

Summer 2018

snowyhydro

NEWS



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ISSUE 43

A busy yet excit



This is the last edition of our Snowy Hydro NEWS for 2018, and what a year it has been. However, for us at Snowy it is not over yet!

The end of 2018 will see a major change for our business as our Snowy 2.0 pumped hydro expansion project goes to our Board of Directors for the Final Investment Decision (FID) in December. If the Board approves Snowy 2.0, their recommendation will be put to our shareholder (the Federal Government) for consideration.

Over the last 12 months, there have been rapid changes in the National Electricity Market (NEM) and competitive pricing across all generation technologies has seen the cost of renewables fall. The favorable economics for new renewables will see more wind and solar projects come online as thermal generation retires over the coming decades.

As both wind and solar are intermittent sources of generation, they will need to be 'firmed' to ensure households and businesses can access reliable and affordable energy whenever they need it. The future NEM will need large-scale energy storage and on-demand generation to fill the gaps (when the wind isn't blowing and the sun isn't shining) and underpin the reliability of the system. Snowy Hydro provides these services to the NEM today and they will be in even greater demand in the future, which is why we're expanding with Snowy 2.0.

The critical need for Snowy 2.0 (and other storage projects across the NEM) is driving the pace at which we are pursuing the project. We have made exceptional progress with technical design, geotechnical investigation, procurement, financing and other important project components and we continue to work through a detailed environmental planning and approvals process, as well as engaging with our many stakeholders, including the local community. We are planning to have everything in place so we are ready to go if we get the go-ahead.

In other exciting news, we recently announced our very successful renewables expression of interest procurement program. Signing eight new contracts with wind and solar projects comes at the end of many months of hard work from our commercial and legal teams.

This is hugely exciting for us - securing these new contracts is a game-changer, not only for Snowy Hydro, but the wider NEM too.

Our new 888 megawatts of generation, 'firmed' by our existing assets, will fundamentally shift market dynamics by adding 2.8 terawatt hours of new supply (by removing Snowy's demand that we



ing end to 2018

no longer need to source from the market), and increasing competition with the addition of a fourth significant player in the wholesale energy space.

Our increase in supply will add much-needed competition to the energy market (largely dominated by a few big players) and put downward pressure on wholesale prices. This in turn will enable us to pass on lower prices to our customers through our retail brands Red Energy and Lumo Energy.

Having our own generation will address our energy 'deficit'. As you may know, we are energy 'short' and currently buy energy from the wholesale market. As one of the largest buyers of energy in the NEM, we are exposed to wholesale energy prices that we see daily.

These new contracts, 'firmed' by our existing assets, allow us to source new generation at the lowest cost. They provide Snowy with price certainty at a long-term fixed firm flat price of \$70 per megawatt hour (ie, the cost of raw renewables plus a cost for firming) and in turn, greater control over prices we can offer to our customers.

Another key focus for the business at the moment is the drought we are experiencing and our water position. Low water levels are definitely a sight that could make one nervous - however, this is what the mighty Snowy Scheme was designed for and I am confident we will manage our water as efficiently as we have done in droughts previously.

It is true that at this time of year we would like to have a little more in our storages, but there is still snow high up on the hills and we do expect some more run-off to reach the dams.

We are adjusting our generation levels to make the most of our water position and get ready for the summer. Our talented team of weather scientists have reaffirmed that the forecast is continuing dry, so we are managing our water and using our gas and diesel plants to generate energy when we need to. The decision to expand and diversify our generation portfolio some years back is proving, once again, to be a smart one. Having strategically-located gas and diesel power stations ready to back up the Scheme in the drier years is critically important. As always we are, and remain, in a position to keep the lights on at times of peak energy demand.

I am continually amazed by the dedication and commitment of the Snowy Hydro team. The teams across the mountains and our regional assets keep our power stations operating like new, our retail teams continue to deliver great products with excellent customer service and the Snowy 2.0 team is pulling out all the stops to be ready for FID.

Finally, as always, I would like to thank you for your support of Snowy Hydro this year. We look forward to a very exciting 2019 with the impending changes to our business. On behalf of everyone who works for Snowy Hydro, I wish you a safe, prosperous and happy festive season.

