, it will reduce the cost of meeting the RET 2020 target (which would be offset against the economic cost of the government funding provided).

A further outcome is an increased Australian capability to deploy large-scale solar. This provides the option for Australia to ramp up installation rates quickly if it chooses to increase the level of ambition in its climate policies.

ARENA's analysis showed that most of the costs in the supply chain are local – the cost of cables, brackets, frames and piles, and the cost of construction and finance.

ARENA's LSS competitive round has encouraged a portfolio of new Australian solar plants to proceed to more advanced stages of planning and development and is expected to reduce the levelised cost of energy of solar PV through competitive tension.

Whereas Moree Solar Farm and AGL's Nyngan and Broken Hill plants needed around \$1.60 in public funding per watt, the projected funding requirement for new projects fell to 43 cents per watt in the expression-of-interest phase in late 2015.

The projected need for grant funding fell again by more than a third to an average of 28 cents per watt in the full applications. This clearly demonstrates how ARENA contributes to reducing the cost of renewable energy by contributing to increased skills and capacity in supply chains, rising confidence, and lower finance costs.

Through the LSS competitive round ARENA helped to link up government efforts by working with the CEFC and a number of state governments to coordinate the design and implementation of their respective initiatives to support large-scale solar.

ARENA-supported activities benefited off-grid miners by providing part funding for projects that demonstrated viable, lower-cost renewable energy alternatives to diesel-generated electricity.

The impact of ARENA-supported projects was reflected in the international attention they elicited. The DeGrussa and Weipa projects were credited with helping change the attitude of the resources sector towards renewable energy and for setting precedents – DeGrussa for being one of the world's largest off-grid solar PV systems and one of the biggest solar plants providing peak power load to a mining operation, and Weipa for being the only mining operation to share renewable energy with a local community.



The demonstration effect of successful projects was augmented and amplified by a program of knowledge sharing activities that made up to date information about design, construction, asset management and operating and maintenance skills available to businesses.

ARENA contributed to development of the knowledge base in a number of areas by producing significant reports that analysed markets and opportunities for:

- renewable energy options for industrial gas users
- energy storage technologies
- energy use associated with water treatment and irrigation.

During the reporting period Australian researchers benefited from ARENA's support, in particular support for solar research and development.

ARENA embraced innovation by developing better approaches to deciding where and how to provide financial assistance.


The A-Lab initiative was launched in response to the multiplicity of needs identified by stakeholders in relation to the integration of renewable energy into grids. During the pilot phase, A-Lab succeeded in bringing together businesses that would normally be competitors to develop project ideas that maximised the impact of investment and minimised unnecessary overlap and duplication.

At the end of the pilot phase, feedback from industry participants identified a number of benefits to the A-Lab approach based on co-design, rapid prototyping and safe fail principles. These include:

- providing a framework for industry to incubate/accelerate ideas and solutions
- creating opportunities to generate and share intellectual capital
- strong alignment with the national innovation discourse.

ARENA has maintained robust technical and commercial procedures to support strong project assessment, negotiation and delivery during the reporting period supported by:

- documented procedures in place for the assessment of applications and provision of financial assistance
- extensive internal and external expertise utilised to provide advice to ARENA in its project assessment, negotiation and delivery and
- no significant findings from related internal audits following review of ARENA's processes for project assessment and delivery.



ARENA considers the  
commercialisation  
pathway in totality  
so that barriers can  
be overcome and  
opportunities realised

*Rio Tinto's Weipa Solar Farm.  
Image credit: First Solar.*



A photograph of two men in high-visibility work clothes and hard hats standing in front of a large array of solar panels. The man in the foreground is wearing a white hard hat with a logo, sunglasses, and a yellow high-visibility shirt. The man behind him is wearing a white hard hat, sunglasses, and a yellow high-visibility shirt. They are standing on a dirt path. The solar panels are arranged in rows and are tilted towards the sun. The sky is clear and blue.

# 03

## Investment portfolio





*Construction of the  
DeGrussa Solar Farm.*

*Image credit: Neoen and juwi.*



## Investment portfolio

During the reporting period ARENA committed or provided funding to 193 projects across the innovation chain.

Details of those projects are provided in the table below in accordance with the ARENA Act, which requires ARENA to publish details of financial assistance agreements and progress, and the *Australian Renewable Energy Agency (Consequential Amendments and Transitional Provisions) Act 2011*, which requires ARENA to report details of people to whom financial assistance is provided under a transferred Commonwealth funding agreement or Australian Solar Institute Limited agreement.

**Table 3: ARENA funding provided/committed 2015-16**

Research and development				
Proponent name	Project description	Location	**Funding provided/committed (GST exclusive)	Primary technology
*ANU	A robotic vision system for automatic inspection and evaluation of solar plant infrastructure	ACT	\$876,183	Solar thermal
ANU	Advanced surface and contact technologies for industrial silicon photovoltaics	ACT	\$4,102,000	Solar PV
ANU	Bladed receivers with active airflow control	ACT	\$1,361,327	Solar thermal
*ANU	CONSORT: Consumer energy systems providing cost-effective grid support	ACT	\$2,895,951	Enabling
ANU	Eliminating material quality barriers to low cost, very high efficiency silicon solar cells and modules	ACT	\$2,023,407	Solar PV
ANU Complete	High quality laser doping for solar cells through improved characterisation	ACT	\$469,164	Solar PV
ANU	High-temperature solar thermal energy storage via manganese-oxide based redox cycling	ACT	\$1,193,534	Solar thermal
ANU	Improved high-temperature receivers for dish concentrators	ACT	\$1,486,210	Solar thermal
ANU	Machine-learning-based forecasting of distributed solar energy	ACT	\$799,522	Enabling
ANU	PV Modules for the Australian environment (PV-MATE)	ACT	\$502,977	Solar PV
*ANU	Real-time operational distributed PV simulations for distribution network providers	ACT	\$1,018,359	Solar PV
ANU Complete	Roof mounted hybrid CST system for distributed generation	ACT	\$3,235,710	Solar thermal

Research and development				
Proponent name	Project description	Location	**Funding provided/ committed (GST exclusive)	Primary technology
Barbara Hardy Institute	Development of high temperature phase change storage system and test facility	SA	\$689,500	Enabling
CSIRO Complete	A novel thermoelectric topping cycle receiver for CST applications	NSW	\$2,497,000	Solar thermal
CSIRO	Australian Solar Thermal Research Initiative (ASTRI)	NSW	\$35,000,500	Solar thermal
CSIRO Complete	Evaluation and demonstration of hybridisation of CST with CCS	NSW	\$667,500	Solar thermal
CSIRO	High efficiency solar Allam cycle	NSW	\$2,749,748	Solar thermal
CSIRO	Hybrid CST systems for large-scale applications	VIC	\$520,011	Solar thermal
CSIRO	Novel concepts for low cost small heliostats in remote installations	NSW	\$1,000,000	Solar thermal
CSIRO	Optimisation of central receivers for advanced power cycles	NSW	\$1,150,880	Solar thermal
CSIRO	Plug and Play Solar Power: Integration of solar in hybrids	NSW	\$1,292,725	Enabling
CSIRO Complete	Solar Hybrid Fuels	NSW	\$1,838,136	Solar thermal
CSIRO	Solar-driven supercritical CO <sub>2</sub> Brayton Cycle	NSW	\$2,496,835	Solar thermal
CSIRO	Virtual Power Station 2	NSW	\$850,000	Enabling
*Curtin University of Technology	Increasing the uptake of solar PV using energy storage	QLD	\$900,375	Enabling
IT Power	Testing the performance of lithium-ion batteries	ACT	\$477,950	Enabling
*Queensland University of Technology	Integration of biogas from sugarcane residues in sugarcane transport and milling to reduce fossil fuel usage	QLD	\$2,090,000	Bioenergy
RayGen Resources Complete	Central receiver CPV pilot project - Stage 2	VIC	\$1,930,000	Solar PV
RMIT	MUSIC: Micro-urban solar integrated concentrators	VIC	\$4,521,191	Solar thermal
*University of Adelaide	Integrating CST energy into Bayer Alumina Process	SA	\$4,490,752	Industrial processes
*University of South Australia	Maximising solar PV with phase change thermal energy storage	SA	\$995,290	Enabling
University of South Australia	New photocathodes for solar hydrogen production	SA	\$500,000	Solar thermal
University of Technology Sydney	Develop lithium-sulfur batteries for large-scale electrical energy storage	NSW	\$750,000	Enabling

Research and development				
Proponent name	Project description	Location	**Funding provided/committed (GST exclusive)	Primary technology
*University of Western Australia	From single to multiple wave energy converters	WA	\$994,198	Ocean
*University of Wollongong	Smart sodium storage system	NSW	\$2,707,000	Enabling
UNSW	40% Efficient photovoltaic "Power Cube" power tower receiver	NSW	\$1,000,000	Solar PV
UNSW	Advanced recombination-based loss analysis methods for silicon wafer and silicon solar cells	NSW	\$381,328	Solar PV
UNSW	Australia-US Institute for Advanced Photovoltaics (ACAP)	NSW	\$33,174,000	Solar PV
UNSW	Cost-effective GaAsP top solar cell on high performance	NSW	\$2,480,000	Solar PV
UNSW	Develop and commercialise high efficiency silicon solar cell tech	NSW	\$3,972,980	Solar PV
UNSW	High-efficiency silicon/perovskite tandem cells and modules: Demonstration and commercial evaluation	NSW	\$3,599,459	Solar PV
UNSW	Hot Carrier Solar Cell	NSW	\$563,906	Solar PV
UNSW	Low-cost, high-efficiency Copper-Zinc-Tin-Sulphide (CZTS) silicon	NSW	\$1,511,828	Solar PV
UNSW	Multi-Junction c-Si solar cells based on virtual Ge substrates	NSW	\$1,265,000	Solar PV
UNSW Complete	Overcoming performance limitations of commercial solar cells	NSW	\$4,400,000	Solar PV
UNSW	Time-and-spectrally resolved Photoluminescents for silicon solar	NSW	\$490,166	Solar PV
UNSW	Tools for design and scale-up of solar thermo-chemical reactors	NSW	\$1,083,320	Solar thermal
UNSW	Towards a practical hot carrier solar cell	NSW	\$2,278,343	Solar PV
UNSW	Towards ultimate performance commercial silicon solar cells	NSW	\$2,970,702	Solar PV
UNSW/ Suntech Complete	Next generation crystalline silicon on glass	NSW	\$1,178,000	Solar PV
<b>Total</b>	<b>50</b>		<b>\$151,422,967</b>	

Postgraduate scholarships and fellowships				
University/Institution	Scholar	Type of funding	**Funding provided /committed (GST exclusive)	Primary technology
ANU Complete	Andreas Fell	Fellowship	\$420,271	Solar
ANU	Andrew Thomson	Fellowship	\$347,054	Solar
ANU Closed	Da Wang	Scholarship	\$47,473	Solar
ANU Closed	Elizabeth Thomsen	Fellowship	\$210,000	Solar
ANU Complete	Fiacre Rougieux	Fellowship	\$338,351	Solar
ANU	James Bullock	Scholarship	\$49,402	Solar
ANU Closed	Jaret Lee	Scholarship	\$22,759	Solar
ANU	Jose Zapata	Fellowship	\$359,654	Solar
ANU	Katherine Booker	Fellowship	\$356,749	Solar
ANU	Keith Sue	Scholarship	\$120,000	Solar
ANU Complete	Ngwe Soe Josh Zin	Fellowship	\$378,154	Solar
ANU	Qunyu Bi	Fellowship	\$356,749	Solar
ANU	Thomas Allen	Scholarship	\$120,000	Solar
ANU Complete	Thomas Ratcliff	Scholarship	\$25,340	Solar
ANU	Xinbo Yang	Fellowship	\$370,622	Solar
Charles Darwin University Complete	Wai Kean Yap	Fellowship	\$333,049	Solar
CSIRO Complete	Hasitha Weerasinghe	Fellowship	\$332,039	Solar
CSIRO	Kallista Sears	Fellowship	\$301,530	Solar
CSIRO	Krishna Feron	Fellowship	\$333,081	Solar
CSIRO	Tianshi Qin	Fellowship	\$329,231	Solar
CSIRO	Timothy Jones	Fellowship	\$329,231	Solar
Monash University Complete	Alex Pascoe	Scholarship	\$49,426	Solar
Murdoch University	Tobias Prosin	Scholarship	\$120,000	Solar
RMIT	Ahmad Mojiri	Scholarship	\$39,816	Solar
Swinburne University Complete	Wensheng Yan	Fellowship	\$343,920	Solar
Swinburne University	Ben Ekman	Scholarship	\$96,667	Solar
Swinburne University Complete	Benjamin Mashford	Fellowship	\$347,055	Solar
Sydney University	Bjorn Sturmberg	Scholarship	\$48,455	Solar
Sydney University	Alexandre Le Fontaine	Scholarship	\$120,000	Solar
Sydney University	Andrew Danos	Scholarship	\$70,000	Solar
Sydney University	Miroslav Dvorak	Fellowship	\$352,321	Solar

