



Attachment 3 to Item 10.3.2.

ARENA Advancing Renewables Program – Guidelines

Date of meeting: 26 November 2024
Location: Council Chambers
Time: 6:30pm

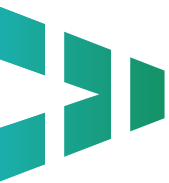
2024

ARENA
Investment Plan



Australian Government
Australian Renewable
Energy Agency

ARENA



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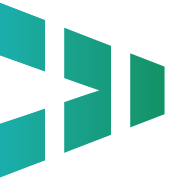
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ARENA acknowledges the Traditional Custodians of Country across Australia and their continuing connection to land, sea and community. We pay our respects to elders past and present.



Delivering the energy transition



Delivering the energy transition will require innovation, commercial support and a focussed effort as we face the challenges of weaning our modern world off fossil fuels and removing carbon from our economies.

Australia's rapid renewable electricity transition is driving decarbonisation of its broader economy. Renewables accounted for almost 40% of electricity in the National Electricity Market (NEM) in the first quarter of 2024, a significant rise from 12% in 2012.

Ultra low-cost solar and energy storage are crucial enablers for the transition, providing and enabling cheap renewable electricity to decarbonise the grid. These technologies will also be important inputs to the electrification of industry and transport and the production of renewable fuels such as hydrogen.

There are many challenges still to work through. Renewables remain the cheapest sources of energy, but require significantly more firming, including energy storage, to balance the variability of renewable energy sources and provide essential system services. Australia must also address supply chain and workforce constraints, streamline planning and approvals processes, and foster community support

(also known as social licence) to mitigate delays in building transmission infrastructure and making grid connections.

There have been promising developments on the electricity demand side, with market integration trials demonstrating flexible demand solutions and consumer energy resource (CER) integration being undertaken.

The renewable hydrogen sector continues to work through the commercial and technical challenges faced by early projects, with a growing awareness emerging of where green hydrogen may provide the most likely pathway to decarbonisation. Beyond the US Inflation Reduction Act, other regions have accelerated their support for renewable hydrogen including the European Hydrogen Bank auction and Japan's contracts for difference model. This support is crucial to establish the industry by bridging the commercial funding gap for early projects.

Australia has seen continued but slow growth in battery electric vehicle sales, which reached 10% of total new passenger and light commercial vehicle sales in early 2024. Despite improvements in vehicle availability and cost, challenges persist including the cost and delays associated with grid connection for chargers. Heavy vehicles are at an earlier stage of decarbonisation, although Australia has achieved early success with the launch of its first multi-truck battery electric vehicle trial, supported by ARENA.

In the hard-to-abate metals sector, Australia's shift to low emissions iron and steel has continued slowly in a transition led by European front runners. Research and Development (R&D) investment and emerging collaboration partnerships are adding promising momentum to the pace of innovation in Australia. This progress comes at a cost; as technology pathways mature, the sector will face the next challenge of meeting the significant capital requirements of green metals production.

Australia is well-positioned to become a green iron powerhouse, but is reliant on supporting industries, especially renewable hydrogen, reaching maturity and commercial viability to capitalise on this opportunity. In the alumina and aluminium value chains, Australia is poised to be a global leader as green pathways develop, furthered by support for onshore manufacturing.

Globally, many governments have increased focus on critical energy minerals as demand surges and traditional suppliers are disrupted by preferences for sources with greater Environmental, Social and Governance (ESG) credentials. This shift presents an opportunity for Australia to establish decarbonised minerals processing and make the most of its significant reserves and reputation as one of the most trusted suppliers in the critical energy minerals sector.

As the penetration of renewable energy and decarbonisation technologies increases, the challenges become more complex.

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



This Investment Plan details our strategic priorities and funding programs, as well as how to apply for ARENA funding as of August 2024. We periodically review and update our strategy and may reflect any changes in a revised Investment Plan at which point this document will be superseded.

You can also read about ARENA's:

- overall strategy including our operating context, vision and purpose, key activities and approach to delivery, performance reporting and risk management in our **Corporate Plan**
- principal objectives and priorities for ARENA's key activity of providing financial assistance in our **General Funding Strategy**
- achievements and outcomes to date in our latest **Annual Report**.