Snowy Hydro signs game-changing deals

In an exciting and game-changing move for the energy market, Snowy Hydro recently announced the signing of eight wind and solar contracts to provide cheaper energy to 500,000 Australian households.

The eight projects, totalling 888 megawatts (MW), are located across New South Wales and Victoria and are expected to generate about 2.8 terawatt hours of energy annually.

Snowy Hydro is a key provider of fast-start, capacity-type products, and we keep the lights on at times of high demand. However, we are 'energy short' (meaning that we do not generate enough energy from own power stations to cover all of our customers) so we have to purchase energy from the wholesale market. We are one of the largest energy buyers in the National Electricity Market and, just like households, we are exposed to high wholesale prices. Therefore, nine months ago we looked to test the market with a renewable energy procurement program to see what additional renewable generation was available to us.

We were overwhelmed with the level of interest and had more than 17,600MW of projects submitted through the procurement process. All eight winning projects are expected to come online within the next two years.

Our project partners are also excited by the deals. Here's what some of them had to say:

Adam Pegg, Lightsource BP Country Manager for Australia, said: "At Lightsource BP, we pride ourselves in offering global solar energy solutions that are competitively priced to our customers. Our success in this bid, reaffirms that capability."

"Securing such a prestigious offtake agreement with Snowy Hydro is an outstanding result, and we are pleased to work with Snowy in delivering sustainable clean energy for Australia," said Daniel Hong, CEO of Clenergy.

According to Daniel Sagi-Vela, CEO of FRV, "with this agreement we want to continue leading the production of renewable energy in Australia, a country that is showing a great commitment to boost renewable energy projects."

Snowy Hydro's existing hydro, gas and diesel assets give us the ability to 'firm' up vast amounts of intermittent renewable generation today to ensure energy is available when needed.

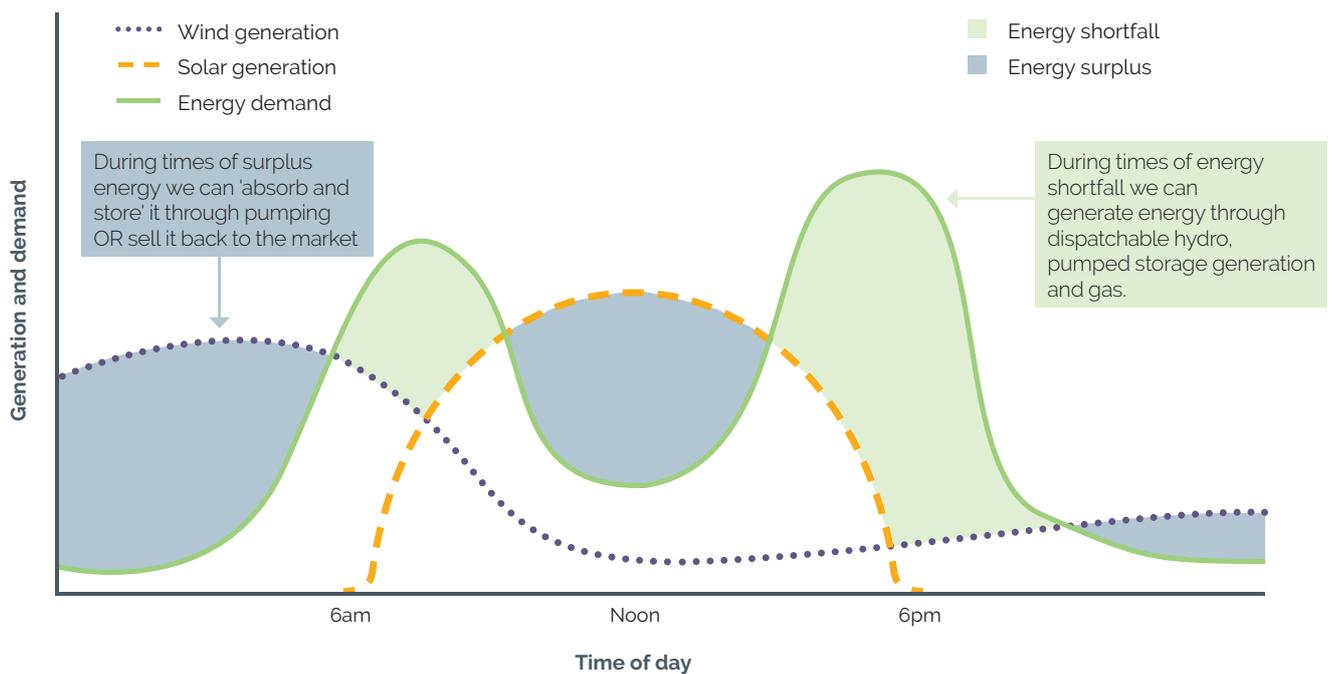
What does 'firming' mean ?

