

INSIDE

- 3 CEO's message
- 4 Snowy 2.0 update
- 6 Segment factory update
- 7 Bushfire preparation
- 8 Regional works Burrungubugge
- 10 Red Energy tips for summer
- 11 Then and now Customline
- 12 Clontarf partnership
- 13 Clean penstocks
- 14 Education and community

Follow us



(a) @snowyhydroofficial

We welcome your feedback:

1800 623 776 @ communityfeedback@snowyhydro.com.au

For more information, please visit our website snowyhydro.com.au



CEO UPDATE

A message from Managing Director and CEO Paul Broad

ow encouraging it is to see the Snowy Mountains looking green again!

This time last year it was very dry throughout NSW and we were rolling out support for our retail customers

impacted by drought and bushfires.

While bushfires ultimately hit many parts of Australia, the mountains community has been a tower of strength and resilience. Now, with some very welcome rain, we are seeing farmland and the bush abundantly spring to life and there are much improved inflows into the Snowy Scheme reservoirs.

Of course, we aren't forgetting that another summer is upon us. Snowy Hydro has detailed plans in place for protecting its important assets and we have thoroughly prepared for the bushfire season. Our Snowy 2.0 contractor, Future Generation Joint Venture, has worked with the NSW Rural Fire Service and National Parks and Wildlife Service to also develop its bushfire management plan.

Speaking of Snowy 2.0, have you seen any of the huge tunnel boring machine components being trucked up the highway? It's been pretty exciting having these loads on the move and our first tunnel boring machine being assembled onsite at Lobs Hole.

We are getting very close to the start of tunnelling for Snowy 2.0, which is a massive project achievement. Following the approvals for our environmental management plans, we have now also kicked off Main Works activities, such as the emergency, cable and ventilation tunnel portal and works at Tantangara.

Locally, among the key benefits of Snowy 2.0 are the jobs and investment for Snowy Mountains communities.

So far, Snowy 2.0 has injected about \$50 million into the local economy and there's currently about 500 people working on the project. Future Generation and its recruitment agency NX Blue will be looking for more workers in the coming months, including at the Polo Flat concrete segment factory in Cooma, so don't forget to visit the Future Generation JV website to find out more about these opportunities.

Snowy Hydro has a long history of investing in our young people, education and the regions. This continues with our new, three-year sponsorship for the Country Universities Centre (CUC). We were a founding partner of this initiative to support local young people studying for a degree, with the establishment of the very first CUC in Cooma. Now there are CUCs throughout NSW and the concept is spreading nation-wide!

For the younger brigade, we have launched the Next Generation online education hub. You can visit our website to see the excellent resources based on the Snowy Scheme and Snowy 2.0. No doubt many of the kids who participated in our highly successful 'Science of the Snowy Scheme' competition will enjoy all of the STEM activities on offer.

Finally, on behalf of us all at Snowy Hydro, I would like to wish everyone a safe and happy Christmas and New Year.

Paul Broad

Managing Director and CEO



Tantangara

Snowy 2.0 has commenced a new phase of construction after the final two Environmental Management Plans for the Main Works were approved in October. Work is now underway at Tantangara, where excavation will take place for the headrace tunnel portal. Initial activities include clearing vegetation, preparatory road works along the edge of Tantangara Road, geotechnical investigations, installation of erosion sediment controls and bulk earthworks.

In a similar process to the construction of the Main Access Tunnel portal, an opening will be cut into the hillside. The portal is initially excavated in two-metre lifts, with the rock face supported as each section is completed. After excavation, the next step is preparing the site to build the cradle where the tunnel boring machine (TBM) will be assembled.

There will be changes to access around Tantangara Reservoir now that work on the headrace tunnel has started. The western shore of the reservoir will be closed to the public, with access still available along Tantangara Road. Information about any access restrictions will be provided by the Snowy 2.0 principal contractor, Future Generation Joint Venture. NSW National Parks and Wildlife Service will also advise of any access changes within Kosciuszko National Park.