## Postgraduate scholarships and fellowships

University/Institution	Scholar	Type of funding	**Funding provided /committed (GST exclusive)	Primary technology
University of Wollongong	Andrew Nattestad	Fellowship	\$374,511	Solar
University of Adelaide	Martin Belusko	Fellowship	\$394,585	Solar
University of Melbourne	Kyra Schwarz	Scholarship	\$52,941	Solar
University of Melbourne	Shuhua Peng	Fellowship	\$324,612	Solar
University of Newcastle	Anthony Rawson	Scholarship	\$46,095	Solar
University of Newcastle	Dylan Cuskelly	Scholarship	\$65,543	Solar
University of Melbourne Complete	Viktoras Dryza	Fellowship	\$339,446	Solar
University of Queensland	Ajay K Pandey	Fellowship	\$349,864	Solar
University of Queensland	Yuan Fang	Fellowship	\$349,864	Solar
University of South Australia Complete	Nguan Hwee Steven Tay	Fellowship	\$289,930	Solar
University of South Australia	Shane Sheoran	Scholarship	\$120,000	Solar
University of Wollongong	Joseph Giorgio	Scholarship	\$47,891	Solar
UNSW	Alexander To	Scholarship	\$48,762	Solar
UNSW	Adrian Shi	Scholarship	\$120,000	Solar
UNSW	Bernard Mitchell	Fellowship	\$330,195	Solar
UNSW	Clare Disney	Scholarship	\$106,667	Solar
UNSW	Edward Law	Scholarship	\$47, 910	Solar
UNSW	Gough Lui	Scholarship	\$27,816	Solar
UNSW Complete	Hangtao Cui Bi	Fellowship	\$330,195	Solar
UNSW Complete	Jianshu Han/Allen Barnett	Scholarship	\$80,000	Solar
UNSW	Murad Tayebjee	Fellowship	\$330,195	Solar
UNSW	Peerapat Vithayasrichareon	Scholarship	\$396,843	Solar
UNSW Complete	Robert Patterson	Fellowship	\$327,240	Solar
UNSW	Sammy Lee	Fellowship	\$330,195	Solar
UNSW	Simon Chung	Scholarship	\$41,654	Solar
UNSW	Simon Heslop	Scholarship	\$121,321	Solar
UNSW	Sisi Wang	Scholarship	\$31,041	Solar
UNSW Complete	Supriya Pillai	Fellowship	\$370,288	Solar
UNSW	Thilini Ishwara	Fellowship	\$356,965	Solar
UNSW	Tom Keevers	Scholarship	\$31,129	Solar
UNSW	Vincent Allen	Scholarship	\$120,000	Solar
UNSW	Xi Wang	Fellowship	\$396,843	Solar
UNSW	Yang Yang	Fellowship	\$330,195	Solar
UNSW	Zi Ouyang	Fellowship	\$391,717	Solar
<b>Total</b>	<b>65</b>		<b>\$14,494,032</b>	



Demonstration				
Proponent name	Project description	Location	**Funding provided/ committed (GST exclusive)	Primary technology
Abengoa Solar Power Australia Pty Ltd	Perenjori Dispatchable Solar Thermal Power Project	WA	\$449,718	Solar thermal
AGL	Energy storage for commercial renewable integration in South Australia	SA	\$445,847	Enabling
Alinta Energy <a href="#">Closed</a>	Port Augusta Solar Thermal Generation Measure	SA	\$408,100	Hybrid
Australian PV Institute	Aust involvement in IEA implementing agreements	NSW	\$440,500	Enabling
Australian PV Institute	Climate-based PV module rating scheme	NSW	\$268,320	Enabling
Australian PV Institute	Development of an interactive Australian Solar Map	NSW	\$443,238	Enabling
Bioenergy Australia	Participation and management of tasks for the IEA Bioenergy Taskforce	NSW	\$360,000	Bioenergy
BioPower Systems P/L	bioWAVE ocean pilot at Port Fairy	VIC	\$11,000,000	Ocean
Biosystems Engineering	Full-scale woody crop harvester prototype and commercial biomass supply chain demonstration	NSW	\$1,940,000	Bioenergy
BlueScope Steel <a href="#">Complete</a>	Develop a prototype Building Integrated PV product	NSW	\$2,284,800	Solar PV
*Bombora Wave Power	Cost of energy study for Bombora Wave Energy Converter	WA	\$210,287	Ocean
Brisbane Materials Technology <a href="#">Complete</a>	A pilot-scale plant for the production of solar anti-reflection coatings	QLD	\$1,262,000	Solar PV
*Brookfield	Delivering higher renewable energy penetration with micro-grids	NSW	\$442,000	Enabling
Carnegie Wave Energy Ltd	Perth Wave Energy Project - CETO 6 expansion	WA	\$13,000,000	Ocean
Carnegie Wave Energy Ltd	Perth Wave Energy Project	WA	\$13,095,381	Ocean
Clean Energy Council <a href="#">Complete</a>	Clean Energy Australia: annual renewable energy industry analysis	VIC	\$129,100	Enabling
Clean Energy Council	Future Proofing Australia's Electricity Industry - Stage 2	VIC	\$425,050	Enabling
Clean Energy Council <a href="#">Complete</a>	Future Proofing Australia's Electricity Industry - Stage 1	VIC	\$452,850	Enabling
CS Energy <a href="#">Closed</a>	44MW solar thermal demonstration at Kogan Creek	QLD	\$6,403,000	Solar thermal
CSIRO <a href="#">Complete</a>	Integrated solar radiation data sources over Australia	ACT	\$712,581	Enabling
*CSIRO	Promoting use of solar cooling and heating in Australia	ACT	\$399,436	Solar thermal
*CSIRO	Specifying guidelines for assessing perovskite solar cells	NSW	\$892,000	Solar PV

Demonstration				
Proponent name	Project description	Location	** Funding provided/ committed (GST exclusive)	Primary technology
CSIRO	Australian Wave Energy Atlas	WA	\$1,352,755	Ocean
CSIRO	Australian Solar Energy Forecasting System (ASEFS) - Phase 1	ACT	\$3,305,316	Enabling
DeGrussa Solar Farm /Neoen	10.5MW off-grid solar PV/storage project	WA	\$20,900,000	Solar PV
*Dyesol	Demonstrate viability of commercial-scale manufacture of perovskite solar cells	NSW	\$449,823	Solar PV
Elecnor Australia Pty Ltd	Barcaldine remote community solar farm project	QLD	\$22,800,000	Solar PV
Energy Developments Ltd (EDL)	5MW renewable diesel hybrid	SA	\$18,500,000	Hybrid
Ergon Energy	Doomadgee Solar Farm Project	QLD	\$4,649,998	Hybrid
*Ergon Energy	Test model for centrally- controllable grid-connected PV and batteries	QLD	\$400,000	Solar PV
First Solar	Weipa Solar PV Project	QLD	\$11,300,000	Solar PV
First Solar/CuDECO	CuDECO/Rocklands Solar Farm	QLD	\$13,000,000	Solar PV
Frontier Carbon	Toolkit for renewable energy funding and financing	VIC	\$296,000	Enabling
Fulcrum3D	Cloud detection and prediction for maximising solar PV utilisation in off-grid hybrid power systems	NSW	\$569,200	Enabling
*Genex	Feasibility study for 330MW Kidston Hydroelectric Project	QLD	\$4,000,000	Enabling
Geodynamics Ltd Closed	Construction of a 25MW EGS hot fractured rock demonstration plant	SA	\$32,750,000	Geothermal
Hydro Tasmania	Rottneest Island: Addressing the Energy and Water Nexus	WA	\$4,800,000	Hybrid
Hydro Tasmania	Flinders Island Renewable Energy Integration Project	TAS	\$5,500,000	Hybrid
Ipsos Institute Complete	Social license to operate large-scale solar	NSW	\$153,388	Enabling
James Cook University	High energy algal fuels project	QLD	\$5,108,100	Bioenergy
Karratha Solar Power	Karratha Airport Solar Project	WA	\$2,300,000	Solar PV
Laing O'Rourke Australia Pty Ltd	Redeployable solar first deployment	NSW	\$451,986	Hybrid
*Lakeland Solar & Storage	Cook Shire Solar Project	QLD	\$19,000,000	Solar PV
Licella P/L Complete	Biomass to Bio-Crude: Producing Advanced Drop-in Fuels for Australia	NSW	\$4,864,414	Bioenergy
*LMS Energy Pty Ltd	Pilot landfill solar project - Phase 1	SA	\$100,000	Solar PV

Demonstration				
Proponent name	Project description	Location	**Funding provided/ committed (GST exclusive)	Primary technology
Lord Howe Island Board	Lord Howe Island Renewable Project	NSW	\$4,500,000	Hybrid
Monash University	Australia's prosperity in a low carbon world: UN SDSN 2050 Deep Decarbonisation Pathways Project	VIC	\$305,893	Enabling
*Moreland Energy Foundation Ltd	Feasibility and product design for inner city brown field off-grid solar	Vic	\$112,400	Solar PV
Muradel P/L	Advancing established marine microalgae biofuel to commercialisation	SA	\$4,415,500	Bioenergy
National ICT Australia	Australian Renewable Energy Mapping Infrastructure (AREMI)	NSW	\$2,099,350	Enabling
Power and Water Corp	Solar Energy Transformation Project (SETuP)	NT	\$35,000,000	Hybrid
*RayGen Resources	Concentrated solar PV 1MW demonstration plant	VIC	\$2,920,000	Solar PV
*RDA Pentland	Preparatory activities for integrated biofuel production facility	QLD	\$3,000,000	Bioenergy
Regional Development Australia ACT	Renewable energy region of collaborative industry and research excellence in the south-east region of NSW	ACT	\$315,000	Enabling
Renergi Pty Ltd	A low emission biofuel technology	WA	\$5,173,000	Bioenergy
Renergi Pty Ltd	Advanced biomass gasification technology	WA	\$3,840,542	Bioenergy
Reposit Power	A commercially viable application of electricity storage for Australia's national electricity grid	ACT	\$445,666	Enabling
*RIRDC	Australian biomass for bioenergy assessment	ACT	\$2,987,351	Bioenergy
*SA DSD	Solar storage diesel hybrid	SA	\$3,180,000	Hybrid
*Scouller Energy	Normanton Solar Farm	QLD	\$8,382,000	Solar PV
Smart Storage P/L (Ecoult)	UltraBattery distributed Solar PV support and UltraBattery for RAPS	NSW	\$583,780	Enabling
Southern Cross Venture Partners	Southern Cross Renewable Energy Fund	-	\$60,000,000	Various
*Southern Oil Refinery	Biocrude refinery	NSW	\$2,416,000	Bioenergy
*Sustainable Melbourne Fund	Expansion of Environmental Upgrade Agreement	VIC	\$425,000	Solar PV
Swinburne University	Towards an Australian capability in arrays of ocean wave-power machines	VIC	\$770,728	Ocean
Synergy	Alkimos Beach Energy Storage	WA	\$3,310,000	Enabling

Demonstration				
Proponent name	Project description	Location	**Funding provided/ committed (GST exclusive)	Primary technology
*TransGrid	New England renewable energy hub feasibility study	NSW	\$450,000	Enabling
*University of Adelaide	AusPERM: Structural permeability mapping	SA	\$450,000	Geothermal
University of Adelaide	Establishing the Australian Energy Storage Knowledge Bank	SA	\$1,441,811	Enabling
University of Melbourne	Achieving cost-effective abatement from Australian electricity generation	VIC	\$931,207	Enabling
University of Technology Sydney	Using DANCE model, extend maps of network constraints, planned investment and the potential value of distributed energy in electricity networks across the NEM	NSW	\$425,000	Enabling
University of Technology Sydney	Facilitating local use of system charging and virtual net metering	NSW	\$250,000	Enabling
UNSW Complete	Forecasting and characterising grid-connected solar energy	NSW	\$470,284	Enabling
Vast Solar P/L	Vast Solar 6MWth grid-connected multi-module CST plant with thermal storage	NSW	\$7,896,960	Solar thermal
Voyages Indigenous Tourism Australia	Yulara 1.8 MW Dispersed PV	NT	\$447,525	Solar PV
<b>Total</b>	<b>75</b>		<b>\$388,960,185</b>	

Deployment				
Proponent name	Project description	Location	**Funding provided/ committed (GST exclusive)	Primary technology
AGL	Fixed angle PV power stations at Broken Hill (53MW) and Nyngan (102MW)	NSW	\$166,699,000	Solar PV
Gullen Solar	Gullen Range Solar Farm	NSW	\$12,400,000	Solar PV
Moree Solar Farm	Design, construction and build 56MWAC PV	NSW	\$101,700,000	Solar PV
<b>Total</b>	<b>3</b>		<b>\$280,799,000</b>	

\* ARENA entered into these agreements for the provision of financial assistance during the year. These agreements will each contribute to the continued progress of ARENA's principal objectives and priorities under its General Funding Strategy, including by improving the competitiveness of renewable energy technologies and by increasing the supply of renewable energy in Australia.

\*\* Funds committed to ongoing projects or total funds paid to completed or closed/discontinued projects.

**ARENA works  
cooperatively  
with industry and  
government to  
maximise the benefits  
from the financial  
assistance it provides**



# 04

## Governance and operational matters





*RayGen Resources' world-first pre-commercial pilot using a central receiver for concentrating solar PV.*

## Enabling legislation

ARENA is a statutory agency established under the *Australian Renewable Energy Agency Act 2011* (ARENA Act). The agency is a corporate Commonwealth entity under the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

During the financial year minor consequential amendments were made to some legislative references in the ARENA Act by the *Acts and Instruments (Framework Reform)(Consequential Provisions) Act 2015*.