In simple terms, 'firming' works by transforming intermittent energy into reliable energy so it's available on-demand when a customer needs it.

While the energy output of individual projects varies, Snowy Hydro's power stations can work in combination with wind and solar, creating 'firm' reliable energy.



Firming - conceptually



Wind, solar and hydro:

how do they work together?

The National Electricity Market has almost 8,500 megawatts (MW) of installed large-scale wind and solar farms, on top of almost 6,000MW of rooftop solar. With the proposed installation of an additional 6,500MW of large projects in the coming years, as well as continued growth in rooftop solar, all of this renewable generation poses some interesting challenges for the market into the future.

Wind and solar can affect the energy market in two ways - through supply and through demand.

When it is windy or sunny, we see high electricity generation from the respective wind and solar projects providing lots of supply to the grid. Vice versa when there is no wind, or it's cloudy or dark, there is zero energy output and supply needs to come from other sources. As renewables essentially cost nothing in the short-term to run, this means energy is needed from more expensive sources, such as coal, gas or hydro and it's on these days where we see higher spot market prices and bigger output from our stations.

While you may say Snowy's short-term actual costs are also close to zero, we can store our energy (unlike the wind farms), allowing us to save it for the days when wind is low and maximise what we get for our limited water resource. If there is severe weather the wind farms may need to reduce their output by turning the blades away from the wind ('feathering'), though this is only with very high wind speeds. If the turbines are not feathered they can be destroyed. Interestingly, some of the solar farms do not reach their maximum output in the middle of summer as they can be affected by heat - the hotter it gets the less efficient they are.

Wind and solar also play a key role in the demand side. More sunshine of course leads to more heat, but wind can also play a role. The direction of wind can have a large effect on heat waves in summer and heating demand in winter. A good example of this is in Sydney. Whether a sea breeze develops or not can have a material impact on NSW demand.

Wind speed plays a key role in determining the 'apparent temperature' which is a good indicator of personal comfort. Especially on cold days, an increase in wind speed can have a profound effect on thermal comfort, which tends to drive people to turn their heating up.

In addition, there are also likely to be direct impacts on the energy efficiency of homes on windy days. In particular for older homes, heat loss due to cold draughts can be a major factor.

In the long run, wind and solar will help lower prices, but it needs to be part of a coordinated approach with backup generation. This includes pumped hydro, which is needed when the wind isn't blowing or the sun is not shining. If it is not planned well we end up with a lot of renewable generation in the same place with insufficient backup, this could actually lead to higher prices in the short to medium term, as has been the case in South Australia.

Wind and solar variability helps underpin both Snowy Hydro's current business and the Snowy 2.0 project. Our peaking plant provides backup and essential storage to the market, filling in the gaps when other generation is down or demand is up.

As more intermittent generation is installed there will be a greater need for other generation that can ramp up and down as wind and solar output varies. The existing NEM fleet of coal and gas generation will get to a point where it will not be able to cope with the big swings in renewable output, creating a need for lots of storage such as Snowy 2.0.



Snowy 2.0 update

Project activity has been ramping up in recent months as the Snowy 2.0 team prepares for some key milestones.

