

snowy hydro

NEWS

ISSUE 10
AUGUST 2010

Cloud Seeding Delivers
14% MORE SNOW

**GUIDE FOR EVENT
ORGANISERS**
Foreshores &
Surrounds

Tumut Business Awards
THE 2010 WINNERS

SNOW = WATER

**Young
Driver
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10 years of support for
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Jounama Power Station
THE OFFICIAL OPENING



Snowy Hydro Cloud Seeding

*John Denholm
Project Director
Cloud Seeding*



Introduction

Cloud seeding involves the introduction of a seeding agent into suitable clouds to encourage the formation and growth of ice crystals or raindrops and, in turn, enhancing the precipitation falling from the cloud. The technique has been in use for more than 50 years, and in Australia for more than 40 years.

Today, there are more than 150 cloud seeding projects around the world.

The Snowy Mountains Cloud Seeding Trial Act 2004 (NSW) allows Snowy Hydro to undertake the Snowy Precipitation Enhancement Research Project (cloud seeding) over a limited and clearly defined target area in the Snowy Mountains region of NSW.

The cloud seeding legislation imposes a number of mandatory constraints on the cloud seeding project. For example, Snowy Hydro can only use ground based generators for seeding - aircraft cannot be used for this purpose.

Cloud seeding only takes place between May and early October each year, and only when precipitation is likely to fall as snow – seeding for rain over the target area is not permitted.

The objectives of the Snowy Hydro cloud seeding project are to determine if cloud seeding can be used to increase snow falls, at reasonable cost and without any significant adverse effects on the environment or downwind of the target area.

Winter precipitation over the Snowy Mountains is typically associated with moist westerly weather systems.

These systems are often inefficient, and under normal circumstances (that is, if left unseeded), these clouds pass across the mountain range and the moisture in them evaporates on the leeward side of the mountain. The result is the well understood, naturally occurring phenomena known as a rain shadow.

The predominant weather systems that bring precipitation to the Monaro - those from the north, east or south are never seeded, and there are no cloud seeding generators in place which could operate under these wind directions.

A comprehensive Environmental Management Plan for the cloud seeding project was developed in collaboration with experts from the Department of Environment, Climate Change and Water, and the monitoring analysis and outcomes are reported to Government each year.

All of the monitoring to date shows no evidence of any significant adverse environmental impact.

An independent evaluation of the project undertaken up to June 2009 has shown when cloud seeding was undertaken during suitable conditions there was a 14 percent increase in snowfall. The independent evaluation included an assessment of potential effects on downwind areas, and found no evidence of any impact in these areas.

History of Cloud Seeding

The potential for cloud seeding in the Snowy Mountains was recognised as early as the 1950s.

A joint experiment between the CSIRO and the Snowy Mountains Hydro-electric Authority (SMHEA) took place during 1955 to 1959. This study reported an increase in precipitation of 19 percent.



The results of the trial were challenged however because of claims proper scientific procedure had not been followed.

Some research into cloud seeding over the Snowy Mountains was undertaken following a severe drought across the region during late 1970s. Further studies took place over the winters of 1988-1989, and by 1993 a proposal for a second cloud seeding project was tabled. For a number of reasons the project did not proceed at that time.

No further progress was made until after corporatisation of the SMHEA to Snowy Hydro Limited in 2002. By this time, the drought impacting the region had increased in severity, with declining inflows into Scheme storages resulting in less water being released down the Murray and Murrumbidgee Rivers.

The community, stakeholder and political will to find some means of mitigating the impacts of the drought then put cloud seeding firmly back on the regional and state agenda.

An independent Expert Panel was commissioned in the second half of 2003 to undertake a comprehensive assessment of the potential environmental effects that may be associated with a cloud seeding experiment over the Snowy Mountains. The Expert Panel reported to the NSW government that "any significant adverse environmental impacts would be very unlikely". This resulted in the NSW government passing enabling legislation, the Snowy Mountains Cloud Seeding Trial Act 2004 (NSW) early the following year.

Stakeholder and community support for the project continued to increase as the drought showed no signs of abating. This resulted in the NSW government amending the cloud seeding legislation, extending the duration of the trial from 2009 until 2015, increasing the size of the original target area from around 1,000 square km to 2,150 square km.

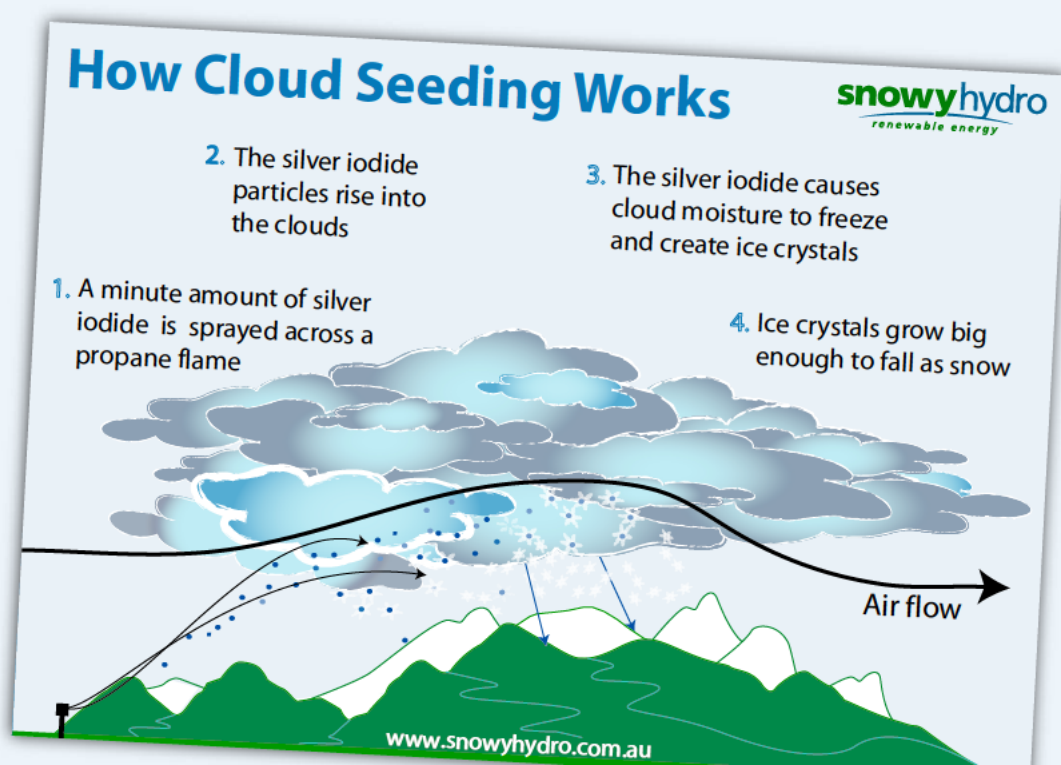
To avoid the issues associated with the 1955 to 1959 cloud seeding trial and to ensure that the results of the 2004 to 2009 Snowy Hydro cloud seeding trial could be relied on, a number of measures were carefully implemented.