Lobs Hole

Over at the Main Access Tunnel at Lobs Hole, the construction of the TBM cradle has been completed and all TBM components have been delivered ready for assembly with the help of two cranes - one 300 tonnes, the other 750 tonnes. Crews are working 24 hours-aday across three eight-hour shifts, seven days a week.

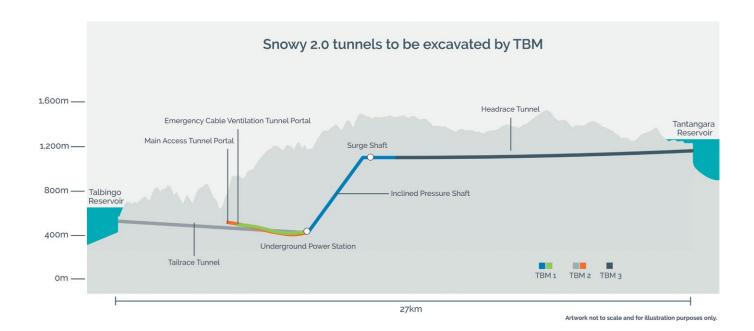
At the front of the TBM is a large steel structure called the cutter head, which rotates against the rock face. Measuring 11 metres in diameter, the cutter head contains 66 replaceable metal disk cutters and metal scrapers that break the rock into small chips. Due to its mammoth size and combined weight of 380t, the cutter head was broken down into five segments

for transport; four outer and one centre segment. These segments are welded together onsite using continuous welding, 24-hours-a-day.

Once assembled, the cutter head is tilted from its horizontal position to vertical and lifted with the 750t crane into place in front of the TBM shield that has been assembled in the cradle.

Work has also started on the portal for the Emergency, Cable and Ventilation Tunnel, or the cable tunnel for short. The 1.7 kilometre tunnel is one of two access tunnels to the underground cavern and provides critical airflow, as well as access for people and materials into the underground power station during construction. It will also provide the conduit for high voltage cables for power generated by Snowy 2.0.





TBM in transit

- 2,400 tonnes of components for the Main Access Tunnel TBM were delivered over 125 loads through October and November; 41 were oversize loads.
- The largest load was the main drive bearing, measuring 6.6 metres in width and weighing 174 tonnes. It was transported using four prime movers, police and pilot vehicles and required a 14-axle trailer.
- Our thanks to residents and visitors for their patience while the large loads were transported to site.



The business case for Snowy 2.0, our pumped-hydro expansion of the Snowy Scheme, has improved at every milestone.

With an internal rate of return initially estimated at 8% (and underpinned by independent financial and economic modelling), the project economics are strengthening. There is increasing wind and solar coming into the National Electricity Market and the value of leveraging our existing Scheme infrastructure — the Talbingo and Tantangara dams — is clear.

Deep energy storage is needed to absorb and store large quantities of excess renewables across months and seasons.

Earlier this year, Snowy Hydro secured \$3.5 billion in corporate debt facilities. The lending banks conducted extensive due diligence and review of the Snowy 2.0 business case, so it was a clear tick of financial approval. The project construction cost is \$5.1 billion and will be largely funded through Snowy Hydro's cash flows and its balance sheet. Our shareholder will contribute \$1.38 billion in equity.

JOB OPPORTUNITIES

Hiring is underway for a range of positions across the Snowy 2.0 project. Future Generation is looking for experienced tunnel workers including TBM operators, grout operators, driller operators, loader operators and shotcrete operators. There are also a number of full-time engineering, hospitality and other roles available.

More information at futuregenerationjv.com.au



Pacific Hill digs

Snowy 2.0 workers will soon have access to new accommodation options in Cooma. The Pacific Hill complex in Boobah Street is being built by Future Generation to provide housing for 126 people, along with communal facilities and parking.

The Pacific Hill complex is expected to ease local housing demand, with the additional accommodation ready for tenants by mid-2021.

Buses or mini vans will transport workers between Pacific Hill and the Polo Flat factory, as well as to Future Generation project offices at other sites.

BUSHFIRE PREPARATION

SUMMER IS HERE

Preparing for the bushfire season is a year-round consideration at Snowy Hydro, but activities step up as summer approaches to make sure any risk of fire is anticipated and managed.