## Objectives and functions

ARENA's objectives and functions are set out in the ARENA Act. The agency's main objective is to improve the competitiveness of renewable energy technologies and increase the supply of renewable energy in Australia.

ARENA's functions are to provide financial assistance to accelerate the transition of renewable energy technologies across the innovation chain from research and development to demonstration and large-scale pre-commercial deployment activities. ARENA develops analysis and advice, and shares information and knowledge on renewable energy and related technologies. ARENA also provides advice to the portfolio Minister on renewable energy and related technologies.

The Australian Renewable Energy Agency Regulation 2016 commenced on 10 May 2016, which prescribes a new function for ARENA to assist the Clean Energy Finance Corporation in the governance, management and administration of the Clean Energy Innovation Fund.

ARENA works cooperatively with industry and government to maximise the benefits from the financial assistance it provides.

## Responsible ministers

The Ministers responsible for ARENA during 2015-16 were:

- Hon Ian Macfarlane MP, Minister for Industry and Science, from 1 July 2015 to 21 September 2015
- Hon Greg Hunt MP, Minister for the Environment, from 21 September 2015 until the end of the reporting period.

Since its establishment ARENA has worked with successive portfolio Ministers, keeping them informed about the operations of ARENA by providing reports of each ARENA Board meeting, including key deliberations, meeting outcomes and significant correspondence.

ARENA has also outlined to successive Ministers its efforts to improve the competitiveness of renewable energy technologies and increase renewable energy supply in Australia over the longer term, consistent with the ARENA Act.

The portfolio Minister appoints ARENA Board members (other than the Secretary of the portfolio Department, who is on the Board by virtue of s29 of the ARENA Act) and the CEO.

## Ministerial approval

To ensure accountability and transparency for expenditure of a significant sum of public funds, the Australian Government has put in place safeguards that ARENA must follow when making funding decisions.

The ARENA Act requires the portfolio Minister to approve ARENA's General Funding Strategy (GFS) and any program guidelines that permit project grants in excess of \$15 million. The Minister must also approve projects where grants in excess of \$50 million are to be awarded.

The GFS 2015-16 to 2017-18 and the Advancing Renewables Program Guidelines were presented to the Minister in June 2015, and approved on 8 July 2015.

## Ministerial requests and directions

No requests were made by the Minister under s11 of the ARENA Act for 2015-16, and no ministerial directions were made under s13.

Under s22 of the PGPA Act, ARENA must comply with Government Policy Orders (made by the Finance Minister) to the extent that they apply. No Government Policy Orders applied to ARENA for 2015-16.

## Reports to the Minister

There were nil significant issues reported to the Minister under paragraph 19(1)(e) of the PGPA Act that relates to non-compliance with the finance law in relation to ARENA.

## Key governance events and other activities affecting ARENA

In September 2015, as the result of changes to the Australian Government's ministry, portfolio responsibility for ARENA was moved from the Department of Industry and Science to the Department of the Environment.

On 23 March 2016, the Australian Government announced its intention to retain ARENA, expand its investment mandate to include energy efficiency and low emissions technologies, and create a new Clean Energy Innovation Fund (Innovation Fund) to be jointly managed by ARENA and the CEFC.

The Australian Renewable Energy Agency (Repeal) Bill 2014 lapsed with the prorogation of the Australian Parliament on 15 April 2016.

After the reporting period, the Australian Parliament amended the ARENA Act, reducing the agency's uncommitted grant funds by \$461 million.

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.

## ARENA Board

The ARENA Board was established under the ARENA Act.

### Responsibilities

ARENA's Board is a skills-based decision making body. Its functions involve:

- developing general funding strategies, financial assistance guidelines and work plans
- determining other strategies, objectives and policies to be followed by ARENA
- making decisions of financial assistance
- ensuring that ARENA complies with the ARENA Act.

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

### Membership

According to the ARENA Act, the agency's Board consists of:

- up to six members, appointed on a part-time basis by the portfolio Minister
- the Secretary of the Department.

To be eligible for appointment to the Board, the Minister must be satisfied that the person has experience or knowledge in at least one of the following fields:

- renewable energy technology
- commercialisation
- business investment
- corporate governance.

Board members may be appointed for a term of up to two years, and may be reappointed for a total of up to six continuous years.

At 30 June 2016, members of the ARENA Board were Mr Martijn Wilder AM (Chair), Ms Maria Atkinson AM, Ms Susan Jeanes, Mr Jonathan Jutsen, Ms Meg McDonald, Dr Katherine Woodthorpe and Dr Gordon de Brouwer PSM (ex officio).

With the exception of Dr de Brouwer, these Board members were appointed by the portfolio Minister on 13 April 2016 for a two-year term.

Previous members of the Board, whose terms concluded on 16 January 2016, were Mr Greg Bourne (Chair), Ms Judith Smith and Mr Danny Broad. From 20 January 2016 to 12 April 2016 Dr de Brouwer was the sole member of the ARENA Board.





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

*With ARENA's support, Renewable Developments Australia is conducting growing trials of Super Sweet Sorghum, a biomass feedstock that has the capacity to produce triple the biomass of traditional sugarcane. RDA aims to develop the lowest cost ethanol plant in the world.*

*Image credit: RDA.*



**Martijn Wilder AM**  
Chair/Non-Executive Director  
Appointed: April 2016  
Term expires: April 2018

Mr Wilder is head of Baker & McKenzie's Global Environmental Markets and Climate Change practice specialising in climate change law, international carbon and broader environmental markets, climate and conservation finance and conservation projects. He is also Chair of the Baker & McKenzie Law for Development Initiative.

Mr Wilder's other roles include Professor of Climate Change Law at the Australian National University and Affiliate, Cambridge Centre for Climate Change Mitigation Research, at the University of Cambridge. In addition to being Chair of ARENA, Mr Wilder is a Director of the Clean Energy Finance Corporation, WWF (Australia) and the Climate Council. He also holds advisory roles as Chair of the NSW Climate Change Council and Governing Board Member of the Renewable Energy and Energy Efficiency Partnership, and is a member of the Wentworth Group of Concerned Scientists. Mr Wilder is also the Deputy Chair of the Private Sector Roundtable of the Asia Pacific Rainforest Recovery Plan.

Mr Wilder chaired the Independent Review Committee of the Victorian Climate Change Act, was formerly Chairman of Low Carbon Australia and for many years chaired TRAFFIC (Oceania).

He has written widely especially on climate change law, environmental law and Antarctica. In 2012, Mr Wilder was awarded a Member of the Order of Australia in recognition of his "service to environmental law, particularly in the area of climate change through contributions to the development of law, global regulation, public policy and the promotion of public debate, and to the community".

Mr Wilder holds a Bachelor of Economics (Hons) from the University of Sydney, LLB Honours from the Australian National University, LLM from the University of Cambridge and has studied at the Hague Academy Centre for Studies and Research in International Law and International Relations. He is also a Graduate Member of the Australian Institute of Company Directors.



### **Maria Atkinson AM**

Non-Executive Director

Appointed: April 2016

Term expires: April 2018

Ms Atkinson is a sustainability strategist with extensive experience in governance, strategy, organisational and market transformation, business development and stakeholder engagement. As director of Maria Atkinson Consultancy Pty Ltd, she helps clients ranging from governments to non-government organisations and research institutions to articulate and deliver sustainability outcomes for projects or organisations.

On top of her consultancy services, Ms Atkinson sits on a number of boards such as The Ethics Centre and the Royal Botanic Gardens and Domain Trust. She is a previous Chair of the UN Environment Program Sustainable Buildings & Climate Initiative in 2010 and 2011, and a Co-Chair of the World Economic Forum Global Agenda Council on Sustainable Construction in 2008 and 2009.

In 2012, Ms Atkinson was honoured to be awarded a Member of the Order of Australia for “service to the construction and real estate sector, particularly as a leader and contributor to environmentally sustainable building development in Australia”.



### **Susan Jeanes**

Non-Executive Director

Appointed: April 2016

Term expires: April 2018

Ms Jeanes is a Principal at Jeanes Holland and Associates, which assists companies that are developing and promoting the goals of sustainability, particularly in the emerging renewable energy sector. She has worked closely with the Australian renewable energy and sustainability sectors for more than two decades, most recently in her roles as the Chief Executive Officer of the Australian Geothermal Energy Association, the national body representing the Australian geothermal energy industry, and previously as the Chief Executive Officer of the Renewable Energy Generators Australia.

Ms Jeanes is a director of The Climate Institute, and Chair of the South Australian Centre for Geothermal Energy Research and the Centre for Energy Technology. Prior to 2002, she worked exclusively in the political area as Advisor to the former Federal Environment Minister Robert Hill on climate change, renewable energy and the urban environment, and serving the Federal Parliament as the Member for Kingston.

Ms Jeanes has tertiary qualifications in politics and environmental studies.





#### **Jonathan Jutsen**

Non-Executive Director

Appointed: April 2016

Term expires: April 2018

Mr Jutsen is Chair of the Australian Alliance to Save Energy (A2SE), a not-for-profit organisation committed to making Australia an energy productive country, and which is leading the program to double Australia's energy productivity (2xEP). A2SE also has an active EP innovation initiative, and runs the annual Summer Study on Energy Productivity.

Mr Jutsen is also a steering committee member of the Global Alliance for Energy Productivity. He has been a leading figure in Australia and internationally in the energy and carbon management field for over three decades. In 1984 he founded Energetics, a leading consulting company on greenhouse gas mitigation and energy management, which he recently left after 32 years.

Mr Jutsen has tertiary qualifications in chemical engineering and energy technology. He has been selected as one of the 100 most influential engineers in Australia by IEAust.



#### **Katherine Woodthorpe**

Non-Executive Director

Appointed: April 2016

Term expires: April 2018

Dr Woodthorpe is an experienced non-executive director, serving for over 19 years on boards ranging from ASX-listed companies to research institutions and government entities. She currently serves on nine boards, is an adviser to others and is a Council member of the Australian Institute of Company Directors.

Dr Woodthorpe was Chief Executive of the Australian Private Equity and Venture Capital Association Ltd (AVCAL) between 2006 and 2013. Prior to AVCAL, she held a broad range of management and board positions, both in Australia and overseas.

Dr Woodthorpe has a deep understanding of the private equity and venture capital industries as well as the superannuation industry in the financial sector. She also has a strong track record in a broad range of technology-oriented industries including mining and healthcare.

Dr Woodthorpe has been cited in various media as one of Australia's most influential people in innovation.



### **Meg McDonald**

Non-Executive Director

Appointed: April 2016

Term expires: April 2018

Ms McDonald has career experience at senior levels in business and government across the fields of energy and environment.

From 2013-15 she served as Chief Operating Officer of the Clean Energy Finance Corporation (CEFC). Previously, from 2010-13, Ms McDonald was CEO of Low Carbon Australia Limited (LCAL), leading LCAL's development of innovative financial solutions for energy efficiency and investment partnerships for financing projects deploying low emissions technologies. Over three years, LCAL financed more than \$80 million in projects valued at over \$270 million. LCAL merged with the CEFC in 2013.

From 2002-10, Ms McDonald held roles with the global resources and manufacturing corporation, Alcoa. Initially this was as General Manager, Corporate Affairs for Alcoa in Australia, and later as Director, Global Issues, Alcoa Inc. in New York and as global President of Alcoa Foundation, where she pioneered innovative sustainability partnerships and worked with business development teams, helping develop and deliver major international growth projects.

The Foundation was one of the largest US corporate foundations, managing a fund with assets of over US\$500 million and which made annual grants up to US\$50 million across 24 countries in environment, sustainability and social projects.

While a member of the Australian Public Service from 1978-2002, Ms McDonald had roles across a variety of portfolios, including transport, aviation, finance and foreign affairs and trade (DFAT). With DFAT (1987-2002), she served as a senior Australian diplomat, including in Geneva, as Assistant Secretary, Environment and Antarctic Branch, (responsible for Australia's international environment treaty negotiations, and the Antarctic treaties) and in the Australian Embassy in Washington as Australia's Deputy Chief of Mission to the United States. As Australia's Ambassador for the Environment, in 1997-98, Ms McDonald was Australia's lead negotiator for the Kyoto Protocol and played a key role in shaping those negotiations and other environment treaties.

Ms McDonald holds an Honours Degree in Applied Science from the University of NSW and has served on boards and a variety of advisory bodies in Australia and the United States.





**Dr Gordon de Brouwer PSM**  
Ex-Officio Director  
Commenced: October 2015

Dr de Brouwer has been portfolio Secretary of the Department of the Environment and Energy since September 2013 and is responsible for the design and implementation of the Australian Government's environment, heritage, energy and climate policy. He leads a department of around 2500 staff, including operations in Antarctica and key national parks.

He has 30 years' experience in public policy. At the time of his appointment, Dr de Brouwer was Associate Secretary in the Domestic Policy Group at the Department of the Prime Minister and Cabinet, having worked on domestic and international economic, financial, industry, natural resource management and climate change policy in various positions from July 2008 to September 2013. He was Prime Minister Gillard's G20 sherpa and supported Australia's Prime Ministers at the eight G20 summits before Australia's host year.

Dr de Brouwer has worked at the Treasury (1987, 2003-08), Australian National University (2000-03), Reserve Bank of Australia (1991-99) and Westpac Bank in Tokyo (1989-90). At Treasury, he worked on budget policy, led the G20 and APEC Secretariat during Australia's host years of the finance ministers process, and domestic and international macroeconomic forecasting and policy.