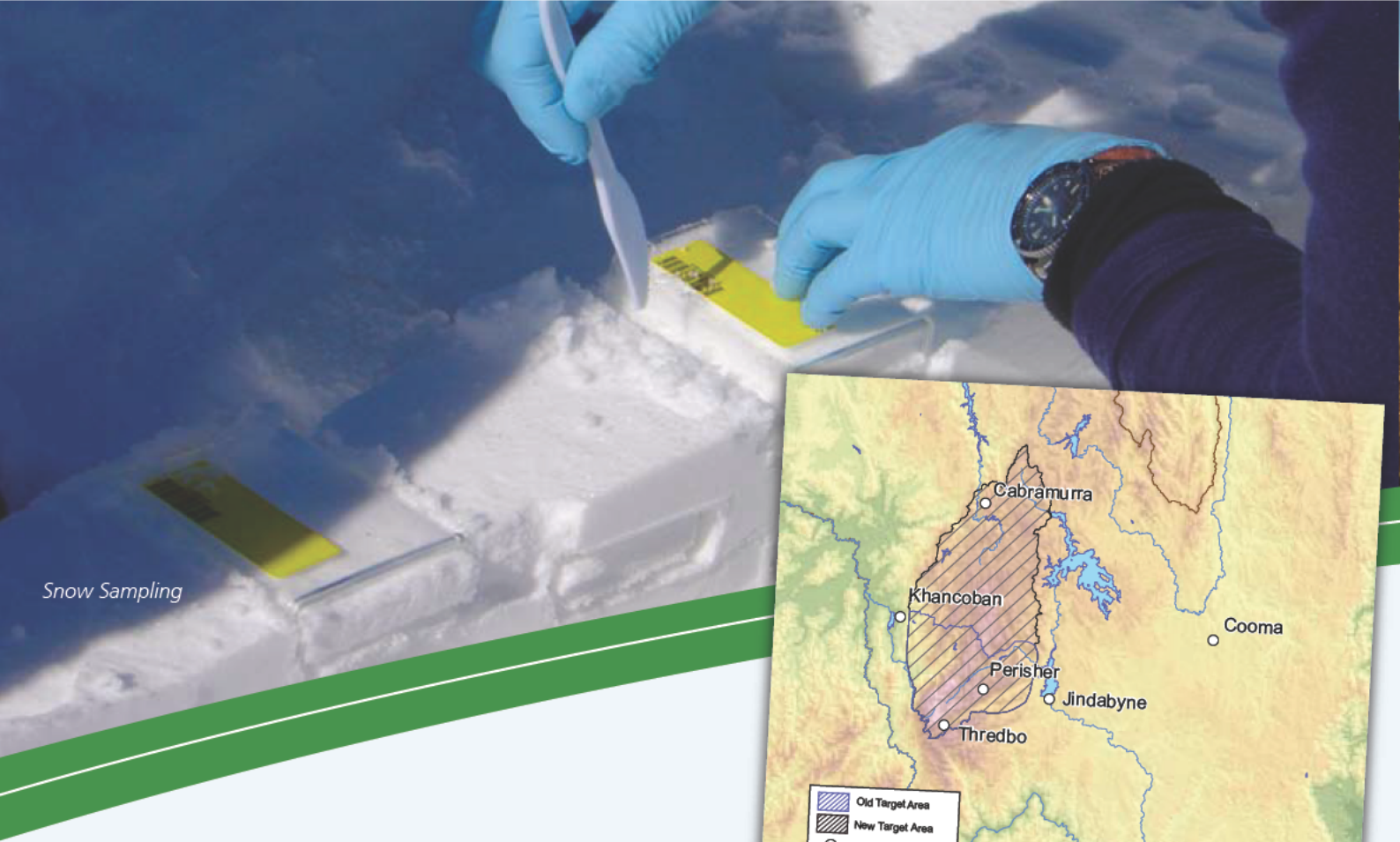
These included the development of a formal experimental design, and an evaluation plan setting out in detail the methods for analysing the experimental data and criteria for success – published and publicly available in advance of the evaluation of the trial.

Procedures were also developed to ensure that every cloud seeding experiment – without exception – was undertaken in compliance with the experimental design and legislative obligations. Independent audits were also undertaken each year and reported to the NSW Government. Most importantly, the final evaluation of the project outcomes and peer reviews of outcomes were to be undertaken independently of Snowy Hydro Limited.

How Does it Work?

Winter precipitation over the Snowy Mountains is largely associated with moist westerly weather systems. As these systems approach the mountains, the air mass is lifted and condenses further to form orographically enhanced clouds composed of tiny water droplets. Under certain conditions these droplets





Snow Sampling

remain in liquid form, even at temperatures well below zero degrees Celsius. Water in this form is known as super cooled liquid water (SLW).

To fall out of the clouds as snow, the SLW droplets need to form ice crystals. This naturally occurs through interaction with tiny airborne particles (like dust or other ice crystals), or when cloud temperatures are very cold, for example at least minus 30 degrees Celsius. If there are not enough of these particles, or the temperatures are not cold enough, then not all the SLW droplets are converted into ice crystals to form snow flakes. These clouds can be described as 'naturally inefficient'.

To improve the precipitation efficiency of these clouds, additional particles can be introduced for the excess SLW droplets to freeze onto, allowing ice crystals to form and grow and fall to the ground as snow. This process is known as glaciogenic cloud seeding.