Asset protection zones and easements around power stations, Snowy-owned power lines and critical equipment are regularly cleared of vegetation and checked develop a bushfire management

throughout the year. These zones provide an all-important buffer when fire fronts or flying embers encroach on built-up areas. Power lines are also checked for faults through aerial inspections.

The team from Future Generation has worked with the NSW Rural Fire Service (RFS) and National Parks and Wildlife Service to

plan for the Snowy 2.0 Main Works worksites. The plan includes establishing controls around work activities that have the potential for sparks, such as welding, to prevent activities that may start a fire. The plan also details emergency response and evacuation procedures to be followed in the event of a bushfire, and onsite workers take part in bushfire awareness training.

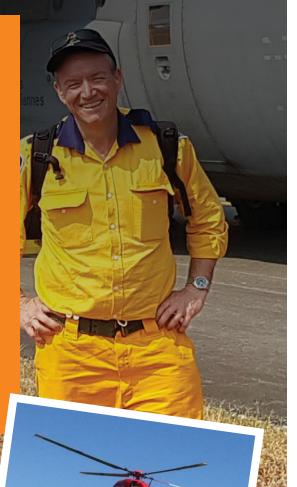
Frontline volunteers

old with the Gocup Bushfire

as well as a member of the area firefighters are airlifted into use chainsaws and hand tools to construct firebreaks and

This fire season is likely to be different from the last. With recent rainfall and pasture growth, more running grass bushland environment.

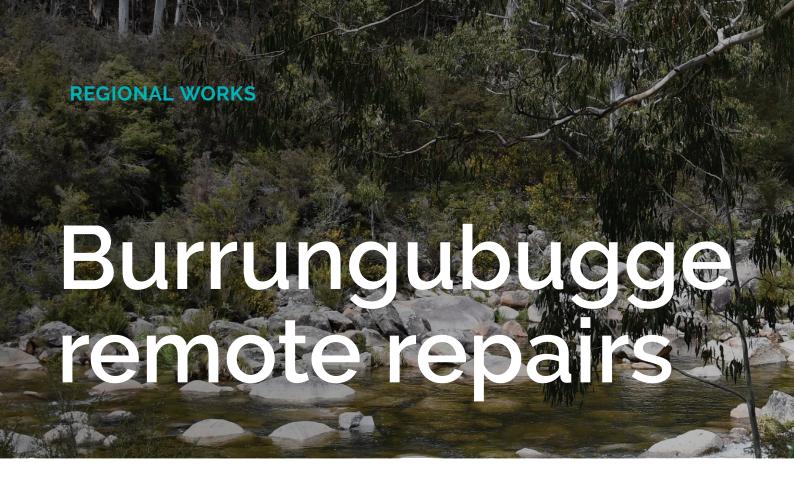
for community members is to have a clear plan for what to do in the event of a bushfire.



Prepare your home

- Cut back trees overhanging buildings
- Clean up leaf debris around your property
- Have hoses long enough to reach around your house
- If you have a pool, tank or dam, put a Static Water Supply (SWS) sign on your property entrance

For more information on preparing for the bushfire season, visit **rfs.nsw.gov.au**



n a remote part of the Snowy Mountains, Snowy Hydro and its contractors have been carrying out complex and important improvements to a 125-metre deep intake shaft.

The Burrungubugge intake shaft is a critical part of the Snowy Scheme, diverting water from the Gungarlin and Burrungubugge rivers into the Snowy-Eucumbene tunnel directly below.

This tunnel transfers water more than 23km from Island Bend Pondage to Snowy's central storage, Lake Eucumbene, where it can be used to generate electricity on either the Khancoban or Tumut side of the mountains.

A project is currently underway to increase the longevity of the Burrungubugge intake shaft, using an innovative new method to repair a long-term defect. To safely access the repair location - 80m down the narrow, 1.8m diameter shaft - a purpose-built access hoisting system has been designed and installed.

