snowy hydro

NEWS

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Underground cavern breakthrough

- Power boost for Murray 2
- Cooma's multicultural hub
- Mountains of history

INSIDE

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This page: Jindabyne dam
Cover image: Snowy 2.0 underground cavern

CEO UPDATE

A message from Snowy Hydro CEO Dennis Barnes

When I joined Snowy Hydro just over a year ago, my initial impressions were that we had an excellent team of people dedicated to progressing the company through this period of unprecedented transition in the energy sector.

During my first week visiting our sites in the Snowy Mountains I could also see the breadth and diversity of our operations and appreciate the importance of the Snowy Scheme, both its role in the National Electricity Market and to the community.

So there is a lot of collective pride as we mark 75 years since construction of the Scheme began in Adaminaby

The Snowy Scheme is more than a historical icon. This anniversary reminds us that the Scheme was built to last! It continues to generate clean hydropower to help keep the lights on and deliver water services to downstream users, including irrigators and towns in NSW and Victoria.

Our major Scheme expansion project, Snowy 2.0, has recently achieved a number of construction milestones.

Deep underground at Lobs Hole, the drill and blast teams have broken through the power station cavern crowns in the machine and transformer halls. The excavation process is progressing well. When fully excavated, we will have one of the largest deep cavern complexes in the world.

I'm pleased to report our famous tunnel boring machine Florence is continuing her tunnelling journey at Tantangara. She restarted in December 2023 following the State Government's approval of the project's planning modification and navigated some identified soft ground in closed or 'slurry' mode before reaching hard rock.

Working together with our contractor Future Generation Joint Venture, we are well on our way to delivering the largest single project that will help ensure Australia's secure and reliable transition to renewable energy.

Across the business at Snowy Hydro we are focused on actions and outcomes that demonstrate our commitment to environmental responsibility, community support, and the ongoing pursuit of clean, sustainable energy solutions.

Our 2023 Sustainability Report - available on our website - details our sustainability program and priority opportunities for this financial year. They include understanding the risks from climate change and being equipped to mitigate, manage and report on them, reducing greenhouse gas emissions while developing our medium to long-term emission reduction pathways, and strengthening relationships with Traditional Owners and local communities.

We have a long history supporting the communities in which we operate. We partner with and sponsor not-for-profit organisations, run community grants programs, contribute to local infrastructure, and provide economic investment.

We look forward to continuing and building our local connections in our 75th year.

All the best

Dennis

Cavern breakthrough

The Snowy 2.0 team has achieved a significant construction milestone with the blasting of the final few metres of rock to break through into the cavern space where the underground power station will be built.

Drill and blast excavation of the two enormous caverns began in June 2023 with more than 75,000 cubic metres of material removed so far. The team reached the transformer hall cavern crown in early January, followed by the machine hall cavern breakthrough less than a fortnight later.

Precise drill and blast methods are being used to profile the curved crowns which form the ceiling of the caverns. The rock is broken up and mucked out before a surface scaling process removes any remaining loose rock. The exposed solid rock face is then supported with rock bolts and shotcrete.

Both cavern crowns will be widened using a method called side slashing, which involves blasting the rock from the side of the opening.

This is expected to take several months, with excavation of both power station caverns continuing through 2024.

When completed, the machine hall and transformer hall will form one of the largest and deepest caverns in the world; 800m underground and big enough to fit the Sydney Opera House inside.

A group of Snowy 2.0 workers gathered at the excavation site to acknowledge the achievement of drill and blast crews and other team members, and to capture a commemorative photo of the breakthrough milestone.

Snowy Hydro CEO Dennis Barnes visited the underground site at Lobs Hole in January and said the breakthrough reinforces the good progress of Snowy 2.0 drill and blast activities.

"We are well on our way to delivering the largest single project that will help ensure Australia's secure and reliable transition to renewable energy."

Workers at the Snowy 2.0 cavern excavation site

Drill rig in transformer hall

High tech drill and blast

Snowy 2.0

The breakthrough blast in the machine hall cavern marks an important achievement for Snowy 2.0, and is one of several key milestones expected in 2024.