These can be found at arena.gov.au/about/publications



About ARENA

The Australian Renewable Energy Agency (ARENA) was established on 1 July 2012 by the *Australian Renewable Energy Act 2011 (Cth) (ARENA Act)*. ARENA is a Commonwealth corporate entity under the *Public Governance, Performance and Accountability Act 2013 (Cth) (PGPA Act)*.

The ARENA Act is supported by the Australian Renewable Energy Agency Regulation 2016 (Regulation), which extends ARENA's functions with respect to renewable energy technologies to include electrification and energy efficiency technologies.

Through our role in improving the competitiveness of renewable energy technology and increasing the supply of renewable energy in Australia, ARENA is helping to achieve the Government's climate change and energy objectives, anchored by emissions reductions goals of 43% by 2030 and net zero by 2050.

We acknowledge that Australia's path towards net zero traverses the lands and waters of First Nations People. In carrying out our work, ARENA supports the Government's commitment to meaningful engagement and reconciliation with First Nations people. We are incorporating engagement and benefit-sharing requirements into our program guidelines and funding agreements. We have engaged First Nations members and advisers to our Advisory Panel and First Nations cultural advisers to help build our cultural capability.

In accordance with our General Funding Strategy, ARENA provides financial assistance for:

- research into and development of early-stage technologies that are world-leading or address specific Australian requirements
- demonstration of the feasibility of new technologies or supporting business models that are novel in application
- pre-commercial deployment of technologies where this is expected to improve the competitiveness of future projects.

Our **vision** is a prosperous Australia that is a renewable energy superpower in a net zero world.

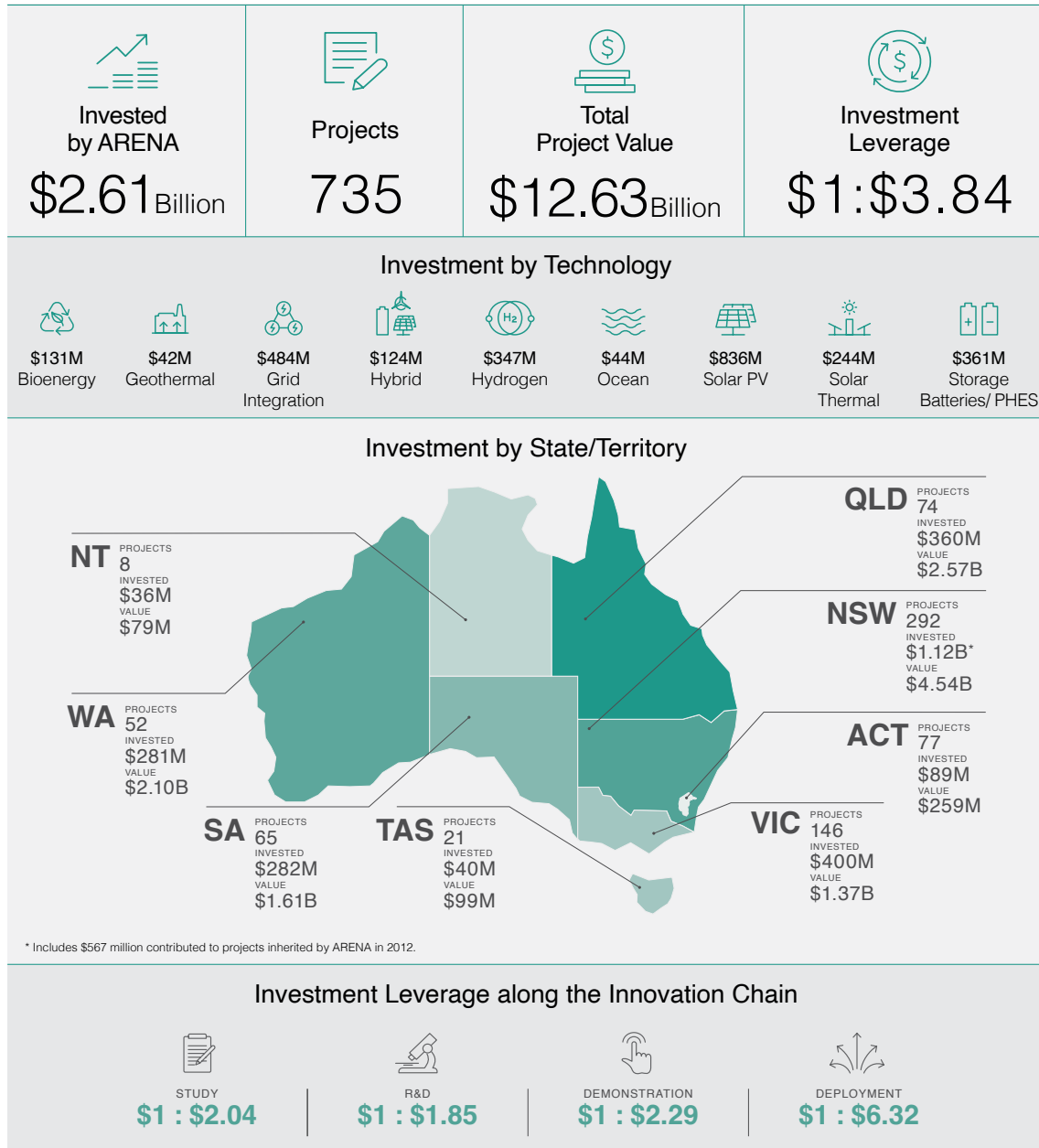
Our **mission** is to support the global transition to net zero emissions by accelerating the pace of pre-commercial innovation, to the benefit of Australia.