He was Professor of Economics in the Crawford School of Economics and Government at the ANU, working on Asian economies, macroeconomics, international finance, regionalism and international institutions. He worked in both Economic Group and Markets Group at the RBA, on macroeconomic modelling, monetary policy, international finance and the Asian financial crisis. He was a credit analyst at the Tokyo Branch of Westpac Bank in the late 1980s.

Dr de Brouwer has a doctorate in economics from the ANU and first-class honours bachelor and master degrees in economics from the University of Melbourne. He was awarded Monbusho and Japan Foundation scholarships for study in Japan in 1987-89 and 1994. He has publications in the areas of macroeconomics, international finance, Asian regionalism and international institutions.

He received a Public Service Medal in 2011 for outstanding public service in the development of international economic policy and the G20. In 2013, he was awarded the Knight in the Legion of Honour by the President of the French Republic for G20 and public service.



### **Greg Bourne**

Chair/Non-Executive Director

Appointed: July 2012

Term expired: January 2016

Mr Bourne studied chemistry at the University of Western Australia via a scholarship from BP Refinery (Kwinana). After graduating with honours in 1971 he carried out research into refinery processes before joining BP Exploration. As a drilling engineer, he worked and lived in the United Kingdom, North America, South America, the Middle East, China and Australia.

In 1988, Mr Bourne was seconded to the Prime Minister's policy unit in the United Kingdom, where he was the Special Adviser on energy and transport. Mr Bourne returned to Australia in 1992 to be in charge of BP Exploration's activities in Australia's North-West Shelf region and Papua New Guinea.

After working overseas as Director, BP Scotland and then Regional Director, Latin America based in Caracas, he returned to Australia in 1999 to become Regional President, BP Australasia, the position from which he retired from BP in 2003.

In 2004, Mr Bourne was appointed Chief Executive Officer of WWF (Australia), a position he held until 2010. Mr Bourne is a member of a number of government and business advisory groups primarily concerned with energy, climate change and sustainability.

He was awarded the Centenary Medal for services to the environment, and an honorary doctorate from the University of Western Australia for services to international business.



### **Judith Smith**

Non-Executive Director

Appointed: July 2012

Term expired: January 2016

Until 2013, Ms Smith was the Head of Private Equity for Industry Funds Management (IFM) (now known as IFM Investors), and chair of the IFM risk committee. She was also deputy chair of the IFM investments and strategy committee. Post retirement from the firm she remains a member of the IFM Investors investment committee. Prior to joining IFM, Ms Smith held various investment management roles.

During more than a decade at National Mutual Funds Management, she managed Australian equity portfolios (including large capitalisation portfolios, specialist small company portfolios and private equity investments) and Australian equity research and strategy.

Ms Smith has been involved with private equity in the Australian market since 1990. She was a Board member of the Australian Private Equity and Venture Capital Association Limited, and participated on a number of fund advisory boards. At IFM she ran a multi-billion dollar private equity portfolio with Australian and global investments.

Ms Smith is on the Board of the Acorn Capital Investment Fund, LUCRF and Universal Biosenses Inc.

Ms Smith holds a Master of Applied Finance from the University of Melbourne and a Bachelor of Economics (Honours) from Monash University. She is a Fellow of the Financial Services Institute of Australasia and a Graduate of the Australian Institute of Company Directors.



### **Danny Broad**

Non-Executive Director

Appointed: November 2014

Term expired: January 2016

Mr Broad has more than 25 years' experience in senior executive roles in the rail, civil and construction industries in Australia. He has extensive experience in company management, leadership, stakeholder engagement and business development within dynamic marketplaces, with recent expertise in growing customer and partner relationships as well as business strategic planning.

Mr Broad's career developed from commencing as a civil/structural design engineer, through project management, construction management and operations management to company management.

He project managed the construction of the coal handling plant at Tarong Power Station, the construction of the coal wash plant at Meandu Mine in Queensland, the Australia Telescope Project in Narrabri, and the construction of the steel structure of Chifley Tower in Sydney.

In 1997, Mr Broad was appointed a Group General Manager of Walkers Maryborough and moved to Sydney in 2000 to merge the Walkers business and Clyde Engineering into EDI Rail. Following the acquisition by Downer, Mr Broad has held various senior executive roles in Downer Rail. He then joined engineering consulting group Ranbury in Brisbane in an executive role.

Mr Broad has a Bachelor of Engineering (Civil) from the University of Queensland, a Graduate Diploma in Business Administration from the Queensland University of Technology and has held board roles on the Australasian Railway Association Board and the NSW Council of the Australian Industry Group.



### **Martin Hoffman**

Non-Executive Director

Appointed: July 2014

Term expired: July 2015

Mr Hoffman was Deputy Secretary of the Department of Science (and its predecessors) from July 2010 to August 2015. He worked particularly on resources and energy matters, including significant international engagement bilaterally and with the International Energy Agency and the G20. He joined the Australian Public Service in March 2009 in the Department of the Prime Minister and Cabinet.

Before joining the public sector, Mr Hoffman had a lengthy private sector career primarily in digital media and technology, including as CEO of NineMSN, Australia's largest media company.

Mr Hoffman holds an MBA (Hons) from the Institute for Management Development in Lausanne, Switzerland, a Master of Applied Finance (Macquarie), and a Bachelor of Economics (Sydney). He completed the Executive Fellows program at the Australia New Zealand School of Government in 2009, and was awarded the James Wolfensohn Public Service Scholarship to study at the Harvard Kennedy School in 2013.



### **Glenys Beauchamp PSM**

Ex-Officio Director

Commenced: September 2013

Ended: September 2015

Ms Beauchamp was appointed Secretary of the Department of Industry and Science on 18 September 2013. She has had an extensive career in the Australian Public Service at senior levels with responsibility for a number of significant government programs. Ms Beauchamp has more than 25 years' experience in the public sector and began her career as a graduate in the Industry Commission.

Prior to her current role, Ms Beauchamp was Secretary of the Department of Regional Australia, Local Government, Arts and Sport. She also served as Deputy Secretary of the Department of the Prime Minister and Cabinet, and the Department of Families, Housing, Community Services and Indigenous Affairs.

Ms Beauchamp has held a number of executive positions in the ACT Government, including Deputy Chief Executive of the Department of Disability, Housing and Community Services, and Deputy Chief Executive Officer of the Department of Health.

In 2010 Ms Beauchamp was awarded a Public Service Medal for coordinating Australian Government support during the 2009 Victorian bushfires.

Ms Beauchamp has an Economics degree from the Australian National University and an MBA from the University of Canberra.

## Board governance practices

ARENA places considerable emphasis on strong governance arrangements.

The Board's operations and meetings were conducted during the reporting period in accordance with the requirements of applicable legislation.

Board members regularly reviewed the Board's operation as part of their commitment to continually improve the efficiency and effectiveness of the Board's processes.

ARENA's new Board members participated in an induction program, which included matters such as WHS, risk, probity, conflict of interest management and relevant legislation.

## Ethics and risk management

In 2015-16 the ARENA Board continued to implement the conflict of interest policy that was adopted in 2012. The policy describes:

- the duties in respect of the disclosure of actual or potential conflicts for all ARENA personnel, including:
  - members of the Board
  - members of the Risk and Audit Committee (RAC) (and any other subcommittee of the Board)
  - the Chief Executive Officer and the Chief Financial Officer
  - all ARENA staff, including employees of the Department who are made available to ARENA
  - contractors and consultants engaged by ARENA, including probity advisers, expert due diligence advisers and other independent specialist or technical advisers
  - members of the ARENA Advisory Panel

- how individuals are to discharge their duties under the policy
- how declarations are managed.

ARENA is committed to integrating risk management practices into all processes and operations.

ARENA manages risk commensurate with ISO 31000:2009, Risk management - Principles and guidelines. Accountability and responsibility for ARENA's performance lies with the Board. This includes accountability for ARENA's management of risk. While the Board and ARENA executive are ultimately accountable for risk management, it is the responsibility of all ARENA personnel to manage risk.

ARENA's RAC provides independent assurance and advice to the Board on ARENA's risk management. In 2015-16, the RAC was provided with information on ARENA's approach to managing ARENA's major risks including those associated with individual programs, projects and significant procurements.

### Meetings

The Board formally met nine times during 2015-16. See Table 4.

### Reporting

Following each Board meeting, the Chair provided the Minister with a report on the key outcomes of that meeting.

### Subcommittees

The Board has a Risk and Audit Committee, established in compliance with s45 of the PGPA Act and authorised by s48 of the ARENA Act.





*Researcher involved in  
ARENA-supported project  
at Monash University.*

Table 4: ARENA Board meetings 2015-16

Date	Meeting	Location	Attendance (In person & via teleconference)
25 August 2015	31st Board meeting	Canberra, ACT	All Board members <i>Secretary's alternate: Mr Chris Locke</i>
23 September 2015	32nd Board meeting	Canberra, ACT	Mr Greg Bourne, Ms Judith Smith, Dr Gordon de Brouwer <i>Secretary's alternate for part of meeting: Mr Robert Sturgess (Secretary attended part meeting)</i>
5 November 2015	33rd Board meeting	Canberra, ACT	All Board members <i>Secretary's alternate for Item 12: Dr Rhondda Dickson</i>
3 December 2015	34th Board meeting	Canberra, ACT	All Board members <i>Secretary's alternate for Items 10-11, 13-16: Dr Rhondda Dickson</i>
18 February 2016	35th Board meeting	Canberra, ACT	Dr Gordon de Brouwer
1 April 2016	36th Board meeting	Canberra, ACT	<i>Secretary's alternate: Dr Rhondda Dickson</i>
27 April 2016	37th Board meeting	Canberra, ACT	<i>Secretary's alternate: Dr Rhondda Dickson</i>
30 May 2016	Board Strategy Session and 38th Board meeting	Sydney, NSW	Mr Martijn Wilder, Dr Gordon de Brouwer, Ms Susan Jeanes, Mr Jonathan Jutsen, Ms Meg McDonald, Dr Katherine Woodthorpe
24 June 2016	39th Board meeting	Sydney, NSW	Mr Martijn Wilder, Ms Susan Jeanes, Mr Jonathan Jutsen, Ms Meg McDonald, Dr Katherine Woodthorpe <i>Secretary's alternate: Dr Rhondda Dickson</i>

Table 5: ARENA Risk and Audit Committee meetings 2015-16

Date	Meeting	Location	Attendance (In person & via teleconference)
20 August 2015	12th RAC meeting	Canberra, ACT	Ms Judith Smith, Ms Jenny Morison, Mr Peter Thomas
11 November 2015	13th RAC meeting	Via teleconference	Ms Judith Smith, Ms Jenny Morison, Mr Peter Thomas
7 April 2016	14th RAC meeting	Canberra, ACT	Ms Jenny Morison, Mr Peter Thomas, Ms Heather Wilson
31 May 2016	15th RAC meeting	Canberra, ACT	Ms Jenny Morison, Ms Meg McDonald, Mr Peter Thomas, Dr Katherine Woodthorpe

## ARENA aims to be an agile agency that responds quickly to changes in the operating environment

### ARENA Risk and Audit Committee

The ARENA Risk and Audit Committee (RAC) provides independent advice and assurance to the Board on the appropriateness of ARENA's financial reporting, performance reporting, system of risk oversight and management and system of internal control.

The RAC provides a forum for communication between the Board and the internal auditor (Synergy) 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.

#### Responsibilities

RAC members are expected to understand and observe the requirements of the PGPA Act and PGPA Rules. The RAC is responsible and accountable to the ARENA Board for the performance of its functions.

#### Membership

In 2015-16 the RAC was made up of the following Board members and independent members:

- Ms Meg McDonald (Board member) from April 2016
- Dr Katherine Woodthorpe (Board member) from April 2016
- Ms Judith Smith (RAC Chair and Board member) until January 2016
- Mr Martin Hoffman (Board member) until July 2015
- Ms Jenny Morison (RAC Chair from February 2016)
- Mr Peter Thomas
- Ms Heather Wilson (Acting General Counsel) February 2016 to April 2016.

#### Meetings

The RAC formally met four times during 2015-16. See Table 5.

#### Reporting

Following each RAC meeting, the RAC Chair provided the Board with a report on the key outcomes of that meeting.

#### Subcommittees

No subcommittees were established by the RAC.

## ARENA people

ARENA is a dynamic and outcomes-oriented agency, staffed by highly qualified and experienced people. ARENA aims to be an agile agency that responds quickly to changes in the operating environment.

ARENA has two employees, the Chief Executive Officer (CEO) and Chief Financial Officer (CFO). Other ARENA staff are employed by the portfolio Department under the *Public Service Act 1999* and made available to ARENA by the Secretary of the Department. ARENA also engages contractors and consultants when necessary.

### CEO

The CEO is appointed by the portfolio Minister on the recommendation of the Board for a period of up to three years and can be eligible for re-appointment.

The CEO has responsibility for the day-to-day business of ARENA, including:

- executing directions of the Board
- overseeing administration of existing projects
- supporting the Board to develop and execute its General Funding Strategy, forward work plan and initiatives
- representing ARENA at public events and managing stakeholder engagement
- analysing and sharing knowledge and information about renewable energy technologies
- developing advice to the Minister on renewable energy technology innovation.

At 30 June 2016, the ARENA CEO was Mr Ivor Frischknecht.