Other major milestones will be the excavation of the inclined pressure shaft by TBM Kirsten. This is expected to start in March after modifications are made to the TBM to enable it to tunnel uphill at a steep gradient.

And at Marica, the headrace tunnel surge shaft will reach a depth of 100m by May.

Drill and blast excavation in progress

High tech drill and blast

In drill and blast excavation, the rock is drilled and charged with explosives according to a precise blast plan. The tunnels are cleared before an electronic blasting system is initiated. This system uses a unique electronic pulse to start the firing of the explosives.

Specialist drill and blast crew, Orica, is working with principal contractor Future Generation to carry out the complex excavation of the power station caverns, cross passages and construction tunnels.

When a tunnel is ready for blasting, the Orica technical team designs the optimum blast plan, which is then drilled under strict quality controls with a bespoke tunnel blasting system.

To initiate the explosives column, the detonator must first receive a specific, encoded electrical pulse. This unique electronic signal initiates firing via a specialist scanner.

When all checks are complete, and workers have left the area, the Orica shotfirer communicates via radio that the tunnels are clear to start the firing procedure. With that confirmation received, the blasting system is armed to fire the headings. At the completion of firing, the shotfirer confirms via radio the blast has happened and the area is safe for workers to return.

TBM Florence

At Tantangara, TBM Florence has restarted and is making steady progress on the headrace tunnel. Now tunnelling through solid rock, the dual-mode TBM has moved out of closed slurry mode and into open excavation.

TBM Florence will excavate 15km of the headrace tunnel to link Tantangara Reservoir to Snowy 2.0's underground power station, providing water supply to drive the generators.

Ravine Road North - January 2024

Road ready

A Lobs Hole internal access road leading to an emplacement area on Talbingo Reservoir is now complete. The pioneering construction across steep terrain was started from both ends, meeting up at the Middle Creek cliffs.

Led by Leed Engineering and Construction, the excavation involved a 30-metre cut across the top of the cliffs, with an elevation gain of 60m through the steepest section. Slope support has been installed throughout the works.

The six-kilometre road is now five metres wide and includes passing bays to accommodate use by both light and heavy vehicles.

Murray 2 upgrade

With 55 years of service to the Snowy Scheme to its credit, Murray 2 power station is undergoing a significant upgrade. It has been more than 20 years since the last major maintenance and upgrade, and is part of the ongoing asset management plan that extends across all Snowy Hydro assets.

With an existing capacity of 550MW, Murray 2 is being upgraded to 600MW, or 150MW per unit through the installation of new turbine runners (the component that rotates the generator to produce electrical power). All of the main components of the machines including the turbine, generator, lubricating oil system, cooling water system, and other hydraulically operated control systems are dismantled and inspected before being overhauled or replaced.

To increase the capacity of each unit from 137.5MW to 150MW, a new turbine runner will be installed. This new runner is designed with a different optimal efficiency point to operate at higher load and more smoothly, with less rough running zones. The runner and shaft are assembled in an offsite workshop in Perth and transported back to the power station at Khancoban for installation.