Among these is final investment decision (FID) in December, when Snowy Hydro's independent Board of Directors determines whether to proceed with the project, a proposed major pumped hydro expansion of the Snowy Scheme.

In the lead-up to this event, the project team has been extremely busy managing the tender process for the civil and electrical and mechanical contracts. Snowy Hydro owns and oversees the 2.0 project, but is utilising experts to construct it.

Preparing for, and assessing, the tenders is a significant and painstaking operation as we strive to achieve the highest quality result for the project build (subject to approvals).

Quality is a key term in relation to Snowy 2.0. Each item of equipment, from the smallest bolt to the largest turbine runner, needs to be designed, manufactured, delivered and installed to the highest possible standard so that the completed plant operates safely, efficiently and reliably over many years.

Snowy Hydro staff have visited dozens of workshops, construction projects and operating facilities throughout Australia and internationally in the last 12 months to better understand the building and performance of similar equipment, best practice quality management processes, and safety and environmental management.

These site visits have provided valuable insights that are informing our safety, environmental, technical and quality planning for Snowy 2.0.

Snowy Hydro staff have also recently visited sites in Europe and Japan to observe and report on testing of working pump-turbine scale models. These models have been developed by companies tendering for the electrical and mechanical contract for the Snowy 2.0 project.

The models are specially-constructed to about 1/8 scale and tested in laboratories which simulate the hydraulic conditions the pump-turbines would be subject to while in operation. This includes under emergency conditions, as well as outside the usual operating ranges, to establish the safety margins.

Snowy Hydro owns and oversees the Snowy 2.0 project, but is utilising experts to construct it...

Field work restarted in October after a break over the winter months, with investigative geotechnical and hydrogeological drilling occurring at several sites along the proposed project alignment.

We have also been conducting surveys focusing on identifying items or sites associated with Aboriginal cultural heritage, as well as historic cultural heritage, which may be present across the project area.

Biodiversity survey work undertaken by contracted ecologists has included vegetation plot surveys and mapping, and targeted fauna surveys (including night-time camera surveys). These studies are helping identify the location of threatened flora and fauna species so impacts can be minimised or avoided through the project design.

Aquatic surveys are being carried out at both Talbingo Dam and Tantangara Dam to identify any threatened species and survey both the aquatic life and their habitat.

Meanwhile, a scoping report has been provided to the NSW Department of Planning and Environment as part of the approvals process for Snowy 2.0 Main Works.

A detailed Environmental Impact Statement (EIS) will also be required - it considers any potential environmental, social and economic impacts of Snowy 2.0 Main Works and provides measures to minimise and avoid these impacts.

The Snowy 2.0 team is working to gather the information we need to prepare the EIS, which is due to be submitted in the first half of 2019.

*Eastern Three-lined Skink (*Acritoscincus duperreyi*) caught and released as part of surveys for Snowy 2.0.*

Inset: Contractors EMM carrying out groundwater monitoring.





Have your say on Snowy 2.0

Talking to the local community about Snowy 2.0 and receiving feedback about the project is extremely important.

We are committed to keeping the Snowy Mountains community updated on this major proposed expansion of the Snowy Scheme, and providing people with the opportunity to 'have their say'.

Snowy Hydro is a long and proud member of the local community and engagement with community stakeholders is an ongoing focus for the business.

The Snowy 2.0 journey began in March 2017 and has involved regular community consultation.

Recently, the Snowy 2.0 team hosted information sessions in a number of local towns and communities - Tumut, Adaminaby, Talbingo, Cooma and Tumbarumba.

The informal drop-in sessions were held during daytime hours and in the evening, to allow as many community members as possible to attend.

Local residents were encouraged to find out more about Snowy 2.0, how it would work, what benefits it would bring for energy consumers and what it might mean for communities.

People of all ages dropped in to have a chat with the Snowy 2.0 team, ask questions, receive activity updates and provide their views on the project.

Further Snowy 2.0 community information sessions are planned for 2019, to be held across the Snowy Mountains. Look out for details of these events on our website and local media outlets.