### Ivor Frischknecht

Chief Executive Officer

Appointed: 6 August 2012

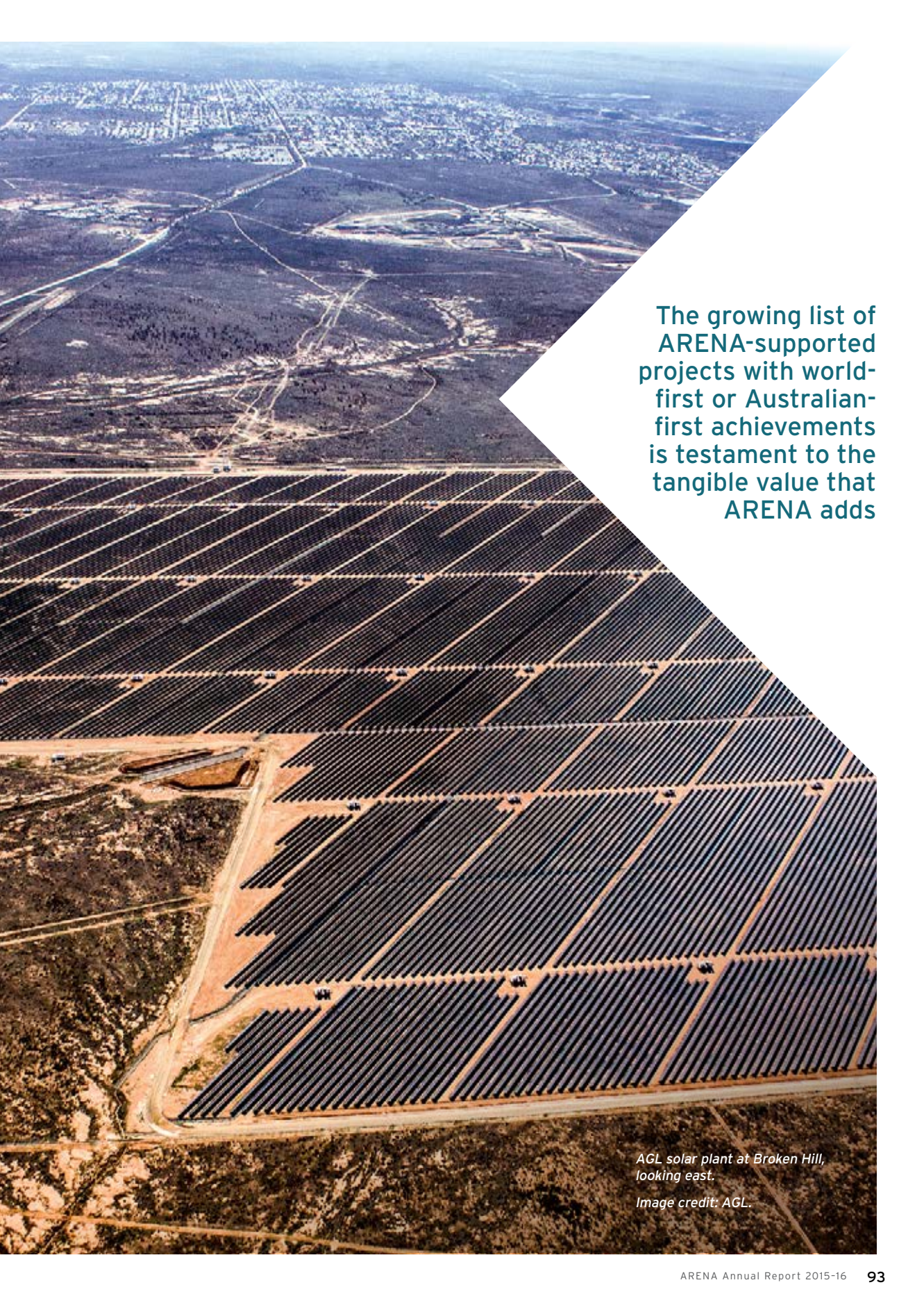
Term expiring: 5 August 2018

Mr Frischknecht is a former investment director of Starfish Ventures Pty Ltd, a venture capital firm that manages \$400 million, primarily on behalf of Australian superannuation funds. He was responsible for the firm's clean tech investment activities in areas such as alternative energy, water and environmental technologies.

Mr Frischknecht was previously Director, New Ventures, of Idealab, a company involved in developing and investing in technology start-up companies, including renewable energy companies. He was also previously the CEO or other senior executive of a number of venture funded energy and technology companies.

Mr Frischknecht started his career with the strategy consulting firm Bain & Co. He holds a Bachelor of Laws and Bachelor of Economics (Honours) from the University of Sydney, and a Master of Business Administration and Public Management Certificate from the Stanford University Graduate School of Business.





The growing list of ARENA-supported projects with world-first or Australian-first achievements is testament to the tangible value that ARENA adds

*AGL solar plant at Broken Hill, looking east.*

*Image credit: AGL.*



### CFO

The CEO is supported by an executive team, including a CFO. The CFO during 2015-16 was Mr Ian Kay.

### Staff

At 30 June 2016, the agency had two ARENA staff (CEO and CFO), 49 departmental staff (47.7 FTE) including staff in non-ongoing positions, and a number of consultants and contractors.

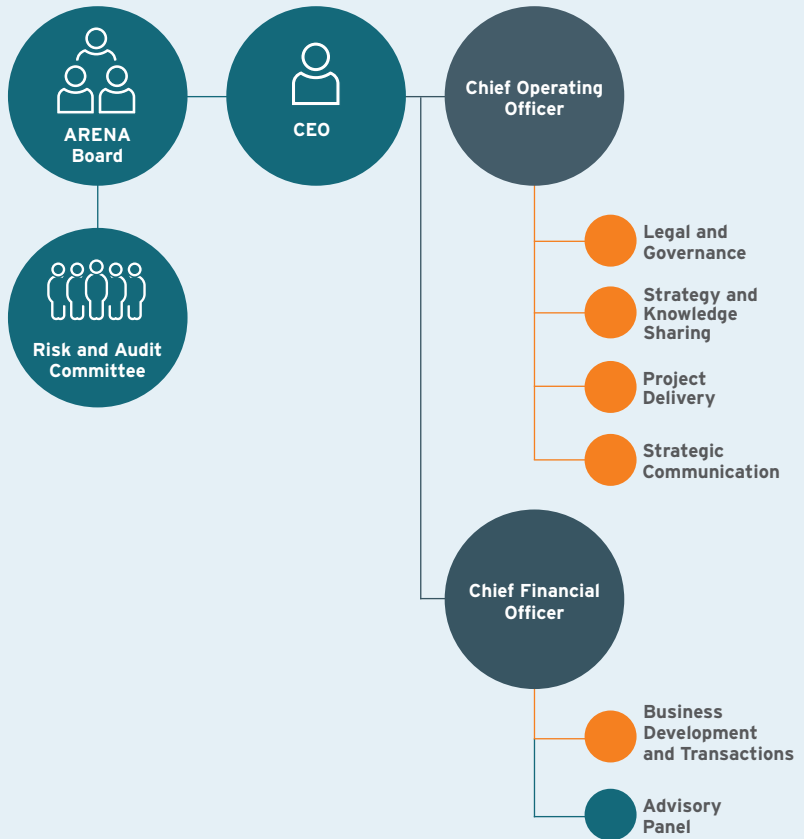
ARENA has three offices, which are located in Canberra, Sydney and Melbourne.

### Diversity

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

- of the seven Board members, four were female
- of the seven personnel in ARENA's Executive Leadership Team (excluding the CEO), five were female
- of the ten personnel in other senior roles at ARENA, five were female.

Figure 4: ARENA organisational structure



## ARENA service charter

ARENA aims to provide a high standard of service to all its stakeholders, focusing on the achievement of honest and ethical relationships with stakeholders, underpinned by genuine consultation and feedback.

ARENA provides high quality, evidence-based advice and decisions through informed judgment and prudent risk management. ARENA staff are bound by the Australian Public Service Values and Code of Conduct.

As ARENA 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, which allows reviews of ARENA decisions and complaints about service quality to be resolved fairly and simply. Information on the complaints and review process is available at [arena.gov.au/contact-us/complaints/](http://arena.gov.au/contact-us/complaints/)

## Ecologically sustainable development

Table 6 sets out ARENA's report against section 516A of the *Environment Protection and Biodiversity Conservation Act 1999*.

**Table 6: Contribution to ecologically sustainable development 2015-16**

Reporting criteria	Performance
Accordance with and contribution to ecologically sustainable development (ESD), including the development and implementation of policies, plans, programs and legislation	<p>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:</p> <ul style="list-style-type: none"> <li>• helping to foster the long-term sustainability of Australia's energy sector while promoting the reduction of energy-related greenhouse gas emissions</li> <li>• taking into account economic, environmental and social considerations when developing renewable energy measures.</li> </ul>
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.	<p>ARENA's accommodation and facilities arrangements are supported by the portfolio Department. The Department operates under the Energy Efficiency in Government Operations policy, which aims to reduce the energy consumption of government operations, with particular emphasis on the energy efficiency of buildings.</p> <p>The Department also aims to improve its environmental management practices, reduce the impacts of its operations, and foster greater efficiencies and operational costs savings consistent with legislative, regulatory and policy requirements such as the Australian National Audit Office's Public Sector Environmental Management Better Practice Guide of April 2012.</p> <p>For the duration of 2015-16, ARENA's Canberra offices were located in the NewActon Nishi Building. The offices in the Nishi Building have a 6-star Green Star Design rating and NewActon Nishi is considered to be Canberra's most sustainable mixed-use building complex.</p>

## Fraud control

The ARENA Fraud Control Plan 2014-16 was approved by the Board in July 2014. ARENA's adherence to the Plan continues, including preparation of its Fraud Risk Assessment and periodic review of the Plan. ARENA has appropriate fraud prevention, detection, investigation, reporting and data collection procedures and processes in place, as detailed in the Plan.

ARENA has taken all reasonable measures to minimise the incidence of fraud and where applicable, to investigate and recover the proceeds of fraud against ARENA.

All of ARENA's personnel are provided with fraud awareness training. Interactive fraud awareness refresher training was provided to ARENA's personnel during the year, with personnel also having access to an online training module.

## Freedom of information and Information Publication Scheme

Australian Government entities that are subject to the *Freedom of Information Act 1982* (FOI Act) are required to publish information to the public as part of the Information Publication Scheme.

ARENA's publications covered by the scheme are accessible from the ARENA website at [arena.gov.au](http://arena.gov.au). Consistent with its knowledge management agenda, ARENA also publishes information on the renewable energy sector, including information from financial assistance recipients.

Information on how to make a request under the FOI Act is available on the Department of the Environment and Energy's website.

## Contact details are:

FOI Contact Officer  
Legal Section  
Department of the  
Environment and Energy  
GPO Box 787  
CANBERRA ACT 2601  
Email: [FOI@environment.gov.au](mailto:FOI@environment.gov.au)  
Phone: +61 2 6274 2098

Two requests for information under the FOI Act were received by ARENA in 2015-16.

## Indemnities and insurance premiums of officers

ARENA was included under the portfolio Department's insurance policy with Comcover for 2015-16, with costs of the insurance premiums met by the portfolio Department. ARENA has entered into a Deed of Indemnity, Access and Insurance with the CEO of ARENA.

## Judicial decisions and reviews by outside bodies

In 2015-16 ARENA was not subject to judicial decisions or reviews by administrative tribunals, the Auditor-General, the Commonwealth Ombudsman or the Office of the Australian Information Commissioner.

ARENA received an unqualified audit report on its financial statements for 2015-16. The Auditor-General's independent report is presented in the financial statements section of this annual report.

## Legal expenditure

ARENA outsources all of its legal work. During 2015-16 ARENA incurred \$2,857,032 (excluding GST) in external legal service expenditure.

ARENA has reported the expenditure to the Office of Legal Services Coordination as required under the Legal Services Directions 2005.



*Solar panels at AGL's Broken Hill solar facility.*

*Image credit: AGL.*



### Public interest disclosure

There was one disclosure under the *Public Interest Disclosure Act 2013* for 2015-16.

### Related entity transactions

Details of related entity transactions are covered in Note 4.3 of the Financial Statements section of this report.

### Service level agreement

The portfolio Department provides corporate support for ARENA's day-to-day operations. This relationship is managed by a service level agreement, which sets out the arrangements for the provision of services to ARENA. This will be the subject of review in 2016-17.

### Subsidiaries

ARENA did not have any subsidiaries during 2015-16.

### Training and development

ARENA's commitment to quality, innovation and professionalism are core elements of the organisation's competitive advantage, and underpin ARENA as an employer of choice.

ARENA has a strong commitment to building the skills and expertise of its people. ARENA personnel have participated in a wide range of training including postgraduate study, leadership training and secondment opportunities within the Department and other agencies.

All new personnel receive an induction pack and in-house training. New ARENA personnel meet members of the executive and learn about current activities in ARENA.

Topics covered in the induction material given to new ARENA personnel include:

- introduction to ARENA
- overview of business functions including strategy, business development and contract negotiations, project management, strategic communication, knowledge management and business support functions
- Code of Conduct
- conflict of interest and probity
- work health and safety
- governance and compliance in ARENA
- employment, learning and development, and other mandatory departmental procedures.



## Work health and safety

*The Work Health and Safety Act 2011* (WHS Act) aims to ensure so far as reasonably practicable the health and safety of workers (who are engaged by ARENA or whose work is influenced or directed by ARENA) and other persons who may be put at risk by work carried out as part of the conduct of ARENA's business or undertaking.