Silver iodide is used as the seeding material because it has physical properties very similar to natural ice crystals. The project uses ground based generators arranged along the western side of the mountains to disperse very small quantities of the silver iodide into winter storm clouds as they pass over the mountain range. These particles are invisible to the human eye - so small that more than 300 million particles would fit

on the head of a pin. On average the amount of seeding material used each year across more than 2150 square km could be contained within an average domestic water bucket or kitchen tidy.

The cloud seeding project infrastructure includes:

- An extensive network of high resolution meteorological instruments (for monitoring weather conditions and recording meteorological data);
- A weather balloon launching facility near Khancoban;
- Two Remote Sensing Facilities, with special instrumentation designed for measuring SLW. These instruments identify inefficient systems, for cloud seeding, ensuring that efficient systems are left to snow naturally;
- A total of 23 ground generator sites along the western side of the mountains.

The Snowy Hydro cloud seeding project is run very much like a medical trial where some patients randomly receive the active treatment and others a placebo. This method is used to avoid inadvertent bias. In the case of this project, some cloud seeding experiments are seeded, and others not. The present randomisation of seeding means that less 50% of the suitable weather systems are actually seeded.

The costs for the first six years of the project were more than \$20 million. Just over \$16 million was provided by Snowy Hydro. Early promising results were sufficient for the Federal Government to also provide \$4 million in research funding support.

Environmental Management and Care

Snowy Hydro has implemented a comprehensive Environmental Management Plan (EMP) for the cloud seeding project. The EMP was developed in collaboration with experts from the NSW Department of Environment, Climate Change and Water (DECCW) and in consultation with the NSW Natural Resources Commission (NRC). The EMP covers aspects of the project including:

- The installation, operation and maintenance of infrastructure;
- Use of seeder and tracer agents;
- Changes in precipitation.

Audits of infrastructure by Snowy Hydro, DECCW and the NRC over the duration of the trial have not identified any significant adverse environmental impacts associated with cloud seeding infrastructure.

As explained earlier, silver iodide is used as the seeding agent. An inert tracer



agent indium (III) oxide is also released from each generator site. Snow samples are collected from the target area after cloud seeding experiments, and these are analysed to provide scientists with information on targeting and cloud seeding effectiveness.

A large number of soil, lake and stream sediments, moss, peat and water samples were collected prior to the commencement of the cloud seeding trial in 2004. Analysis of these samples confirmed silver and indium to be present in measureable – sometimes quite high – concentrations well before any cloud seeding operations took place.

More than 2000 samples are collected each year to determine if concentrations of the seeder and tracer compounds are increasing above background levels or approaching the relevant environmental guideline trigger values for investigation.

An expert analysis of all of the monitoring data collected over the period 2004 to 2009 shows average concentrations of silver and indium at all locations and for all environmental matrices remain unchanged or very low compared to the relevant environmental guidelines.

All potable (drinking) water supplies within the cloud seeding target area are regularly tested, and with an average concentration of 1 part per trillion (that is, 1 part in one million, million parts). Every single sample collected has been almost 100,000 times lower than the level specified in the National Health and Medical Research Centre Australian Drinking Water Guidelines. In comparison, commercial distilled water

supplied from a local supermarket was found to have a concentration of around 40 parts per trillion of silver.

Monitoring of precipitation impacts includes assessments of both the aquatic and terrestrial environments. Data from these programs has shown no evidence of any significant adverse impact associated with cloud seeding activities.

Overall, and most importantly, the environmental investigations conducted over the last six years support the conclusion of the Expert Panel, providing compelling evidence that cloud seeding has not had, and is unlikely to have, a significant adverse environmental impact.

What about Downwind – More or less rain?

From time to time, questions are raised by some stakeholders to the east of the Snowy Mountains as to whether the seeding is adversely impacting on rainfall downwind of the project.

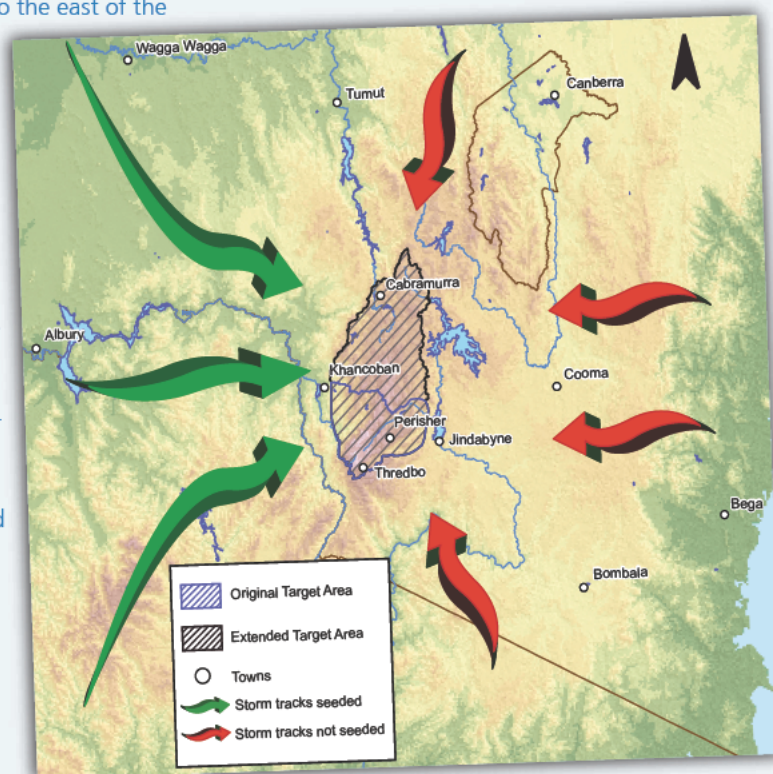
Their concerns are based on the idea that increasing precipitation in one area can only be done at the expense of a decrease in precipitation in another area.

The Snowy Hydro cloud seeding project only targets inefficient orographic clouds with an excess of super cooled liquid water,

which evaporates as the clouds descend on the eastern side of the mountains. As seen in the diagram below, only westerly storm systems are ever seeded. It is worth noting that some projects around the world have reported marginal increases in precipitation downwind of the cloud seeding target area.

While the Expert Panel concluded there would be no adverse impact, the evaluation plan for the project included a scientific assessment of potential downwind effects to confirm this opinion.