You can also let us know your thoughts about Snowy 2.0 via snowy2.0@snowyhydro.com.au

All feedback received from community members will be taken into account as part of the approvals phase for Snowy 2.0 Main Works.

 snowyhydro.com.au

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Looking to the future of Jindabyne

If you live in Jindabyne, you may have seen Expressions of Interest (EOI) signs going up on several parcels of Snowy Hydro-owned land around the town.

The parcels of land, located at Cobbon Crescent, Old Kosciuszko Road In East Jindabyne, Coppertom Point and Kosciuszko Road near Snowy Mountains Grammar School, are not required for the operation of the Snowy Scheme in the future.

An EOI process for the potential sale of these Jindabyne landholdings is underway. It will enable Snowy Hydro to assess the level of interest in the land and allow people to put forward offers that may result in new opportunities for the town and local region.

According to Paul Broad, CEO of Snowy Hydro, the company is constantly reviewing its landholdings and whether they are serving their best purpose.

"We have heard the local view that land shortages are reducing opportunities for some home buyers to enter the market. They are also making it difficult for tourism operators and for the local Council to identify suitable community land," Mr Broad said.

"Our parcels of land are in a range of locations and land-use zones, and would be suitable for diverse parts of the market, including for housing, tourism, community and commercial uses.

"If there is evidence that by releasing some parcels of land it could help address local issues - and any proposals are supported by Council - then that would be a great outcome."

He said past Snowy Hydro land releases in the area had been well-received and had assisted with land supply issues at the time.

"An EOI process for the four current lots ensures a potential Snowy Hydro land release is open and competitive and that all offers could be carefully considered.

"It gives us the ability to see if there are any significant issues that we are not aware of and assess the way forward."

The EOI will be coordinated by local agent Michael Henley and will run until the end of January 2019.

Members of the community can direct enquiries about the land parcels or the EOI process to Michael Henley on (0403) 165563 or 6457 2504.

For general Snowy Hydro enquiries, contact:

@ info@snowyhydro.com.au



Mini-engineers of the future win Science of the Snowy

The winners of this year's Snowy Hydro 'Science of the Snowy' competition were recently announced, after entries from 55 'mini-engineers' were received from across the Snowy Mountains.

Students in years 3-6 from the Snowy Valleys and Snowy Monaro Regional council areas were asked to design a renewable energy power station of the future. Unique and creative ideas involving tiles that absorb kinetic energy from people walking over them, large-scale biomass power stations utilising food waste and biowaste from farms, and rechargeable batteries capturing energy from swimming fish were among the dozens of well-presented posters, videos, slides and written entries.

Snowy Hydro CEO, Paul Broad, said it was great to see so many local students engaged with engineering and thinking about energy.

"I'm thrilled to see all the budding young engineers across the local region who could potentially join the Snowy team in the future! We have a company full of engineers and scientists and encouraging young people to be interested in STEM is something we're very committed to.

"It's an exciting time for us here at Snowy. As we look to the future we're not just thinking about building new power stations like Snowy 2.0 - we're also focused on finding the best people to run the Scheme in the future."

The winners were:

- Year 3-4 Felix Bertossi (Berridale Primary School) and Grace Pedersen (Jindabyne Central School)
- Year 5-6 Kate Yelds (St Josephs Bombala) and Ruben White (McAuley Catholic Central School, Tumut).

Each winner was awarded a science prize pack from the Snowy Hydro Discovery Centre, and their school received a cash prize of \$300 for learning resources.

Highly commended entries by Cruz D'Helin (Jindabyne Central School), Maxine Girling (Berridale Primary School), Leanne Adams (Cooma Primary School) and Tully McGuinness (St Josephs Bombala) also receive a science prize pack. All winning and highly commended entries are on display at the Snowy Hydro Discovery Centre in Cooma.

Recognition and thanks must go to all the teachers who encouraged their students to enter the competition, and a special thank you to our judging panel, The Hon Mike Kelly, Gail Eastaway, editor of the Monaro Post, Damon Miller from SMEC and Carolyn Ewart from the Country Universities Centre.



