NSW Climate Change Fund

Annual Report 2022-23

Acknowledgment of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.

We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander peoples to Country and acknowledge their continuing custodianship of the land, seas and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander peoples, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices, and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander peoples, families and communities, towards improved economic, social and cultural outcomes.

Artwork: Regeneration by Josie Rose

Contents

Sydney NSW 2000 · GPO Box 5469, Sydney NSW 2001 · www.treasury.nsw.gov.au

Executive summary

> ## Through the Climate Change Fund (CCF), the NSW Government continues to build resilience to the impacts of climate change, transition to a net zero future and protect the natural environment.

In 2022-23, the first year of the 8-year funding period, the CCF has laid the foundations for new programs and initiatives. These programs will help to decarbonise our economy, transition to a renewable energy system and support communities and businesses to mitigate and adapt to a changing climate.

The CCF has invested $39.5 million to take action on climate change this year, driving toward our goal to reach net zero emissions. We have also invested more than $160.2 million to help communities increase their resilience to the impacts of climate change.

We invested $39.1 million to help households, businesses and communities benefit from clean energy and $8.2 million on programs which provide energy bill relief for households and businesses by promoting energy efficiency.

The NSW Government, through the CCF, continues to collaborate, partner and respond to the needs of households, businesses and communities. It is supporting the technologies and innovations that will deliver cleaner, more reliable and affordable energy while protecting our environment, natural heritage and some of our most important biodiversity.

The NSW Government is determined to meet our commitment of net zero by 2050 and the CCF paves the way to achieve this.

NSW Government

Section **2**

About the CCF

> The CCF was established in 2007 under Part 6A of the *Energy and Utilities Administration Act 1987* to address the impacts of climate change, encourage energy and water saving activities and increase public awareness and acceptance of the importance of climate change.

The Minister for Energy and the Minister for Climate Change has statutory responsibility for the fund. This responsibility includes approving payments to the fund, allocating funding to programs and reporting annually to parliament on the fund's performance.

The CCF achieves its objectives through a range of programs delivered across government, primarily through the Department of Planning and Environment (DPE) and the Treasury Cluster - Office of Energy and Climate Change.

In 2022-23, the CCF was in NSW Treasury, and the Environment and Heritage Group in DPE administered the fund for NSW Treasury under a service partnership agreement.

The CCF Administration Committee is an Advisory Committee established under Part 6A Division 5 of the Act. The purpose of the Committee is to administer the CCF on behalf of the Minister, with representatives from the Office of Energy and Climate Change, NSW Treasury and DPE. The Committee meets regularly to monitor the fund and its programs.

The purposes of the fund as stated in section 34F of the Act are:

a. to provide funding to reduce greenhouse gas emissions, and the impacts of climate change associated with water and energy activities

b. to provide funding to encourage water and energy savings and the recycling of water

c. to provide funding to reduce the demand for water and energy, including addressing peak demand for energy

d. to provide funding to stimulate investment in innovative water, and energy savings measures

e. to provide funding to increase public awareness and acceptance of the importance of climate change and water and energy savings measures

f. to provide funding for contributions made by the state for the purposes of national energy regulation.

NSW Government

2022-23 highlights

NSW DPE, Jamie Plaza Van Roon

Here are some highlights achieved with support from the CCF

The CCF has supported our community to:

- test drive electric vehicles (EV), with 6,000 test drives in metropolitan and regional NSW

- prepare strata apartment buildings to be EV ready, providing guidance material and webinars to help owners prepare for an EV future

- collaborate with government on the transition to innovative and/or dispatchable renewable energy by co-funding regional community energy projects. These will unlock 17.2 MW in electricity generation and up to 17.9 MW of energy storage.

The CCF has supported businesses to:

- transition fleet vehicles to EVs by co-funding the uptake of around 2,000 vehicles and the installation of 1,200 smart chargers

- stimulate clean technology innovation by providing $15.9 million for projects to support the development and commercialisation of low emission technologies, especially in industries where the technology does not exist

- decarbonise by investing in submetering, options to replace gas-fired heating, skills development through the Net Zero Emissions Leadership Accelerator and in industry projects within the high emitting industries

- research clean energy solutions and remove barriers for NSW primary industries to respond to climate change. This included engaging 3,400 farmers across 7 projects, publishing 34 research reports and undertaking 20 pilot projects.
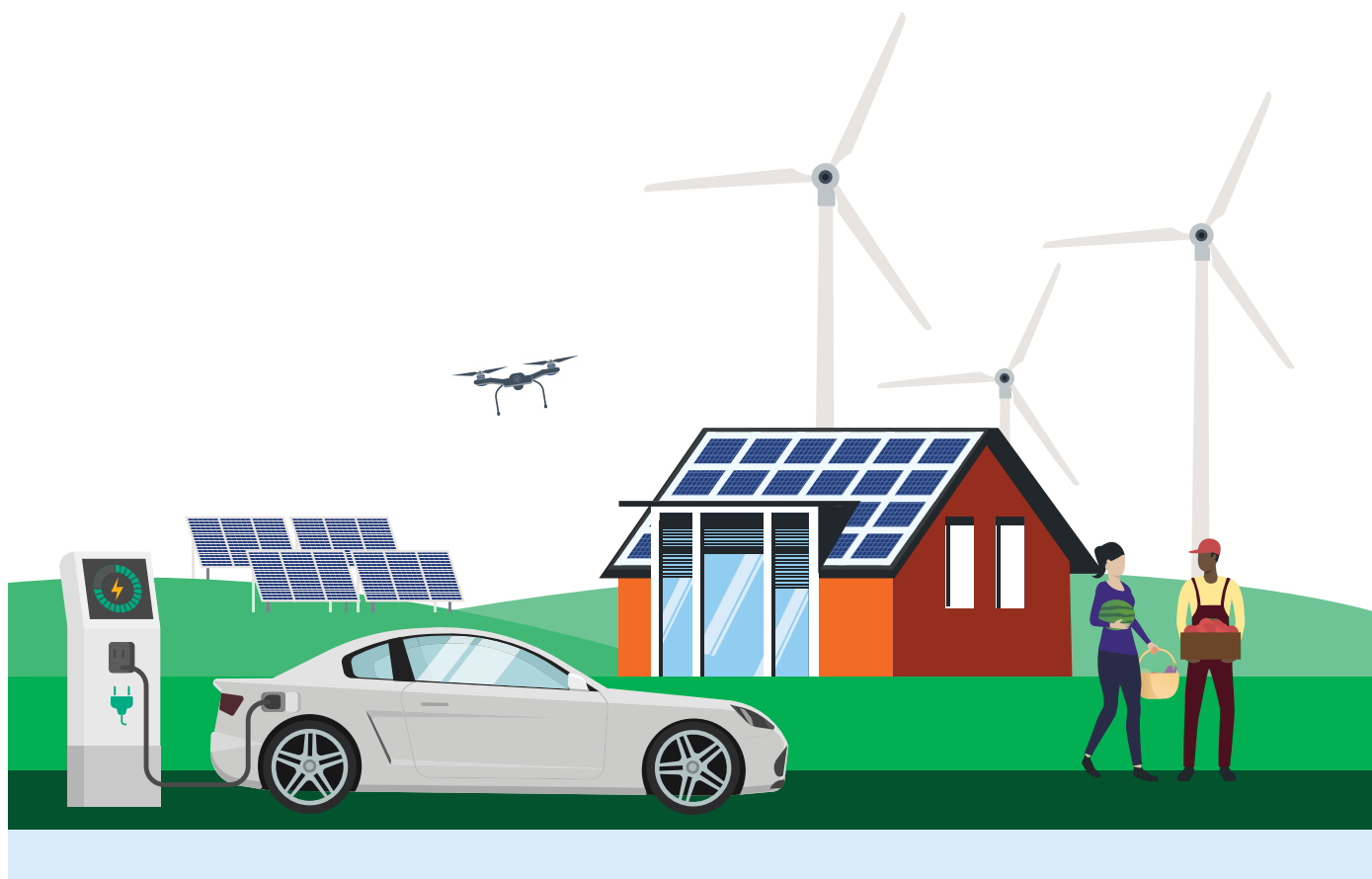
The CCF has supported NSW local government and government agencies to:

- install 77,800 MWh of solar generation on NSW public buildings, saving $12.3 million annually on energy bills and exceeding the Government Resource Efficiency Policy solar generation target of 55,000 MWh
- assess 2,000 schools across NSW for their suitability for solar and battery systems
- embed net zero managers in Joint Organisations, investing $1.4 million and partnering with 70 regional and 33 metropolitan councils
- manage flood risks by investing just under $10 million across 65 new projects
- develop and implement coastal management plans across the state, with 95% of the 56 coastal councils actively involved.

The CCF has supported our environment and biodiversity by:

- continuing to deliver on the Electricity Infrastructure Roadmap, which will unlock up to $32 billion in private investment to 2030. This is expected to save consumers $10.6 billion over the next 20 years
- awarding contracts that will invest more than $2.5 billion in NSW's renewable energy infrastructure including large scale, dispatchable electricity storage
- adding 33,000 ha to the national parks system and conserving an additional 226,240 ha through conservation agreements with 420 landholders
- implementing new air quality modelling systems and upgrading to high-performance computing facilities for enhanced air quality forecasting capability
- achieving the goal to plant over 1 million trees, helping to reduce urban heat and cool Greater Sydney
- supporting Aboriginal communities to conduct cultural burns, exceeding the annual target by 25%.

Challenges of 2022-23

The 3 biggest contributors to program delays in 2022-23 were recruitment issues related to the worldwide shortage of labour, natural disasters and supply chain issues. These affected all of NSW, but had particular impacts on the delivery of CCF programs.

Over 70% of program delays were due to issues with recruitment, presenting our most significant challenge this financial year. Similarly, there were delays in developing external partnerships and delivering projects due to staff shortages within external organisations.

NSW experienced unprecedented flooding conditions in 2022 which affected many households and caused devastation across the state. Widespread flooding slowed the progress of existing projects where sites were inaccessible for many months. These works had to be rescheduled and completed later. Damaged infrastructure needed to be rebuilt or restored at multiple locations. Some program staff were redeployed to assist in emergency response efforts.

Many programs were affected by international supply chain issues and increased materials costs. Changing global and domestic conditions impacted some CCF programs, which were unable to source products and complete installation works on time.

These restrictions presented a challenge to operations and delivery of CCF programs in the last financial year. Contractors were rearranged and project schedules and agreements readjusted so that programs can continue to operate and deliver.

Throughout 2022-23, the CCF remained focussed on building a clean energy future and making energy more affordable. The CCF will continue to work together with partners to build community resilience to the impacts of climate change and protect the environment of NSW.

NSW Government

Building a clean energy future

The NSW Government is building a clean energy, low carbon future with significant investment in NSW energy infrastructure.

The CCF has been working with industry and the community to advance clean and emerging technologies, increase the uptake of electric vehicles and accelerate the preparation of residential and commercial buildings to achieve net zero.

The CCF has invested in the development of large-scale electricity and storage projects and worked closely with regional communities to create community-led renewable energy projects. This investment will continue to help households, businesses and the community reduce their emissions and save on energy costs. It will also ensure that the NSW energy system is secure, reliable and always on.

The programs in this section promote one or more purposes of the Act as stated in 34F (a), (c), (d) and (e). The CCF funds programs to:

a. reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities

c. reduce the demand for water and energy, including addressing peak demand for energy

d. stimulate investment in innovative water and energy savings measures

e. increase public awareness and acceptance of the importance of climate change and water and energy savings measures.

This section highlights the best examples of how the CCF has contributed to building a clean energy future in NSW.

5.1 NSW Electricity Infrastructure Roadmap

The Electricity Infrastructure Roadmap (the Roadmap) is a legislated plan to transform the electricity sector into one that is cheap, clean and reliable.

It is enabled by the *Electricity Infrastructure Investment Act 2020* (EII Act) and focused on the whole of NSW's energy infrastructure including delivering:

• at least 12 GW of renewable energy generation (such as solar and wind) by 2030

• at least 2 GW of long duration storage by 2030 to meet the reliability standard

• at least 5 Renewable Energy Zones plus priority transmission infrastructure projects

• firming as required to meet the Energy Security Target and the reliability standard.

When released, the Roadmap was expected to support up to $32 billion in investment in regional energy infrastructure to 2030. The CCF's contribution to Roadmap outcomes predominantly supports critical agency staffing and operations.

LEGEND

⬚ Renewable Energy Zones — Existing Network
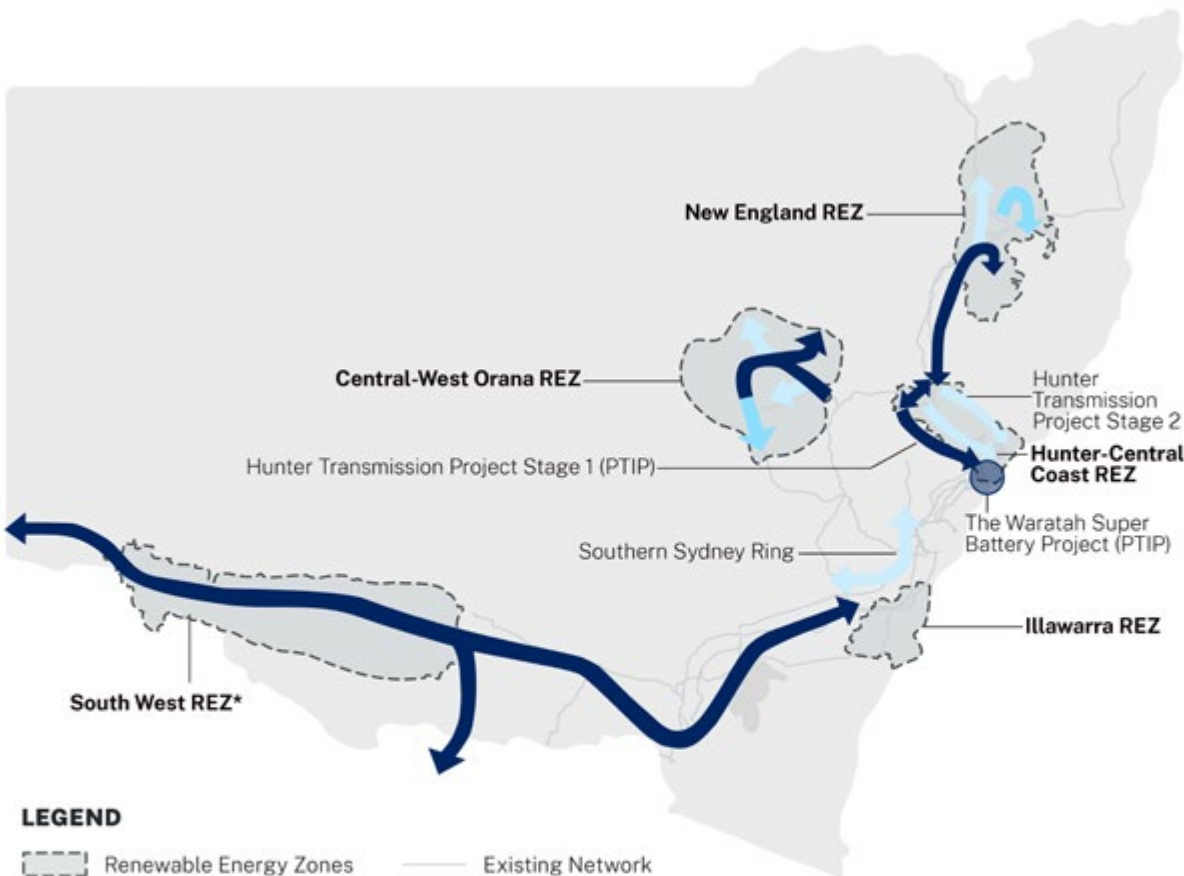
Deliver now

Secure now

Plan for the future

*Network infrastructure delivered through Transgrid's ISP projects EnergyConnect, HumeLink and VNI West
Reference map of NSW network infrastructure and REZs

5.1 NSW Electricity Infrastructure Roadmap

$2.5 billion worth of renewable generation projects will contribute 1.4 GW of energy and storage

Key achievements

- Published NSW Electricity Infrastructure Jobs Advocate findings on employment, training and workforce development within Renewable Energy Zones, alongside infrastructure that fosters export opportunities for generation, storage and network technology.

- Published NSW Renewable Energy Sector Board's Plan providing recommendations for the cost-effective construction of generation, storage and network infrastructure.

- Announced projects for new generation and long duration storage Long Term Energy Service Agreements in May 2023.

- Secured Waratah Super Battery planning approval, with construction now underway. This will be the largest battery, by capacity, in the southern hemisphere. It is due to be completed before the potential closure of the Eraring Power Station in 2025.

- Released EnergyCo's Network Infrastructure Strategy, which is a 20-year blueprint to build new poles and wires to connect the 5 Renewable Energy Zones and deliver power to the consumers who need it.