The work includes welding repairs to nine circumferential joints, followed by the application

of more than eight tonnes of concrete grouting between the liner and the wall for extra support. Finally, a layer of 4mm carbon fibre wrapping will be applied to the inner surface of the shaft at the point of highest stress - think of a similar process to that of fibreglassing - which will provide a further 40 years' design life of reliable operation.

More than 20m high, the access system includes a multi-level work stage and a separate two-person access cage to allow work to occur safely in the confined space. At any one time, four people can work down the shaft.

The hoist was constructed and commissioned in Western Australia earlier this year by specialist mining contractor RUC Cementation. It was then taken apart and transported in more than 450 pieces to the Snowy Mountains, before being reconstructed and commissioned at the worksite.

The narrow, deep intake shaft is a tight work environment, which means ventilation is important. A specifically-designed heating and ventilation system has been installed to provide comfortable and safe working conditions.

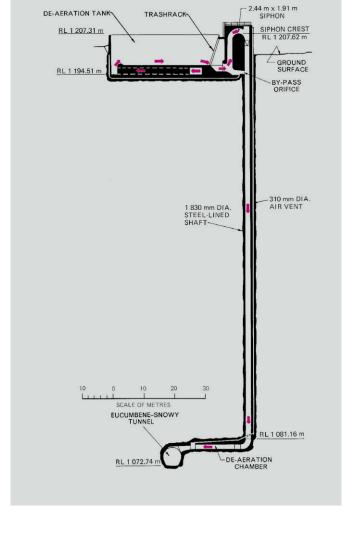
The total system requires enormous power to operate - the team needed to install over two megawatts of diesel power generators to power the hoist and all of its systems. Multiple cameras provide live footage of all aspects of work done in and around the shaft to the hoist operators, whose principal job is to ensure the safety of the workers in the shaft.

The work area is normally underwater, as it is at the same elevation as the surface of Lake Eucumbene. For this job, the water level in the shaft was lowered by shutting down the diversion capability of the Snowy-Eucumbene Tunnel and partially draining the structure using a precise level monitoring and control system.

The unique nature of this job required a project team made up of local and global specialists. In addition to RUC, Snowy Hydro has engaged ESI Alphatec, Insituform Pacific RIGCOM, Coates Hire and local companies including Cooma Cranes and A&D Scaffolding.



Cross-section of intake shaft





1,72

RETAIL

SUMMER ENERGY SAVERS



With warm weather on the way, now is the time to throw open the windows and let nature help keep your energy costs down.

More sunshine and longer daylight hours are just the right conditions for hanging clothes out in the fresh air. The clothes dryer is one of the biggest drains on energy, so use it sparingly. Air conditioners are another energy-hungry appliance, contributing up to 40% of energy use. Close off rooms not in use and when the cool change arrives, switch off the aircon and open up the house to welcome in the breeze.

Did you know Red Energy is:

- ▶ 100% Australian-owned by Snowy Hydro, a leader in renewable energy
- The only energy retailer certified to use the Australian Made logo
- Keeping jobs right here in Australia, with its customer solutions team based in Melbourne

To find out more go to redenergy.com.au or call 131 806.

Tips to reduce energy use by Red Energy's Lucy Aston:

- 1. Smart use of air conditioners. Use the timer function to switch off overnight and during the day, and limit use to the hottest times. Clean filters at least twice a year and replace when worn out. Filters filled with dirt and grime add up to 15% more energy to power the unit.
- 2. Insulate your home. Wall and roof insulation keeps warm air from escaping in winter and traps cool air inside during summer. Draft-proofing doors and installing blinds on windows will also help.
- Use less hot water. Wait for a full load before using the

- dishwasher and skip the drying cycle. When hand-washing dishes, rinse in cool water and keep your mixer tap on cold to avoid generating hot water. Limit time under the shower and install a three star-rated showerhead to help conserve water.
- 4. Check your lights. With the average Australian home using 6% of its energy to power the lights, it makes sense to switch off lights in rooms you're not occupying. Solar-powered lights in the garden and motion-sensor security lights will help reduce energy use outside.



CLASSIC MEMORIES

The sight of machinery for Snowy 2.0 moving up the mountains over recent months has stirred fond memories of the original Snowy Scheme. Back then, interested onlookers would line the streets to watch the trucks pull their enormous loads through town.