The independent evaluation of the cloud seeding project and case studies reported to the NSW government included an assessment of precipitation from gauges in downwind areas including Cooma, Berridale, Dalgety, Popong, Bombala, Bega and Braidwood.





Jounama Small Hydro

The assessment found no evidence of any impacts – positive or negative – downwind of the target area.

The Results - Where to from here?

The Snowy Hydro Cloud Seeding Project was undertaken in accordance with a formal experimental design and evaluation plan with criteria for success clearly defined and published in advance. This was done to ensure the results would be credible, the process transparent and that the results could be relied on.

The expert scientific evaluation of the project was undertaken independently of Snowy Hydro, in addition there were two separate independent reviews of the evaluation outcomes.

Analysis shows where the overall target was effectively covered and “applied to the overall target area the precipitation increase is 14% at the 3% significance level”.

In other words, there was only a 3% probability that the outcome could have resulted from chance alone.

The independent peer reviews of the evaluation noted that the trial was “well designed” and “particularly well executed”, and most importantly that “.. the evaluation can be accepted with confidence.”

The Snowy Hydro cloud seeding project set out to answer the question: “can cloud seeding can be used to increase snow falls, at reasonable cost and without any significant adverse effects on the environment or downwind of the target area?”. This question has been answered in the affirmative, and the decision to move from an experimental trial to an ongoing operation is now being considered by the NSW government.

A move to an ongoing operation would mean that all suitable cold fronts would be seeded, delivering further benefit to all stakeholders.

Over the course of the project Snowy Hydro has made a considerable effort to keep the local community and stakeholders well informed on the progress of the trial and the scientific evaluation. This has been done through our quarterly Community Newsletters,

via our website, detailed presentations to community and stakeholder groups and in written responses to all enquires received about the project.

New Power Station Opens

*Peter Hill
Electrical & Mechanical
Construction Manager*



Snowy Hydro recently celebrated the official opening on 30 June of the new \$30 million Jounama Small Hydro Power Station at Talbingo.

The station, which is the first new significant hydro-electric power station to be built since completion of the Snowy Mountains Scheme in 1974, will increase the capacity of the scheme, with enough power to run more than 6000 homes.

Utilising water that would otherwise have passed through the Jounama Dam spillway, Snowy Hydro will be able to save about 58,000 metric tonnes of greenhouse gases each year.

The success of Snowy Hydro in the National Electricity Market to date has allowed the company to earn sufficient revenue to undertake projects like the Jounama Small Hydro Power Station.

More than 350 people worked on the Jounama project – a mix of Snowy

We would like your feedback...

Snowy Hydro welcomes your comments and feedback. You can contact us for more information by calling, 1800 623 776, emailing communityfeedback@snowyhydro.com.au or by visiting www.snowyhydro.com.au



Right: Driving Instructor, David Knowles with students from Corryong Secondary College

Hydro employees and contractors from both the local area and further afield.

Major works included a 30m high, 13m diameter silo that was built on the downstream side of Jounama Dam to house the turbine generator and associated control systems.

To accommodate the new hydro station, the existing river diversion tunnel was modified, which involved teams of divers working 30m under water for a six-month period to open up the intake of the river diversion tunnel. Under the dam wall the original 500 tonne concrete plug was removed to allow a new 4m diameter, 60m long new steel pipeline to be installed to carry water to the power station.

The silo structure is built within the Blowering Reservoir and the 30m height was required to ensure the station doesn't flood when Blowering Dam is full. The whole structure is anchored down using 31 anchors that are each drilled 20 metres into the rock below.

Other significant facts about the project are that the Kaplan turbine installed in the station is the first of its kind for the Snowy Scheme. The station connects to the electricity grid via an 11kV powerline which extends from the station to a new switch yard, which connects to the 66kV Talbingo-Tumut transmission line via 700m of upgraded lines.

The completion of the project is a positive outcome for the company, the local community and energy users who support renewable energy.

Young Driver Training Program

Tracy Crowe
Community Liaison & Education Program Coordinator



More than 250 year 12 students from six local high schools across the Snowy region have recently completed the Snowy Hydro Young Driver Training Program. The program aims to improve young drivers' attitudes and behaviours to driving.

The Snowy Hydro Young Driver Training Program includes both theory and practical sessions and is run in partnership with local high schools. The theory sessions, held in the classroom, educate the students on areas such as consequences of speeding, responsibility and concentration, knowing their limitations and kinetic energy.

The practical sessions are held with a specially designed 'skid car'. The skid car is a Subaru Forrester with a custom designed, hydraulic skid frame. This allows students, under direction and control of expert driver trainer, David Knowles from the Australian Driving Institute, to experience what causes a car to lose control in a simulated skid situation.

This improves the level of awareness of young drivers and demonstrates how easy it is to lose control in certain conditions.

In response to the 2010 program being successfully completed, Snowy Hydro CEO, Mr Terry Charlton said "The Snowy Hydro Young Driver Training Program has been running locally for over eight years. It's part of our long standing commitment to young people in our local area and is consistent with our company's focus on health and safety."



The skid car in action



Tumut High School year 12 students



Right: David Knowles with students from Snowy Mountains Grammar School

"We are all too familiar with disturbing news headlines about young people killed or injured in car accidents."

Mr Charlton added "Through Snowy Hydro's ongoing success in the National Electricity Market, we are able to make a significant financial investment in the local community such as this program. If our program saves a life or prevents one crash, then it is money well spent."

As Community Liaison and Education Program Coordinator for Snowy Hydro, I see first hand the difference the program makes to young people in our area, it's a great feeling when the students say how much they have learnt and what we do offer is an opportunity which they would not normally have. It makes me proud to think that my company does this each year for the benefit of the local community, in particular our young people. It's about supporting the community that supports us.

The program could not have been possible without the input, support and cooperation of our local high schools, in particular the school co-ordinators which have made the program such a success. All year 12 students should be congratulated on their commitment and interest shown in the program. We received valuable feedback from all students and we are constantly looking at ways to improve the program in the future. The skills the students learn may one day save their life.