Key data

- $32 billion in private investment to 2030 will be unlocked.

- $10.6 billion (net present value) in expected savings for consumers over the next 20 years.

- 5 Renewable Energy Zones to be delivered.

- 3 renewable generation projects were awarded Long-Term Energy Services Agreements. Along with 1 long-duration storage lithium-ion battery project, these are worth $2.5 billion of investment and will contribute 1.4 GW of renewable energy generation and storage in NSW.

5.2 Transport Consumer Information and Electric Vehicle Fleets Incentive

The Transport Consumer Information initiatives help consumers make sustainable transport choices. The initiatives aim to lower vehicle emissions and accelerate the uptake of electric vehicles (EVs) in NSW by offering credible, independent information, resources and tools to guide consumers' vehicle purchase and use decisions.

The Electric Vehicle Fleets Incentive supports fleet operators to procure EVs.

Key achievements

- Launched the Vehicle Emissions Offset Scheme in partnership with Service NSW and Transport NSW. This scheme enables road users to offset their vehicle's average emissions when they renew their registration.

- Completed the Vehicle Emissions Star Rating (VESR) design phase which allows consumers to compare the vehicle tailpipe emissions of light vehicles on NSW roads. The website build has commenced and is due for public release by the end of 2023.

- Supported the uptake of around 2,000 EV fleet vehicles and the installation of 1,200 smart chargers, as of June 2023, with an expected increase from the third round of the EV Fleet Incentive.

- Developed and delivered capacity building modules to support fleet operators in preparing vehicle transition plans and charging infrastructure strategies.

NRMA Drive Days showcase EV capability

Key data

- In 2021, the team partnered with NRMA to deliver 8 multi-day EV test drive events across regional and metropolitan NSW. The agreement aimed to deliver 75-150 people per day, or 2,200 attendees in total. The scheme was extended, and as of 30 June 2023, 5,000 test drives have been undertaken by 3,000 drivers over 18 event days.

- In its first 5 months, the Vehicle Emissions Offset Scheme (VEOS) collected over $96,000 worth of voluntary carbon offset contributions from more than 2,500 NSW vehicle owners.

- The uptake rate for VEOS has been tracking at over 0.015%, which is higher than the anticipated 0.01% uptake rate similar offset schemes report.

- Under VEOS, vehicle owners have the option of choosing to voluntarily offset any amount between $5 and $200. The average offset amount was $38 per transaction, which is much higher than expected.

- Contributions received to date will abate more than 2,000 tonnes of CO_2 through the purchase and retirement of Australian Carbon Credit Units (ACCUs).

- Additionally, engagement with the VEOS information pages has been positive, with over 8,800 web visits as of 30 June 2023. This visitation has been on par, and in some cases has exceeded the viewing statistics of many of the existing Net Zero Transport pages over the same period.

🔖 **Case study**

Road trip to Broken Hill proves EV range is no barrier

'Range anxiety', or the fear of running out of battery power and being stranded, has long been a significant perceived barrier to the widespread adoption of electric vehicles (EVs). To address this concern and promote the benefits of EVs, the NRMA, in partnership with the NSW Government, organised an EV Drive Day in Broken Hill.

The EV Drive Day in Broken Hill was part of a series of 14 similar events designed to showcase the capabilities of EVs and demonstrate that long-distance travel with EVs is achievable with the right charging infrastructure. The events were held across NSW and brought together some of the largest EV and accessory producers in Australia for curious members of the public. Over 3,500 people attended the events, with 2,550 people experiencing first-hand what it's like to drive an EV.

After travelling 1,127 km over 2 days with charging stops in Lithgow, Bathurst, Orange, Cobar and Wilcannia, the event in Broken Hill was a pivotal milestone in delivering EV test drives to NSW regions. It demonstrated long distance EV travel in remote areas was possible today, and would become the norm in the future, as the EV charging network expands across NSW.

The EV Drive Day itself gave attendees the opportunity to test drive various EV models, with the feedback overwhelmingly positive.

One test driver stated that they were 'really impressed; considering the roads out here can be a little bit bumpy, the car was really quite smooth to drive around town'.

Industry experts and representatives from the NSW Government were present to provide information on EV incentives and initiatives, addressing questions about the future of EVs in NSW.

Lani Kirby, NRMA Community Manager, and project lead on the EV Test Drive Day highlighted that supporting the transition to EVs has positioned NRMA at the forefront of providing advice and EV experiences for NSW residents. By allowing members to touch, feel and experience an EV, they can see firsthand what it's like to drive one. The results have been encouraging, with 35% of participants stating they are less worried about the driving range of EV's.

By showcasing the ability of EVs to travel long distances with appropriate charging infrastructure, the NRMA and the NSW Government have played a crucial role in advancing the transition to sustainable transportation. With ongoing efforts and education initiatives such as the EV Drive Days, range anxiety can continue to be alleviated, accelerating the widespread adoption of EVs.

The NRMA Drive Day in Broken Hill showed how EVs perform in rural areas

5.3 **Making Buildings EV Ready**
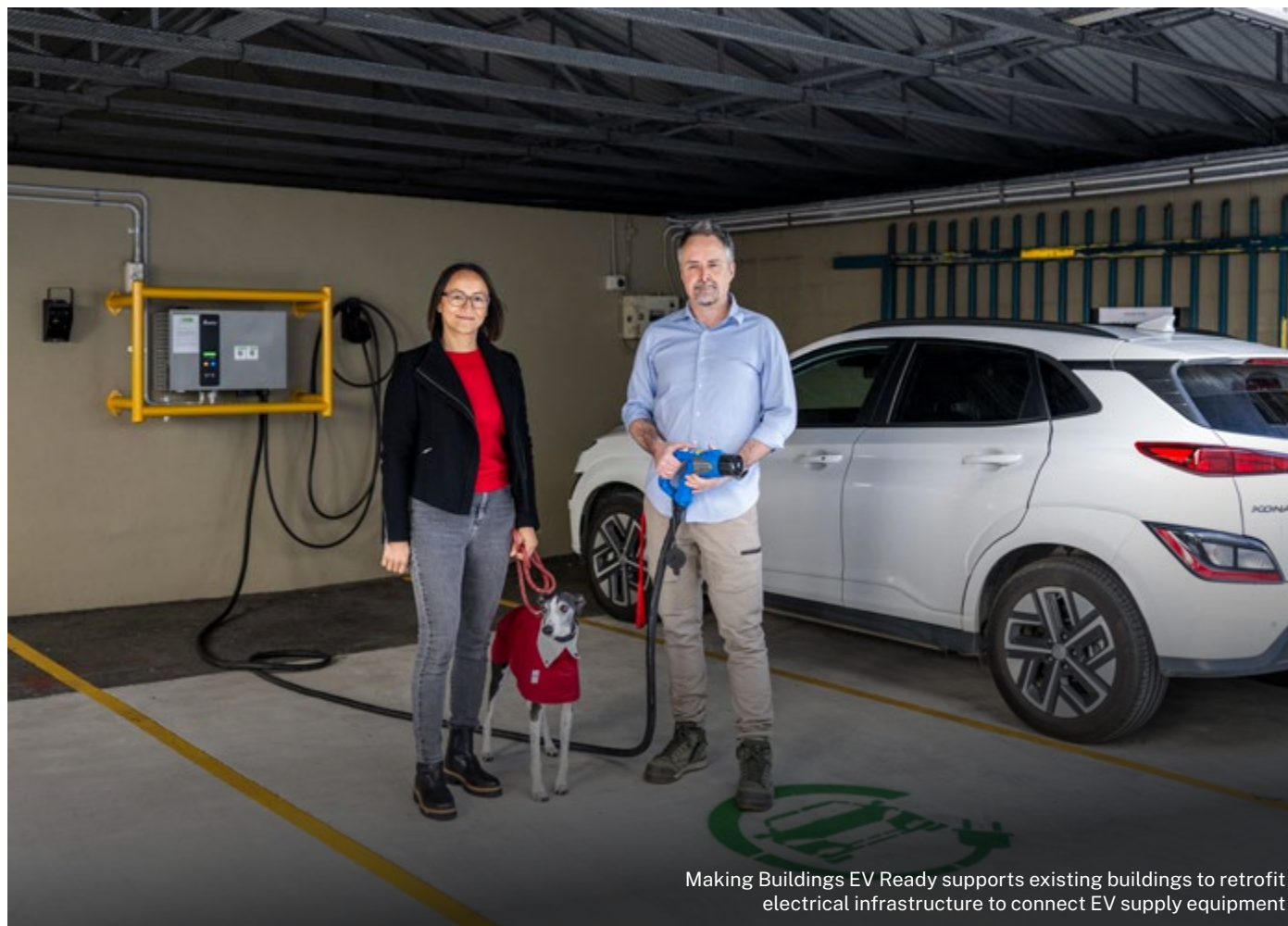
NSW Government

Making Buildings EV Ready supports existing buildings to retrofit electrical infrastructure to connect EV supply equipment

The Making Buildings EV Ready program provides guidance materials on upgrading multi-tenanted residential and commercial buildings to be EV ready.

The program supports existing buildings to retrofit electrical infrastructure required to connect the supply equipment needed to charge a vehicle. It involves identifying the building's maximum electricity demand, the number of charging points that may be installed (now and in the future), the likely costs, funding sources, and any approvals that need to be granted.

Key achievements

- Co-funded 2 strata apartment buildings to become EV ready.

- Released Commercial Building and Residential Building guidance materials which attracted over 16,000 views.

- Published templates for letters, surveys and building assessments to support building owners on the journey to making their building EV ready.

- Developed and released an EV charging costing tool and reference material to help building owners understand the cost of retrofitting EV infrastructure in buildings.

- Delivered a series of webinars on EV readiness for building owners.

- Developed EV fire safety precautions and best practice recommendations.

5.4 **Emerging Energy**
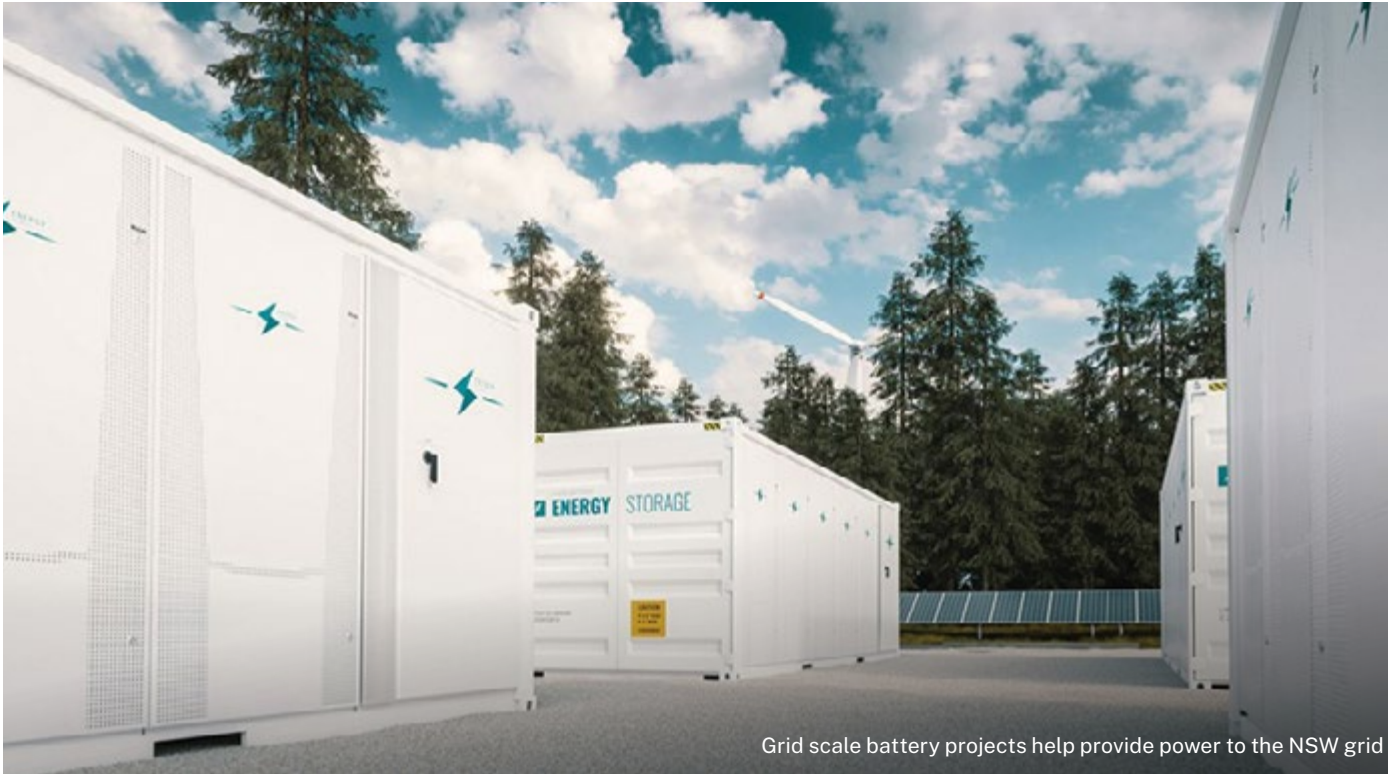
Grid scale battery projects help provide power to the NSW grid

The Emerging Energy program offers grant funding to support the development and commercialisation of large scale, dispatchable electricity storage projects across NSW. Dispatchable electricity is power that is available on-demand and which can be turned on or off.

The program supports projects at varying stages of development and aims to reduce investment barriers for emerging technologies, supporting affordable, reliable and clean energy across NSW.

Key achievements

- Supported the completion of 4 pre-investment study projects, through the program's knowledge sharing component. An additional 3 projects are due for completion in 2023.

- Supported the construction of 2 operational capital projects, now providing firm, reliable power to the NSW grid. Projects include:

  – 50 MW large-scale lithium battery known as the 'Wallgrove Grid Battery' project. This is the first grid scale battery in NSW and provides the use of synthetic inertia as a network service to support security of the grid

  – 25 MW 'Darlington Point Energy Storage System' battery project, the second grid scale battery operating in NSW.

Key data

- $10.5 million awarded to 9 pre-investment study projects for pre-feasibility works.

- $54.4 million awarded to support 6 capital projects.

5.5 Clean Technology Innovation

Clean Technology Innovation funded the Clean Energy Living Lab at the University of Wollongong to study the viability of energy microgrids
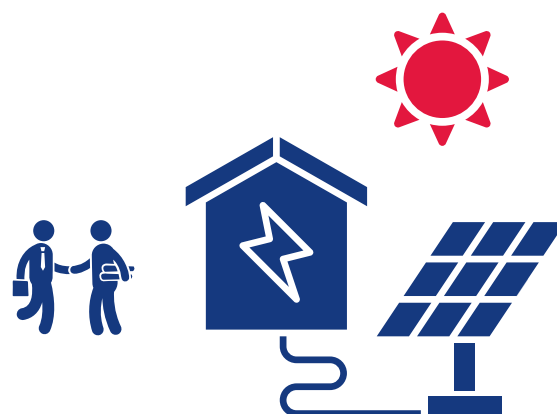
The [Clean Technology Innovation program](#) supports research, development, ecosystem and commercialisation of low emission technologies, especially in industries where they do not exist.

The program currently supports 12 projects with a total project value of $41.9 million, consisting of $26 million contributed by project sponsors and $15.9 million from the Clean Technology Innovation grant fund.

Key achievements

- Supported 12 projects with a total of $15.9 million from the fund. These included:
  - $5.3 million across 5 climate tech accelerator programs which aim to support over 4,000 start-ups
  - $4.9 million towards climate tech enabling infrastructure research projects
  - $5.8 million for commercial pilots and demonstration projects.
- Launched and delivered the first ClimateTech Acceleration program with 15 climate tech start-ups participating. This accelerator is designed to elevate researchers' understanding of commercial pathways and realise potential markets for their project.

Key data

- $26 million of private investment secured.
- $1.64 in co-investment for every $1 allocated by the program.

25% of projects are based in regional NSW

5.6 Accelerating Net Zero Buildings

The Accelerating Net Zero Buildings program aims to accelerate the transition of buildings in NSW towards net zero emissions. By verifying the performance of a building through the National Australian Built Environment Rating System (NABERS), building owners can work to improve performance, saving energy costs and reducing emissions.

The program collaborates with industry to promote and verify lower embodied carbon buildings, increase the supply of low emissions building materials and improve construction practices. Embodied emissions are the greenhouse gas emissions associated with the physical parts of a building during its lifetime.

Key achievements

- Engaged widely with industry to design the principles behind the NABERS Embodied Carbon rating tool.
- Increased participation in the Energy Starters stream, which helps owners of existing buildings in the early stages of their energy efficiency and sustainability journey. Increased participation of new sectors, such as residential aged care and retirement living, and warehouse and cold stores.
- Increased participation in the New Buildings stream, which provides incentives for developments to commit to high energy performance through NABERS Commitment Agreements.