Our **purpose** is to support improvements in the competitiveness and supply of renewable energy and the uptake of energy efficiency and electrification by providing financial assistance and sharing knowledge, to accelerate innovation that benefits all Australians, and facilitates the achievement of Australia's greenhouse gas emissions targets.

The impact of our work is significant. Since 2012, we have been instrumental in building the foundation of the renewable energy ecosystem in Australia. ARENA has committed over **\$2.61** billion in grants to 735 renewable energy projects, with a total project value of **\$12.63** billion, meaning that for every dollar of Commonwealth funding third parties have invested **\$3.84**.

Figure 1 - ARENA at a Glance - funding commitments to projects 2012-2024

Key statistics 2012-2024

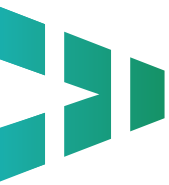


AS AT 30 JUNE 2024

Since October 2020, ARENA has received funding totalling almost \$12 billion in the form of baseline funding and specific budget measures. This total includes \$7.1 billion over 16 years provided to ARENA in the May 2024 Federal Budget, to target priority sectors including renewable hydrogen, green metals, low-carbon liquid fuels, and clean energy manufacturing. The additional funding to ARENA was committed through:

- a \$1.9 billion replenishment of ARENA’s baseline funding
- the \$1 billion Solar Sunshot program
- a \$2 billion second round of the Hydrogen Headstart program
- the \$500 million Battery Breakthrough Initiative
- the \$1.7 billion Future Made in Australia Innovation Fund.