Appreciation and thanks also goes to the following for their valued and continued support to this program; Tumut Shire Council through use of the Tumut Aerodrome, Mr David MacLean through use of the Rosewood Skid Pan, Perisher Blue through use of the Bullocks car park, Snowy Mountains Airport Corporation for use of the Cooma Airport and Towong Shire Council through use of the Corryong Aerodrome.

Snowy Hydro, through school partnerships like this, hope to run the program again next year. The expert knowledge and experience of David Knowles and Rob Burns makes the program a huge success. Thank you to David and Rob for their professional delivery of the program.

What the Schools said...

Principal of Jindabyne Central School, Mr Garry Atkinson said "Jindabyne year 12 students learnt so much from the Snowy Hydro driver training program. The relevance of the subject and the practicality of the program engaged them and made them think very carefully about their driving and the way they will behave behind the wheel of their car. They all believed the program would change their driving behaviour and from a teachers point of view this has to be the ultimate goal to improve safety on the roads and decrease dangerous driving. We thank Snowy Hydro for a first class day for all."

Deputy Principal of Corryong College, Mrs Denise Joy, said "thank you to Snowy Hydro for making a difference in the safety of our young people. The program is hugely beneficial in spreading the message that speed is a key contributor to losing control of a vehicle. Our students thoroughly enjoyed the program, were responsive in both the theory and practical sessions and have taken away valuable learning experiences that they will put into practice in their own driving".

Deputy Principal of Tumut High School, David Deitz said "The Snowy Hydro Young Driver Training program was outstanding. The hands on experience and professional instruction that was made available to all students will have a significant positive impact upon the safe driving habits of these young drivers."

Principal of Tumbarumba High School, David Crellay said "the students said that this was a unique program that they would never have the opportunity to undertake anywhere else. We sincerely thank and recognise the support and opportunity Snowy Hydro has provided to our students."

Deputy Principal of Snowy Mountains Grammar, Mr Geoff Greentree said "The Snowy Hydro Young Driver Training Program provides students at SMGS with an invaluable experience as they begin to drive independently. Most of these young drivers will, at some time, find themselves driving in conditions unique to the Snowy Mountains and Monaro - snow, frost and black ice. This program helps them understand the driving techniques that will allow them to safely negotiate their way through or around these road conditions. SMGS thanks Snowy Hydro for the chance to be involved and we will continue to support it in the future."

Relieving Principal of Monaro High School, Mr David Brison, said "the feedback from the students has been exceptional. Comments from students such as 'I didn't realise that talking or texting on a mobile phone could be so dangerous and the practical aspect was great - it's great to find out how skids on ice can occur - safety and I know I can't control skids but I think I can decrease my chances of getting into one now. The students were unanimous in agreeing that the program was a great help and also hope that Snowy Hydro will continue to run the program in future so that other students can benefit from the knowledge that they gained."



Above: Snowy Hydro CEO, Terry Charlton with Virginia and Bruce Robinson - Inside Out Homestore and guest speaker, Michael Pascoe

Tumut Business Awards

Maarten Van der stap
Area Manager, Tumut
Region



Snowy Hydro was honoured to sponsor the recent Tumut Regional Business Awards and to host the guest speaker for the night, finance journalist, Michael Pascoe.

The awards, held in late June, celebrated excellence in business and Michael Pascoe's key note address further inspired the Tumut Region Business Community. Michael provided an insight into the global financial situation and its key economic drivers which he then related back to business in the region, including some tips on how to maximise opportunities.

Awards were announced in categories including innovation in business, young business person of the year and new business of the year.

The winners were:

Young business person of the year - Daniel Roddy, GIO

Innovation in business - JAG Security and Communications

Employee of the year - Sue Goodsall, Bupa Tumut

Superior festival or event - Festival of the Falling Leaf

People's choice - Between the Lines Bookshop

Best new business - Snowy Mountains Finance

Outstanding customer service - D&K Jeffree Express Freight

Outstanding manufacturing, industrial or trade - Katopra Design and Print

Best retail business - Inside Out Homestore

It was great to see the dedication and hard work of so many locals being recognised by the local community.

Clarification on Scheme Rehabilitation

Terry Charlton
CEO & Managing
Director



We seek to clarify a recent misleading statement made by Member for Monaro, Steve Whan, in the media during July 2010.

In the press release Mr Whan reported that as part of the NSW Budget he had secured \$32 million for the Snowy Hydro Electric Scheme rehabilitation program.

While it is true that there is around \$32 million in the NSW Budget for a Snowy rehabilitation project, what Mr Whan failed to acknowledge was this is not a new initiative nor is it originally Government money.

The \$32 million was not secured by Mr Whan as part of the NSW Budget, but is actually money that was paid from the previous Snowy Mountains Hydro-electric Authority to the Government at the time of corporatisation in 2002.

The payment was agreed with the NSW Government in return for National Parks taking responsibility for rehabilitating the major and minor former scheme sites.

This was recognised in the 2001-02 State Budget where the Budget Highlights for Rural and Regional NSW Statement acknowledged "The new company [Snowy Hydro] will pay approximately \$32 million to NSW over five years, to help remediate former Snowy Scheme constructions sites".

In the following 2002-03 State Budget again the Budget Highlights for Rural and Regional NSW Statement included as an ongoing initiative of National Parks and Wildlife Service "\$1.2 million for remediation works in Kosciuszko National Park under the Snowy Mountains Corporatisation program".

Consequently, the \$32 million has been in the NSW Budget since 2001-02. What Mr Whan was referring to in his press releases was a renouncement of old funding that has not yet been expended, not a new initiative. Snowy Hydro understands only \$8 million of the \$32 million has actually been spent by National Parks in efforts to rehabilitate the sites since 2001-02.

The erroneous and misleading nature of Mr Whan's press release was quite rightly recognised by Max Talbot's in his letter to the Cooma Monaro Express on Tuesday 6 July 2010.

In this letter, Mr Talbot also correctly identifies that Mr Whan's statement that he secured [through the State budget] a further \$68 million for transmission and distribution network upgrades is equally incorrect and misleading.



Neither TransGrid nor Country Energy receives budget funding for infrastructure projects. What is reported in the State's Budget is the planned capital expenditure program of those businesses. This capital works program is determined by the businesses, not the Government, and is funded through user charges (which are included in customer's electricity bills).