Key data

- 200 individuals from 140 organisations consulted on the NABERS Embodied Carbon rating tool.
- 85% of participants stated they are 'likely' or 'very likely' to support the NABERS Embodied Carbon methodology.
- 65% increase in participation in Energy Starters stream.
- 65 Assessors and 115 industry professionals informed about Energy Starters grant opportunities.
- 50% increase in applications for the New Buildings stream with 4 buildings committing to high energy performance.

The Energy Starters stream helps building owners starting on their energy efficiency journey
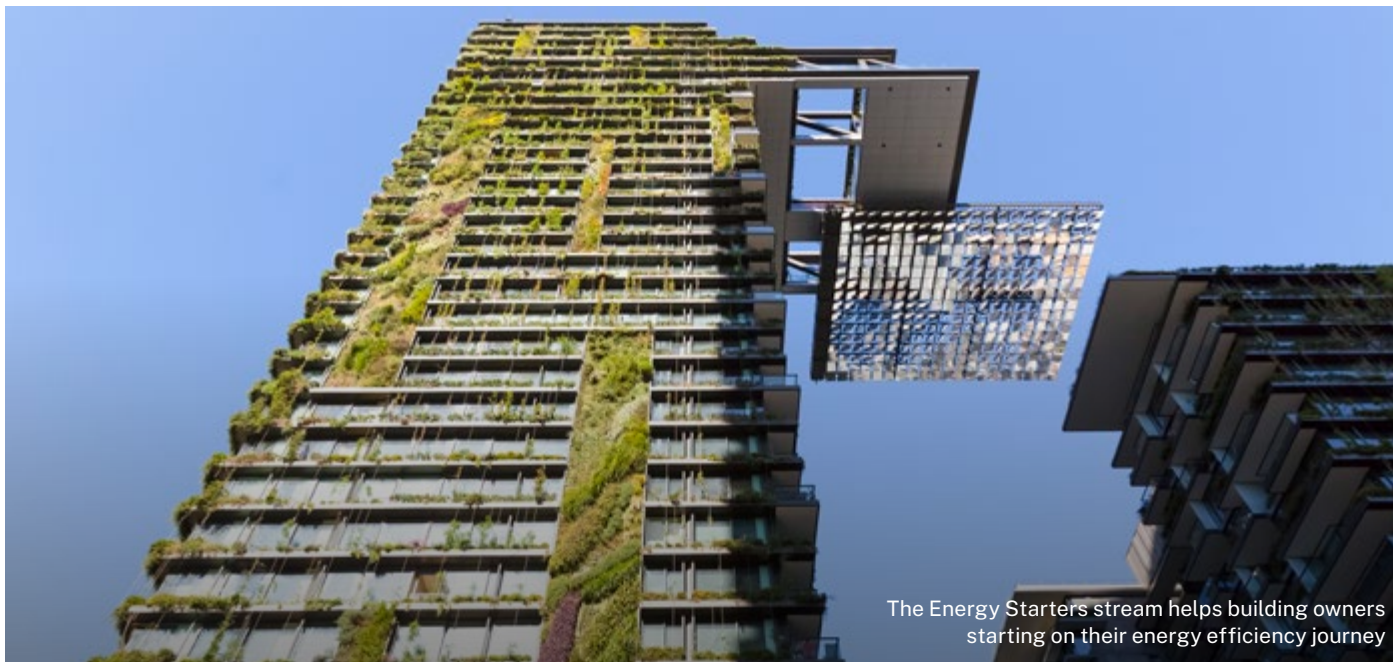
5.7 Smart Batteries for Key Government Buildings

The Smart Batteries for Key Government Buildings initiative supports the installation of battery storage at schools, hospitals and other government buildings with rooftop solar systems.

Key achievements

- Supported a range of innovative battery storage pilot projects in collaboration with Property NSW, NSW Health and the Department of Education. These projects will result in the installation of 24 batteries and more than 3,000 kWH of storage capacity.

The program will install 24 batteries at schools to store renewable energy

5.8 Liddell Response

The new Tallawarra Power Station provides consumers with continued access to affordable and reliable power

EnergyAustralia

> The Liddell Response program was initiated following the announcement of the closure of the Liddell Power Station. The power station closed in April 2023.

This program helps secure the NSW energy system by part-funding the development of a gas-fired open cycle power station at Tallawarra. The power station will have a capacity of at least 300 MW. Tallawarra B is a fast start gas-fired power station in Yallah and will be Australia's first peaking power station to be powered by a blend of gas and green hydrogen with direct emissions offset. The new power plant will help ensure NSW energy consumers have continued access to affordable and reliable power following the closure of the Liddell Power Station.

Key achievements

- Installed the gas turbine and generator, considered the largest 'internal combustion engine' in Australia.
- Approved for the installation of the Plume Dispersion Device.
- Kept the project on track despite one of the engineering, procurement and construction contractors entering into voluntary administration.
- Identified a land parcel to accommodate the electrolyser required to meet the green hydrogen requirements for the project.

5.9 Regional Community Energy Fund

The Regional Community Energy Fund provides grants to community energy projects that create innovative and/or dispatchable renewable energy and benefit the local community.

The program has been designed to increase renewable energy generation, improve energy reliability and help communities save money on electricity bills. Projects being funded by the Regional Community Energy Fund require the community group to invest at least 50% of the project cost.

Key achievements

- Commenced commissioning the Byron Bay Solar Farm, which is expected to be operational in 2023.
- Began constructing large-scale community-owned solar and battery projects in Goulburn and Orange.
- On track to deliver the Haystacks project at the Grong Grong Solar Farm, the first solar garden in NSW.
- Latitude Solar Farm in Boggabilla is ready for commissioning.

Key data

- $15.4 million has been awarded in grants.
- 7 projects will be delivered, including 4 solar farms and 3 battery systems.
- 17.2 MW in electricity generation will be unlocked.
- Up to 17.9 MW (39.3 MWh) of energy storage will be supplied.
- $36 million in private investment has been leveraged.
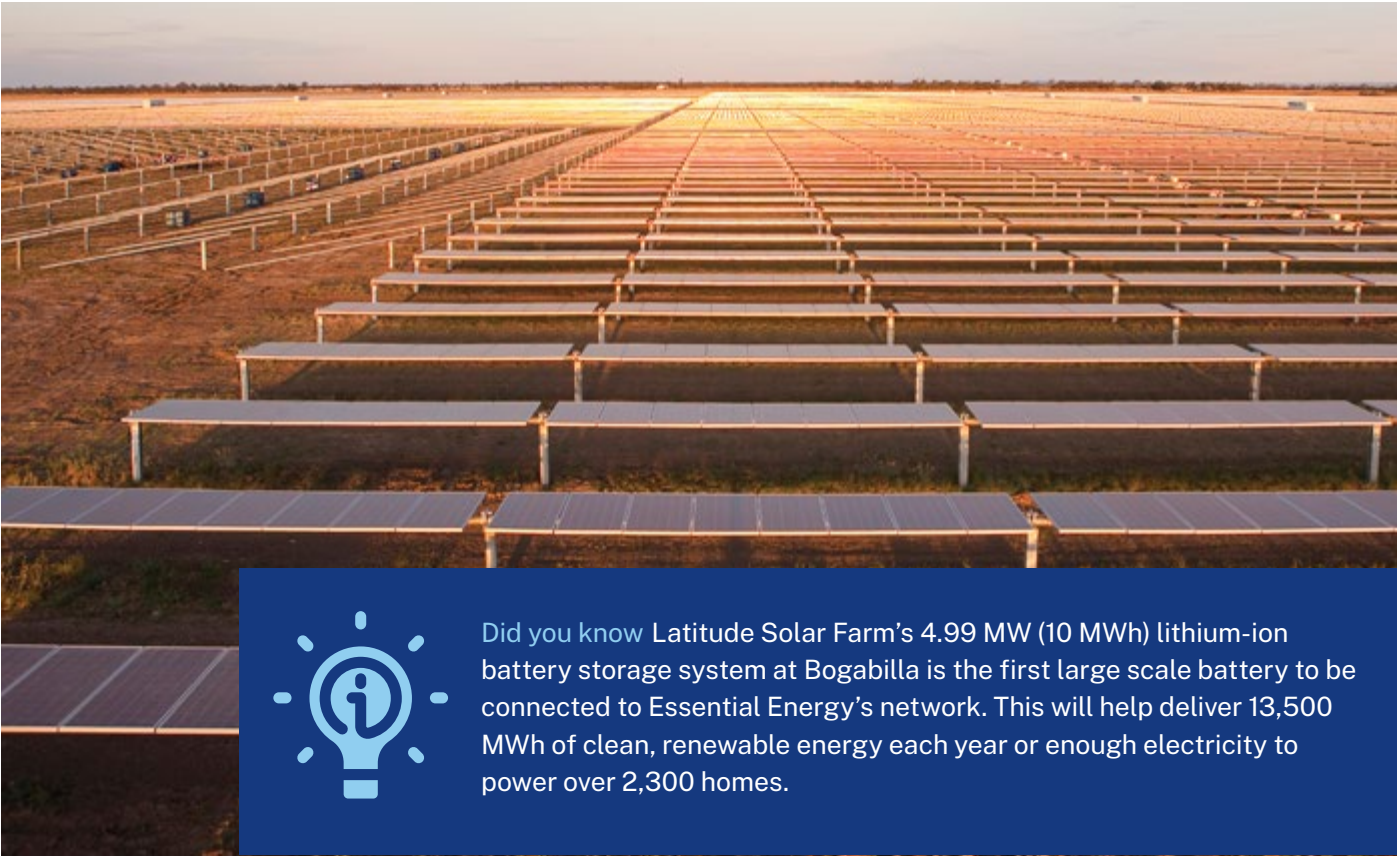
Did you know Latitude Solar Farm's 4.99 MW (10 MWh) lithium-ion battery storage system at Bogabilla is the first large scale battery to be connected to Essential Energy's network. This will help deliver 13,500 MWh of clean, renewable energy each year or enough electricity to power over 2,300 homes.

Making energy more affordable

NSW Government

The CCF has supported NSW households to purchase solar and battery systems for their homes.

It has also supported farmers to identify and invest in clean energy solutions to tackle rising energy costs through efficiency and technology, and to improve access to carbon markets.

The CCF has supported businesses to decarbonise and reduce their energy costs including in net zero skills development, measuring and monitoring tools, such as submetering, and new technology assessments for the manufacturing sector. It has also partnered with over 100 councils to fast-track their move towards net zero.

The programs in this section promote one or more purposes of the Act as stated in 34F (a), (b) and (c). The CCF funds programs to:

a. reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities

b. encourage water and energy savings and the recycling of water

c. reduce the demand for water and energy, including addressing peak demand for energy.

This section highlights the best examples of how the CCF has helped make energy more affordable in NSW.

6.1 Sustainable Councils

> Sustainable Councils builds capacity, provides technical resources and delivers expert advice for NSW councils to reduce their carbon emissions and transition towards net zero.

This year, the program launched the Joint Organisation Net Zero Acceleration initiative. Through this $1.4 million pilot grant, net zero managers have been embedded in 9 Joint Organisations for 12 months to accelerate net zero outcomes for regional councils. There are 68 member councils benefiting from this capacity-building grant, expanding the Sustainable Councils program to 70% of regional NSW councils.

Key achievements

- Designed, consulted and launched the $1.4 million Joint Organisation Net Zero Acceleration initiative to embed net zero managers in regional Joint Organisations.

- Expanded the Sustainable Councils program to over 100 councils and 9 Joint Organisations.

- Developed and launched tools to help councils reduce energy consumption and achieve net zero swimming pools and net zero water treatment plants.

- Developed and launched a Power Purchase Agreement Guide for NSW councils in partnership with Business Renewables Centre Australia. The guide provides an accessible resource on best practice off-site renewable energy procurement.

- Continued to provide the Kinesis Community Emissions Net Zero app which empowers 33 metropolitan councils to assess net zero strategies, and aids informed investments and decision-making. All Greater Sydney councils now share consistent data, analysis tools and methodology, to help state and regional leaders curtail emissions.

- Partnered with Local Government NSW to host webinars to build understanding of guidelines and tools including Power Purchasing Agreements, Net Zero Pools, Revolving Energy Funds and Electric Vehicle (EV) charging site selection.

- Conducted EV charging feasibility studies for 60% of regional councils, preparing them to install destination and fast charging in their regions and providing the technical aspects for their Destination Charging Grant applications.

Key data

- 9 new net zero manager roles created to support regional councils in accelerating action towards net zero.

- 341 EV charging site suitability assessments conducted across 58 regional councils.

- 10 Emission Reduction Plans developed, to guide the actions of councils towards net zero this year. The program has now developed 50 plans.

- 6 webinars were hosted on the topics: swimming pools and aquatic centres, mid-scale solar photovoltaic, electric vehicles, water treatment plants, revolving energy fund, and power purchase agreements, totalling about 400 council attendees.

- 2 toolkits launched on net zero pools, and wastewater recycling and sewage treatments plants.

- 12 regional councils received comprehensive energy tariff reviews and assessments.

Sustainable Councils expanded the Sustainable Councils program to over 100 councils and 9 Joint Organisations

ChargeWorks

🔖 **Case study**

Collaborating to secure renewable energy for local councils

For many years, councils in Central NSW have grappled with short-term electricity contracts, leading to uncertainties in energy costs. This left the councils vulnerable to market fluctuations and compelled them to seek a long-term solution to support renewable energy sources.

The Central NSW Joint Organisation (CNSWJO) took a proactive approach to address their energy needs. The 11 councils within the CNSWJO joined forces with 5 councils from the Eastern Riverina region to secure a renewable energy deal with Iberdrola Australia for their combined electricity consumption of 36GWh a year.

The 8-year renewable energy contract will see councils in the Central NSW region source 78% renewable energy for their large sites and streetlighting from the Bodangora Wind Farm near Wellington, NSW. This initial arrangement provides the councils with a strong foundation for sustainable energy practices. Moreover, they have the flexibility to transition to the Flyers Creek Wind Farm near Blayney when it becomes operational, further solidifying their commitment to renewable energy sources.

For CNSWJO member Bathurst Regional Council, the arrangement has had a significant impact on their operational energy emissions. The renewable energy deal reduced council's emissions by 4,280 tonnes of CO_2e, contributing to an overall 52% reduction in their operational energy emissions since 2018-19.

The renewable energy deal aligns with CNSWJO's commitment to accelerate the transition towards a net zero carbon future and the partnership's commitment to renewable energy is set to make a substantial impact. By securing a long-term renewable energy deal, the councils have reduced annual greenhouse gas emissions by over 20,000 tonnes of CO_2e, which is equal to electricity use for over 5,800 homes in NSW. In just the first 6 months, the renewable energy deal has saved the group $2.3 million compared to a conventional electricity contract. This bold step exemplifies their dedication to combat climate change and create a sustainable future for their communities.

With funding support from the NSW Government and councils, this project is now supporting renewable energy projects in the region. As they continue their journey towards net zero, the councils set an inspiring example for other communities and regions to emulate in their pursuit of a cleaner and greener future.

Iberdrola Australia

Central NSW councils source renewable energy from the Bodangora Wind Farm near Wellington

Actions by councils

Data from 3 Joint Organisations

$1,000,000
invested in council projects

$1.3 million
annual energy tariff savings identified or implemented

Adopted

Riverina and Murray Joint Organisation Regional Energy Strategy

Adopted

Riverina Eastern Regional Organisation of Councils Net Zero Acceleration Plan

Adopted

Central NSW Emissions Reduction Plan

Completed

10 Council Emission Reduction Plans & Lithgow Renewable Action Plan

In progress

11 Council Fleet Transition Plans

$1.22 million
grants awarded

$11.95 million
in grant funding applications

Over $730,000
annual energy bill savings from implemented projects by 3 Joint Organisations
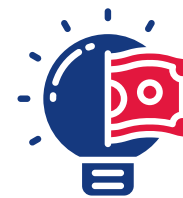
20,000 t greenhouse gas
savings from regional renewable energy Power Purchase Agreement

663 MWh
savings from upgrades

With access to the Net Zero App,
19 Greater Sydney councils
have now set Net Zero targets

NET ZERO

6.2 **Empowering Homes**

The Empowering Homes program helped over 700 homes to install renewable energy technologies

The Empowering Homes program offered no-interest loans to people with a household income of up to $180,000 per year to purchase a home battery, or solar and battery system.

The program was piloted across 24 Local Government Areas. Following an evaluation, the pilot was closed to new applications in July 2022. The evaluation found there had been a significant shift in the market since the pilot was launched and a government backed no-interest loan was no longer needed. Unspent funds have been redirected to new programs that will support energy efficiency upgrades for low-income households.

Key achievements

- Supported 721 NSW households to install renewable energy technologies, including 498 solar and battery systems and 223 battery systems.