For information on active funding programs visit arena.gov.au/funding



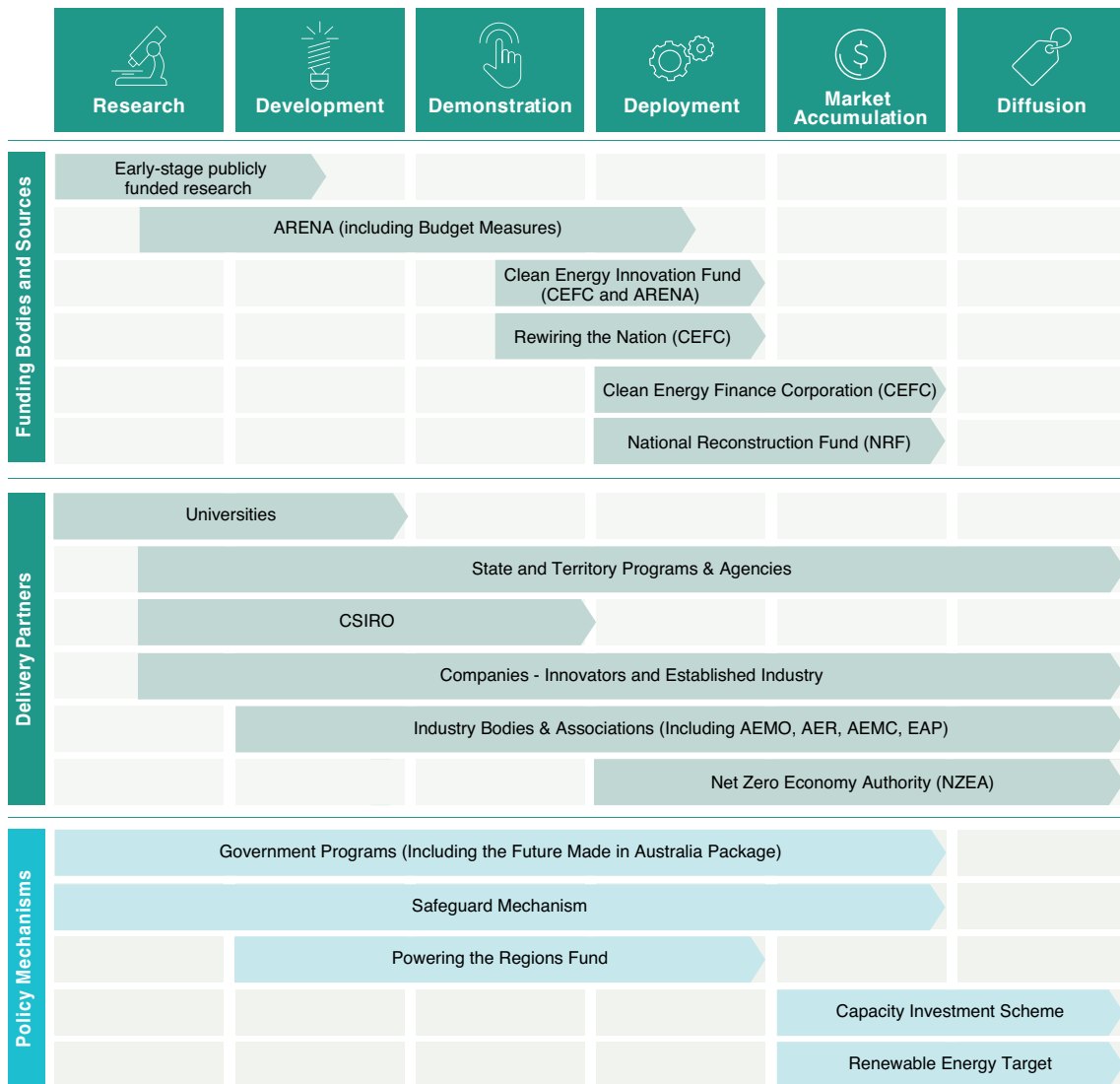
Our investment approach

How we make our funding decisions

ARENA is committed to achieving maximum impact and value from the projects we fund.

We provide funding for projects across the innovation chain, from research through to pre-commercial deployment. Our funding is focused on finding and demonstrating technology solutions and business models that reduce technical, commercial and regulatory barriers and improve Australia’s knowledge and expertise.

Figure 2 - Collaboration across the innovation chain



When making funding decisions, we carefully consider a project’s merit. A project must demonstrate that it is technically or commercially innovative, will advance market knowledge, has a pathway to commercialisation and can help unlock future investment.



Our funding programs

ARENA has a range of funding programs that support projects from research and development through to demonstration and deployment. The funding programs range from continuously open programs to those that are run periodically to target specific outcomes and types of projects. We also administer Budget Measures and support the Clean Energy Innovation Fund through our role on the Joint Investment Committee.

Visit arena.gov.au/funding for up-to-date information on the programs currently open for applications. You will also find information on the funding application process, funding guidelines and relevant timelines.

Our funding is provided as a grant. Where a proposal has the potential for significant commercial success, ARENA funding may include recoupment rights contingent upon future outcomes. We will provide further guidance to applicants on which type of funding is appropriate to your project.