So putting this altogether, of the \$162 million Mr Whan claims to have secured, \$100 million relates to activities of Government-owned businesses and would have been included in the NSW Budget regardless.

Snowy Mountains Heritage Centre moves forward

*David Hogan
Manager Public Relations & Community Affairs*



From a modest beginning the goals of the Snowy Alpine Heritage Association have grown to encompass an ambition to establish a heritage centre of significance to all Australians. To accomplish a project on the scale now envisaged, it was essential that both private enterprise and government show a similar interest in achieving the aims of the Heritage Centre through tangible involvement and partnerships.

Snowy Hydro Limited, was amongst the early interested parties and the first to offer tangible support in the form of the parcel of land at Jindabyne.

The Snowy Alpine Heritage Association has gained further private sector support and are now joined by GHD, a Canberra based international consultancy of engineers and architects, who have completed preliminary estimates of the project.

The committed team involved with this project will pursue its goals to the next stage being the concept designs for a building of national significance. Snowy Alpine Heritage Association President Mr Tom Barry said, "It comes at a time when government itself has determined that we should embrace our national identity through greater consciousness of our collective history, the proposed heritage centre consolidates that aim in an environment respected and treasured by Australians."

Mr Barry added "Over time, the desire to see the mountain heritage preserved for its value to the local community has grown to a realisation that the history of the mountains represents a unique blend of the features that gave rise to that genuine, often envied Australian character and sense of national pride. This history of the Snowy Mountains symbolised what it means to be an

Australian and provides the opportunity for future generations to better understand themselves amongst the nations of the world."

Snowy Hydro is pleased to partner with the Snowy Alpine Heritage Association and encourages the local community to get behind the committee and support this project.

If you would like to get involved please contact the Snowy Alpine Heritage Association on 0438 561 405.

Snow = water... doesn't it?

*Tania Ward
Public Relations Advisor*



We all know that snow eventually melts resulting in water for the streams, rivers and lakes of the Snowy Mountains but just how much water is there in snow?

There's a science behind this and we've put together a few interesting facts to shed some light on this interesting topic and hope to clear up some of the debate that occurs on this - especially from armchair experts.

The water content of snow varies greatly and depends on many factors. A major contributor is the density - the ratio of



Old Adaminaby boat ramp improvements

water content to the depth of the snow which is then calculated as a percentage. For example - 100cm of snow doesn't translate to 100cm of water, it depends on the density of the snow so 100cm of snow at 30 percent density actually results in the equivalent of 30cm of water.

Other factors include the speed of the melt process as well as evaporation and seepage which play major roles in the final result. If there is little or no spring rain then the snow pack will melt slowly, regardless of the depth, resulting in minimal inflows to streams and rivers.

When snow pack is "ripe", warm winds can cause a lot of evaporation. However, rapid melting from rainfall on the snow pack late in the season is best for higher inflows.

Snow characteristics:

- The colder the temperature the dryer the snow
- The less humid the air, the dryer the snow
- Australian winters are usually humid resulting in less dry snow than other countries like Japan and Canada
- Typically, fresh Australian powder has a density of 15 – 20 percent compared to Canada which is generally between 5 – 7 percent.
- Rivers receive little runoff when it snows so inflows are usually very low from June – August
- The dryer the catchment is the higher the infiltration into the soil and water table which reduces the run off into water storages. This was especially evident after the 2003 bushfires.

The region has been in an unprecedented 12-year drought with

well below average inflows to the Snowy Scheme reservoirs, this includes the lowest ever recorded inflows during the 2006-07 water year. However, regardless of this situation, the company has been able to meet its water licences and electricity generation obligations.

Recovery from this extended dry period will be a slow process with many successive years of above average inflows likely required to replenish the water storages.

Boat Ramp Improvements

*Jenny Crowe
Lands Systems
Administrator*



In recent months we have been able to assist with improvements being undertaken at both the Old Adaminaby and Jindabyne boat ramps.

Snowy Hydro made available gravel to Snowy River Shire Council crews, who took advantage of low water levels to undertake some pavement strengthening and shaping work at Old Adaminaby.

The Lake Eucumbene Chamber of Commerce also chipped in, with the assistance of the Adaminaby Fishing Club, with a working bee at the site to install ramps that have greatly improved all-weather access to the lake.

At Jindabyne, works have included the widening of the existing boat ramp by about 3m to improve access.

Snowy Hydro celebrates 10 years of support for Snowy Hydro SouthCare

*Lara McAuley
Public Relations &
Community Affairs*



It's Snowy Hydro Limited's 10th anniversary as major sponsor of the Snowy Hydro SouthCare Rescue Helicopter.

The Snowy Hydro SouthCare Rescue Helicopter has performed 4,000 life saving and rescue missions throughout our region.

Being a successful business enables us to make significant financial contributions to this service. Together we make a positive difference to our local communities.

Join Snowy Hydro Limited in supporting this vital community service. Visit www.snowyhydrosouthcare.com.au to become involved or donate by calling 02 6207 9923.





CEO - Terry Charlton, Bronnie Taylor and Michele Miller at the 2010 Snowy Hydro Australia's Biggest Morning Tea

A Big Morning

*Michele Miller
Projects Team*



Snowy Hydro, throughout the Snowy Mountains and in our Sydney and Melbourne offices, again showed strong support to the 2010 Cancer Councils Australia's Biggest Morning Tea in May. Snowy Hydro employees have supported the event for 11 years and this year more than \$2,500 was raised through donations and raffles.

Snowy Hydro CEO, Terry Charlton attended the Cooma "Biggest Morning Tea" and was pleased to announce that the company would match the employee contributions and donated a further \$2,500, bringing Snowy Hydro's total support to the Cancer Council to more than \$5,900.

Mr Terry Charlton said in an address to Snowy Hydro staff in Cooma "that initiatives such as this deserve our strong support" before making a cheque presentation to Cancer Care Coordinator and new Cooma Councillor Bronnie Taylor.

Bronnie Taylor, who is also a McGrath Foundation Breast Care nurse for the Monaro region, attended Cooma event and spoke passionately about her involvement and how these funds do so much to support those diagnosed and battling cancer.

Bronnie also addressed staff about ways anyone diagnosed with cancer can locate assistance and financial help, she also provided a variety of information booklets for staff to take home to their families and friends.