ARENA's officials promote a positive safety culture at ARENA.

The ARENA Board closely monitors health and safety in ARENA projects and in ARENA workplaces.

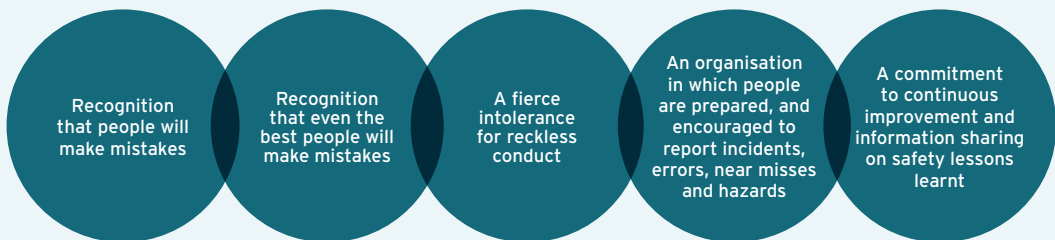
ARENA considers health and safety throughout the life cycle of the funding process. ARENA is supported in securing the health and safety of its workers during its day-to-day operations by arrangements put in place by the portfolio Department.

Those arrangements incorporate:

- agreed responsibilities in maintaining a safe and healthy working environment for workers
- agreed WHS frameworks and consultative forums
- systems for identifying hazards and effectively managing risk
- measures for monitoring, evaluating and striving for continual improvement in WHS performance
- procedures for the reporting and resolution of WHS issues.

In respect of ARENA employees, no investigations were conducted and no notifiable incidents were reported during 2015-16. Reporting in respect of Departmental staff made available to ARENA is covered in the Department of Environment and Energy's Annual Report 2015-16.

## ARENA's WHS culture



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# 05

## Financial Statements



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*Arrays of solar PV panels at the Broken Hill site of AGL's Solar Farm.*



## INDEPENDENT AUDITOR'S REPORT

### To the Minister for the Environment and Energy

I have audited the accompanying annual financial statements of the Australian Renewable Energy Agency for the year ended 30 June 2016, which comprise a Statement by the Accountable Authority, Chief Executive and Chief Financial Officer; Statement of Comprehensive Income; Statement of Financial Position; Statement of Changes in Equity; Cash Flow Statement; and Notes comprising a Summary of Significant Accounting Policies and other explanatory information.

### Opinion

In my opinion, the financial statements of the Australian Renewable Energy Agency:

- (a) comply with Australian Accounting Standards and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and
- (b) present fairly the financial position of the Australian Renewable Energy Agency as at 30 June 2016 and its financial performance and cash flows for the year then ended.

### Accountable Authority's Responsibility for the Financial Statements

The directors of the Australian Renewable Energy Agency are responsible under the *Public Governance, Performance and Accountability Act 2013* for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards and the rules made under that Act. The directors are also responsible for such internal control as the Australian Renewable Energy Agency determines is necessary to enable the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

### Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements 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. An audit also includes evaluating the appropriateness of the

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accounting policies used and the reasonableness of accounting estimates made by the directors of the Australian Renewable Energy Agency, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

***Independence***

In conducting my audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Australian National Audit Office

A handwritten signature in black ink, appearing to read 'Kristian Gage', is written over the printed name.

Kristian Gage  
Executive Director

Delegate of the Auditor-General

Canberra

5 September 2016



Australian Renewable Energy Agency

**STATEMENT BY THE ACCOUNTABLE AUTHORITY, CHIEF EXECUTIVE  
AND CHIEF FINANCIAL OFFICER**

In our opinion, the attached financial statements for the year ended 30 June 2016 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.



Martijn Wilder AM  
Chair of the Board  
5 September 2016



Ivor Frischknecht  
Chief Executive Officer  
5 September 2016



Ian Kay  
Chief Financial Officer  
5 September 2016

# Statement of Comprehensive Income

for the period ended 30 June 2016

	Notes	2016 \$'000	2015 \$'000
<b>NET COST OF SERVICES</b>			
<b>Expenses</b>			
Employee benefits	1.1A	907	909
Suppliers	1.1B	24,055	19,318
Grants	1.1C	113,001	216,204
Depreciation and amortisation	2.2A	182	86
Write-down and impairment of assets	1.1D	5	-
<b>Total expenses</b>		<b>138,150</b>	236,517
<b>Own-source income</b>			
<b>Own-source revenue</b>			
Interest	1.2A	252	36
Other revenue	1.2B	59,370	15,571
<b>Total own-source revenue</b>		<b>59,622</b>	15,607
<b>Gains</b>			
Other gains	1.2C	-	214
<b>Total gains</b>		<b>-</b>	214
<b>Total own-source income</b>		<b>59,622</b>	15,821
<b>Net cost of services</b>		<b>(78,528)</b>	(220,696)
Revenue from Government	1.2D	114,611	244,424
<b>Surplus on continuing operations</b>		<b>36,083</b>	23,728
<b>OTHER COMPREHENSIVE INCOME</b>			
<b>Items not subject to subsequent reclassification to net cost of services</b>			
Decrease in the value of investment	1.3	2,293	860
<b>Total comprehensive income</b>		<b>33,790</b>	22,868

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

# Statement of Financial Position

as at 30 June 2016

	Notes	2016 \$'000	2015 \$'000
<b>ASSETS</b>			
<b>Financial assets</b>			
Cash and cash equivalents	2.1A	41,660	469
Trade and other receivables	2.1B	11,676	4,067
Other investments	2.1C	19,929	13,058
<b>Total financial assets</b>		<b>73,265</b>	17,594
<b>Non-financial assets</b>			
Plant and equipment	2.2A	-	5
Computer software	2.2A	536	718
Other non-financial assets	2.2B	174	20,934
<b>Total non-financial assets</b>		<b>710</b>	21,657
<b>Total assets</b>		<b>73,975</b>	39,251
<b>LIABILITIES</b>			
<b>Payables</b>			
Suppliers	2.3A	2,208	1,036
Grants	2.3B	2,979	3,186
Other payables	2.3C	2	55
<b>Total payables</b>		<b>5,189</b>	4,277
<b>Provisions</b>			
Employee provisions	4.1A	158	136
<b>Total provisions</b>		<b>158</b>	136
<b>Total liabilities</b>		<b>5,347</b>	4,413
<b>Net assets</b>		<b>68,628</b>	34,838
<b>EQUITY</b>			
Retained surplus		68,628	34,838
<b>Total equity</b>		<b>68,628</b>	34,838

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

# Statement of Changes in Equity

for the period ended 30 June 2016

	2016 \$'000	2015 \$'000
<b>TOTAL EQUITY</b>		
<b>RETAINED EARNINGS</b>		
<b>Opening balance</b>		
Balance carried forward from previous period	<b>34,838</b>	11,970
<b>Adjusted opening balance</b>	<b>34,838</b>	11,970
<b>Comprehensive income</b>		
Surplus for the period	<b>36,083</b>	23,728
Other comprehensive income	<b>(2,293)</b>	(860)
<b>Total comprehensive income</b>	<b>33,790</b>	22,868
<b>Closing balance as at 30 June</b>	<b>68,628</b>	34,838

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

# Cash Flow Statement

for the period ended 30 June 2016

	Notes	2016 \$'000	2015 \$'000
<b>OPERATING ACTIVITIES</b>			
<b>Cash received</b>			
Receipts from Government		114,720	244,301
Interest		76	145
Net GST received		12,923	26,662
Return of grant funds from prior years		40,899	5,099
<b>Total cash received</b>		<b>168,618</b>	<b>276,207</b>
<b>Cash used</b>			
Employees		(853)	(839)
Suppliers		(15,301)	(11,275)
Grants		(102,109)	(260,958)
<b>Total cash used</b>		<b>(118,263)</b>	<b>(273,072)</b>
<b>Net cash from operating activities</b>	3.1	<b>50,355</b>	<b>3,135</b>
<b>INVESTING ACTIVITIES</b>			
<b>Cash received</b>			
Return on investment		-	3,038
<b>Total cash received</b>		<b>-</b>	<b>3,038</b>
<b>Cash used</b>			
Purchase of intangibles		-	(6)
Investments		(9,164)	(5,724)
<b>Total cash used</b>		<b>(9,164)</b>	<b>(5,730)</b>
<b>Net cash used by investing activities</b>		<b>(9,164)</b>	<b>(2,692)</b>
<b>Net increase in cash held</b>		<b>41,191</b>	<b>443</b>
Cash and cash equivalents at the beginning of the reporting period		469	26
<b>Cash and cash equivalents at the end of the reporting period</b>	2.1A	<b>41,660</b>	<b>469</b>

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



# Notes to the Financial Statements

## Overview

### Objectives of the Australian Renewable Energy Agency

The Australian Renewable Energy Agency (ARENA) is an Australian Government controlled entity. 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:** 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.

ARENA transferred from the Industry, Innovation and Science Portfolio to the Environment Portfolio on 21 September 2015 under a Machinery of Government change. Under the *Australian Renewable Energy Agency Act 2011* (the Act) the Secretary of the Portfolio Department is required to make staff available to ARENA and pay associated costs.

The continued existence of ARENA in its present form and with its present programs is dependent on:

- Government policy and the continuation of the Act;
- continued funding under the legislation for ARENA's administration and programs; and
- the Secretary of the Portfolio Department making sufficient staff available.

The Australian Government announced as part of the 2014-15 Budget its intention to abolish ARENA. The Australian Renewable Energy Agency (Repeal) Bill 2014 did not pass through the Senate and was prorogued on 15 April 2016 as a result of the prorogation of the Australian Parliament.

As ARENA was expected to be abolished, no budget allocation was made for the agency in 2014-15 and 2015-16. On 23 March 2016, the Government announced its policy to reinstate and reinvigorate ARENA with departmental budget funding being allocated to ARENA in 2016-17.

## The basis of preparation

The financial statements are general purpose financial statements and are required by:

- a) section 42 of the *Public Governance, Performance and Accountability Act 2013*.

The financial statements have been prepared in accordance with:

- a) Public Governance, Performance and Accountability (Financial Reporting) Rule 2015 (FRR) for reporting periods ending on or after 1 July 2015; and
- b) Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) 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.

## New Accounting Standards

### Adoption of New Australian Accounting Standard Requirements

No accounting standard has been adopted earlier than the application date as stated in the standard.

All other 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 future material effect, on ARENA's financial statements. AASB 1055 Budgetary Reporting is not applicable as ARENA was not required to present its budget in the Portfolio Budget Statements for 2015-16.

### Future Australian Accounting Standard Requirements

All other standards and interpretations that were issued prior to the sign-off date and are applicable to future reporting period(s) are not expected to have a future material impact on ARENA's financial statements.

## Going concern

The Australian Government announced on 23 March 2016 that ARENA would be retained with an expanded mandate and that it would jointly manage a new Clean Energy Innovation Fund with the Clean Energy Finance Corporation (CEFC). The Australian Government has introduced legislation to reduce ARENA's available funding under the Act by \$1.3 billion.

Under the announced policy, ARENA would continue to oversee its existing portfolio of grants and other announced commitments such as the large scale solar round within its existing budget.

The Australian Renewable Energy Agency (Repeal) Bill 2014 lapsed upon prorogation on 15 April 2016 and will not be reintroduced to the Parliament.

## 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 Adjusting Events that have a potential to significantly affect its ongoing structure or financial activities.

# Financial Performance

This section analyses the financial performance of the Australian Renewable Energy Agency for the year ended 2016

1.1 EXPENSES	2016 \$'000	2015 \$'000
<b>1.1A: Employee benefits</b>		
Board remuneration fees	133	95
Wages and salaries	559	556
Superannuation		
Defined contribution plans	129	129
Leave and other entitlements	86	129
<b>Total employee benefits</b>	<b>907</b>	<b>909</b>

## Accounting Policy

Accounting policies for employee related expenses is contained in Note 4.1: Employee Provisions.

## 1.1B: Suppliers

### Goods and services supplied or rendered

Audit fees	99	93
Consultants	10,485	5,740
Department support costs (resources received free of charge) <sup>1</sup>	8,939	10,363
IT services	541	323
Legal fees	2,857	2,197
Travel	251	177
Other	657	226
<b>Total goods and services supplied or rendered</b>	<b>23,829</b>	<b>19,119</b>

### Other suppliers

#### Operating lease rentals in connection with:

Operating lease rentals - external parties:		
Minimum lease payments	221	194
Workers compensation expenses	5	5
<b>Total other suppliers</b>	<b>226</b>	<b>199</b>
<b>Total suppliers</b>	<b>24,055</b>	<b>19,318</b>

1. Department support costs represent the cost of staff and associated costs made available by the Secretary of the Portfolio Department (also refer to Statement of Comprehensive Income - own source revenue). This forms a majority of the total related party transactions.

1.1 EXPENSES (contd.)	2016 \$'000	2015 \$'000
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#### Leasing commitments

The Australian Renewable Energy Agency in its capacity as lessor, sub-leases office space in Sydney. The sub-lease is on standard commercial terms for a fixed period to August 2018.

#### Commitments for minimum lease payments in relation to non-cancellable operating leases are payable as follows:

Within 1 year	134	68
Between 1 to 5 years	157	-
<b>Total operating lease commitments</b>	<b>291</b>	<b>68</b>

#### Accounting Policy

##### Operating leases

Operating lease payments are expensed on a straight-line basis which is representative of the pattern of benefits derived from the leased assets. The lessor effectively retains substantially all such risks and benefits of ownership.