In 1954, one of the spectators was a Dalgety-based courier, who was snapped across from the Alpine Hotel in Cooma leaning against his car - a 1953 Anniversary Ford Customline. Cooma resident John Neilson remembers the man in the photograph and the moment

— a decade later — when he first set eyes on the Customline.

He was 14-years-old and working in his father's Cooma butchery. The car's owner came through every Saturday and each time, John asked if he'd one day sell him the car. Eventually the car was sold, but not to John.

In the mid 1980s, John got word the Customline was back in Cooma, but had seen better days. Despite the best intentions, the new owner hadn't found time to restore the car, but when John tracked him down, he wasn't ready to sell. John waited, determined not to miss out a second time.

His patience paid off and the car was finally parked in his driveway. He worked on it for eight years to restore the body and bring it back to showroom condition.
Mechanically the car was perfect.

For fans of the classics, the Customline has a side valve V8 engine, three-on-the-tree manual transmission and 87,000 original miles on the clock.

As a longtime member of the Cooma Monaro Historic Automobile Club, John and his Fords (his other car is a '68 GT Falcon) are often spotted around town. The Customline, we're reliably informed, can comfortably handle 110km/hour on the open road.

John says it's nice to know his Ford has played a small part in the Snowy Scheme's long history. Give him a wave if you see him drive by.



TOUCH FOOTY FUN

2020 has certainly been the year of the workaround and the Clontarf Foundation, like so many of us, had to modify their regular programs across Australia due to limited faceto-face contact. After months of tight restrictions, most of the boys are now back at school and resuming their much-loved outdoor activities.

Earlier in the year, Bodie Gabriel and Turell Mapiva-Miller, both year 10 students from the Karabar Clontarf Academy, had an exciting opportunity to put their public speaking skills to the test and represent Clontarf.

With some logistical help from Snowy Hydro, the boys took to the stage to deliver the Acknowledgement of Country at the *Daily Telegraph* Bush Summit held at Cooma. It was certainly a high profile experience, with Prime Minister Scott Morrison, senior MPs and business leaders taking part in the summit.

By November, we were pleased to welcome back a group of year 7 students and their year 11 mentors after an overnight camping trip at Jounama Creek, Talbingo. It was the perfect opportunity to kick off regular training with a game of touch football, followed by breakfast.

Tumut Academy Director Mat Chapman said the boys were "super keen" about playing a game of touch with the Snowy employees.

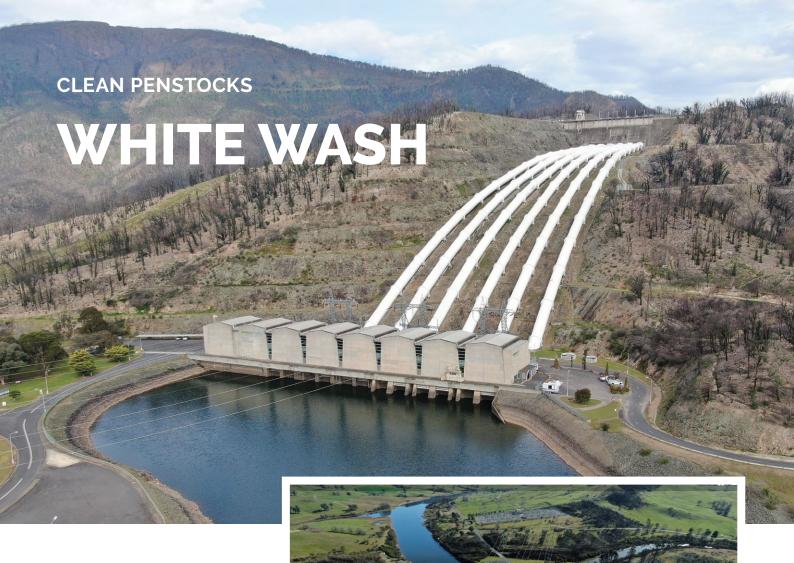
He said the extra opportunities helped the boys grow and develop in a safe and welcoming environment. There are now three former Clontarf students with electrical or mechanical apprenticeships at Snowy Hydro and studying at TAFE. Many more students have participated in career forums and work experience.