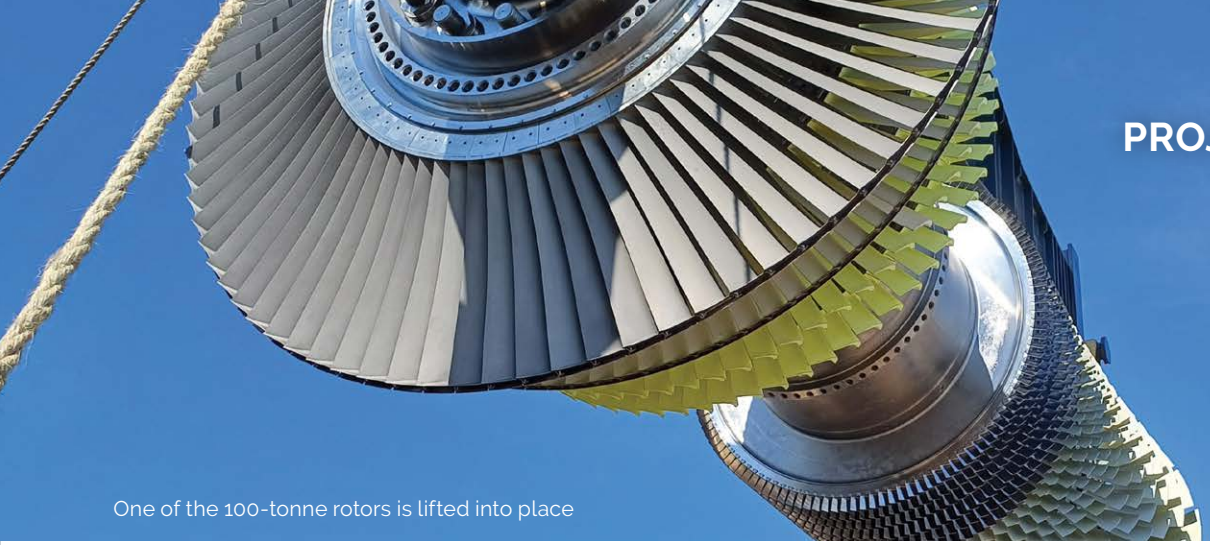
Prior to work at Murray 2 commencing, extensive computer modelling was used to determine any areas of excessive stress or fatigue in the original designs. This is done to confirm the generators can achieve a reliable service life for a further 20 years. During this assessment, an area where the generator rotor poles connect with a dovetail design to the rotor rim was assessed as having a high risk of failure in certain situations.

To correct this, the rotor dovetails required machining, which takes place in situ. This work is done by General Electric Australia in collaboration with US-based In-Place Machining, which sends over all equipment and personnel from their plant in Milwaukee.

Built in 1969, Murray 2 was designed to continue operating during major maintenance. Each of the four units can be individually isolated from the electrical network and water supply to allow for safe access. While one unit is offline, the remaining units continue to operate and deliver power into the electricity grid.

Once the upgrade is complete, the additional power generated by Murray 2 at peak power will be enough to power 12,500 light bulbs, or the average yearly demand of around 1,600 homes.

From top: measuring the turbine runner; a turbine shaft is lifted, machining works on the rotor rim.



One of the 100-tonne rotors is lifted into place

snowy hydro

Hunter Power Project

The Hunter Power Project continues to hit major milestones, with the arrival of critical infrastructure, the first cable pull for the switchyard and some eye-watering precision work on the giant gas turbines.

Final adjustments for the two open-cycle gas turbines (GT01 and GT02) are underway in preparation for the installation stage. Part of the adjustment process involves the temporary installation of turbine components to ensure the clearance between the rotor blades and the casing meets turbine manufacturer MHI's requirements. At its widest point the 5-metre diameter turbine has between 2mm and 8mm clearance.

Each of the turbines' 100-tonne rotors with 1,522 blades must fit perfectly in its casing. If the fit is too tight, the blades will clash with the casing when it heats to 1,600˚C during operation. Too loose a fit will mean the turbine operates less efficiently. During operation, the rotor spins at 3,000 RPM, or 50 times per second.

Elsewhere onsite, the central hub for electrical distribution and control for the power station has arrived after travelling more than 1,500km from Adelaide. The 95-tonne switch room will house the switchboards, control panels and monitoring equipment that allow the plant to function. The 33-metre structure has been lifted into place, awaiting connection when the power station is built.

The HPP electrical team has also completed the first cable pull for the Ausgrid switchyard in preparation for the future transfer of electricity from the power station.

When complete, the Hunter Power Project will have the capacity to contribute 660MW of energy to the National Electricity Market.