- Contributed to 6.8 MWh of installed battery capacity and 3.5 MW of new installed solar capacity.

- Unlocked a total of $11.9 million in private investment for clean energy solutions.

6.3   **Sustainable Homes**

> The Sustainable Homes program aims to improve the energy performance and accelerate demand for sustainable homes.

The program assists householders to identify the most cost-effective energy upgrades for their homes. It also aims to prepare the market to respond to policy and market shifts that support the transition to sustainable homes in NSW.

Key achievements

- Developed and commenced implementation of the Residential Energy Performance Baseline project, which aims to measure the current average energy performance of NSW homes built before 2004.

- Continued to collaborate with the Commonwealth and other jurisdictions to inform the delivery of Nationwide House Energy Rating Scheme (NatHERS) for existing homes, the National Disclosure Framework and the National Framework for minimum energy efficiency rental standards.

- Implemented the pilot baseline project with 26 householders engaged across 5 Local Government Areas.

- Prepared a literature review to support a demand-side strategy approach to Net Zero Buildings. The findings will inform the broader government strategy addressing energy demand with internal collaboration and external sector co-ordinated engagement.

NSW Government

The Sustainable Homes program helps householders identify the most cost effective energy upgrades

6.4 Primary Industries Climate Change Research Strategy

The research strategy helped determine the impacts of different land and livestock management actions on greenhouse gas emissions
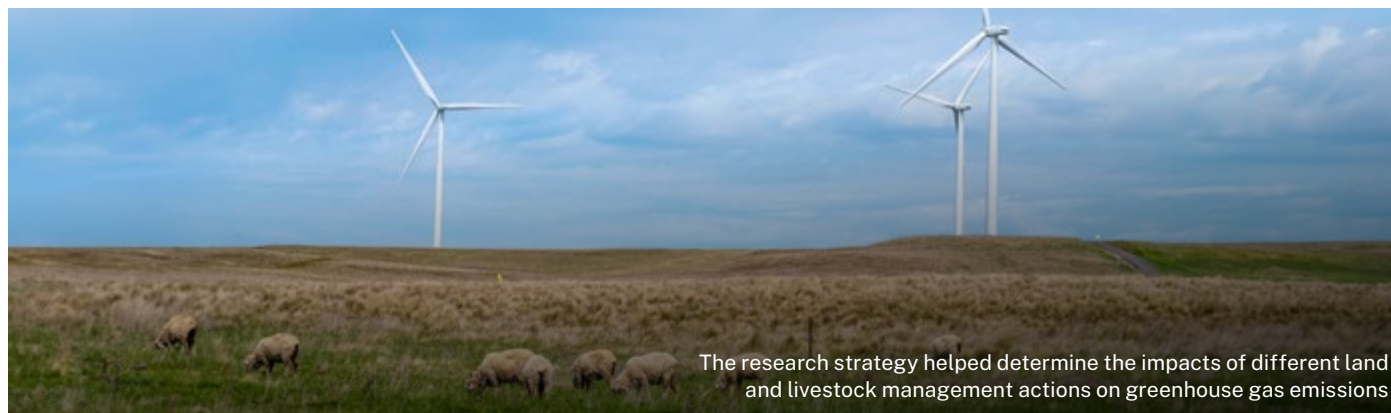
Delivered by the NSW Department of Primary Industries, the Climate Change Research Strategy investigated energy supply and demand solutions, carbon markets and emissions reduction opportunities, as well as climate risks across multiple primary industries and potential adaptation options. The program finished in June 2023.

Key achievements

- Produced a suite of 'farmer stories' and case studies on adaptation actions and technology solutions being adopted by farmers across NSW.
- Developed case studies from the Energy Pilots, which helped farmers understand and choose renewable energy solutions.
- Delivered the Carbon Farming Opportunities tool, which enables farmers to explore the sequestration potential for 3 Emissions Reduction Fund methods in NSW.
- Undertook biophysical modelling to assess the effectiveness of alternative climate change mitigation strategies for cropping systems.
- Developed an online Biomass Spatial and Modular Assessment of Resources Tool to assist planning of biomass energy projects.
- Conducted field days on climate resilience and biomass tree crop opportunities.
- Engaged industry and government on the Vulnerability Assessment results, which assessed the impact of climate change on 14 biosecurity risks and 24 related commodities.

Key data

The following data sums up the 5-year program:

- 3,400 farmers have been engaged across the 7 projects.
- 34 research reports supporting innovation and removal of barriers for NSW primary industries to respond to climate change.
- 20 pilot projects were delivered with video case studies.
- 19 farmer stories were developed to illustrate climate adaptation and resilience.
- 290,000 readers of articles related to carbon opportunities were written for 'The Conversation'.
- 65,000 maps were developed to help industry interpret climate impacts.
- 6,000 model runs helped determine the potential impact of different land and livestock management actions on greenhouse gas emissions.

🔖 **Case study**

Powering Rosnay Organic with renewable energy

Rosnay Organic experienced a transformative change when it embraced renewable energy. The winery was the first in NSW agriculture to install a grid connect hybrid system as a result of the Department of Primary Industries (DPI) on-farm energy efficiency grant program. It is comprised of a 30 kW solar array and a 40 kWh Redflow battery in a 3-phase configuration. Unlike farms with single-phase rural power supply, this eliminates the need for expensive upgrades.

The farm also installed an innovative Virtual Energy Network (VEN) which facilitates energy sharing between sites, creating a peer-to-peer energy trading system with other farms that could be hundreds of kilometres away. This interconnectedness fosters cooperation, reduces energy waste and maximises the use of renewable energy resources.

Rosnay Organic owner, Sam Statham explains that another benefit of the VEN is that the data it provides gives him better knowledge of what the farm is doing. Sam can see the daily, weekly or monthly usage patterns through a phone or computer and use this information to reduce reliance on outside energy. Additionally, the VEN's potential to benefit from escalating power prices ensures the system saves money in the long run.

The farm's shift towards renewable energy was driven by the vulnerability of their existing energy supply. The farm had also experienced droughts and bushfires, so the need for a reliable, sustainable and cost-effective energy solution was urgent.

The farm's renewable energy system initially projected a payback period of around 12 years. However, with rising energy prices, increased diesel costs, and enhanced production within the farm's operations, the team now expects payback much sooner.

Sam shares that implementing the renewable energy system has not only reduced carbon emissions and energy costs, but has enhanced energy efficiency and productivity on the farm. Sam and his team are now looking into how they can use the power from the winery to power the irrigation pumps at the vines.

By partnering with DPI, Rosnay Organic have successfully harnessed solar energy, implemented cutting-edge battery technology and embraced peer-to-peer energy trading. The farm has demonstrated that renewable energy solutions can revolutionise farming practices, making them more sustainable, efficient and productive. As more farms embrace renewable energy, the agricultural sector takes a significant stride towards a greener and more sustainable future.

> "This farm can be an independent, self-reliant organism almost, producing its own power, but still part of a grid community, just like our farm's part of the society."

Grow Love Project

Sam Statham with his old diesel PTO generator that has been replaced with solar battery storage

6.5 **Business Decarbonisation**

The Business Decarbonisation program worked with 56 organisations to develop net zero pathways

> This 5-year program helps businesses plan for net zero, make low-cost improvements and take practical steps to shift towards net zero emissions.

The program also aims to upskill and grow the workforce to meet demand for low emissions products and services.

Key achievements

- Launched the Metering and Monitoring Planning program, which is part of the $12 million metering package.

- In collaboration with the Sustainability Advantage program, worked with 56 organisations to develop net zero pathways which outlined opportunities for energy efficiency, renewable energy and other initiatives that these organisations could implement to achieve net zero emissions.

- Delivered the heat pump pilots, which evaluated the merits of replacing organisations' gas-fired heating with heat pumps. 10 organisations participated in the pre-screening stage with 3 participants completing detailed technical feasibility studies.

Richard Morton, Group Financial Controller at Konica Minolta, has provided his key takeaways from participating in the net zero pathways pilot:

"Through the net zero pathway process we have developed a plan that helps us to prioritise our efforts and to progress the investments required to reduce greenhouse gas emissions in a way that is aligned with our business objectives."

6.6 **Safeguard Acceleration**

The Safeguard Acceleration program supports the expansion of the Energy Security Safeguard (Safeguard). The program helps grow the Safeguard by stimulating new and underused activities in the market.

The Energy Security Safeguard is a set of schemes that aim to make the energy system more reliable, affordable, and sustainable. The Safeguard creates financial incentives to deliver cost-effective energy savings, reduce peak demand, and increase the production of green hydrogen. Safeguard Acceleration is designed to accelerate the uptake of new opportunities under the Peak Demand Reduction Scheme and Energy Savings Scheme.

Key achievements

- Approved funding for 60 submetering grants, as part of the $12 million metering package in collaboration with the Business Decarbonisation program.
- Delivered a detailed outcomes report, engaging with 110 stakeholders regarding the expansion of the Safeguard.
- Delivered a training pilot and investigated a new approach to simplify measurement and verification under the Safeguard.
- Surveyed participants of the Safeguard to understand the costs for participating in and administering the Energy Savings Scheme. This allowed a baseline for evaluating the impact of the Safeguard Acceleration program.

The Safeguard Acceleration program surveyed customers of the Energy Savings Scheme to help better understand the costs of participation

Working together for NSW

Through the CCF, NSW government agencies are working collaboratively to deliver energy efficiency, on-site renewable generation and storage at scale. They've also developed net zero pathways for priority health and government precincts.

The CCF is helping progress the green hydrogen industry. It is working with industry to deliver the first 2 hydrogen hub funding agreements.

The CCF has supported programs to remove barriers and incentivise the business community and NSW land sector to decarbonise through skills development, access to carbon markets and support of clean technology to improve efficiency and lower emissions.

The programs in this section promote one or more purposes of the Act as stated in 34F (a), (d) and (e). The CCF funds programs to:

a. reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities

d. stimulate investment in innovative water and energy savings measures

e. increase public awareness and acceptance of the importance of climate change and water and energy savings measures.

This section highlights the best examples of how we are working together for NSW.

7.1 Sustainable Government

Sustainable Government focuses on projects that impact at scale to deliver resource efficiency, net zero emission pathways and renewable energy generation on government-owned assets.

Key achievements

- Developed a net zero diagnostic tool to help government agencies improve their capacity to deliver sustainability outcomes.

- Piloted NSW Health's first NABERS ratings for hospitals, simplifying energy and water savings benchmarking and improving access to finance.

- Released the first tender for Renewable Energy development with Crown Land NSW to add approximately 950 MW of solar energy in the supply network.

- Partnered with School Infrastructure NSW to assess schools across NSW for their suitability for solar and battery systems.

- Worked with priority health agencies and government precincts to complete net zero pathway strategies.

- Exceeded the Government Resource Efficiency Policy solar target of 55,000 MWh per year by 41%. Agencies are now working to an expanded target of 126,000 MWh annually by 2024.

- Commissioned the first inventory of NSW Government Scope 3 emissions, which shows 70% of NSW Government carbon emissions come from the government operations supply chain.

- Completed carbon emissions footprint for the Northern Sydney Local Health District, Central Coast Local Health District and the Sydney Children's Hospitals Network.

- Completed NSW Health's first whole-life carbon assessment and developed a process brief for quantifying upfront and embodied carbon emissions in new hospital buildings.

Key data

- 77,800 MWh of solar generation installed on NSW public buildings, saving $12.3 million annually on energy bills.

- Energy audits completed for TAFE, Fire and Rescue, and Police.

- Smart energy infrastructure portfolio-wide projects developed for 3 government agencies.

- Electrification feasibility study completed for hospitals and community health facilities in the Hunter New England District.

- 5 net zero pathways completed with priority health agencies and government precincts.

- 2,000 schools were assessed for solar and battery systems, identifying an annual saving of 63,750 MWh which is equivalent to powering Sydney Opera House for 4 years and saving $15 million in cost. 35,500 tonnes of CO_2e will also be saved in the first year, which is equivalent to electricity use for over 10,000 households in NSW.

The Sustainable Government team is working with NSW Health to achieve its first ever NABERS Energy and Water ratings across 75 hospitals from Western NSW, Hunter New England and Nepean Blue Mountains Local Health Districts.

🔖 **Case study**

Achieving large-scale renewable energy impact in NSW schools

Solar energy systems like this one at Kingswood Public School can be fantastic learning opportunities for students

School Infrastructure NSW

With over 2,200 public schools in NSW, School Infrastructure NSW (SINSW) identified an opportunity for cost and energy savings through the large-scale deployment of small-scale on-site solar and battery storage.

Public schools across the state have already installed more than 17 MW of solar energy systems, capable of generating enough energy to power 3,000 NSW homes. These systems have the potential to be fantastic learning opportunities for students. Real-time data monitoring portals will be used in classrooms to engage students with what's happening on their school roof, putting their maths, electrical engineering and sustainability skills into practice.

As energy systems transform and technology improves, there is even more of an opportunity for schools to become part of the energy transition. SINSW recognised this opportunity but needed to determine the best way to generate cost-effective renewable energy at each site.

The Sustainable Government program, in the Office of Energy and Climate Change, supports NSW Government departments to achieve their net zero emissions goals. With access to a panel of solar and battery experts, the Sustainable Government team undertook a desktop assessment of the optimal solar and battery energy system sizes for 2,000 schools across NSW.

The assessments included determining the ideal solar energy and battery storage system size for each school to allow for maximum energy savings, return on investment and environmental benefit for the

NSW Department of Education. The potential savings identified are substantial and the Office of Energy and Climate Change have recognised that applying similar thinking to all government assets and roof space could make a significant contribution to the state meeting its overall targets.

SINSW has included the portfolio-wide assessments in an Expression of Interest (EOI) process, which is seeking proposals from the private sector to finance, install and operate renewable energy technology across all NSW public schools.

"The opportunity to take a portfolio view, aggregating many small-scale systems to achieve large-scale impact demonstrates the leadership and ambition of the NSW Department of Education. Working collaboratively with the Sustainable Government program and SINSW has been one of the many reasons why the desktop assessment has been so successful. It's a great demonstration of how government agencies can lead the way in the transition to net zero emissions," says Prema Govender, Manager, Sustainable Government.

This process is the largest 'behind-the-meter' procurement exercise of its type in Australia. The results of the EOI will also provide insight into how solar and battery energy storage systems could be best delivered across other government assets.

7.2 **Hydrogen Strategy**

The NSW Hydrogen Strategy sets out the state's vision for a green hydrogen industry. The strategy is the framework that unlocks $3 billion in incentives and provides a pathway to achieve green hydrogen production under $2.80 per kilogram by 2030.

Key achievements

- The first 2 hydrogen hubs funding agreements were executed and will provide 22 MW of electrolyser capacity by 2025, increasing to 760 MW of potential electrolyser capacity by 2030.

- Assessed 8 applications for the Hume Hydrogen Highway initiative and began negotiating with the preferred applicant. The initiative is the first stage of an east coast hydrogen refuelling network. It will deliver the 4 refuelling stations and 25 hydrogen-powered trucks, providing the first step towards a stretch target of 10,000 hydrogen vehicles by 2030.

- Continued work on the NSW Hydrogen Infrastructure Masterplan and the Green Ammonia Market study to provide an evidence base for policy and investment decisions.

- Participated in the national hydrogen standards and legal framework reviews and mapped NSW regulations to ensure safe production, storage, handling, distribution and use.

- Launched the Green Hydrogen Electricity Concessions, which equate to $1.5 billion in incentives for potential green hydrogen producers and represents a cost reduction of around $2/kg.

- Secured hosting rights for the inaugural Asia-Pacific Hydrogen 2023 Summit and Exhibition, October 2023, Sydney.

The NSW Government has awarded $64.3 million in funding to develop green hydrogen hubs in the Illawarra and Moree. These 2 funded projects will produce green hydrogen and support the decarbonisation of hard-to-abate markets, such as transport and agricultural sectors. The hubs are due to begin operating in 2025.

7.3 Net Zero Emissions and Clean Economy Board

The Net Zero Emissions and Clean Economy Board was established in December 2021 to advise the NSW Government on the implementation of the Net Zero Plan. The Board advises on programs and policies developed to support the transition to a net zero economy, opportunities for further emissions reductions and strategies to support existing industries to decarbonise.

Key achievements

- The Board met 10 times between July 2022 and June 2023. The minutes from each meeting are available on the Board's website.

- The Board provided advice on the NSW Government's key net zero programs and initiatives, including the:

  - Hydrogen Hub initiative
  - Hume Hydrogen Highway initiative
  - Net Zero Industry and Innovation program
  - Business Decarbonisation program

  - Primary Industries Productivity and Abatement program
  - NSW Safeguard Acceleration program
  - Electric Vehicles program.

- Meeting agendas also included items on emerging and thematic issues to facilitate discussion about opportunities for emissions reduction in NSW.

