



SNOWYSTEMACADEMY

# 2023 STEM Engagement & Education Report

*The opportunities are endless*

**snowy**hydro





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# Message from Snowy Hydro CEO Dennis Barnes



At Snowy Hydro, we understand the value of learning about science and technology from an early age.

Our ongoing work with educators and partners to foster learning opportunities is designed to inspire the next generation of Australians to study Science, Technology, Engineering and Maths (STEM) subjects, and choose careers that are critical for our transition to a more sustainable future.

The shift to renewable energy has generated a \$300 billion global industry\*, paving the way for employment in various STEM-related fields and creating demand for new roles in the future. Today's children need to be prepared for the future and equipped with the necessary skills to drive the energy industry for generations to come.

Since the inception of the Snowy Scheme, education has formed an important foundation for young people in the communities where we work and live. Further afield, generations of Australian children learnt about hydro-electricity and multiculturalism by studying the Snowy Scheme at school. Many will remember making the trip to the Snowy Mountains with their classmates to see hydro-power in action on the way to the ski fields, or following a visit to Parliament House.

Snowy Hydro is uniquely positioned to bring industry experts and educators together to create programs that kids find fun and want to engage with. We know the more opportunities we can provide for students to see real-world STEM careers in action, the more they will appreciate the value of studying the relevant subjects.

The Snowy STEM Academy's combination of education-focused programs, partnerships and investment is designed to inspire even more young Australians to pursue careers in STEM.

The Snowy Hydro 2023 STEM Engagement and Education Report provides a snapshot of these programs and demonstrates our commitment to forming partnerships to bridge the gap between education and industry. By opening the doors to Snowy Hydro through work experience, immersive learning, traineeships, mentoring and more, we are leading the way in developing the required skills of tomorrow to meet Australia's renewable workforce of the future.

A handwritten signature in dark ink that reads "Dennis Barnes". The signature is written in a cursive, flowing style.

**Dennis Barnes**  
Snowy Hydro CEO

# 2023

## EDUCATION SCORECARD

**185**

schools participated

Engaged with

**6,800+**  
students

Engaged with

**500+**  
teachers

**5**

qualified educators

**141**

Snowy employees helped deliver the programs

**280**

hours of Snowy industry expertise spent supporting education

**\$160K**

invested in local school STEM initiatives

**18**

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

**50+**

educational events

**275**

kids participated in the H2O Kids program

- **16 programs**
- **78+ activities**
- **26 hosted sessions**

**12**

online modules with

**19** fact sheets

**100** activity sheets

**19,000+**

views of our educational video content

**85,000+**

page views on our online learning platform

**105K**

total clicks across education pages



# Snowy STEM Academy

With Australia's transition to a renewable economy, the energy industry is undergoing rapid transformation, unveiling new and exciting career opportunities. The success of this transition hinges on ensuring the workforce is adequately prepared to meet the evolving demands.

Recognising that today's students are tomorrow's workforce, Snowy Hydro plays a pivotal role in supporting teachers and students by aligning educational programs with industry expertise. The Snowy STEM Academy serves as a bridge for students, parents and teachers, connecting theoretical STEM knowledge to practical, real-life applications.

Through the Academy, students gain unique learning experiences that broaden their perspectives on the potential careers within STEM subjects, as they relate to renewable energy.

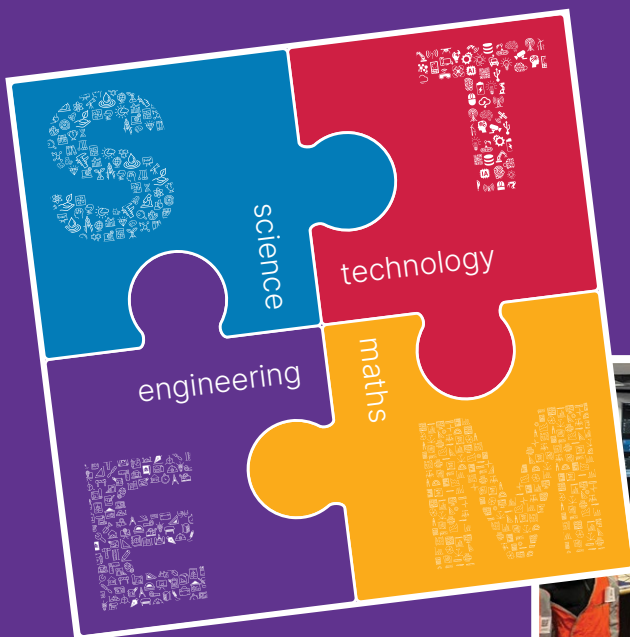
To emphasise the importance of creating learning opportunities throughout the