The Clontarf Foundation started as a single academy in Western Australia in 2000 to support education, life skills and employment prospects of young Aboriginal and Torres Strait Islander boys and men.

The Clontarf Foundation launched the Tumut Clontarf Academy in 2019, one of more than 120 academies now supporting 9,000 students across Australia.

"Clontarf is grateful for the partnership with Snowy Hydro which goes above and beyond in so many ways, including staff and student engagement, employment and work experience opportunities, worksite visits and a real sense of connection and pride between both organisations."





Maintenance of our power stations, dams and other critical assets is an ongoing focus for Snowy Hydro and when it comes to spring cleaning, we certainly have some hard-to-reach spots.

Our famous penstocks at Tumut 3 Power Station are a distinctive feature of the Snowy Scheme, but in recent years they had lost some of their sparkle.

With more than 50,000 square metres of surface area and the top of each penstock reaching six metres off the ground, there were a number of risk factors for the team to consider. In the past, cleaning was done manually by workers on scaffolding, but with safety a number one priority, it was time to switch to a more automated approach.

A range of different cleaning methods and technologies were trialled. This included a remotecontrolled helicopter that sprayed the pipes with biodegradable cleaning agents. Students from the University of NSW were also invited to brainstorm ideas, working with Snowy engineers to design different systems.

After 18 months of investigations, the team decided on a mostly hands-free cleaning robot. The Vertidrive robotic water blasting system is held in place by strong magnets and operates remotely from the ground while it navigates the curves of the pipes. Magnetic robots are used for all sorts of difficult cleaning jobs, including shipping tankers, windmills and industrial-sized storage tanks.

Initially, the team cleaned the top section of the penstocks (closer to Talbingo Dam) where the ground is relatively flat, while they worked out the most efficient approach.

The robot was lifted into place on the underside of the pipe with hoses connected to a trailer-mounted pressure pump.

It took 14 weeks with two robots cleaning in unison to remove the built-up grime and algae on all six pipes. Depending on climatic conditions, the penstocks should stay fresh and clean for up to 10 years.

EDUCATION AND COMMUNITY

Discover the power of water

nextgen education Hub

enerations of school children have visited the Discovery Centre in Cooma to experience the wonder and excitement of the Snowy Scheme and the power of water as it flows through dams and hydro power stations to generate clean, renewable energy. Now we're expanding the experience with our new online education platform.

The Next Generation Education
Hub has been developed in line
with the Australian curriculum and
offers study material across the
STEM subjects, as well as history
and geography - all through the
lens of the original Snowy Scheme
and the Snowy 2.0 expansion.

Designed as a classroom support. Next Generation provides easyto-access teaching materials including downloadable lesson plans and activity sheets.

The education hub will also include a behind-the-scenes video tour at one of Snowy's power stations and an interactive digital story about Snowy 2.0 and its role in helping keep renewable energy affordable and reliable. Explore our Next Generation Education Hub at snowyhydro.com.au



Snowy 2.0 Snowy 2.0 - Word search Circle or highlight the words listed below Words can go in any direction, across, down, up and hotcontaily CONCRETE SEGMENTS LINKED RENEWABLE TIBM D'NAMAC LOB HOLE RESERVOIRS TECHNOLODY ELECTRICITY MCAMANTE SECURITY THE FUTURE BNERDY PEAL CREAMAD SNOWY 2.0 ELERAND POWER STATION SOLAR CONCRATION PUMPTCD-1470RD STABILITY VISION GROWTH OUCK STATT STORAGE WATER HOUSEHOLD RECYCLED SUPPLY WIND