Integrity

As a granting agency responsible for the allocation of Commonwealth funds, ARENA recognises that it is critical our processes and decision-making are fair, transparent, robust and defensible from an integrity perspective. To achieve this, when carrying out our activities we strive to conduct ourselves with the highest professional standards and in an ethical manner at all times. Consideration of integrity and probity has always been a key driver in our conduct of grant and other activities, with ARENA committed to its Integrity Framework, to ensure that ARENA and its workers adhere to the highest standards of accountability and integrity. ARENA is accountable to the Minister, the Parliament and the Australian public. We work transparently to ensure public funds are spent in a responsible and efficient manner.

See **Before applying for ARENA funding (page 17)** for more details.



Our strategic priorities



Our strategic priorities focus on the next phase of technology research, development, deployment and commercialisation needed to achieve net zero.

ARENA will:

- play a leading role in unlocking ultra low-cost solar, the most important renewable energy generation technology required to achieve the renewable energy superpower vision
- optimise the transition to an electricity system powered by variable renewables by unlocking new sources of flexible demand, improving the economics of energy storage and optimising the integration of large-scale renewable energy assets
- support the commercialisation of a viable renewable hydrogen industry in Australia by investing in renewable hydrogen production and delivery, and proving the viability of the most prospective end uses
- support the transition to low emissions metals focusing on the steel, aluminium and other critical energy mineral value chains
- focus on the development of transport decarbonisation pathways, including light and heavy road transport.

These priorities reflect our mission – to support the global transition to net zero emissions – by lowering the cost and increasing the availability of renewable energy; growing the share of renewables in the electricity mix; supporting fuel-switching, energy efficiency and electrification where possible; becoming more flexible about when we use electricity; and supporting the development of technology solutions for hard-to-abate sectors where a pathway to lower emissions is expensive or currently not feasible.

The strategic priorities are funded through our baseline funding and, where applicable, Budget Measure funding that aligns with these priorities. ARENA also delivers other Budget Measures that may extend beyond the scope of our strategic priorities.

For more details on our strategic priorities and Budget Measures please refer to the remainder of this document and visit arena.gov.au/funding

We deliver Budget Measures that align to ARENA's priorities and mandate. These programs include funding beyond our baseline funding and are delivered with targeted funding rounds or open programs designed and launched periodically. For information on active programs, how to apply, key dates and guidelines please visit arena.gov.au/funding.

ARENA works collaboratively with the Clean Energy Finance Corporation (CEFC) to administer the Clean Energy Innovation Fund (Innovation Fund). Virescent Ventures manages the Innovation Fund on behalf of the CEFC.

The Innovation Fund can provide equity finance for innovative clean energy businesses that support renewables, energy efficiency and low emission technologies. Funding from the Innovation Fund helps eligible projects and businesses get to the next stage of commercialisation. The Innovation Fund does not provide grants.

More information on the Innovation Fund is available at: cefc.com.au/innovationfund

Figure 3: Our purpose, priorities and key activities



Mission

to support the global transition to net zero emissions by accelerating the pace of pre-commercial innovation, to the benefit of Australia.

Purpose

To support improvements in the competitiveness and supply of renewable energy and the uptake of energy efficiency and electrification by providing financial assistance and sharing knowledge, to accelerate innovation that benefits all Australians, and facilitates the achievement of Australia's greenhouse gas emissions targets.

ARENA's Strategic Priorities and Focus Areas					
	Unlock ultra low-cost solar <ul style="list-style-type: none"> • Ultra Low-cost Solar 	Optimise the transition to renewable electricity <ul style="list-style-type: none"> • Flexible Demand • Energy Storage • Large-scale Integration 	Commercialise renewable hydrogen <ul style="list-style-type: none"> • Renewable Hydrogen 	Support the transition to low emissions metals <ul style="list-style-type: none"> • Steel Value Chain • Aluminium Value Chain • Critical Energy Minerals 	Decarbonise transport <ul style="list-style-type: none"> • Light Road Transport • Heavy Road Transport

Budget Measures	Solar Sunshot	Regional Microgrids Program	Hydrogen Headstart	National Industrial Transformation Program
	Battery Breakthrough Initiative	Community Batteries	Driving the Nation	Industrial Transformation Stream (Powering the Regions)
	Future Made In Australia Innovation Fund	Large Scale Battery Storage	Sustainable Aviation Fuel	

Key Activities

- **Provide financial assistance** to innovative projects that maximise emissions reduction impact and fit within our technology mandate
- **Manage our portfolio** of projects and programs to success
- **Share knowledge and insights** gained through ARENA-supported projects with governments, industry and relevant organisations

Delivering on our Purpose

Through our capabilities and cooperation, performance and risk management.