EnergyCo

The Board advises on programs and policies to support NSW's transition to net zero

7.4 Sustainability Advantage

[Sustainability Advantage](#) supports medium and large organisations to achieve better business success by adopting sustainable practices and goals. Impact at scale is achieved by supporting good practice, catalysing collaborations, building capacity and strengthening leadership.

Sustainability Advantage accelerates transformation by acting as a broker, utilising the convening power of government to bring key players together. They supported stakeholders to solve complex sustainability challenges and co-develop and share solutions with other partners. Sustainability Advantage works with a network of 800 partners to boost commitment and action to achieve or exceed net zero emissions targets, circular economy, nature restoration and the United Nations Sustainable Development Goals.

De Bortoli Wines

Sustainability Advantage recognised De Bortoli Wines as their first platinum partner for their commitment to being a zero waste wine company, as demonstrated at their facility at Bilbul

7.4 **Sustainability Advantage**

Key achievements

- Implemented and progressed scope 1, 2 and 3 projects to reduce emissions. Projects included renewable energy, energy efficiency, product improvements and materials optimisation.

- Delivered the second Net Zero Emissions Leadership Accelerator with 20 organisations, increasing their skills and capacity to deliver net zero emissions in their organisations. A total of 45 organisations have now completed the Accelerator.

- Delivered an additional 20 Net Zero Emissions Pathways which supported organisations to develop a transition pathway. Over 60 Net Zero Emissions Pathways have been developed since the initiative commenced.

- Recognised the first Sustainability Advantage Platinum Partner, De Bortoli Wines, acknowledging their sustained environmental achievements, commitment to innovation and outstanding leadership.

- Developed and launched Partnering with Nature, an interactive web-based tool to help organisations understand their relationship with nature and develop an action plan to improve their organisation's resilience.

- Developed a baseline to map progress on the Sustainable Development Goals for the Hunter region, through the Sustainable Development Goals Taskforce. This initiative identified and collated 124 data sets across 54 indicators agreed meaningful for the region. The initiative will enable ongoing monitoring and trend analysis of environmental, social and economic performance to inform better decision making, helping the Hunter region to be more resilient and prosperous.

Key data

- 115 projects delivered with member organisations to accelerate action in net zero emissions, circular economy, nature positive and the UN Sustainability Development Goals.

- 42 organisations recognised through the Sustainability Advantage Recognition Scheme for verified sustainability achievements.

- Evaluation of the Net Zero Emissions Leaders Accelerator and the Net Zero Pathways revealed:
  - 93% of participants were equipped with knowledge, skills and resources to implement net zero emissions commitments and pathways
  - 93% of participants were very motivated to implement net zero projects in their organisation. Reasons for this included: having a support network, an opportunity to share learnings and experiences, sessions with engaging and motivational speakers, and participants were simultaneously working on a relevant project
  - 56% of participants were investing more than $1 million each in net zero emissions reductions.

Did you know that since 2016, Sustainability Advantage has partnered with the University of Cambridge's Institute for Sustainability Leadership to support executive and practitioner participation in leadership programs. In addition, Sustainability Advantage partnered with Cambridge to develop a Positive Impact Leaders capacity building program for senior government executives. Delivered to 40 delegates across a wide range of clusters, this intensive program helped participants understand how sustainability drives business outcomes and increased the strategic capacity of participants to steer the sustainability agenda.

🔖 **Case study**

Collaboration is key to Port Authority's prize-winning plan for net zero

Port Authority of NSW has embarked on an ambitious, sector-leading net zero emissions journey. As a Sustainability Advantage Bronze Partner, they have worked with Sustainability Advantage to create an award-winning Sustainability Plan that has, in turn, driven a series of transformative actions. The plan is the result of close collaboration of staff, along with Port Authority's customers and suppliers.

"Our Sustainability Plan, developed during extensive consultation with our staff, authentically speaks to who we are and what we want to achieve. It is something that our staff can feel genuine ownership of and pride in delivering," says Port Authority CEO, Captain Phillip Holliday.

"We have worked very hard to achieve these outcomes and see our partnership with Sustainability Advantage as an important enabler on our journey to embed sustainability across the organisation," Captain Holliday said.

The whole process has been collaborative, with staff working with Sustainability Advantage to align the Sustainability Plan to the aspirational United Nations Sustainable Development Goals. The Sustainable Development Goals are 17 goals to improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and preserving our oceans and forests.

This plan, now deeply embedded in Port Authority's DNA, has driven many impactful projects. They have sourced renewable energy from wind and solar, set a net zero roadmap and established an internal carbon emissions reduction working group.

In a world first, Port Authority of NSW is investing nearly $60 million to supply renewable Shore Power to docked ships, saving up to 14,000 tonnes of CO_2 emissions each year. Sustainability Manager for Port Authority, Ryan Bennett explains that ships can power down their auxiliary engines by plugging into renewable energy from the shore, reducing emissions, noise, odours, and air pollution.

Based on their commitment and ambition, Port Authority was part of the Sustainability Advantage Value Chain Emissions Pilot. Port Authority is working closely with Sustainability Advantage, suppliers, and customers to measure and reduce emissions across the value chain.

Port Authority's sustainability efforts have been recognised by the Banksia Foundation, winning the NSW Sustainability Award for large business transformation in 2022 and being a finalist in the National Awards.

Port Authority is well placed to influence the industry on sustainability, managing the navigation, security and operational safety needs of commercial shipping in NSW ports

7.5 Primary Industries Productivity and Abatement program – Net Zero Nature Markets

Net Zero Nature Markets team within the Primary Industries Productivity and Abatement program enables primary industry and land sector markets, and removes barriers and enables primary industry and land sector markets to decarbonise.

Key achievements

- Developed the Conceptual Economic Framework, exploring policy options to realise the primary industries and land sector's potential to achieve positive carbon and nature outcomes.

- Developed NSW Nature Market Landscape Analysis which will inform the development of the NSW Carbon Nature Market Roadmap, establish a joint vision for the growth of carbon and nature markets in the state and outline the actions required to achieve net zero vision.

- Developed Marginal Abatement Cost analysis to identify the cost and potential of reducing greenhouse gas emissions from soil carbon and farm forestry. This analysis also plots cumulative emissions reduction against the incremental cost per unit of reduction.

- Developed a Livestock Emissions Baseline.

- Funded a Carbon Mapping Proof of Concept project, whereby carbon sequestration potential of the NSW Land Sector will be calculated within (initially) 2 Local Government Areas, based on Light Detection and Ranging (LiDAR) and aerial imagery information to enable decisions on feasibility of state-wide carbon mapping.

Peter Jamieson, Anditi

Aerial imagery from drones helped determine if state-wide carbon mapping is feasible
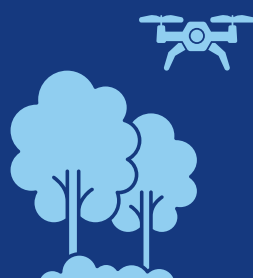
Net Zero Nature Markets have allocated funds for a pilot study aimed at establishing a proof-of-concept for carbon storage quantification. The study evaluates the current carbon storage of trees in various environments across NSW. If successful, this study could be expanded throughout the state to establish a carbon benchmark and facilitate the measurement and ongoing monitoring of carbon sequestration potential in NSW.

7.6 Primary Industries Productivity and Abatement program – On-Ground Implementation

Primary Industries Productivity and Abatement program – On-Ground Implementation (Net Zero Land) builds critical mass and capacity for carbon projects in the land sector. The program provides incentives for land managers to reduce emissions from agriculture and increase sequestration in soils and vegetation, including blue carbon. It also helps build land managers' skills and capability.

Key achievements

- Developed, launched and assessed Round 1 of the High Impact Partnerships competitive grants program, recommending approval of 6 partnerships expected to generate 1.8 million Australian Carbon Credit Units, in addition to case studies and demonstration sites.

- Established an Interagency Agriculture Working Group to help coordinate programs from 6 agencies, avoiding potential overlap and identifying opportunities for collaboration.

- Partnered with the NSW Department of Primary Industries to establish the On-Farm Carbon Advice program, delivering capacity building workshops and developing carbon farm plans for farmers across NSW. To date there have been 16 events held with 700 people in attendance.

- Established a partnership with NSW National Parks and Wildlife Service (NPWS) to support the implementation of carbon projects on NPWS Estate and help achieve their Carbon Positive by 2028 plan, with funding provided to support the first project.

- Published a Carbon on Country guide and fact sheets for NSW Aboriginal land managers and held workshops.

Key data

- The Office of Energy and Climate Change, and NPWS have signed a deed to invest $6 million over the next 5 years for carbon abatement projects on the NSW National Parks Estate.

- $5 million invested to co-fund the On-Farm Carbon Advice project.

- Up to $7 million allocated for 6 High Impact Partnerships expected to generate 1.8 million Australian Carbon Credit Units.

The On-Farm Carbon Advice program helped develop carbon plans for farmers across NSW
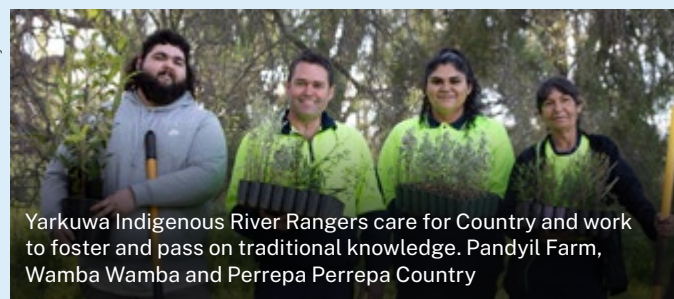
🔖 **Case study**

Creating opportunities to heal Country through carbon farming

Carbon farming projects can provide a pathway for First Nations communities to care for Country and get paid for it. Carbon farming projects reduce carbon emissions by either storing carbon in soil or vegetation or by avoiding emissions that would have otherwise gone into the atmosphere. Projects can create new jobs, strengthen traditional knowledge and practices, protect culturally significant species, and heal Country.

There are barriers to participating in carbon markets that are unique to First Nations organisations and communities. Cultural values and community decision-making is at the heart of Indigenous communities' processes. This makes the decision to participate in carbon markets more complex as organisations and groups must respond to community needs and aspirations for Country.

The Net Zero Land – Carbon on Country initiative facilitates knowledge sharing and access to carbon markets for NSW Aboriginal landholders. The team has developed a suite of resources to support communities in their decision making.

The resources outline the importance of embedding the principles of Free, Prior and Informed Consent and Indigenous and Cultural Intellectual Property rights within carbon contracts and throughout the life of the project. These principles are vital to meaningful participation and ensuring First Nations Peoples retain the rights to their knowledge, culture, stories and practice.

Native seeds collected at Wirraminna Environmental Education Centre, Burrumbuttock, Wiradjuri Country

Yarkuwa Indigenous River Rangers care for Country and work to foster and pass on traditional knowledge. Pandyil Farm, Wamba Wamba and Perrepa Perrepa Country

NSW Aboriginal Land Council has connected the team with many Local Aboriginal Land Councils (LALCs) across NSW. The LALC forums have provided an opportunity to discuss the fundamentals of carbon and the ways community aspirations for Country can shape carbon projects.

Attendee feedback highlighted a strong desire for 'economic development opportunities and environmental repair' and a greater understanding of 'the benefits of carbon farming and associated pitfalls'.

"Partnering with NSW Aboriginal Land Council and Local Land Services has been instrumental to delivering information to NSW Aboriginal organisations and communities," says Ava Kirkby, Project Officer, Net Zero Land team.

Community engagements took place on Wiradjuri (Bathurst), Gumbaynggirr (Coffs Harbour), Birpai (Port Macquarie), Jerrinja (Culburra Beach) and Kamilaroi (Tamworth and Copeton Dam) Country with up to 47 Local Aboriginal Land Councils participating.

Feedback has been positive, with communities keen to learn more about the opportunity. The next phase of the initiative will be to invest in projects on the ground. Local communities will lead and co-design these projects, ensuring First Nations landholders have control over their carbon rights.

Visit carbon for Aboriginal landholders for more information.

7.7 NSW Coastal and Flood Data Network

The NSW Coastal and Flood Data Network provides essential near real-time flood and estuary water levels, rainfall, tide and wave data to government, emergency services, Bureau of Meteorology, researchers and community.

Key achievements

- Collected consistent and continuous data, published in near-real-time on the Manly Hydraulics Laboratory website.
- Continued to facilitate the proactive mitigation and management of coastal hazards and flood risks, with the data network maintained and operated by Manly Hydraulics Laboratory including:
  - 225 flood and estuary water level recording stations
  - 75 rainfall monitoring stations
  - 20 ocean tide monitoring stations.
- Working closely with the NSW Reconstruction Authority, the Department of Planning and Environment, and the Commonwealth Government to install new monitoring stations in Northern NSW in response to the recommendations of the 2022 NSW Flood Inquiry.
- Fulfilled data requests from federal, state and local governments, universities, consultants, community groups and individuals.

Key data

The following data informs extreme weather event warnings, emergency response planning, long-term disaster and climate change modelling, land use planning and critical infrastructure design. Data capture rates across the year:

- 99% (above a target of 95%) of flood and estuary water levels and rainfall station data
- 98% (above a target of 95%) of ocean tide level data
- 89% (above a target of 85%) offshore wave climate data
- 843,000 public web page visits.

Manly Hydraulics Laboratory has been producing NSW Tide Charts since 1990. The NSW Tide Charts are an invaluable aid to coastal practitioners, emergency response managers and planners and community across fishing, boating, sailing, recreational diving, surfing, sailboarding, water skiing, diving and salvage. These free resources forecast 24-hour tidal predictions for a full calendar year and are available on the Manly Hydraulics Laboratory website.
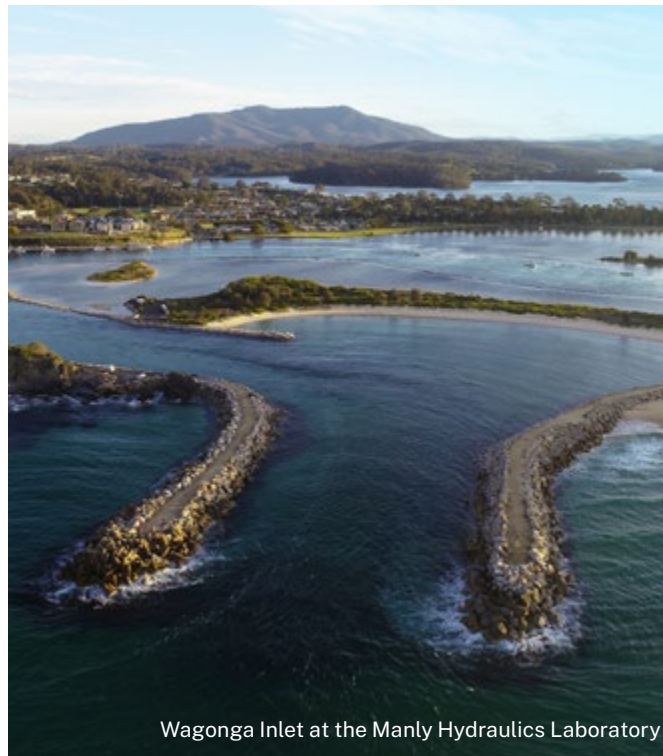
Wagonga Inlet at the Manly Hydraulics Laboratory

Eduardo Pombo Lavin, DPE

7.8 **Emissions Intensity Reduction**

NSW Government

The Emissions Intensity Reduction program develops and implements decarbonisation plans for high emitting industries in the Illawarra and Hunter regions

> The program supports hard-to-abate industries in NSW to accelerate their transition to net zero emissions. The program aims to achieve 28 MtCO$_2$e cumulative reduction in industrial emissions by 2030, which is equivalent to taking 10 million cars off the road for a year.

The Emissions Intensity Reduction program develops and implements long-term, comprehensive decarbonisation plans for high emitting industries in the Hunter and Illawarra regions.

Key achievements

- Launched the Net Zero Industry and Innovation Program Investment Plan 2022-2024 which included a $305 million High Emitting Industries fund.
- Progressed the Orica Tertiary Abatement Project as per delivery schedule, with 250,000 tCO$_2$e abatement milestone achieved in October 2023.
- Commenced the development of the Hunter and Illawarra Industrial Decarbonisation plan, being delivered by the Go2Clean consortium.
- Delivered Orica's Transformative Industry Projects including delivery of a comprehensive decarbonisation report.

Key data

- 3 Transformative Industry Projects scoping studies grants awarded, valued at $680,000, with an industry commitment of $1,520,000.
- $305 million High Emitting Industries fund launched, with 32 high emitting companies actively engaged via the High Emitting Industry program, representing the top 55 emitting facilities in NSW.
- Over 150 direct and group stakeholder engagements have been completed to inform, design, and validate the Industrial Decarbonisation Plans for the Hunter and Illawarra.