student's school journey, the Snowy STEM Academy aims to cultivate an early fascination with STEM subjects. This proactive approach contributes to the development of a cohort of young Australians eager to participate in the renewable energy industry of tomorrow.

The Snowy STEM Academy programs are aligned with the Australian Curriculum and can be delivered face-to-face, online or virtually. Students of all ages are discovering more about the world of STEM and the history of the Snowy Scheme as they explore the engineering and science behind Snowy Hydro's operations.

The Snowy STEM Academy is where education and the renewable energy industry come together. Snowy Hydro engineers, scientists and other experts help educators design and deliver programs, and support students through mentoring and work experience supervision.

Since its launch in 2021, the Snowy STEM Academy has expanded to offer a range of sub-programs spanning online, virtual and in-person education experiences. It provides the framework for the Local School STEM Fund to support the creation and expansion of STEM programs, and through the Discovery Centre, provides a STEM-centric learning destination. Here, kids have the space to immerse themselves in the world of Snowy Hydro and renewable energy.





# INDUSTRY AND EDUCATION

## Taking industry capability into the classroom

Snowy Hydro is uniquely positioned to bring together educators and the renewable energy industry to create real-world learning for young Australians.

As the world transitions to renewable energy, Snowy Hydro is providing industry expertise and deep sector knowledge to inform STEM-specific education programs.

For local students, Snowy Hydro is a rare operational example of hydro-power generation. Through the Snowy STEM Academy, teachers and students get a glimpse in real time of how electricity is generated using the power of water. Virtual classrooms and online programs extend Snowy STEM Academy's valuable learning experiences to all Australians.





# STEM-centric learning destination

The Discovery Centre at Cooma is one of a kind. No other educational venue in the world can offer such a rich window into the iconic Snowy Scheme and the science of hydro-power.

It is the ideal location for experiential learning about Snowy Hydro, Snowy 2.0 and renewable energy using audio, video, historic imagery, digital information and high tech virtual reality.

The Snowy Hydro Education team takes an agile approach and works with teachers to prepare for and plan every visit to ensure a tailored experience that suits the learning stage and specific requirements of each class.

In 2023, 5,440 students from 148 schools visited the Discovery Centre to explore and discover the many different parts of the Snowy Scheme. Experiences are entertaining and diverse and include a virtual flyover of the Snowy Scheme in the immersive theatre, a 3D model showing dams and power stations, and real-time digital screens that light up when Snowy Hydro is generating and pumping. The scale model of a tunnel boring machine with

a moving cutterhead demonstrates the world leading technology in operation today for the construction of Australia's largest and most complex renewable energy project, Snowy 2.0.

Programs at the Discovery Centre are modular and customisable. They are supported by videos and printed collateral as part of the Snowy STEM Academy. The interactive Power Up @ Snowy program, for example, provides an opportunity for students to explore the Discovery Centre's interpretive space under the guidance of qualified educators. The program highlights the Snowy Scheme, Snowy Hydro activities and renewable energy.

Schools build on this popular program with unique, customised STEM experiences which are developed in consultation with teachers to meet learning requirements for specific STEM topics.