Water Operations Report

*Andrew Nolan
Manager Water*



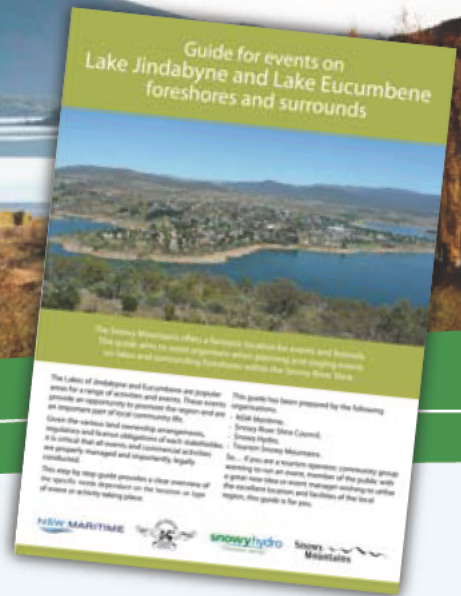
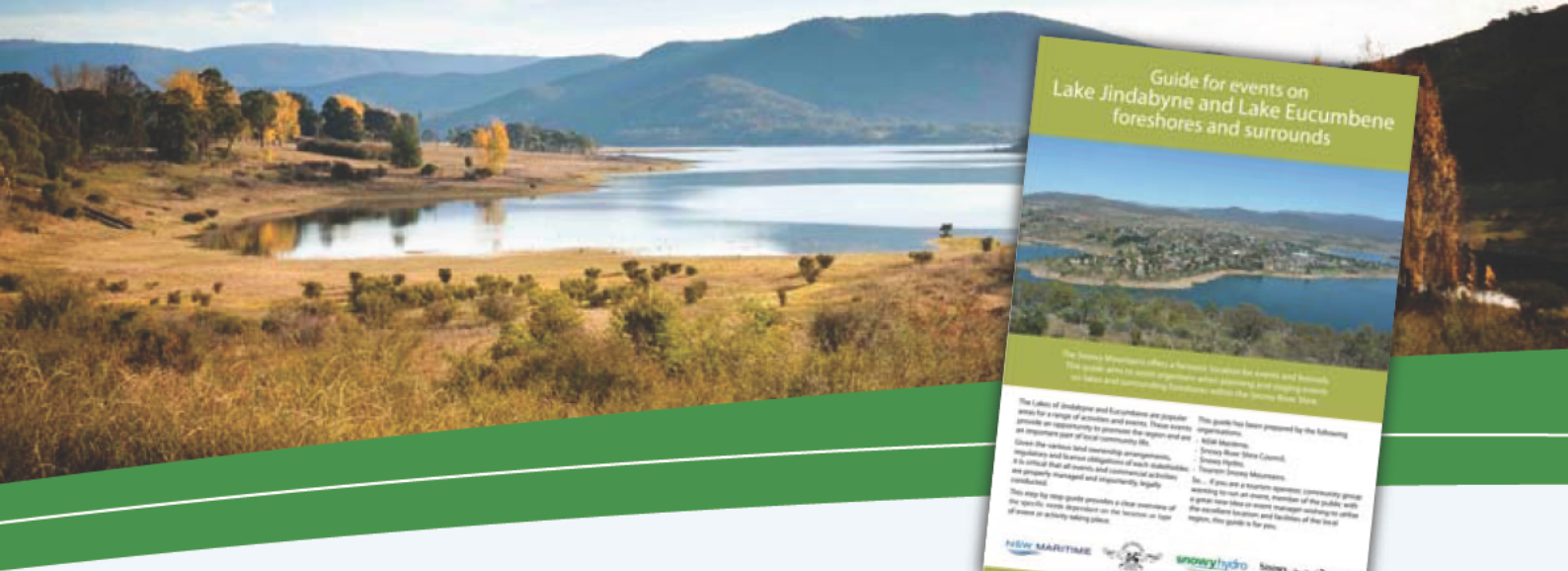
The Snowy Hydro Water Operations Report is the ultimate guide to understanding the water operations of

the Snowy Mountains Scheme, lake levels, water releases and water license obligations.

The latest edition for the 2009 – 2010 water year will be available in late August

You can download a copy at our website www.snowyhydro.com.au or call 1800 623 776 to order a free hard copy. Alternatively you can pick up a copy at the Snowy Mountains Scheme Education Centre, Cooma or Murray 1 Visitors Centre, Khancoban.





Upper Murray Challenge

Mark Clayton
Area Manager,
Murray Region



If you love your adventure sports and the great outdoors then you must not miss the 2010 Snowy Hydro Upper Murray Challenge!

This annual multi-sport event includes a 38km mountain bike, 26km kayak and a 25km run through some of the country's most beautiful high country terrain.

Open to individuals and relay teams, this year's event will be held on Saturday, 2 October. You can choose to complete the entire course, or one leg only.

The ride leg, which begins in Khancoban and takes in hilly forest trails, river crossings, 4WD tracks and open grazing country on the historic Khancoban Station, is not for the faint hearted.

For the paddle, competitors will take to the fast-flowing (and icy cold) Swampy Plains River which then joins with the upper reaches of the mighty Murray.

With some tricky chutes, half-metre waves and turbulent eddies, it too is a challenge even for the most experienced competitors.

To round out the day, the competition then takes to the road for a 25km run that offers outstanding views of the Murray River flats and the main range

and takes runners all the way to the top of Mt Elliot before descending back down through the Thougla Valley and into Corryong.

All up, the event takes competitors between 5.5 and 9.5 hours to complete.

Entries for the challenge are now being taken online at www.uppermurraychallenge.com.au or competitors can call the race director, Peter Dikschei, on 0409 022 242. Get in before 23 August and save on your entry fee!

The prizes for this year's event include an AVANTI mountain bike spot prize, \$500 cash plus prizes for the individual male and female open champions and a cash prize of \$150 will be awarded to the fastest male and female over each leg.

Below: Upper Murray Challenge



New Guide for Lake based events

Jenny Crowe
Lands Systems
Administrator



Lakes Jindabyne and Eucumbene are popular areas for a range of activities and events. These events provide an opportunity to promote the region and are an important part of local community life.

A new step by step guide is now available to provide a clear overview of the specific needs dependant on the location or type of event or activity taking place.