#### 1.1C: Grants

##### Public sector

Australian Government entities (related parties)	8,368	11,968
State and Territory Governments	-	420

##### Private sector

Australian private companies	88,155	153,745
Australian public companies	4,569	27,265
Other entities <sup>1</sup>	11,909	22,806
<b>Total grants</b>	<b>113,001</b>	<b>216,204</b>

1. This includes the Australian Government's contribution to the Clean Energy Solutions Centre and the International Renewable Energy Agency.
2. For information on outstanding grant commitments refer to Note 6.2: Grant Commitments.

#### 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.

##### Locked Box arrangements

ARENA's Locked Box funding arrangements relate to grant funding contracts 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. At the time of payment, the transaction is recorded as a Prepayment in the Statement of Financial Position. Upon the recipient satisfying certain conditions, the Prepayment is transferred to Grant Expenses in the Statement of Comprehensive Income. That is, when control of the prescribed bank account passes to the grantee upon meeting the necessary grant conditions.

ARENA continues to be responsible and accountable for ensuring that the funds are only released from the Locked Box when conditions specified in the grant funding contract have been met. Accordingly, the value of Locked Boxes at balance date is disclosed under Note 6.1A: Assets Held in Trust.

#### 1.1D: Write-down and impairment of assets

Write-down of plant and equipment	5	-
<b>Total write-down and impairment of assets</b>	<b>5</b>	<b>-</b>

#### Accounting Policy

Refer to Note 2.2A: Non-Financial Assets.

1.2 OWN-SOURCE REVENUE AND GAINS	2016	2015
	\$'000	\$'000

#### Own-source revenue

##### 1.2A: Interest

Deposits	252	36
<b>Total interest</b>	<b>252</b>	<b>36</b>

#### Accounting Policy

Interest revenue is recognised using the effective interest method (refer to Note 5.2A: Categories of Financial Assets).

##### 1.2B: Other revenue

Resources received free of charge		
Department of the Environment	5,986	-
Department of Industry, Innovation and Science	2,953	10,363
Return of grants	50,431	5,208
<b>Total other revenue</b>	<b>59,370</b>	<b>15,571</b>

#### 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. Resources received free of charge are recorded as either revenue or gains depending on their nature.

##### Return of grant

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

#### Gains

##### 1.2C: Other gains

PAYG receivable from prior year	-	85
Gain on sale of assets (investments)	-	129
<b>Total other gains</b>	<b>-</b>	<b>214</b>

##### 1.2D: Revenue from Government

Appropriations		
Departmental appropriations	114,611	244,424
<b>Total revenue from Government</b>	<b>114,611</b>	<b>244,424</b>

#### Accounting Policy

##### Revenue from Government

Amounts appropriated for departmental appropriations for the year (adjusted for any formal additions and reductions) are recognised as Revenue from Government when the entity gains control of the appropriation, except for certain amounts that relate to activities that are reciprocal in nature, in which case revenue is recognised only when it has been earned. Appropriations receivable are recognised at their nominal amounts. Refer to Note 2.1B: Trade and Other Receivables.



1.3 OTHER COMPREHENSIVE INCOME	2016 \$'000	2015 \$'000
<b>Other comprehensive income</b>		
Decrease in the value of investment <sup>1</sup>	<b>2,293</b>	860
<b>Total other comprehensive income</b>	<b>2,293</b>	860

1. Refer to Note 2.1C: Other investments.

## Financial Position

This section analyses the Australian Renewable Energy Agency'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	2016	2015
	\$'000	\$'000

### 2.1A: Cash and cash equivalents

Cash on hand or on deposit	41,660	469
<b>Total cash and cash equivalents</b>	<b>41,660</b>	<b>469</b>

#### Accounting Policy

##### Cash and equivalents

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

- cash on hand; and
- demand deposits in bank accounts with an original maturity of 3 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

<b>Appropriations receivables</b>		
Receivable from Portfolio Department	-	301
<b>Total appropriations receivables</b>	<b>-</b>	<b>301</b>

#### Other receivables

GST receivable from the Australian Taxation Office	1,500	3,653
PAYG receivable from the Australian Taxation Office	-	85
Return of grant receivable	10,000	-
Other receivables	176	28
<b>Total other receivables</b>	<b>11,676</b>	<b>3,766</b>
<b>Total trade and other receivables (gross)</b>	<b>11,676</b>	<b>4,067</b>
<b>Less impairment allowance</b>	<b>-</b>	<b>-</b>
<b>Total trade and other receivables (net)</b>	<b>11,676</b>	<b>4,067</b>

#### Trade and other receivables (net) expected to be recovered

No more than 12 months	11,676	4,067
<b>Total trade and other receivables (net)</b>	<b>11,676</b>	<b>4,067</b>

#### Trade and other receivables (gross) aged as follows

Not overdue	11,676	4,067
<b>Total trade and other receivables (net)</b>	<b>11,676</b>	<b>4,067</b>

2.1 FINANCIAL ASSETS (contd.)	2016	2015
	\$'000	\$'000

#### 2.1C: Other investments

REVC Fund Commonwealth Participation Trust	19,929	13,058
<b>Total other investments</b>	<b>19,929</b>	<b>13,058</b>

#### Other investments expected to be recovered

More than 12 months	19,929	13,058
<b>Total other investments</b>	<b>19,929</b>	<b>13,058</b>

#### Accounting Policy

Other investments are expected to be recovered in more than 12 months.

At 30 June 2016 ARENA held 27,718,780 (2015: 18,555,156) fully paid "A" class units in the Renewable Energy Venture Capital (REVC) Fund Commonwealth Participation Trust (Trust). The fair value of this investment is ARENA's share of the net assets of the audited Trust. The change in the value of the investment is shown against Other Comprehensive Income.

The principal activity of the Trust is to invest in the commercialisation of renewable energy companies.

ARENA's return from the Trust is initially limited to the capital committed plus interest at the long term bond rate. Any additional returns from the Trust is split amongst the unit holders, including ARENA, on an agreed basis.

## 2.2 NON-FINANCIAL ASSETS

### 2.2A: Reconciliation of the opening and closing balances of property, plant and equipment and intangibles

Reconciliation of the opening and closing balances of property, plant and equipment for 2016	Plant and equipment	Computer Software	Total
	\$'000	\$'000	\$'000

#### As at 1 July 2015

Gross book value	9	854	863
Accumulated depreciation, amortisation and impairment	(4)	(136)	(140)
<b>Total as at 1 July 2015</b>	<b>5</b>	<b>718</b>	<b>723</b>
Depreciation and amortisation	-	(182)	(182)
Disposals			-
Write off plant & equipment	(5)	-	(5)
<b>Total as at 30 June 2016</b>	<b>-</b>	<b>536</b>	<b>536</b>

#### Total as at 30 June 2016 represented by

Gross book value	-	854	854
Accumulated depreciation, amortisation and impairment	-	(318)	(318)
<b>Total as at 30 June 2016</b>	<b>-</b>	<b>536</b>	<b>536</b>

All software assets were assessed for indications of impairment as at 30 June 2016 and no evidence of impairment was found.

Reconciliation of the opening and closing balances of property, plant and equipment for 2015	Plant and equipment	Computer Software	Total
	\$'000	\$'000	\$'000

#### As at 1 July 2014

Gross book value	9	849	858
Accumulated depreciation, amortisation and impairment	(3)	(51)	(54)
<b>Total as at 1 July 2014</b>	<b>6</b>	<b>798</b>	<b>804</b>

#### Additions:

Purchase	-	5	5
Depreciation and amortisation	(1)	(85)	(86)
<b>Total as at 30 June 2015</b>	<b>5</b>	<b>718</b>	<b>723</b>

#### Total as at 30 June 2016 represented by

Gross book value	9	854	863
Accumulated depreciation, amortisation and impairment	(4)	(136)	(140)
<b>Total as at 30 June 2015</b>	<b>5</b>	<b>718</b>	<b>723</b>

## 2.2 NON-FINANCIAL ASSETS (contd.)

### 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.

#### Plant and equipment

Plant & Equipment are valued at cost in accordance with the Financial Reporting Rule.

#### Intangibles

ARENA's intangibles comprise internally developed software for internal use. These assets are carried at cost less accumulated amortisation and accumulated impairment losses. Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of the entity's software are 10 years in 2015 and 7 years in 2016.

#### 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, plant and equipment 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 reverse 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 the revalued amount.

#### Depreciation

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

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.

As at 30 June 2016 ARENA did not have any depreciable plant and equipment assets.

2.2 NON-FINANCIAL ASSETS (contd.)	2016 \$'000	2015 \$'000
<b>2.2B: Other non-financial assets</b>		
Prepayments <sup>1</sup>	174	20,934
<b>Total other non-financial assets</b>	<b>174</b>	<b>20,934</b>
<b>Other non-financial assets expected to be recovered</b>		
No more than 12 months	174	20,934
<b>Total other non-financial assets</b>	<b>174</b>	<b>20,934</b>

No indicators of impairment were found for other non-financial assets.

1. Prepayments in 2015 included a Locked Box deposit of \$20.9m for an approved grant project. Control of the Locked Box had passed to the grant recipient in 2016 (for the relevant accounting policy refer to Note 1.1C: Grants).



2.3 PAYABLES	2016	2015
	\$'000	\$'000

#### 2.3A: Suppliers

Trade creditors and accruals	2,208	1,036
<b>Total suppliers</b>	<b>2,208</b>	<b>1,036</b>

#### Suppliers expected to be settled

No more than 12 months	2,208	1,036
<b>Total suppliers</b>	<b>2,208</b>	<b>1,036</b>

#### 2.3B: Grants

##### Public sector

Australian Government entities	1,939	2,450
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##### Private sector

Australian private companies	1,035	736
Other entities	5	-
<b>Total grants</b>	<b>2,979</b>	<b>3,186</b>

#### Grants expected to be settled

No more than 12 months	2,979	3,186
<b>Total grants</b>	<b>2,979</b>	<b>3,186</b>

Settlement is usually made within 30 days. Refer to Note 6.2: Grant Commitments.

#### 2.3C: Other payables

Salaries and wages	2	55
<b>Total other payables</b>	<b>2</b>	<b>55</b>

#### Other payables to be settled

No more than 12 months	2	55
<b>Total other payables</b>	<b>2</b>	<b>55</b>

## Funding

This section analyses the funding of the Australian Renewable Energy Agency.

3.1 CASH FLOW RECONCILIATION		2016	2015
		\$'000	\$'000
<b>Reconciliation of cash and cash equivalents as per statement of financial position and cash flow statement</b>			
<b>Cash and cash equivalents as per</b>			
Cash flow statement	41,660	469	
Statement of financial position	41,660	469	
<b>Discrepancy</b>	-	-	
<b>Reconciliation of net cost of services to net cash from/(used by) operating activities</b>			
Net cost of services	(78,528)	(220,696)	
Revenue from Government	114,611	244,424	
<b>Adjustments for non-cash items</b>			
Depreciation/amortisation	182	86	
Net write down of non-financial assets	5	-	
Gain on disposal of assets	-	(129)	
<b>Movement in assets and liabilities</b>			
<b>Assets</b>			
(Increase)/decrease in net receivables	(7,609)	2,367	
(Increase)/decrease in prepayments	20,760	(20,897)	
<b>Liabilities</b>			
Increase in employee provisions	22	62	
Increase/(decrease) in suppliers payables	1,172	(1,077)	
Decrease in grant payables	(207)	(1,011)	
Increase/(decrease) in other payables	(53)	6	
<b>Net cash from operating activities</b>	<b>50,355</b>	<b>3,135</b>	

## People and Relationships

This section describes a range of employment and post employment benefits provided to our people and our relationships with other key people.

4.1 EMPLOYEE PROVISIONS	2016 \$'000	2015 \$'000
<b>Employee provisions</b>		
Leave	158	136
<b>Total employee provisions</b>	<b>158</b>	<b>136</b>
<b>Employee provisions expected to be settled</b>		
No more than 12 months	97	95
More than 12 months	61	41
<b>Total employee provisions</b>	<b>158</b>	<b>136</b>

### Accounting Policy

Liabilities for short-term employee benefits and termination benefits expected within twelve months of the end of 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 minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly.

### Leave

The liability for employee benefits includes provision for annual leave and long service leave. 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 Public Governance, Performance and Accountability (Financial Reporting) Rule 2015 (the FRR). The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

4.2 SENIOR MANAGEMENT PERSONNEL REMUNERATION		2016	2015
		\$	\$
<b>Short-term employee benefits</b>			
Salary		559,197	570,703
Board remuneration fees		133,219	94,664
<b>Total short-term employee benefits</b>		<b>692,416</b>	665,367
<b>Post-employment benefits</b>			
Superannuation		91,436	68,485
<b>Total post-employment benefits</b>		<b>91,436</b>	68,485
<b>Other long-term employee benefits</b>			
Annual leave		47,161	57,956
Long-service leave		20,679	15,376
<b>Total other long-term employee benefits</b>		<b>67,840</b>	73,332
<b>Total senior executive remuneration expenses<sup>1</sup></b>		<b>851,692</b>	807,184

The total number of senior management personnel that are included in the above table are 9 individuals (2015: 7) and includes 7 ARENA Directors (2015: 5). One Director is from the Portfolio Department and is not remunerated.