*"Teachers – you can be sure these are not cut-and-paste excursions. When you contact Snowy Hydro, the education team works with you to plan your visit and to help you plan classroom experiences before and after. You get so much more than a two-hour tour, these are rich, educational experiences tailored to the position and needs of your class. The resources are world-class and students make connections again and again."*

- John Cole, Year 7 Teacher, John Paul II College, ACT



# BRINGING STEM CAREERS TO LIFE

## CASE STUDY 1

### Snowy Hydro Careers Day

The annual Snowy Hydro Careers Day event showcases the diversity of our people and their STEM-related careers. The day connects young people from across the Snowy Monaro and Snowy Valleys Local Government Areas to highlight future career opportunities.

More than 110 students from four schools attended the inaugural event in 2023, targeted at Year 9 students. Throughout the day, students interacted with senior leaders, engineers, climate scientists and STEM experts from Snowy Hydro. Our people shared their career stories to encourage students to learn more about STEM fields of study. Students had an exclusive behind-the-scenes look at how Snowy's generation operations control room connects with the National Electricity Market (NEM), and took a virtual Snowy Scheme flyover in the immersive theatre at the Discovery Centre.

Students chose an elective presentation from diverse areas including climate science, trade skills, technological innovations, construction and engineering. Snowy experts led the face-to-face sessions and linked their content to school subjects, to demonstrate the relevance of study to various STEM careers offered at Snowy Hydro.

*"It was a different experience and it showed me lots of new career paths I hadn't been exposed to."*

- Mary, Year 9 student, Monaro High School, Cooma

*"I enjoyed it because we actually got to meet the people in the fields that we were learning about."*

- Benjamin, Year 9 Student, St Patrick's Parish School, Cooma





# Taking science out of this world with @AstroKirsten

*"The students loved learning along with Kirsten Banks. The resources engaged the kids, were relatable and the correct length. It was interesting to see behind the scenes and gain an understanding of how renewable energy is generated in our local environment."*

- Julia Cane, Year 6 teacher, Snowy Mountains Grammar School

As an influential Australian woman in STEM, Kirsten Banks was nominated by local school student, Kobe from Brungle Public School to be a Snowy 2.0 tunnel boring machine (TBM) namesake. After launching TBM Kirsten in 2021, Kirsten partnered with Snowy Hydro to develop engaging educational videos to expand her connection with students.

The **Science of the Snowy Scheme with Kirsten Banks** launched in September 2023 and is the newest addition to the suite of online learning modules. The ten-episode video series explores the science behind the Snowy Scheme.

Kirsten, a Wiradjuri astrophysicist and science communicator, takes the audience on a journey to discover the role of energy, gravity, water and weather in the generation of hydro-electricity with visits to power stations, tunnels and a cloud seeding remote testing facility. Each video is accompanied by curriculum-aligned activities for students to further explore the subject area.

The Science of the Snowy Scheme module is aimed at students in Stage 3 (years 5 & 6) and Stage 4 (years 7 & 8), and includes topics such as understanding cloud seeding, discovering the purpose of pumped-hydro and stepping into a STEM career.

With a passion to engage young people in the wonders of science, Kirsten was an ideal choice to help create and host the special video series. She is known as @AstroKirsten on social media, and shares her behind-the-scenes moments at Snowy Hydro with her vast audience (407,000 followers on TikTok), bringing additional exposure for the Snowy STEM Academy to science enthusiasts around the world.

We look forward to collaborating with @AstroKirsten on our next chapter as she is loved by teachers, school kids, the public and Snowy employees alike.



# KNOWLEDGE AND MENTORING

## The people behind the power

Snowy Hydro is proud to employ leaders in their field who are passionate about STEM, and committed to voluntarily sharing their knowledge with young Australians.

Our engineers, scientists, spot traders, technologists, data analysts, mechanics and electricians use the core principles of science and mathematics in their work every day. They are role models for students of all ages and through their expertise, provide a unique contribution to the Snowy STEM Academy.

Kids take part in real-life, practical learning and hear about the many and varied paths that lead to a career in STEM. They meet role models close to their age who may become future mentors for post-school education and employment choices.

At Snowy Hydro, we believe in the power of visibility. We remember the value role models played in our own career decisions; relatives, teachers, older school students, community leaders or managers in our first jobs who generously shared their knowledge and advice.