Unlock ultra low-cost solar

Demand for renewable electricity is expected to increase significantly as Australia moves towards net zero. Key drivers of this demand will be greater electrification of sectors such as transport and heavy industry, as well as the development of new industries such as hydrogen production.

Ultra low-cost solar photovoltaics (PV) is a critical source of electricity to meet this

demand and will be a crucial enabler of the energy transition.

Our focus

We are looking to unlock ultra low-cost solar (ULCS) to decarbonise our electricity system and improve the competitiveness of future industries such as renewable hydrogen and low emissions metals.

1/ Unlock ultra low-cost solar

ARENA's Solar 30-30-30 ambition is to achieve: 30% module efficiency at an installed cost of 30 cents per watt by 2030. If achieved, we expect to be able to achieve an LCOE of <\$20/MWh, which represents a reduction of two thirds compared to the cost of today's solar PV.

ULCS will also help us achieve our goal of accelerating deployment to reach 1 terawatt of installed solar PV in Australia by 2050.

<p>Improve cell and module efficiency and costs</p>	<p>Demonstrate solutions that can increase module efficiency towards 30% and beyond, increase module lifetimes and increase bifaciality factors.</p>
<p>Reduce Balance of Plant (BoP) and deployment costs</p>	<p>Demonstrate solutions that can reduce installed costs towards 30 cents per watt, such as simplified mounting, racking and tracking designs, prefabrication, improved installation methods (e.g. robotics, automation, advanced analytics and artificial intelligence) and other design innovations for Australian conditions.</p>
<p>Reduce Operations and Maintenance (O&M) costs</p>	<p>Demonstrate solutions that reduce O&M costs, such as panel cleaning, vegetation management and fault detection.</p>
<p>Reduce other costs and overcome barriers to scale-up</p>	<p>Demonstrate other solutions that can reduce the LCOE of solar PV through levers such as longer asset lifetimes, inverter efficiency, end-of-life management and soft costs.</p> <p>We are also open to working with applicants on capex optimisation, such as large developers, EPCs and offtakers. For example, using a standardised delivery model across multiple projects, and working with an ecosystem of partners who share risk, to increase productivity and reduce deployment costs over time.</p> <p>Through our Solar Sunshot Program, we are also looking at manufacturing projects that can improve the resilience of our solar PV supply chain and create economic opportunities.</p>

For more detail on the types of projects ARENA is prioritising for ultra low-cost solar and before applying, please visit arena.gov.au/funding and review the **Before applying for ARENA funding** section in this document.

Optimise the transition to renewable electricity

Australia's electricity system is rapidly evolving. Solar and wind are now the cheapest sources of new bulk electricity supply, and significant numbers of Australian households and businesses continue to install rooftop solar and other distributed energy technologies. Grid-scale innovations are also driving the transition, including increased use of grid-scale batteries.

New demand loads for green metals, manufacturing and fuel production, coupled with the electrification of transport and broader industry will create unprecedented demand for renewable energy over the next decade. We need to ensure the grid is equipped to support this additional demand and high penetration of renewables.

Further technical and commercial innovation, as well as market reforms, will be critical to ensure the electricity system can transition efficiently, reliably and cost-effectively.

Our focus

Our focus areas within this priority include:

- unlocking new flexible demand to reduce system balancing costs
- improving the economics of energy storage and increasing the diversity of technologies available to allow for low-cost firming of electricity and heat supply
- optimising the large-scale integration of new grid-scale renewable electricity to ensure secure and reliable operation at high levels of instantaneous renewables penetration.



1/ Unlock new flexible demand

Demonstrate the value and viability of flexible demand	Demonstrate novel load shifting and shedding technologies or business models. This could focus on industrial, commercial and residential settings, including managed charging of electric vehicles.
Improve the enablers of flexible demand	Inform the regulatory framework and standards relating to supporting infrastructure and system integration required to enable flexible demand. For example, IT and interoperability, dynamic operating envelopes, data and analytics, market signalling, business models and access to value streams.