Sun shines for the Jounama Classic

Every year people travel from far and wide to take part in the Jounama Classic Fishing Competition held in Talbingo. This exclusive event is high on the bucket list for many keen fishermen as it's the only day annually that boats are permitted on Jounama Pondage.

Snowy Hydro limits generation from Tumut 3 Power Station for this one day of the year in the interests of supporting the local community with an event that brings significant benefits to the local area.

What most people don't realise is how incredibly complex this event is from an operational perspective for Snowy Hydro. Tumut 3 and the Jounama Spillway cannot operate while there are boats on the pondage, however, Snowy Hydro has a requirement for Tumut 3 to be on standby and available to operate 24/7, 365 days-a-year. When Tumut 3 is generating, large amounts of water are released very quickly, which creates strong currents and turbulent conditions, making the water unpredictable and posing significant safety risks to the public. It is in the interests of safety that access to Jounama Pondage for all water sports is prohibited.

Preparation and planning for the Jounama Classic starts weeks in advance to ensure that the water levels are adequate for the competition. We do everything we can to ensure the event goes ahead, but ultimately if the market dictates the

need to generate, then that is the priority. This has only occurred once in the 18-year history of the event, when it was cancelled the day before due to market demands for power.

Competitors at the 2018 Jounama Classic were treated to a beautiful spring day and a full field of boats hit the water. That field included 55 boats, 161 anglers and a total catch across all competitors of 52 fish. Congratulations to all who participated, and to the prize winning anglers listed below:

- Champion Male Angler - Josh Smith
- Champion Female Angler - Kylie Mitchell
- Champion Junior Angler - Regan McKenzie

The event was initiated by the Talbingo Fishing Club in 2000 and Snowy has been a supporter, both from an operational perspective and as a sponsor, since its inception.

Congratulations to the Talbingo Fishing Club for organising another great Jounama Classic and thanks to the many organisations which contributed to and assisted with the event.

Riding for research: 2018 Snowy Ride

Snowy Hydro has been a proud sponsor of the Steven Walter Children's Cancer Foundation (SWCCF) and the annual Snowy Ride since 2001 and this year welcomed more than 2,000 motorcycle enthusiasts to the region.

The Snowy Ride raises money for childhood cancer research and stimulates the local economy by increasing the number of visitors to the Snowy Mountains region. Since its inception, the SWCCF has achieved an 80% cure rate and is tirelessly working towards a 100% cure rate.

This year 2,140 motorcycles and pillions spent the day riding the picturesque alpine roads of the region, visiting event checkpoints and raising more than \$200,000 for research into a cure for childhood cancer.

Snowy Hydro prides itself on supporting the local communities where our staff live and work. The Snowy Hydro Family Program is a company initiative, created in partnership with the SWCCF, where children undergoing cancer treatment and their families are hosted for the weekend at Thredbo. This year eight families with children aged from two to 17 years attended the weekend. They enjoyed rides on Honda Goldwings thanks to the Australian Goldwing Association, activities at Lake Crackenback Resort, toboggan and chairlift rides and plenty more.

Darren Skuse, a senior environmental advisor at Snowy Hydro, said: "As a childhood cancer survivor and ambassador for the SWCCF, it was a pleasure and privilege for Gabrielle Curtin and I to represent Snowy Hydro and take part in the Snowy Hydro Family Program.

"We had a lovely group of families, who were able to get some respite and let us take care of them

for the weekend while they got to enjoy the region and the Snowy Ride event. As always, it's great to see the camaraderie and passion for motorcycles that brings everyone together to work towards SWCCF's goal of 100% survival for all kids living with cancer."

Throughout the weekend Darren was able to provide hope for the families and share his journey to remission.

The SWCCF was founded in 2001 after Steven Walter lost his heroic eight-year battle with childhood cancer, aged only 19 years. Steven's passion for motorbike-riding and his determination to raise money to cure childhood cancer led to the creation of the Snowy Ride, an event which provides a much-needed weekend away for young cancer patients and their families. The key motivation of the charity is "so that one day no other kid will have to go through what Steven went through."





Snowy Hydro's Gabrielle Curtin and Darren Skuse With the Snowy Hydro Family Program kids of 2018.





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