7.9 Net Zero Emissions Policy (International Collaboration)

The Net Zero Emissions Policy (International Collaboration) project supports the NSW Government to learn from, collaborate with and connect to other governments internationally to accelerate our transition to net zero emissions.

Key achievements

- Supported the Net Zero Futures Policy Forum which enabled the NSW Government to collaborate with 9 governments, meet in-person with more than 15 other international governments and learn about best-practice emissions reduction policies at global climate events.

- Grew membership of the Net Zero Futures Policy Forum to 10 governments and held its first Ministerial Leadership Group meeting.

- Hosted 3 events at the COP27 climate change conference in November 2022.

Mirabella Wawn

Officials from governments participating in the Net Zero Futures Policy Forum met in-person at the COP27 climate conference in Sharm El-Sheikh, Egypt, in November 2022

Adapting to climate change

Jaime Plaza van Roon, DPE

Through the CCF, we have partnered with local government and the community, including local First Nations communities, to build resilience and adapt to climate change.

The CCF has supported government agencies and councils in NSW to manage critical infrastructure risk due to climate change. CCF programs have also worked with First Nations community groups to commence implementing climate change adaptation practices on Country. The fund has supported floodplain management, coastal and estuary management and urban cooling projects.

All the programs in this section promote the purpose of the Act as stated in 34F (a). The CCF funds programs to:

a. reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities.

This section highlights the best examples of how the CCF is helping NSW communities adapt to climate change.

8.1 Hunter Valley Flood Mitigation Scheme

The Hunter Valley Flood Mitigation Scheme manages flood risk to the communities of the Hunter Valley. These risks include the increasing risk of sea level rises in Hunter River tidal pool and increases in the frequency and intensity of storm and flood events across the Hunter River Catchment.

Key achievements

- Delivered the annual preventative and reactive maintenance program on flood mitigation infrastructure in the Lower Hunter, and riverbank revegetation and restoration in the Upper Hunter.

- Ensured the scheme operated as designed during multiple flood events. An outcome evaluation of the scheme confirmed improved community resilience to flood risks and impacts of climate change.

- Revegetated 1,008 m of riverbank and 2.75 ha as part of the Upper Hunter program of works to mitigate flood impacts.

- Completed over $6 million in emergency capital works. The works were funded from the Hunter Valley Flood Mitigation Scheme flood damage insurance claim with iCare.

- Recognised through a Certificate of Appreciation for the team's effort and contribution to the community during the July 2022 flood, with some individual team members also receiving the 2022 Community Hero award.

John Spencer, DPE

The Hunter Valley Flood Mitigation Scheme was tested during multiple flood events in 2022-23

8.2 **Greening our City**

NSW Government

Over a million trees have been planted as part of the Greening our City program

The Greening our City program aims to increase tree canopy and green cover across Greater Sydney to 40% by 2036. More green cover will help cool Greater Sydney by reducing urban heat.

Key achievements

- Achieved the goal to plant over 1 million trees by the end of 2022.
- Worked to deliver the Greener Neighbourhoods program with 28 councils.
- Established new data collection methods to provide critical information on canopy cover, tree height, vegetation health and land surface temperature to support increased tree canopy.
- Engaged stakeholders to finalise the Framework for Valuing Green Infrastructure in public spaces.

Key data

- 1,069,938 trees planted to June 2023.
- $9.9 million in funding for Greater Sydney Councils for tree planting, demonstration, active transport and strategic planning support for urban canopy.

Did you know Campbelltown Hospital recently planted 400 trees, providing essential cooling to the area, habitat for wildlife and walkways for the community to enjoy. This is part of a bigger partnership with Landcare NSW and Greater Sydney Landcare to plant 200,000 trees as part of the Greening our City program.

🔖 **Case study**

Nature-based solutions help schools beat the heat

Schools are a great place to start when it comes to showcasing the benefits of nature in cities. Giving students and teachers the opportunity to connect with nature allows them to feel the benefits firsthand and empowers them to take practical steps to help reduce urban heat in their schools.

The Greening Our Cities program aims to lift urban tree canopy coverage to 40% by 2036. It partners with local councils and communities in Greater Sydney to plant and maintain trees in the local area.

Greening Australia saw the opportunity for schools to become involved in the program and created the Cooling the Schools initiative. They work with schools to connect children with nature through free native tree planting sessions, empowering them to create critical wildlife habitat, reduce urban heat and increase shade in their schools.

Greening Australia drew on research by Western Sydney University to identify the hottest 100 schools in Greater Sydney and developed an outreach program with the Department of Education to engage the schools most affected by urban heat. As part of the program, proposed planting sites were assessed and a garden designed with the school's ground keeper.

Once the plans were in place, the Greening Australia team delivered curriculum-aligned planting lessons with the children. Over 3 years, the initiative has worked with 130 schools, engaging with 9,713 students and planting 23,380 trees.

The initiative gives urban children the opportunity to get their hands dirty and learn about biodiversity and the important role trees have in our environment.

Cooling the Schools Program Manager, Nicola Masters explains that green learning environments also contribute to young people's development, through formal structured activities (developing skills in subjects like science, technology, geography and mathematics) and informal play.

"These plantings are designed to create cooler, greener, healthier and more climate-resilient schoolgrounds, while enabling children to take climate action into their own hands. Seeing the children engage with nature is wonderful and their enthusiasm is inspiring," says Nicola.

The Cooling the Schools initiative is part of a larger project by Greening Australia, which has secured new funding to plant 200,000 trees over the next 3 years in communities across Greater Sydney.

Students at Lurnea High School take climate change into their own hands by planting tress as part of the Cooling the Schools initiative

8.3 Climate Change Adaptation in Action

The Climate Change Adaptation in Action program helps NSW Government, local government and communities adapt to the impacts of climate change.

Key achievements

- Began integration with the NSW Climate Change Adaptation Strategy framework, establishing the overarching governance structure for the adaptation program, building a cross-disciplinary team integrating science, policy and implementation and continuing to deliver ongoing projects.

- Provided ongoing support to all government entities and councils in NSW to manage critical risk to their asset and critical infrastructure. In partnership with XDI, entities can use the XDI tool to identify, analyse and prioritise climate risk and build evidence-based business cases to prioritise action.

- Established agreements with 9 government portfolios to place a Climate Change Risk Officer within each portfolio.

- Supported 2 First Nations community groups to commence implementing climate change adaptation practices on Country. A third community group has been supported to commence climate change adaptation planning.

- Published a series of 10 case studies to highlight appropriate and effective application of NSW and Australian Regional Climate Modelling (NARCliM) data for a range of climate adaptation planning and research activities.

- Completed the final round of the Increasing Resilience to Climate Change grants for NSW councils and joint organisations (31 projects across all grant rounds), and the single round for community groups (23 projects). These grants enabled local governments and community groups to respond to climate risks specific to their region.

- Established an agreement to partner with the Cultural Science team in the Department of Planning and Environment to deliver the Protecting Our Country program. This program showcases adaptation actions on Country and develops material to support 2-way learning on climate change using western and First Nations knowledge systems.

Key data

- 377,312 site visits to the AdaptNSW website in 2022-23.

- 22 case studies showcased how communities across NSW are adapting to climate.

- 329 people attended the AdaptNSW Forum, hearing from 85 presenters across 29 breakout, panel and keynote sessions.

- 144 government employees trained in climate risk readiness, with another 67 staff currently in training. This includes Climate Change Risk Officers embedded across NSW Government.

- 194 users currently access the physical climate risk profile of about 1.15 million assets through the XDI NSW project.

The program helped 2 First Nations community groups to implement climate change adaptation on Country

🔖 **Case study**

Breathing new life into flood resilience

The Living Lab showcases stories of severe flooding from around the world and offers a space for researchers to collaborate on climate adaptation challenges

Elise Derwin, Living Lab Northern Rivers

The Northern Rivers region experienced 2 major floods in a month in 2022, with the first one by far the most significant on record. It brought unprecedented amounts of water through the community, damaging and destroying private and public property and people's lives. As the floodwaters receded, and the immediate mess was cleaned up, some big questions remained.

In response to this catastrophic event, the Living Lab Northern Rivers emerged as a unique initiative, transforming a Lismore main street shop front into a hub for design and research collaboration.

The Living Lab was founded by Southern Cross University, the University of Technology Sydney and the Northern Rivers Reconstruction Corporation. It aims to build resilience and support the region's recovery through research, community engagement, technical expertise and lived experiences. Lab Director, Dan Etheridge explains, "It's built on a necessity of local knowledge and lived experience, working hand-in-hand with technical expertise to develop the way forward".

To foster open dialogue and community involvement, the Living Lab's shopfront serves as an informative space, featuring examples of Lismore's history of flooding. It also showcases stories of severe flooding from around the world and offers a space where researchers can collaborate on solutions to address specific questions and challenges.

Dan emphasises the urgency for adaptation in the face of climate change. As climate projections predict an increase in summer and autumn rainfall across the state, we must rethink flood mitigation, disaster preparedness, infrastructure management (including roads, telecommunications and hospitals) and affordable housing. The Lab strives to address these challenges against the backdrop of recovery from the region's most significant natural disaster.

While the Living Lab focuses on the specific challenges of the Northern Rivers region, it also advocates for collaboration and knowledge sharing beyond its boundaries. With its open-door policy, it invites others to learn from their processes and transfer solutions to their respective regions.

8.4 Community Resilience to Climate Change – Climate Science and Information
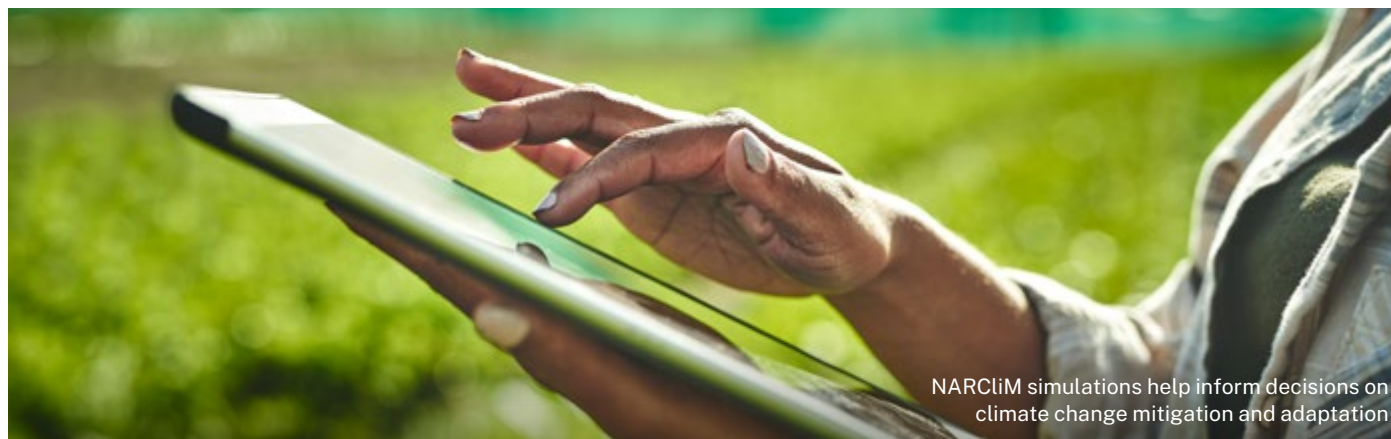
NARCliM simulations help inform decisions on climate change mitigation and adaptation

The Climate Science and Information program provides robust regional climate projections for climate change adaptation and mitigation planning in NSW for use by stakeholders across government and industry sectors. It continuously improves the simulation of the Australian climate by the regional climate models using latest scientific developments.

NSW and Australian Regional Climate Modelling (NARCliM) is a NSW Government led initiative that generates detailed climate projections and data for NSW.

Key achievements

- NARCliM2.0, which is the latest generation of NARCliM, completed simulation for two thirds of its models running on supercomputing facilities as of June 2023. It is on track to deliver core climate indices to end-users through 2023-24, with continuous improvements and expanded modelling and data sets being prepared throughout 2024.

- NARCliM2.0 is a step change in scope and technical complexity relative to the previous generation, NARCliM1.5, which was released only in 2020. For example, NARCliM2.0 data is currently 15 petabytes compared to 1 petabyte for NARCliM1.5, a 15-factor increase.

- Designed and implemented enhanced quality control and quality assurance procedures into NARCliM2.0 production, increasing data quality/integrity for end-users.

- Completed Shared Socio-economic Pathways (Pathways) 3-7.0 high greenhouse gas emissions scenario simulations to 2100. A second Pathways GHG scenario (SSP1-2.6) is on track to complete simulation to 2100 this year.

- Evaluation simulations for NARCliM2.0 show improvements in the simulation of maximum temperature and mean precipitation, relative to the previous generation of NARCliM. These improvements have practical benefits, as these climatic variables underpin assessments of climate change impacts in NSW and will inform mitigation and adaptation decision-making.

8.5 Floodplain Management (technical advice)

The Floodplain Management program provides financial support to local councils and eligible public land managers to help them manage flood risk in their communities, and reduce the impact of flooding and flood liability and the damage from floods using environmentally friendly methods.

Key achievements

- Released the updated Flood Risk Management Manual and the Flood Prone Land Policy to guide local government to understand and manage flood risk in their communities.

- Provided technical guidance, support and financial assistance to local councils and other state agencies.

- Provided flood risk management advice for major developments, government initiatives such as Special Activation Precincts, and projects such as the Hawkesbury Nepean Floodplain Management Strategy.

- Facilitated flood behaviour assessments, following the devasting 2022 floods in the worst affected catchments on the far north coast of NSW.

- Continued to work with the NSW State Emergency Service on the NSW Flood Data Portal that stores and shares crucial flood data within government and stakeholders. The portal currently holds more than 4,300 data sets on 1,600 flood projects (some of which are publicly available) and is used by 169 member organisations.

NSW Government

Severe flooding in NSW caused significant damage and had an even greater impact on communities

🚩 **Case study**

Building community resilience through flood risk management

The Floodplain Management program has been instrumental in providing financial assistance and technical support to local councils and public land managers. The program aims to manage flood risk, mitigate the impacts of flooding, and protect communities from flood-related impacts.

With flooding in NSW resulting in significant damage and an even greater impact on people, it's important to provide updated tools that guide local councils to understand and effectively manage flood risks within their communities.

Central to the Floodplain Management Program is the recently revised Flood Risk Management Manual. The manual, a seminal document in the field, was comprehensively reviewed over the last few years and was launched on 29 June 2023.

Aligning with national guidelines, the manual sets the benchmark for best practice flood risk management in NSW. It facilitates a proactive approach, encouraging councils to think strategically and plan ahead to understand, manage, and mitigate flood risks effectively.

The revised manual and its accompanying toolkit are designed to support councils to foster resilient communities who are better prepared to cope with floods now and in the future. The toolkit can be updated as needed, enabling the team to consider technological advancements and the evolving understanding of climate change impacts on flood producing rainfall events and sea level rise on flood behaviour.

Undertaking studies and developing and implementing flood risk management plans under the Floodplain Management Program allows councils to make informed decisions and provides flood information they can share with their communities. It also allows councils to implement measures that reduce flood risk to both existing and future communities and support effective emergency management planning by the NSW State Emergency Service.

The program team will continue to support local councils during the rollout and implementation of the revised manual. This includes conducting webinars and workshops with councils and industry, to reinforce and guide the transition to the new manual and its associated guidelines.

The team will continue to work alongside councils to scope and deliver flood risk management projects, with technical support and financial assistance provided through the Floodplain Management Program.

This continued partnership between the NSW Government and councils empowers local government to make proactive decisions, set strategic direction and make information available to manage flood risk to their communities.

Leon McLean, DPE

Severe flooding in NSW caused significant damage and had an even greater impact on communities

8.6 **Floodplain Management grants**

Floodplain Management grants provide financial support to councils and eligible public land managers to reduce the impacts of existing flooding and flood liability on communities and reduce private and public losses from floods.

Key achievements

- Awarded grants to 65 new projects to manage flood risk, with a total value of $9,956,299.
- Provided over $5.08 million through existing grants to local government to study flood risk and implement mitigation solutions.

Key data

- The 2023-24 funding round opened in March 2023, with a total of 77 applications received seeking $20.8 million.
- There are 219 active projects totalling $47.2 million being run by local government with funding from the program.
- Since 2012-13, this program has provided funding to 594 projects with around $143.97 million to understand and mitigate flood risk.

This program awarded grants to 65 new projects to manage flood risk

Protecting the environment

Through the CCF, the NSW Government is seeking to stabilise the condition and ecological integrity of ecosystems and biodiversity across the state.

The CCF has expanded our national parks system and its management and educated the public on the value of biodiversity conservation.

The CCF has supported farmers and landholders to enter agreements to conserve biodiversity and improve carbon management to enhance productive landscapes.

It has also mitigated the increasing risk of bushfires on communities, assets and environment through our fire management program and improved the health of our estuaries, wetlands and coastal rainforests.