Α	R	A	G	N	A	Т	N	Α	Т	S	T	Α	В	1	L	1	Т	Y
S	Р	Т	Q	W	Р	U	N	D	Е	R	G	R	0	U	N	D	Α	N
Ρ	E	A	K	Q	D	N	Α	М	Е	D	E	X	P	Α	N	D	L	0
S	0	Z	Q	G	Е	N	Е	R	Α	Т	1	0	N	L	н	X	В	1
Е	Т	W	н	Z	R	Ε	L	1	Α	В	1	L	1	Т	Υ	1	1	Т
Υ	0	Α	Ε	A	X	L	Υ	S	N	0	W	Y	2		0	N	N	Α
R	E	Т	Т	R	X	S	U	Р	Р	L	Υ	т	K	0	Q	X	G	٧
Ε	L	E	Υ	1	Z	Т	R	Α	Т	S	X	K	С	1	U	Q	0	0
S	E	R	W	Z	0	R	Ε	С	Υ	С	L	Ε	D	Ε	٧	т	М	N
Е	C	Υ	X	1	Q	Ν	R	Ε	N	E	W	Α	В	L	Е	G	Ε	N
R	Т	В	М	S	Ν	N	Q	s	D	Ε	S	Α	Ε	L	Е	R	X	1
٧	R	1	Q	0	R	D	Υ	Н	-	D	Е	Р	М	U	Р	0	м	S
0	1	X	Ε	L	X	E	Z	s	L	1	N	K	E	D	Z	W	N	E
1	C	٧	Υ	Α	Z	S	В	0	J	С	E	Q	н	Q	Z	Т	0	C
R	1	P	Z	R	S	٧	н	N	Х	٧	R	Z	R	R	W	Н	1	U
S	Т	0	R	Α	G	Е	٧	٧	М	Ε	G	Α	W	Α	Т	Т	S	R
٧	Υ	L	0	В	S	Q	Н	0	L	E	Υ	Z	S	Q	X	н	1	1
Е	R	U	Т	U	F	Ε	Е	Н	Т	D	Υ	N	Α	М	1	С	٧	Т
т	Q	С	0	N	С	R	Е	Т	Е	S	Е	G	М	Е	N	Т	S	Υ
н	Z	н	Т	Е	С	н	N	0	L	0	G	Υ	Α	т	V	С	Z	a





Skip and go

Skip the coffee queue at the Snowy Hydro Discovery Centre cafe in Cooma by ordering your morning brew ahead of time with the Skip smartphone app. The app is free to download from Google Play or Apple's App store and once installed, simply set your location, select the Discovery Centre and choose from the drinks and snacks on offer. The app will let you know the wait time to collect your order. Add a payment card to pay in advance for a quick and contactless transaction.



Holiday fun

Snowy Hydro's H20 Kids school holiday program is back for summer! Offered for the first time over the October break, H20 Kids will return in January, jam-packed with hands-on activities sure to stamp out any holiday boredom.

Ever wondered what the Snowy Scheme looks like from above? See for yourself with an amazing virtual flyover at the Discovery Centre's new immersive theatre. Learn about dambuilding with a real-life engineer, then test your skills and build your own model dam. A former Snowy worker will also stop by with plenty of tales from the early days on the Scheme.

H20 Kids is run through the Out of School Hours programs across the Snowy Mountains and is designed for children aged from six to 12 years.



Curious minds

Innovation is alive and well in the Snowy Mountains if the entries in this year's Science of the Snowy Scheme competition are any indication.

Students from local primary schools were tasked with designing a future power station that generates 100% Australian-made renewable energy. The years 3-6 students worked individually, or with classmates, to come up with ingenious ideas including a farm of lightning catchers in the outback, a solar-powered windmill in the ocean and a bicycle-powered gym.

Now in its fourth year, the Science of the Snowy Scheme 2020 attracted a record number of almost 200 entries. The competition supports National Science Week, held every year to celebrate science and technology - and the prizes were clearly worth competing for. The winners are off to Taronga Zoo for an overnight stay and can choose from the Roar and Snore in Sydney, or the Zoofari Lodge in Dubbo, thanks to our energy retailer, Red Energy. There's also a behind-the-scenes Snowy Hydro power station tour for the winners and their classmates.

Head over to our Science of the Snowy Scheme competition page at snowyhydro.com.au to see the entries that caught the judges' attention, along with dozens more creative inventions. Congratulations to all who entered!



Owned by **snowy** hydro 131 806