Note: We have an impressive portfolio of Flexible Demand projects and expect to share valuable learnings as they progress. We will only be funding new projects if they are highly innovative and fill a gap in our existing portfolio.

2/ Improve the economics of energy storage

Accelerate commercialisation of large-scale LDES	Accelerate the commercialisation of longer-duration energy storage (LDES) technologies (especially those capable of providing electricity over 8+ hours) including thermal, electrochemical, and mechanical storage.
Accelerate battery innovation	Improve performance and/or reduce cost of novel battery chemistries and demonstrate innovative battery manufacturing pilots.
Demonstrate TES in industrial heat applications	Accelerate the commercialisation of thermal energy storage (TES) technologies for industrial heat.

Note: ARENA has provided significant grant funding to support the commercialisation of utility-scale lithium-ion battery storage and pumped hydro energy storage projects. Given the relative maturity of these technologies, as well as the emergence of new sources of private and public support, ARENA does not intend to provide further funding support for new projects in these areas.

3/ Optimise large-scale integration of renewable electricity

Ensure system security in a 100% renewables grid	Deliver innovative trials and/or studies to support and accelerate the transition to 100% renewable energy penetration.
Lower grid connection and transmission risks	Deliver innovative trials and/or studies in relation to the connection of new generation capacity to the grid and reducing transmission constraints.
Improve grid management and operations	Demonstrate novel technologies such as grid monitoring tools.

For more detail on the types of projects ARENA is prioritising for the transition to renewable electricity and before applying, please visit arena.gov.au/funding and review the **Before applying for ARENA funding** section in this document.

Commercialise renewable hydrogen

Renewable hydrogen is a decarbonisation solution for energy uses that are not well suited to electrification. It is produced from energy generated from renewable sources such as solar and wind. Hydrogen, and its derivatives such as ammonia, can be combusted to produce heat, used as a fuel in transport, used as a chemical feedstock, and stored and transported for long periods and distances.

ARENA's ambition is to support industry to find innovative solutions that can unlock a viable renewable hydrogen industry in Australia and realise our potential as an exporter of renewable hydrogen or zero emissions products in the long term. This will require innovation and support across the full hydrogen value chain, including firming renewable electricity, a step change in electrolyser technology, and rapid proving and scaling of hydrogen production and end uses.

Our focus

We are looking for innovative projects that prove the technical feasibility and commercial viability of technologies along the entire hydrogen value chain – production, transport, storage and end use.



1/ Create a viable renewable hydrogen industry

Reduce LCOH of renewable H2	Reduce the cost of renewable hydrogen production through technologies and commercial innovations that unlock increasing scale in hydrogen production, improve hydrogen production efficiency, and materially lower electrolyser capex and operating costs.
Reduce delivery cost of H2	Demonstrate technologies that address technical challenges along the rest of the hydrogen value chain, including storage, compression and transport (including for hydrogen carriers).
Demonstrate and scale use of renewable H2	Test the technical feasibility and commercial viability of renewable hydrogen use cases. This includes ammonia production, new industrial feedstock and energy applications, heavy vehicles and other modes of transport, and export.

For more detail on the types of projects ARENA is prioritising within renewable hydrogen and before applying, please visit arena.gov.au/funding and review the **Before applying for ARENA funding** section in this document.

Support the transition to low emission metals

Australia is a major global player in the steel, aluminium and critical energy mineral value chains, with mining and processing industries forming a significant part of our economy. These value chains are emissions intensive and will require significant innovation and effort to decarbonise.

With increasing global demand for low emissions materials and end products for the energy transition and growing economies, Australia faces both a challenge and an opportunity to meet that demand in a zero emissions way. ARENA will focus its effort on the following Australian value chains:

- steel: upstream iron ore mining and processing, domestic iron and steel making
- aluminium: alumina refining and aluminium smelting
- critical energy minerals (CEM): domestic processing.

Our focus

We are looking for high impact, incremental and innovative projects that evaluate and demonstrate the technical and commercial viability of technologies, processes and pathways that will support low emissions metals across the following priorities.