Community support

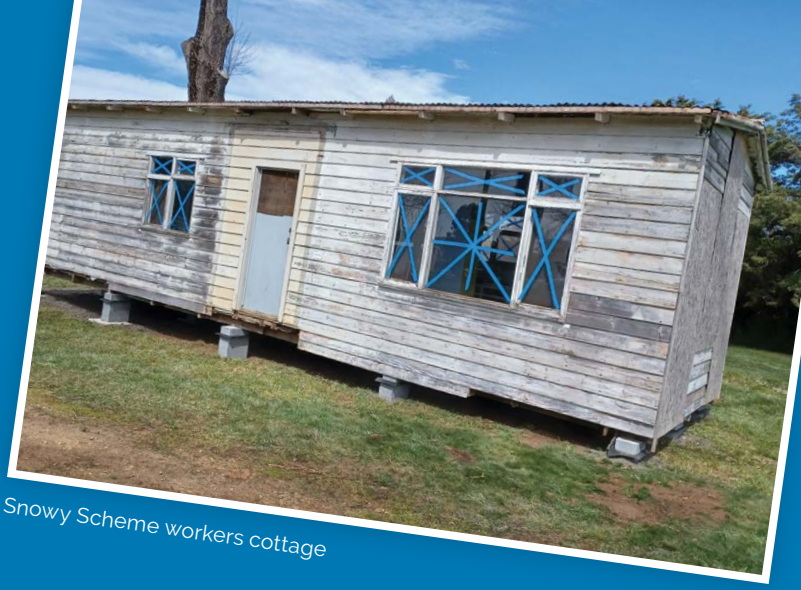
The Hunter Power Project's support in the local community has helped a number of regional groups upgrade their equipment and facilities, with junior sport, senior social groups and a local physiotherapy clinic putting additional funding to good use.

The team from Early Links, who provide health support services for people with disabilities and developmental delays, have purchased a special treadmill and parallel bars with the funding, and will be able to increase the number of clients they can help.

Kurri Kurri Little Athletics club has upgraded equipment and purchased uniforms for its 189 athletes, 12 of whom represented the club at the Hunter Zone Carnival in December.

In addition, senior citizens from Kurri Kurri Community Centre have a freshly refurbished kitchen providing hot meals and new carpet that's perfect for indoor bowling.

Mountains of history



Snowy Scheme workers cottage

For lovers of hydropower, history and old homes, the Snowy Scheme Museum at Adaminaby is a dream destination. The nationally significant collection holds more than 6,000 items broadly categorised into the design, construction and operation phases of the Snowy Mountains Hydro-Electric Scheme.

A collection of larger machinery items and historic vehicles was acquired at an auction of Adaminaby-based sub-contractors to the Snowy Scheme, the Kennedy brothers, and in 2002, a committee formed to raise funds. Governor-General Dame Quentin Bryce officially opened the museum in 2011, with items continually discovered, sourced and added. Hundreds of exhibits have been generously donated by former Snowy workers and their families.

Alongside bulldozers, a snow plough and a tunnel train all used on the project, visitors will see items from the Snowy Mountains Authority laboratory, the original Snowy Scheme control panel, memorabilia, photos and maps. There's also a display of the rock bolting technique developed during construction of the original Scheme and used all over the world today to stabilise rock faces.

The Surveying and Cartography collection is a fascinating insight into the critical work carried out by early surveyors, while the Hudson Collection includes personal items from Snowy's first Commissioner, Sir William Hudson, and Lady Eileen Hudson, including their KBE and OBE medals.

In 2023, a Scammell Mountaineer 4WD truck used during the Scheme's construction years returned 'home' to the region from the Hunter Valley where it had worked in a gravel quarry. After a substantial buff and polish and some minor repairs, the Scammell is now on permanent display outside the museum in the heavy vehicle collection.

To date, the iconic Antar prime mover has eluded museum curators, who remain hopeful they will one day achieve this 'very significant' addition to the collection.

The most recent oversized item to arrive is Snowy Cottage, a two-bedroom workers' cottage donated by the Taylor family of Nimmitabel. Peter Taylor, now deceased, was a museum committee member and the son-in-law of Sir William Hudson.

The cottage is an example of the transportable buildings designed to move from Snowy townsite to townsite (such as Clear Creek, Sue City and Island Bend) when the Scheme was being built. It will be refurbished and set up as a display of mid-20th century living in the Snowy Mountains.

The Snowy Scheme Museum is open to the public on weekends and by appointment.

Image right: Refurbished Scammell Mountaineer truck

A warm welcome

Maintaining the workforce to build the Snowy 2.0 renewable energy mega project will see thousands of workers move to the Snowy Mountains region over the construction years. In a trend resonant with the days of the original Snowy Scheme, the Snowy 2.0 project has triggered an influx of families resettling from all over the world.