Snowy Hydro, in collaboration with NSW Maritime, Snowy River Shire Council and Tourism Snowy Mountains, has developed this guide to assist those who want to run an event in our local region. To obtain an event application pack visit www.snowyriver.nsw.gov.au or call 02 6451 1550.

Doug Rendoth with his dance partner, Kim Neville



Cloud Seeding on show again at Henty Field Days

Shane Bilish
Scientific Officer,
Cloud Seeding



Snowy Hydro invites you to visit the Snowy Hydro Cloud Seeding Exhibition and Display at the upcoming Henty Field Days. The Henty Field Days is one of Australia's largest agricultural fairs and is held at Henty in the Riverina from 21-23 September.

The Snowy Hydro Cloud Seeding Display has attracted strong support and interest from the Riverina and broader farming communities and last year the display attracted over 3,500 visitors.

Expert scientists and seeding operators from Snowy Hydro will be on hand again this year to talk about the science of cloud seeding and its real-life application including live demonstrations in a specially built freezer box. There will also be demonstrations of how cloud seeding works with balloon releases and a big screen to monitor the weather conditions from the site.

The Snowy Hydro display also focuses on water management, environmental protection and Snowy Scheme visitor information. We look forward to seeing you there!

Dancing with the Cooma Stars

Sharon Howes
Executive Officer, ODS&E



Snowy Hydro staff were right behind Snowy's own, Doug Rendoth, who competed in the hugely popular and very successful Dancing with the Cooma Stars event in May.

Doug, who was partnered by the lovely Kim Neville from Jindabyne, competed against 12 other local identities over two nights at the Cooma Multi-function Centre

Snowy Hydro's generous staff helped Doug raise \$4500 for the Monaro Committee for Cancer Research and the company matched this donating a further \$4500.

In total the fundraising efforts of all the dancing stars and local businesses helped to raise more than \$120,000 for the Monaro Committee for Cancer Research.

Below: 2009 Henty Field Days Cloud Seeding Display



New Visitors Centres Manager

*David Hogan
Manager Public
Relations & Community
Affairs*



After an Australia wide search, Snowy Hydro has recently welcomed Mr Heath Redstone as our new Visitors Centres Manager.

Heath will be looking after all aspects of the centre operations at Cooma, Murray 1 and Talbingo.

Heath has made the long journey with his wife and two young boys from Perth to join the Snowy Hydro team.

For the past seven years Heath worked for Tourism Western Australia with his most recent role as Manager of the Western Australian Visitor Centre in Perth.

Additionally, Heath was project manager for the Visitor Servicing Study where \$3 million of funding was allocated to regional visitor centres to improve sustainability through a professionalisation program, resource development and facility upgrades.

Please make Heath and his family very welcome in Cooma and the Snowy Mountains Region.

Right: Heath Redstone

Sale of the NSW Electricity Assets

*Terry Charlton
CEO & Managing
Director*



If you have been keeping abreast of these developments through metropolitan news media and our community newsletters, you will know that the NSW Government is now in the process of selling most of its 100% owned electricity businesses. It is selling its generation output and its electricity retailers.

This is in effect selling Snowy Hydro's customers to our competitors.

Our competitors, AGL and Origin, will come to own much of our customer base, being the three retailers, Energy Australia, Country Energy and Integral Energy.

AGL and Origin, will also come to own the output from the now Government owned electricity generators from whom we buy energy to support the financial contracts we sell to our counterparties.

Snowy Hydro, by the unfathomable decision of our NSW Government shareholder, has been excluded from this process and is unable to be a bidder. This is an outcome that is not in the best interests of the Company.

Many of our staff understand the very real ramifications this will have on Snowy Hydro in the long term and they protested to the NSW Parliament in Sydney late last year. Regrettably, Local State Member of Parliament, Steve Whan, has been unable to protect the interests of the company, even though he is a Cabinet Minister. Federal Member for Eden Monaro, Dr Mike Kelly has been unhelpful by remaining silent on the matter.

There is no substantive reason why Snowy Hydro should be excluded as a full and credible bidder for these assets in the NSW sale process.

Earlier this year, Snowy Hydro referred some aspects of the NSW sale process and structure to the Australian Competition and Consumers Commission (ACCC), highlighting the





anti-competitive nature of aspects of the sale process as intended by the NSW Government. Our submission was very thorough and attracted praise from those involved in its consideration. The ACCC accepted our arguments and the NSW Government has been required to make some change but only to the proposed structure of the generator output sale. This "win", of course, is cold comfort and does nothing to protect the company and the Scheme in the long term.

To repeat what I have said many times, as a result of the sale process our competitors, AGL and Origin will come to control our customer base which now resides within Energy Australia, Country Energy and Integral Energy to whom we now sell financial hedge products from where we earn most of our revenue. They will also come to control the output from the now Government owned generators from

whom we now buy energy to support our financial contracts with our electricity retailer counterparties, including our in-house counterparty, Red Energy. This is an unattractive outcome for the company.

Nevertheless we are not sitting still.

We are growing Red Energy for it to become a substantial electricity retailer in NSW as well as Victoria and we are looking to continue to build new gas fired generation plant. At this stage, we are maintaining current levels of expenditure on upgrading the Scheme's hydro plant and equipment. We are focusing on continuous improvement across the business in order to extract improved results in terms of revenue, profits and cash flow.

Times of such uncertainty are not unique to Snowy Hydro or to our industry. Many companies go through periods like this. The outcomes differ but it is the company that focuses on

adding value and being innovative that comes through uncertain times in the best shape. This is what we are doing irrespective of set-backs.

Whether the sale process which has now commenced by the NSW Government is fully concluded prior to the State election in March 2011 is problematic.

I believe it is in Snowy Hydro's best interests if the sale of NSW electricity businesses is not completed before the NSW state election and that arguably a better designed sale process is developed in the next year or so.

In the meantime however we will just get on with the job of improving both the business and providing job security and challenging careers for our people as best we can. Solid and sustainable success and attention to the basics of business lays the best foundations for ongoing success whatever disappointments occur along the way.

Murray 1 Power Station



snowyhydro

To give us your feedback email communityfeedback@snowyhydro.com.au or for more information go to www.snowyhydro.com.au