1/ Accelerate the transition to a low emissions steel value chain

Enable zero emissions mining	Enable zero emissions mining through the elimination of on-site fossil fuel usage and integration of renewable energy.
Decarbonise domestic steelmaking	Evaluate and demonstrate innovation in steelmaking processes, technologies and equipment for green steelmaking in Australia.
Secure the role of Australian iron ore in green steel value chains	Research, demonstrate and scale the use of Australian iron ore in green iron and steelmaking processes.

2/ Accelerate the transition to a low emissions aluminium value chain

Decarbonise alumina refining	Accelerate the transition to net zero alumina refining through the demonstration of zero carbon processing technologies.
Decarbonise aluminium smelting	Reduce onsite energy consumption and emissions.

3/ Support the development of low emissions critical energy mineral value chains

Support the development of low emissions critical energy mineral value chains	Evaluate and demonstrate innovative technology for zero emissions processing of ARENA priority CEMs*, including from end-of-life batteries.
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*ARENA's Priority CEMs are: Cobalt (including Cobalt Sulphate and pCAM), Copper, Graphite (including BAM), HPA (High Purity Alumina), Lithium (including in Hydroxide, Carbonate and Sulphide form), Manganese, Nickel (including Nickel Sulphate and pCAM), PGE (Platinum Group Elements), REE (Rare Earth Elements including in Oxide and Carbonate form), Silicon (Including Polysilicon) and Vanadium

For more detail on the types of projects ARENA is prioritising within low emissions metals and before applying, please visit arena.gov.au/funding and review the **Before applying for ARENA funding** section in this document.



Decarbonise transport

Transport plays a vital role as an enabler of Australia's economy. As the economy grows, demand across transport modes increases, with demand for transport projected to rise across land, air and sea until at least 2050. Transport is responsible for around 20% of Australia's emissions in 2024.

The diversity of transport use cases presents a decarbonisation challenge, with different viable pathways to net zero for each use case. Some

have relatively clearer pathways (e.g. light passenger vehicles) but face scaling challenges such as commercial models, infrastructure buildout and consumer perception. Others require significant earlier-stage technology innovation (e.g. long-distance trucking and aviation) before becoming viable.

Our focus

We are looking for high-impact, innovative projects across the following aspects of the Australian transport landscape.

1/ Accelerate the decarbonisation of light road transport

Develop a future-proof light vehicle charging ecosystem

Demonstrate technologies and business cases that reduce charging-related barriers to adoption.

2/ Accelerate the decarbonisation of heavy road transport

Decarbonise heavy road transport

Demonstrate technologies and business cases that accelerate adoption of zero-emissions heavy road vehicles.

For more detail on the types of projects ARENA is prioritising within transport and before applying, please visit arena.gov.au/funding and review the **Before applying for ARENA funding** section in this document.

Please note that ARENA's funding under this strategic priority will primarily be administered through the Driving the Nation program.



Before applying for ARENA funding



Before applying, applicants should:

- ✓ Check whether your project aligns with the funding program announcements on our website and review the current program guidelines at [arena.gov.au/funding](https://www.arena.gov.au/funding)
- ✓ Develop a plan to demonstrate that your project contributes to one of ARENA's strategic priorities or the objectives of a Budget Measure.
- ✓ Consider the potential knowledge value of your project, either to fill knowledge gaps or progress innovation in Australia.
- ✓ Assess where your project fits in the innovation chain to see if ARENA is the right place for you to seek funding.

If you've worked through these steps and want to apply for ARENA funding, get in touch via our website at www.arena.gov.au/contact

Further information is available
at arena.gov.au

Australian Renewable Energy Agency

To discuss potential for funding:

Phone +61 1800 804 838

Email proposals@arena.gov.au

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Learn more:



Images

Page 2: Hornsdale Power Reserve. Image credit: Neoen & stock image.

Page 3: Rio Tinto, Yarwun alumina refinery in Gladstone. Image credit: ARENA.

Page 5: Heliostat Field at RayGen's Solar Thermal Plant. Image credit: RayGen.

Page 8: Hornsdale Power Reserve. Image credit: Neoen.

Page 17: Vast Solar's CSP Pilot Plant in NSW. Image credit: Vast Solar.

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ARENA



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