Many of the Future Generation workers excavating the tunnels or working at the various construction sites are rostered on rotation and bunk down in the accommodation camps onsite. But for those who bring their family with them, life is a little more complex.

At the Cooma Multicultural Centre (CMC), the membership has more than doubled in the past year, with 234 new clients and more than 100 families seeking support. Yvi Henderson, herself an expat from Switzerland more than 20 years ago, estimates 80% of the CMC's members today are 'Future Generation' families. The centre offers multicultural playgroups, free English lessons, a homework club, as well as drumming, art and craft, and cooking.

One of Yvi's many roles is coordinating the community to help migrant mums meet locals, connect with each other and find their way around town.

Initially, Yvi was driving the women to school drop-off and pick-up, but quickly realised there was a better way. Many had cars sitting in the driveway unused, they just needed their licence. Seeing an opportunity, Yvi successfully applied for a Snowy Hydro community grant in 2023 and with the funding, arranged for the Monaro Driving School to teach the women to drive.

Twenty five women have been through the driving program and can now take their children to school and sport, manage their appointments and enjoy the sights of the Snowy Mountains. Having a driver's licence also means more independence and provides a welcome confidence boost.

The remainder of the $8,400 grant funding will support the CMC's calendar of cultural events including the Cooma Multicultural Festival on 17 March at Centennial Park. The annual event includes colourful cultural performances, music, dancing and delicious food from all over the world. Festivities kick off at 10am.

The Cooma Multicultural Centre today represents more than 50 different ethnic groups and Yvi says it has become like a second home. "I used to love travelling the world, now the world comes to me."

APPLY NOW

Snowy Hydro's Community Grants Program is back for a new year, with the first round open to applications on Monday 11 March. Local organisations and community groups can apply for grants of up to $10,000 to help fund initiatives that help the community thrive.

In 2023, a total of 49 grant applications were approved from 121 submissions, with a total funding pool of $295k distributed to the community.

Submissions for the current intake period must be received by 7 April 2024, with successful applicants notified by 10 May 2024. The Snowy Hydro website has more details on eligibility and assessment criteria, and links to access the online application form.

Supporting a sustainable future

Snowy Hydro's 2023 Sustainability Report, released in December 2023, reinforces the company's commitment to environmental responsibility, community support, and the ongoing pursuit of clean, sustainable energy solutions.

Our Sustainability Program aligns with Snowy Hydro's integral role in Australia's renewable energy future and highlights three major priorities for 2023-24:

- Understanding and mitigating risks associated with climate change
- Emissions reduction and facilitating the decarbonisation of the National Electricity Market (NEM)
- Strengthening relationships with Traditional Owners and communities where we operate

The report also outlines Snowy Hydro's commitment to supporting local communities through employment, education and environmental responsibility. This includes partnerships and sponsorships with not-for-profit organisations, community grants programs, contributing to local infrastructure, and economic investment in communities.

Snowy Hydro CEO Dennis Barnes said the company remains steadfast in its commitment to delivering clean, affordable energy, and supporting a sustainable transition to renewable energy.

The Snowy Hydro 2023 Sustainability Report is available for download at the Snowy Hydro website.

CAREERS: Starting their Snowy story

For more than 30 years, Snowy Hydro has helped local school leavers take their first career steps through its trainee program. The 2024 cohort recently started their Snowy chapter and over the next 12 months, will learn about the business, develop admin, IT and other skills, and discover future career opportunities in the renewable energy industry.

This year, 14 trainees will learn alongside Snowy employees and gain a range of skills to help them on their professional journey. The recruits have been placed with teams at Cooma, Talbingo, Khancoban and Valley Power and will work alongside industry experts who will guide, mentor, and support them every step of the way.

While gaining real-world, on-the-job experience, trainees will complete Certificates in Business Administration, Information Technology or Warehouse and Logistics.

At the end of the 12-month program, some trainees will take up employment at Snowy Hydro, while others will start their university studies or join our study scholarship program, returning to work at Snowy between semesters.