All the programs in this section promote the purpose of the Act as stated in 34F (a). The CCF funds programs to:

a. reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities.

This section highlights the best examples of how the CCF is protecting the environment.

9.1 Fire Management

> The National Parks and Wildlife Service (NPWS) Fire Management program is an adaptive management initiative designed to mitigate the increasing risk of bushfires on communities, assets and the environment from the impacts of climate change.

Key achievements

- Focussed efforts on high fire risk areas that are close to property and assets, in line with recommendations from the NSW Bushfire Inquiry in 2020.
- Exceeded the target for hazard reduction in Asset Protection Zones (APZs) by 24%.
- Supported Aboriginal communities to undertake 10 cultural burns, exceeding the annual target by 25%.
- Consistently delivers more than 75% of all hazard reduction burning in NSW.

Key data

- 2,154 hazard reduction activities, including 177 hazard reduction burns and 1,977 mechanical activities.
- 72,337 ha of hazard reduction activity on NPWS managed land.
- 87% of all bushfires started on-park were contained to less than 10 ha in size.
- 96% of bushfires that started on-park were contained to NPWS managed land.

Remy Brand, DPE

Specialist NPWS staff check on the purpose-built Southern Corrobboree Frog enclosures and their surrounding Asset Protection Zone, maintained to protect this critically endangered species from bushfire

🔖 **Case study**

Investing in technology for rapid bushfire detection, response and conservation in Kosciuszko National Park

The escalating threat of too frequent bushfires poses a significant risk to the ecosystems and wildlife of NSW, including the iconic Kosciuszko National Park. By integrating the latest technology, including smart fire cameras, and rapid response helicopters with a targeted hazard reduction program, the NSW National Parks and Wildlife Service (NPWS) has implemented an effective management strategy to mitigate the risk of bushfire for this unique alpine environment.

The Australian Alps bioregion is the only true alpine environment in NSW, boasting diverse flora and fauna species found nowhere else. Rare, threatened, or endangered species include the Alpine Ash, Southern Corrobboree Frog, Mountain Pygmy Possum and Broad-toothed Rat. Beyond its ecological significance, Kosciuszko National Park holds immense Indigenous cultural importance that demands preservation for future generations.

The uniqueness of this area is both a high value asset and a challenge for fire management. Frequent, uncontrolled bushfire events, exacerbated by climate change, have the potential to devastate these ecosystems and lead to the local extinction of certain species.

In response, the NPWS Southern Ranges Branch has combined the expertise of fire management, aviation, and flora and fauna specialists to develop a comprehensive approach to safeguarding this precious ecosystem.

Team Leader Fire for the Southern Ranges Branch of NPWS, Ian Dicker says that rapid smoke detection is a crucial first step.

After a global search of the latest technology, the NPWS Southern Ranges Branch installed 4 smart fire cameras with artificial intelligence capabilities to monitor for smoke. These cameras continuously scan the national park, record weather conditions and raise an alarm when they detect potential smoke sightings, enabling a swift response. The technology also monitors neighbouring land including state forests, fostering collaboration between agencies across NSW, Victoria and the ACT.

Complementing the new detection technology is NPWS's Rapid Aerial Response Team capability. NPWS is equipped with 5 helicopters and one fixed-wing aircraft, as well as accessing a fleet of call-when-needed aerial appliances. These teams play a vital role in accessing and containing otherwise inaccessible bushfires in the vast, remote areas of Kosciuszko National Park.

Collaborating with agencies including the NSW Rural Fire Service, NPWS Southern Ranges Branch also implement a strategic hazard reduction program. This aims to protect not only human life and property, but also the environmental and cultural heritage values of the national park. By conducting prescribed burns to reduce fuel loads, the risk of uncontrollable bushfires is mitigated, helping to ensure the preservation of the delicate balance of the national park ecosystems.

As the effects of climate change continue to escalate, the NPWS remains committed to adapting, innovating and collaborating to ensure the long-term resilience of these precious alpine environments.

'By using smart fire detection technology, rapid aerial response teams and strategic hazard reduction, we strive to protect and conserve the diverse flora, fauna and cultural assets unique to this region. The team takes great pride in the vital work we do to secure this invaluable environment for future generations,' concludes Ian.

Visit managing fire for more information about reducing the risk of bushfire impacts in national parks.
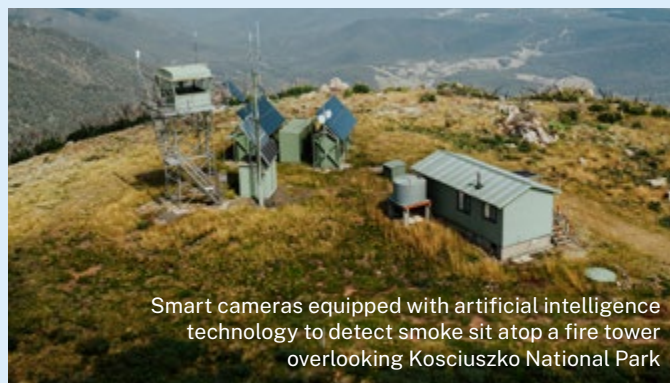
Smart cameras equipped with artificial intelligence technology to detect smoke sit atop a fire tower overlooking Kosciuszko National Park

Remy Brand, DPE

# 9.2 Biodiversity Conservation Trust – Private Land Conservation

The [Biodiversity Conservation Trust](#) (BCT) partners with landholders to enhance and conserve biodiversity on private land. By entering agreements to conserve biodiversity, we extend conservation efforts and protect our unique plants and animals in private land conservation areas.

Key achievements

- Entered into the first co-investment conservation agreement with Nari Nari Tribal Council to fund cultural land management practices across the 55,220 ha Gayini Nimmie Caira Conservation Area.

- Commenced a conservation tender to secure agreements for biodiversity conservation and carbon abatement. Landholders will receive in-perpetuity funding and income from the sale of high integrity Australian Carbon Credit Units to support the conservation of the threatened Murray Woodlands.

- Completed 3 conservation tenders and 1 round of fixed price offer.

- Entered 56 conservation agreements without annual payments, 5 wildlife refuge agreements and 16 conservation agreements with ongoing management payments, protecting 99,961 ha.

- Partnered with Gumbaynggirr Giingana Freedom School to develop an Aboriginal-language school unit, incorporating Traditional Ecological Knowledge and biodiversity science for K-2, with about 50 students.

- Conducted 599 site visits and 4,257 interactions with our existing landholders and delivered 112 events for 1,673 landholders across the state.

Key data

- 420 landholders have entered into conservation agreements since the Biodiversity Conservation Trust commenced in 2017-18.

- 226,240 ha are now covered by BCT conservation agreements.

- $7.36 million in grants have been provided to 382 landholders covering more than 107,000 ha.

Biodiversity Conservation Trust staff visited almost 600 sites in 2023-23

NSW Government
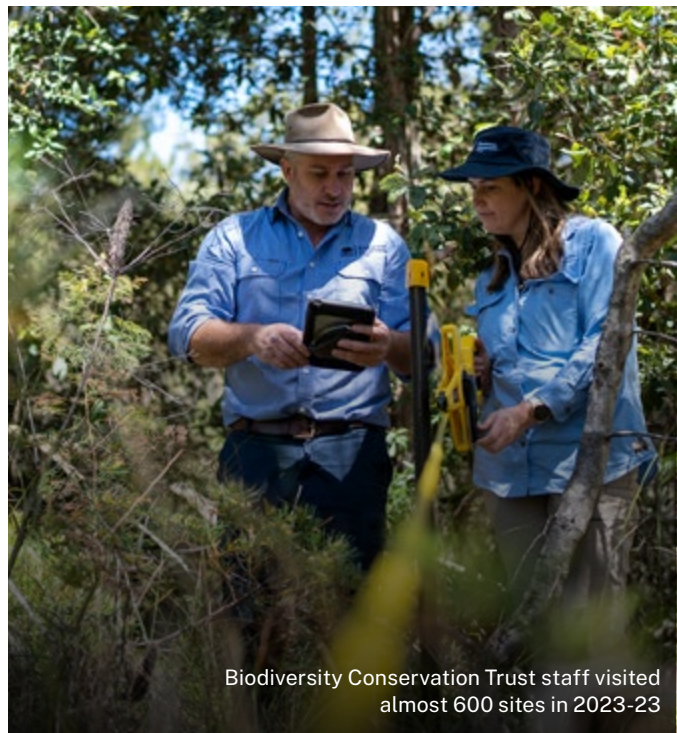
Did you know since 2017-18, we have protected 117 additional landscapes that were either not represented or inadequately protected in the protected areas. This is well in excess of the NSW Biodiversity Conservation Investment Strategy target of 30 NSW landscapes by 2023.

🔖 **Case study**

A grazier's journey bringing wildlife back to Mirrambeena

Grazier Lisa McCann's respect for past biodiversity change has helped her recover native fauna and flora communities on her property

Vera Hong, Backbone productions

After discovering that her mother had ancestral Wiradjuri connections nearby, Lisa McCann knew her 1,200 ha property on the north-eastern edge of the Hervey Range was "home".

Lisa and her family embarked on a conservation journey that led to a funded agreement with the NSW Biodiversity Conservation Trust (BCT) in 2019. Their goal was to restore native ecological communities while operating their grazing business.

Mirrambeena has been protected and restored with a thoughtful approach to production. The idea is not to resist the present natural systems but to alter how the family manages their herd.

Lisa began rejuvenating Mirrambeena's ecosystems, relying on the conservation management actions written for her property by BCT ecologists. Weed control became a key focus, and she employed different methods tailored to each situation, species and condition.

Supporting native wildlife was essential for Lisa. She constructed and installed homes for native fauna in trees, including glossy black-cockatoos, superb parrots and little lorikeets. Lisa also built watering points to help wildlife survive during droughts and plans to establish feeding trees and install further tree hollows.

Internal floodgate fencing was redesigned and constructed to facilitate native animal movements during wet or dry conditions, mitigate erosion and contain the domestic herd when required.

> "The best explanation of the method I use is respect, alter, listen, observe. This is my attempt to ride the waves of this generation's challenges and prepare for those that follow."

While Lisa's conservation efforts have yielded positive results, she recognises the challenges of climate change, extreme weather events, habitat fragmentation and pest species impacts.

Her aspiration for the future includes reconnecting Aboriginal cultural fire with Mirrambeena's vegetation communities.

Lisa's dedicated journey at Mirrambeena showcases the transformative power of dedicated conservation management. Observation, knowledge and respect for past biodiversity change has helped recover the diverse range of native plant communities of Mirrambeena and the native fauna that relies on them.

With land protected under a conservation agreement with the NSW Biodiversity Conservation Trust, Lisa is committed to ensuring a sustainable future for the benefit of both the natural environment and generations to come.

9.3 Protected Area Management

The NSW National Parks and Wildlife Service uses the Protected Area Management program to partially fund park management activities to maximise the protection of ecosystems and biodiversity. The program also aims to improve or stabilise the trend in condition and ecological integrity of ecosystems and biodiversity.

Key achievements

The Protected Area Management program contributed to:

Adding
33,000 ha
to the national parks system, expanding the NSW national parks system to 7.63 million ha or 9.52% of NSW

Removing more than 44,000 feral animals

Controlling weeds across more than 40,000 ha

Park management activities help protect ecosystems and biodiversity

9.4 Coastal and Estuary Management

The aim of the Coastal and Estuary Management program is to manage current and future risks from coastal hazards, restore and maintain coastal habitats and improve the health of our coastal and estuary environments across NSW.

The program supports the delivery of the objects of the *Coastal Management Act 2016*. Under the program, the NSW Government provides technical and planning advice, delivers state-wide science, supports the NSW Coastal Council and the delivery and implementation of coastal management programs in partnership with local councils.

Key achievements

- Certified 10 coastal management programs to date, with another 50+ currently being prepared.
- 95% of the 56 coastal councils are actively involved in developing and implementing coastal management programs.

Coastal and Estuary Management supports the maintenance and restoration of our coastal and estuary environments

The *Coastal Management Act, 2016* provides for strategic and integrated management of the NSW coastal environment in an ecologically sustainable way, for the social, cultural and economic well-being of the people of NSW. A 5-year statutory review was completed this year to determine whether the policy objectives of the Act remain valid and whether the terms of the Act remain appropriate for securing those objectives. The review found that the Act is working as intended with no changes to be made.

9.5 Coastal and Estuary grants

The Coastal and Estuary grants program underpins the implementation of the coastal management framework and enables local councils and communities to prepare coastal management programs. It also implements actions in certified coastal management programs and certified coastal zone management plans, to better manage the coastal and estuarine environment.

Key achievements

- Provided strategic, technical and policy guidance and support to 56 local councils.
- Allocated 11 coastal councils, 11 implementation grants totalling $3,166,192 and 9 planning grants totalling $1,954,413, with a further 3 still under assessment.

Key data

The following data applies to the last funding package (since 2016):

- 128 grants valued at $14.36 million have been allocated under the planning stream
- 154 grants valued at about $43.15 million have been allocated under the implementation stream
- An additional $7.3 million in grants was awarded to programs that pre-existed (before 2016).
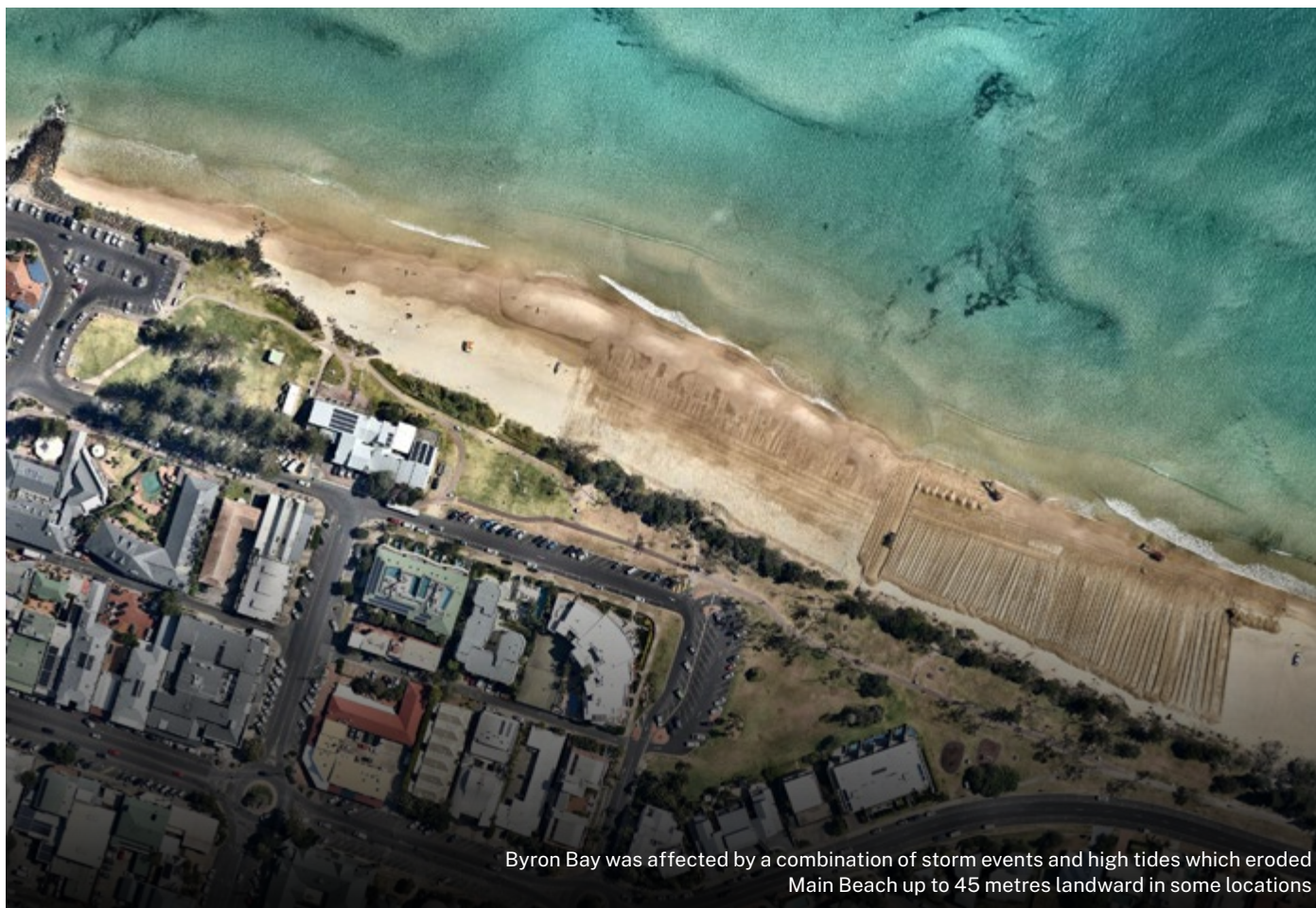
Nearmaps

Byron Bay was affected by a combination of storm events and high tides which eroded Main Beach up to 45 metres landward in some locations

🔖 **Case study**

Award-winning dune recovery project enriches Byron Bay coastal environment

Zoe Immisch

Dune reconstruction provided a low wind environment to stabilise dunes and reduce erosion on Clarkes and Main Beach Byron Bay

Coastal erosion has challenged the Byron Shire community for decades. Cyclones and east coast lows extensively damaged the coastline throughout the 1950s, 60s and 70s, and in 2009. After a period of relative calm, coastal erosion on Clarkes and Main Beach in Byron Bay returned and continued to increase from 2019, with sand eroded from the beach and dune system.