1. Total remuneration expenses are compiled on a combination of accrual and entitlement basis and do not necessarily agree with expenses in the Statement of Comprehensive Income.

#### 4.3 RELATED PARTY DISCLOSURES

There were no related-party transactions in 2015-16 and 2014-15.

Consultancy procurement contracts were made to Baker & McKenzie Pty Ltd, of which Mr M Wilder is a Partner. They were approved by management personnel under normal commercial terms and conditions. Mr Wilder took no part in the relevant decisions.

ARENA has awarded grants to entities where some Board members were involved in an advisory capacity to the recipient. Where this has occurred, the Board member took no part in the relevant decision.

## Managing Uncertainties

This section analyses how the Australian Renewable Energy Agency manages financial risks within its operating environment.

### 5.1 CONTINGENT ASSETS AND LIABILITIES

	Claims for damages or costs		Total	
	2016 \$'000	2015 \$'000	2016 \$'000	2015 \$'000
<b>Contingent liabilities</b>				
Balance from previous period	500	-	500	-
New contingent liabilities recognised	-	500	-	500
Obligations expired	(500)	-	(500)	-
<b>Total contingent liabilities</b>	-	500	-	500

As at 30 June 2016, there were no quantifiable or significant remote contingencies (2015: \$500,000). The letter of demand issued in the previous financial year by the project owner of an ARENA project expired upon the liquidation of the company. ARENA made no payments in relation to this claim.

#### Accounting Policy

##### Contingent liabilities and contingent assets

Contingent liabilities and contingent assets 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 a liability or asset 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.

5.2 FINANCIAL INSTRUMENTS	2016 \$'000	2015 \$'000
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### 5.2A: Categories of financial instruments

#### Financial assets

##### Loans and receivables

Cash and cash equivalents	41,660	469
Trade and other receivables	10,176	28
<b>Total loans and receivables</b>	<b>51,836</b>	<b>497</b>

##### Available-for-sale financial assets

Other investments	19,929	13,058
<b>Total available-for-sale financial assets</b>	<b>19,929</b>	<b>13,058</b>

<b>Total financial assets</b>	<b>71,765</b>	<b>13,555</b>
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#### Financial liabilities

Trade creditors	2,208	1,036
Grant payables	2,979	3,186
<b>Total financial liabilities</b>	<b>5,187</b>	<b>4,222</b>

#### Accounting Policy

##### Financial assets

The entity classifies its financial assets in the following categories:

- a) available-for-sale financial assets; and
- b) loans and receivables.

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.

##### Available-for-sale financial assets

Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories. Available-for-sale financial assets are recorded at fair value. Gains and losses arising from changes in fair value are recognised as a "below the line item" in the Statement of Comprehensive Income with the exception of impairment losses. Interest is calculated using the effective interest method. Where the asset is disposed of or is determined to be impaired, part (or all) of the cumulative gain or loss previously recognised in the reserve is included in surplus or deficit for the period.

##### Loans and receivables

Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified and 'loans and receivables'. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

##### Effective interest method

The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

##### Impairment of financial assets

Financial assets are assessed for impairment at the end of each reporting period.

##### Financial liabilities

##### Other financial liabilities

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). Trade creditors and other payables are derecognised on payment.



5.2 FINANCIAL INSTRUMENTS (contd.)	2016	2015
	\$'000	\$'000

#### 5.2B: Net gains or losses on financial assets

##### Loans and receivables

Interest revenue	252	36
<b>Net gains on loans and receivables</b>	<b>252</b>	<b>36</b>

##### Available-for-sale financial assets

Amounts reversed from equity

Fair value changes	(2,293)	(860)
<b>Net losses on available-for-sale financial assets</b>	<b>(2,293)</b>	<b>(860)</b>
<b>Net losses on financial assets</b>	<b>(2,041)</b>	<b>(824)</b>

#### Accounting Policy

##### Credit risk

ARENA was exposed to minimal credit risk as loans and receivables were cash and trade receivables. The maximum exposure to credit risk was the risk that arises from potential default of a debtor. This amount was equal to the total amount of other receivables of \$10.176m (2014-15 \$0.028m).

ARENA held no collateral to mitigate against credit risk. The risk of interest rate movements is deemed to be immaterial due to the way ARENA manages its cash requirements.

##### Liquidity risk

ARENA's financial liabilities were payables. The exposure to liquidity risk was based on the notion that ARENA will encounter difficulty in meeting its obligations associated with financial liabilities. This was highly unlikely due to the Government funding mechanisms available to ARENA and internal policies and procedures in place to ensure there were appropriate resources to meet its financial obligations.

##### Market risk

ARENA is indirectly exposed to currency risk through its investment in the Renewable Energy Venture Capital (REVC) Fund Commonwealth Participation Trust (the Trust). The movements associated with ARENA's investment in the Trust are accounted for through the Statement of Other Comprehensive Income.

### 5.3 FAIR VALUE MEASUREMENT

The following tables provide an analysis of assets and liabilities that are measured at fair value. The remaining assets and liabilities disclosed in the statement of financial position do not apply the fair value hierarchy.

The different levels of the fair value hierarchy are defined below.

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at measurement date.

Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.

Level 3: Unobservable inputs for the asset or liability.

#### Accounting Policy

The valuation of Other Investments, being ARENA's holding in the Renewable Energy Venture Capital (REVC) Fund Commonwealth Participation Trust, is based on the annual audited financial statements of the co-investment arrangement. The co-investment financial statements are relied upon in the absence of an active market to determine a fair value. This approach provides a reasonable valuation as the financial statements are prepared in accordance with the Australian Accounting Standards and are independently audited to ensure the statements are a true and fair representation.

ARENA deems transfers between levels of the fair value hierarchy to have occurred at the end of the reporting period.

#### 5.3A: Fair value measurement

Financial assets	Fair value measurements at the end of the reporting period		Category (Level 1, 2 or 3) <sup>2,3</sup>	Valuation technique(s) and inputs used
	2016 \$'000	2015 \$'000		
Other investments <sup>1</sup>	19,929	13,058	Level 3	The significant unobservable inputs used in the fair value measurement of ARENA's Other Investments are the cost of the investments disclosed in the co-investment arrangement's audited financial statements. The cost of these investments is the basis of the fair valuation. Significant increases (decreases) in those inputs in isolation would result in a significantly higher (lower) fair value measurement. Generally, a change in the assumption used for the cost of investments within the co-investment arrangement's audited financial statements is accompanied by a directionally similar change in the calculation of net assets of the co-investment arrangement.

1. No change in valuation techniques were made during the period.

2. The highest and best use of all financial assets are the same as their current use.

3. The remaining assets and liabilities reported by ARENA are not measured at fair value in the Statement of Financial Position.

5.3 FAIR VALUE MEASUREMENT (contd.)	2016	2015
	\$'000	\$'000

#### 5.3B: Reconciliation for recurring level 3 fair value measurements

##### Financial assets: Other investments

<b>As at 1 July</b>	<b>13,058</b>	11,131
Total gains recognised in net cost of services <sup>1</sup>	-	129
Total losses recognised in other comprehensive income <sup>2</sup>	<b>(2,293)</b>	(860)
Purchases of investments	<b>9,164</b>	5,724
Returns of investments	-	(3,066)
<b>Total as at 30 June</b>	<b>19,929</b>	13,058

1. These gains are presented in the Statement of Comprehensive Income under Other Gains.

2. These losses are presented in the Statement of Comprehensive Income under Other Comprehensive Income.

## Other Information

6.1 ASSETS HELD IN TRUST	2016 \$'000	2015 \$'000
<b>Locked Box</b>		
<b>Balance as at 1 July</b>	<b>98,406</b>	-
Receipts <sup>1</sup>	<b>62,200</b>	157,749
Payments <sup>2</sup>	<b>(128,451)</b>	(59,343)
<b>Balance as at 30 June</b>	<b>32,155</b>	98,406
<b>Total monetary assets held in trust</b>	<b>32,155</b>	98,406

1. Receipts were the amounts paid into Locked Boxes by ARENA during 2015-16. This amount also includes interest paid from the balance in the Locked Boxes.

2. Payments are those amounts which have been withdrawn by the project from Locked Boxes in accordance with agreed milestones.

### Accounting Policy

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/user 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 contract have been met.

6.2 GRANT COMMITMENTS	2016	2015
	\$'000	\$'000

#### BY TYPE

##### Grant commitments payable

Project commitments <sup>1</sup>	194,053	386,759
Research and development commitments <sup>1</sup>	80,266	84,053
<b>Total grant commitments payable</b>	<b>274,319</b>	<b>470,812</b>

#### BY MATURITY

##### Grant commitments payable

###### Project commitments

One year or less	134,873	252,775
From one to five years	59,180	102,491
Over five years	-	31,493
<b>Total project commitments</b>	<b>194,053</b>	<b>386,759</b>

###### Research and development commitments

One year or less	31,767	32,527
From one to five years	48,499	48,277
Over five years	-	3,250
<b>Total research and development commitments</b>	<b>80,266</b>	<b>84,053</b>
<b>Total grant commitments payable</b>	<b>274,319</b>	<b>470,812</b>

Commitments are GST exclusive.

1. The Australian Renewable Energy Agency is currently providing financial assistance to a broad portfolio of projects and measures across the various stages of renewable energy commercialisation. Project commitments and fellowships are in accordance with signed funding agreements, as varied, or in the case of scholarships, in accordance with the grant offer letter.

#### Accounting Policy

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.

6.3 REPORTING OF OUTCOMES		2016	2015
		\$'000	\$'000
<b>Expenses</b>			
Departmental		<b>138,150</b>	236,517
<b>Total expenses</b>		<b>138,150</b>	236,517
<b>Own-source income</b>			
Departmental		<b>(59,622)</b>	(15,821)
<b>Total own-source income</b>		<b>(59,622)</b>	(15,821)
<b>Net cost of outcome delivery</b>		<b>78,528</b>	220,696

The face statements of these financial statements represent the major classes of expense, income, assets and liabilities attributable to the single Outcome and as such they are not repeated in this note.

ARENA has a single Outcome which is described in the Overview. Net costs shown include intra-government costs that are eliminated in calculating the actual Budget Outcome.







# 06

## References and Index





*Vast Solar's grid-connected concentrating solar thermal plant. The first of its kind to use sodium as the heat transfer fluid.*

*Image credit: Vast Solar.*

## Acronyms and initialisms

<b>ABIR</b>	Advanced Biofuels Investment Readiness
<b>AM</b>	Member of the Order of Australia
<b>ANAO</b>	Australian National Audit Office
<b>APS</b>	Annual Performance Statement
<b>AREMI</b>	Australian Renewable Energy Mapping Infrastructure
<b>ARENA</b>	Australian Renewable Energy Agency
<b>ASI</b>	Australian Solar Institute
<b>ASTRI</b>	Australian Solar Thermal Research Initiative
<b>CEC</b>	Clean Energy Council
<b>CEFC</b>	Clean Energy Finance Corporation
<b>CEO</b>	Chief Executive Officer
<b>CFO</b>	Chief Financial Officer
<b>CO<sub>2</sub></b>	carbon dioxide
<b>CSP/CST</b>	concentrated solar power/concentrated solar thermal
<b>EE</b>	energy efficiency
<b>EIF</b>	Education Investment Fund
<b>EOI</b>	expression of interest
<b>ESD</b>	ecologically sustainable development
<b>FOI</b>	Freedom of Information
<b>FRV</b>	Fotowatio Renewable Ventures
<b>FTE</b>	full-time equivalent
<b>GFS</b>	General Funding Strategy
<b>GST</b>	goods and services tax
<b>GW</b>	gigawatt
<b>IP</b>	Investment Plan
<b>ISO</b>	International Organisation for Standardisation
<b>LCOE</b>	levelised cost of energy
<b>LGC</b>	large-scale generation certificate
<b>LSS</b>	large-scale solar
<b>MSF</b>	Moree Solar Farm
<b>MW</b>	megawatt
<b>PGPA</b>	Public Governance, Performance and Accountability

<b>PPA</b>	power purchase agreement
<b>PSM</b>	Public Service Medal
<b>PV</b>	photovoltaic
<b>RAC</b>	Risk and Audit Committee
<b>RD&amp;D</b>	research, development and demonstration
<b>RET</b>	Renewable Energy Target
<b>REVC</b>	Renewable Energy Venture Capital
<b>RIRDC</b>	Rural Industries Research and Development Corporation
<b>WHS</b>	work health and safety

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<i>Public Governance, Performance and Accountability Act 2013</i> (section 46), <i>Public Governance, Performance and Accountability Rule 2014</i> (section 17BB)	<b>Approval of annual report by accountable authority</b>  Annual report must: <ul style="list-style-type: none"> <li>• be approved by the ARENA Board</li> <li>• be signed by the Board, or a member of the Board</li> <li>• include details of how and when approval of the annual report was given</li> <li>• 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</li> </ul>	3
<i>Public Governance, Performance and Accountability Act 2013</i> (section 46), <i>Public Governance, Performance and Accountability Rule 2014</i> (section 17BC)	<b>Parliamentary standards of presentation</b>  Annual report must comply with the guidelines for presenting documents to Parliament	Yes



<i>Public Governance, Performance and Accountability Act 2013 (section 46), Public Governance, Performance and Accountability Rule 2014 (section 17BD)</i>	<b>Plain English and clear design</b>	
	Follow standards of presentation, language and design	Yes
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**ARENA**