Net zero heroes

When Red Energy was certified a carbon neutral organisation by Climate Active in 2022, a group of employees got together to create the Net Zero Heroes to further support Red's commitment to reducing carbon emissions.

Founding members wanted to motivate their colleagues to get involved in emissions-reducing activities at work and at home, guided by the Red Energy values of decency and taking ownership. Initiatives are a mix of reducing personal environmental impact and business projects to continually improve Red's sustainability.

One of the first projects, the coffee cart initiative, involved replacing as many single-use coffee cups as possible. With thousands of disposable coffee cups used in the office each month, the team calculated a different solution could replace more than 27,000 take away cups a year. The head office in Melbourne is now stocked with Red Energy 'keep' cups which are used, washed and reused for the daily cup of coffee.

The core group of ten Net Zero Heroes has inspired the Plastic Free Pioneers, a group of 30 Red employees who share ideas in a chat forum on how to reduce their use of plastic. Some of the more advanced 'pioneers' are already living 95% single-use plastic free.

Red's vehicle fleet transition continues with seven zero emissions vehicles (five electric and two hydrogen) aiming for full transition by 2027. In addition, the Red team works with suppliers to share what they've learned, helping other organisations reduce their carbon footprint.

"It's been so rewarding to be part of a program that has empowered our employees to influence the sustainability initiatives the business invests in and then have the opportunity to execute those ideas," said Yvette Herft, Manager of Emerging Markets and team leader of the Net Zero Heroes. "We still have a lot more to do but this is a whole of business project where every single one of us can make a tangible difference."

Astrophysicist and TBM namesake Kirsten Banks.

Inspiring a future workforce

Snowy Hydro's education focus is about bringing industry experts and educators together to create programs that are fun and that kids want to be part of. Through hands-on science experiences and seeing real-world STEM careers in action, students are more likely to appreciate the value of studying the relevant subjects at school.

The students of today are the scientists, engineers and technologists of tomorrow. With the transition to renewable energy underway, inspiring a love for STEM-based subjects is essential to create the career pathways that will make the transition a reality.

Hydro-power of the past, present and future can be explored through the Snowy STEM Academy online, at the Snowy Hydro Discovery Centre at Cooma, and in classrooms all over the country.

Apply now for STEM funding

Snowy Hydro's Local School STEM Fund is now open for submissions. Grants of up to $10,000 are on offer for initiatives that provide opportunities for students in science, technology, engineering and maths.

Schools in the Snowy Monaro, Snowy Valleys and Towong local government areas are invited to apply for funding to encourage STEM learning that strengthens the school community and opens up career pathways using STEM skills.

Submissions can be made online at **snowyhydro.com.au/local-school-stem-fund-2024** until Sunday 24 March.

Education by numbers

185 schools participated

6,800+ students

500+ teachers

85,000+ page views on our online learning platform

141 Snowy employees helped deliver the programs

18 grants awarded provided learning opportunities for **2,200 students**

Snowy news on the go

Have you downloaded your SnowyLIVE app yet?

Our mobile app, updated in January, puts the latest Snowy Scheme news at your fingertips, including weekly lake levels, water releases, visitor information, and public access and safety information. There's even a 'favourites' feature to let you customise the app for your specific needs.

The SnowyLIVE app is free and available for Apple and Google Android devices.

Keen for careers in STEM

In January, Snowy Hydro hosted 47 Year 12 students from the National Youth Science Forum (NYSF) as part of a tailored program where industry leaders open their doors to science students interested in science, technology, engineering and maths (STEM) fields of work.

NYSF is a multi-day event held at the Australian National University in Canberra and the University of Queensland in Brisbane. Attendees learn about STEM education and training, tour science and technology facilities, meet with STEM professionals and mix with like-minded students from all over Australia.

The students' visit to Snowy Hydro is consistent with our approach of inspiring young Australians to pursue a career in STEM.

Doing business a better way

At Red, we're serious about making our environment better. That's why we've made changes to the way we work, reducing our carbon emissions across our operations. Red Energy is a Climate Active carbon neutral certified organisation. Now that's real Aussie energy.

AUSTRALIAN MADE AND OWNED

Owned by snowyhydro

Climate Active Carbon Neutral ORGANISATION

red energy™