The effects of storm events and high tides were compounded due to a lack of sand moving around Cape Byron, causing ongoing erosion even during relatively normal conditions. In the short time between April 2020 and July 2021, the dune eroded at some locations up to 45 m landward. This resulted in the loss of high-value dune vegetation, forming an unstable dune scarp and damaging beach accessways and infrastructure.

As there were significant volumes of sand lost from the dune system, natural recovery would have taken years, if not decades. To speed recovery, Byron Shire Council and the Department of Planning and Environment jointly funded the Main and Clarkes Beach Dune Recovery Project through the Coastal and Estuary Grants Program.

The project used soft dune construction and stabilisation techniques including 'beach scraping' and 'dune reprofiling' to accelerate beach recovery, to rebuild an incipient foredune and swale (the low-lying area between the dune crests).

This created a low wind environment which acts as a natural sand trap and encourages dune vegetation to recolonise - stabilising the dune. Benefits of the project include reduction of erosion risk to land and vegetation, restored safe beach access, improved beach amenity, restoration of environmental values and protection of cultural heritage.
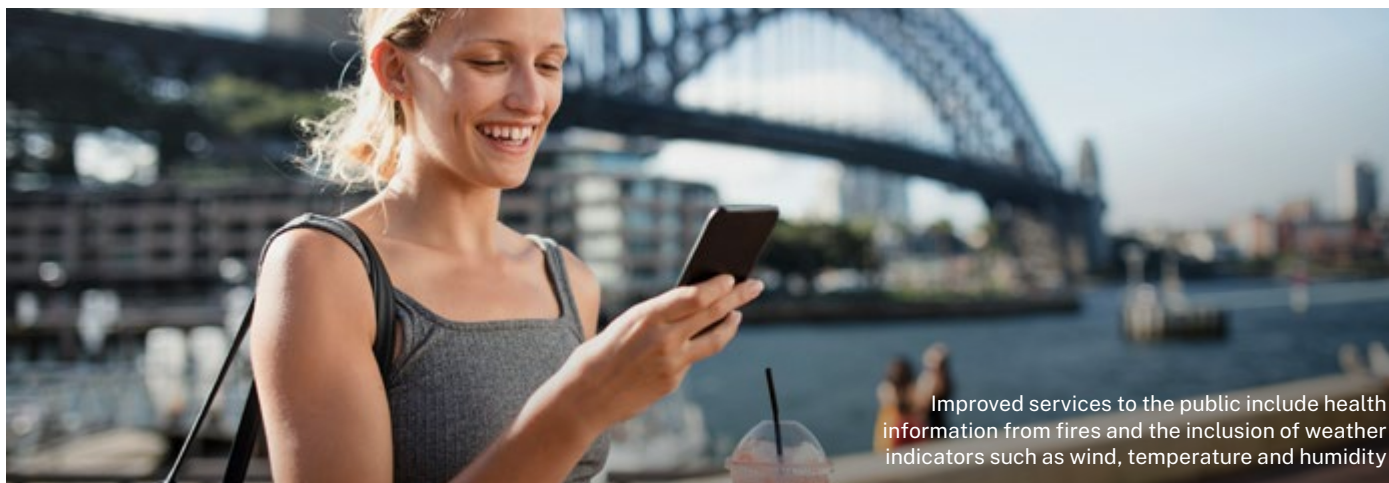
Chloe Dowsett, Byron Shire Council's Coast and Biodiversity Coordinator explains that this sort of sand scraping mimics the work done by nature, but much more quickly. The impact on the dunes has been very positive, with native vegetation growing, wildlife returning, and the dune system continuing to rebuild.

The restoration techniques adopted by the project have been well recognised, with Byron Shire Council winning the Environmental Leadership award in the 2023 Local Government Professional awards.

The project's success is attributed to extensive stakeholder engagement. Collaborating with land managers, Traditional Owners, public authorities, tourism operators and community groups allowed the team to identify effective project solutions and build trust and support for the project. This inclusive approach resulted in well-received dune restoration outcomes that benefit the environmental, social, and cultural values of the Byron Shire coastal zone.

9.6 Air Quality Monitoring and Forecasting

The Air Quality Monitoring and Forecasting program has delivered <u>air quality data, information and support</u> for a variety of stakeholders for 60 years.

Improved services to the public include health information from fires and the inclusion of weather indicators such as wind, temperature and humidity

Key achievements

- Implemented new air quality modelling systems and upgrade to high-performance computing facilities for enhanced forecasting capability.

- Continued to improve services for communicating air quality data and information to the public, including health impacts from bushfire and hazard reduction burning smoke.

- Continued to enhance the NSW rural air quality monitoring network. This included adding wind, temperature and relative humidity measurement across all sites and precipitation measurement at selected sites.

- Commenced exploring the utility of advanced instrumentation in the network, such as the installation of solar trackers, carbon-dioxide monitors and volatile organic compounds analysers at selected stations.

- Progressed the development of the dynamic Modular Emission Modelling System that can provide multi-scale emission inventories to cover NSW (and ACT).

- Partnered with Asthma Australia to complete the <u>AirSmart communications</u> pilot project. The project has developed a new app and completed a targeted media campaign.

Key data

- 95 long-term stations are part of the NSW Air Quality Monitoring Network, the largest network in Australia.

- 100 low-cost sensors (PurpleAir) were distributed in 2022-23 for installation by volunteer citizens, supplementing the air quality monitoring from the core network stations.

- The inventory includes over 1,000 air pollutants, including:

  – common pollutants, such as ammonia, carbon monoxide (CO), lead, oxides of nitrogen (NOx), particulate matter ≤ 10μm (PM_{10}), particulate matter ≤ 2.5μm ($PM_{2.5}$), sulfur dioxide (SO_2) and total volatile organic compounds (VOC)

  – organic compounds, such as 1,3-butadiene, benzene and formaldehyde

  – metals, such as cadmium, manganese and nickel

  – polycyclic aromatic hydrocarbons (PAH), polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF)

  – greenhouse gases, such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).

Program evaluation and budget

10.1 Program evaluation

Section 34H(4) of the Act requires the Minister to report on the effectiveness of completed CCF programs. To meet program evaluation requirements, we introduced a new CCF Monitoring, Evaluation, Reporting and Improvement Framework in 2022 to support performance monitoring, evaluation and adaptive management at portfolio and program levels.

To date, 29 outcome evaluations have been completed as part of the 2017-22 funding package. We have made significant investment to strengthen evaluation capacities and improve the rigour of evaluation plans and reports.

Table 1: Key findings and recommendations from evaluations completed in 2022-23

Evaluation report	Key findings	Key recommendations
Household and Small Business Upgrade program outcome evaluation	• 41,000 tCO$_2$e reduction in emissions. • $15.1 million in energy bill savings. • 47% of projects delivered in regional areas.	• Provide temporary price certainty for service providers to encourage uptake. • Differentiate activities in metropolitan and regional NSW.
Home Energy Action outcome evaluation	• Based on a limited dataset, improved energy performance and liveability was reported for 76,101 vulnerable households in NSW. • 73,714 energy-efficient appliances were upgraded for 63,945 low-income households.	• Strengthen program monitoring, evaluation and learning. • Continue to deliver programs through high and low-capacity partnerships.
Improved Energy Efficiency Standards for Appliances – process and outcome evaluation	• 3 products advanced in their regulatory development but fell short of final regulation.	• Improve coordination, governance and knowledge management. • Clearly define governance structures and responsibilities between the Commonwealth and NSW Government.
Manufacturing Efficiency Fund program outcome evaluation	• 17,960 MWh/year in electricity savings through capital upgrades. • $1.9 million per year in energy bill savings from metering and monitoring contracts. • Under 2 rounds, 26,036 tCO$_2$e reduction in emissions.	• Target support through metering and monitoring projects where market uptake is low. • Strengthen linkages across related programs through an integrated approach.

10.1 **Program evaluation**

Table 1: Key findings and recommendations from evaluations completed in 2022-23

Evaluation report	Key findings	Key recommendations
Evaluation of the Safeguard Administration program recommendations	• Robust governance arrangements established. • An adaptive approach to program management key in responding to identified risks.	• Share program insights on the importance of effective communication, program flexibility and information management for program effectiveness.
Evaluation of the Empowering Homes program (end of pilot)	• Reduction in participant energy grid consumption by an average of 3,847 kWh per year through the installation of solar battery systems. • Participant savings of about $885 per year for participants using time of use tariffs and $786 per year using flat tariffs and 2,533 kgs of carbon dioxide equivalent (CO_2e) per year.	• Improve promotion and education activities to ensure participants can make informed decisions on solar and battery systems. • Ensuring full compliance with safety, quality and protection standards across the sector.
Solar for Low Income Households trial	• Evidence of energy bill savings to trial participants.	• Strengthen installer-delivered education and follow-up support to participants. • Embed smart meters in program delivery.
Cooler Classrooms program process and outcome evaluation	• Air conditioners installed in 1,000 public primary and secondary schools reducing overall heat risk.	• Identify which schools require a more tailored solution. • Provide transparency of the implementation timeline to school principals, designers and contractors.

Five Million Trees program outcome evaluation	• Forecasted program impacts to 2050 include:
	  – 278% increase in tree canopy
	  – air pollutant removal from 10 to 39 kg per year
	  – increase in carbon sequestration from 0.95 to 11.76 tonnes per year
	  – increase in avoided stormwater runoff from 624 m^3 per year to 16,263 m^3 per year.
		• Improve the clarity and measurability of program outcomes.
		• Use available evidence around canopy, heat, biodiversity and socioeconomic disadvantage to prioritise projects for those areas that are most vulnerable.

10.1 Program evaluation

Table 1: Key findings and recommendations from evaluations completed in 2022-23

Evaluation report	Key findings	Key recommendations
Low Emissions Building Materials program evaluation	• Some progress made in relation to ratings schemes and progress towards a digital materials calculator initiative.	• Continue to pursue and develop a national agenda and engage governments in other jurisdictions. • Improve program design and measurement.
Evaluation of Australian Renewable Energy Agency (ARENA) and NSW's 2017-2020 Demand Response Portfolio	• Delivered 200 MW of tested demand response capacity for the Reliability and Emergency Reserve Trader (RERT).	• Balance investment in less commercially mature projects that require a higher percentage of public funding with more commercially mature projects that attract a higher percentage of private sector investment.
Review of the Sustainable Government program	• Some evidence of energy savings although only 26% of General Government Sector (GGS) agencies have met their E1 Government Resource Efficiency Policy (GREP) targets.	• Consider targeted interventions to improve the performance of agencies who have not met their energy efficiency target. • Provide strategic support to agencies, in addition to technical support and information provision.
Evaluation of the Sustainable Homes program	• Complemented other government initiatives to help the residential housing market transition to net zero.	• Reassess potential contribution and importance of residential energy efficiency to achieving NSW's net zero policy outcomes.

10.2 **Budget 2022-23**

In 2022-23, the CCF was resourced by contributions from electricity distributors. Electricity distributors are requested to recover no more than 25% of costs from household customers, with the remainder to come from commercial, business and industrial customers.

Revenue 2022-23

The total revenue for the CCF in the 2022-23 financial year was $294.9 million.

Source	Amount ($)
Ausgrid	136,868,204
Endeavour Energy	89,030,740
Essential Energy	57,172,996
Interest	11,341,476
Miscellaneous Revenue and Return of Grant	463,175
Total	**294,876,591**

Expenditure 2022-23

In 2022-23, the CCF's total expenditure was $268.6 million.

The difference between revenue and expenditure is a result of different program implementation schedules in the 2022-23 financial year.

Net Zero programs	Actuals ($M)	Theme
Clean Technology Innovation	5.2	Building a clean energy future
Electric Vehicles	2.1	Building a clean energy future
Utilising NSW Government Assets for Renewable Energy Infrastructure Investment	0.9	Working together for NSW
Primary Industries Productivity and Abatement	6.1	Working together for NSW
Emissions Intensity Reduction	7.6	Working together for NSW
Hydrogen	7.0	Working together for NSW
Business Decarbonisation	1.4	Making energy more affordable
Energy Security Safeguard	3.0	Making energy more affordable
Accelerating Net Zero Buildings	1.1	Building a clean energy future
Net Zero Emissions and Clean Economy Board	0.6	Working together for NSW
Net Zero International Policy Forum	0.2	Working together for NSW
Strategic Portfolio Functions	4.4	Governance and program administration
Subtotal	**39.5**	

10.2 **Budget 2022-23**

Electricity Roadmap	Actuals ($M)	Theme
Electricity Infrastructure Roadmap Implementation	16.5	Building a clean energy future
Subtotal	**16.5**	

Clean Energy programs	Actuals ($M)	Theme
Empowering Homes	0.5	Making energy more affordable
Regional Community Energy	1.5	Building a clean energy future
Smart Batteries for Key Government Buildings	1.2	Building a clean energy future
Emerging Energy	4.7	Building a clean energy future
Reliable Affordable Clean Energy for 2030 (CRC)	0.3	Other
Rebate Swap for Solar - Social Housing	0.8	Making energy more affordable
Subtotal	**9.0**	

Energy efficiency and sustainability programs	Actuals ($M)	Theme
Sustainable Government	2.0	Working together for NSW
Sustainable Homes	0.7	Making energy more affordable
Sustainability Advantage	2.8	Working together for NSW
Sustainable Councils	1.8	Making energy more affordable
Manufacturing Energy Efficiency	0.9	Program evaluation
Subtotal	**8.2**	

Resilience and adaptation programs	Actuals ($M)	Theme
Community Resilience to Climate Change – Climate Science and Information	1.8	Adapting to climate change
Climate Change Adaptation in Action	0.8	Adapting to climate change
Primary Industries Climate Change Research Strategy	6.2	Making energy more affordable
Greening our City	8.8	Adapting to climate change
Private Land Conservation (Biodiversity Conservation Trust)	50.1	Protecting the environment
Protected Area Management	34.2	Protecting the environment
Hunter Valley Flood Mitigation Scheme	4.6	Adapting to climate change
Enhanced Air Quality Forecasting for NSW	3.7	Protecting the environment
Fire Management	30.4	Protecting the environment
Coastal and Estuary grants	6.5	Protecting the environment
Floodplain Management grants	6.0	Adapting to climate change
Coastal and Estuary Management	2.2	Protecting the environment
NSW Coast and Flood Data Network	4.1	Working together for NSW
Floodplain Management (Flood Technical Advice)	0.8	Adapting to climate change
Subtotal	**160.2**	

10.2 **Budget 2022-23**

NSW's energy regulation responsibilities	Actuals ($M)	Theme
Australian Energy Markets Commission	14.7	Other
Commonwealth Energy Efficiency Working Group	0.5	Other
Subtotal	**15.2**	

Governance and program administration	Actuals ($M)	Theme
CCF Portfolio Management Office	2.2	Governance and program administration
Program Support Services	4.3	Governance and program administration
Subtotal	**6.5**	

Other	Actuals ($M)	Theme
Liddell Plant	13.5	Building a clean energy future
Subtotal	**13.5**	

Grand Total	268.6

Statutory information

Statutory information

Funding purposes as per section 34F of the *Energy and Utilities Administration Act 1987*	Programs which promote the funding purpose
a) Provide funding to reduce greenhouse gas emissions and the impacts of climate change associated with water and energy activities.	5.1, 5.3, 5.5, 5.6, 5.7, 5.9 6.1, 6.2, 6.3, 6.4, 6.5 7.1, 7.2, 7.3, 7.5, 7.6, 7.7, 7.8, 7.9 8.1, 8.2, 8.3, 8.4, 8.5, 8.6 9.1, 9.2, 9.3, 9.4, 9.5, 9.6
b) Provide funding to encourage water and energy savings and the recycling of water.	6.6
c) Provide funding to reduce the demand for water and energy, including addressing peak demand for energy.	5.1, 5.4, 5.8 6.6
d) Provide funding to stimulate investment in innovative water and energy savings measures.	5.1, 5.5 7.2, 7.4, 7.8
e) Provide funding to increase public awareness and acceptance of the importance of climate change and water and energy savings measures.	5.2 7.4
f) Provide funding for contributions made by the State for the purposes of national energy regulation.	Details in Section 10.2 Budget