The engagement of our STEM experts at Snowy Hydro reinforces the importance of giving back and seeing role models in action. We encourage students to develop transferable skills that can be used across many career paths, and in jobs that don't yet exist, but soon will as the world transitions to renewable energy.

*"You can't be what  
you can't see."*

- Marian Wright Edelman

Astrophysicist and host of The Science of the Snowy Scheme video series, Kirsten Banks frequently references this quote when communicating with young people about STEM careers – and at Snowy Hydro we couldn't agree more!

# Learning comes full circle

Snowy Hydro has a strong interest in working with educators to prepare students for their future.

In 2023, our education programs came full circle with Snowy Hydro's graduates hosting work experience students across engineering and other disciplines. Graduates work directly with students and add a fresh, contemporary and fun perspective to learning.

At Snowy Hydro, we know that creating education experiences that engage the imagination and inspire self-belief is the best way to inspire students to stick with STEM.

We see it as our responsibility as a leading renewable organisation and a large regional employer to build a cohort of potential engineers and scientists to take us into the future. This ongoing commitment is essential to the growth of our trade, technical and graduate programs, and more broadly, our national STEM capacity and capability.

*"Working with the kids is really rewarding, seeing them get creative about different problem solving issues or designs that we propose, and enjoying the different amazing facts about the Snowy Scheme."*

- Lachlan Pocock, Graduate Engineer

*"The Snowy STEM Academy has been great to be a part of – the students come up with interesting and sometimes complex questions, leading to fantastic discussions about renewable energy and innovation."*

- Amelia Wilson, Graduate Engineer









Keeping kids interested in and studying maths into their senior school years is vital for those seeking STEM-based careers. With Year 9 identified as the stage where students are most likely to lose interest in maths, local educators worked with Snowy Hydro to create a new program.

## CASE STUDY 2

# Keeping kids interested in maths

The Year 9 Maths Program was piloted in 2022 in partnership with Monaro High School. The Snowy Hydro Education team and a working group of Snowy Hydro graduate engineers worked with a Year 9 maths teacher to plan and develop a program that provides valuable 'real-life' learning experiences.

The program focuses on Year 9 curriculum topics of Area, Surface Area and Volume to help students understand why maths concepts are so important in everyday life, and to encourage them to continue on with their maths studies.

In developing the program, the team designed the content and educational material to meet specific learning needs while also reflecting the practical, everyday use of maths at Snowy Hydro. An educational video on each of the three topics features a graduate engineer on location at Snowy Hydro.

When the teacher delivers the program, the graduates are in the classroom and help the students with problem solving. Their insights and career chats provide a connection between classroom study and cool young people using maths in the workplace.

Following the 2022 pilot, the program was finetuned based on feedback and prepared for delivery in 2023. It is currently delivered in two schools in direct consultation with the Snowy Hydro Education team.

There are plans for the program to be further modified so that it can be included in the Snowy STEM Academy online, and as a virtual offering to all Australian schools.



# PARTNERING AND INVESTMENT

Snowy Hydro invests more than \$1 million each year in the local communities where we operate. We are dedicated to fostering education opportunities and career pathways for local young people with a focus on STEM. We deliver on this promise through our Snowy STEM Academy, partnering with regional schools and educational organisations, and investing in local STEM education.

The collaboration between organisations, community groups, educators and schools in the Snowy Mountains region and beyond, opens up exciting opportunities for students to take part in a range of real world STEM-related projects, supported by the Snowy STEM Academy.

## STEM education funding

In 2023, the inaugural Local School STEM Fund delivered a total of \$160,000 to 18 schools across ten locations in the NSW Snowy Mountains region. The funding benefits over 2,200 students, shaping their educational experiences today, and their future aspirations. Funding was granted for a range of initiatives that would otherwise not have been possible in the schools, including an aquaponics project, a science camp and a robotics club.

Alongside the funding and support from the Snowy STEM Academy, Snowy Hydro STEM experts offer their time and expertise to bring real world knowledge to the students' projects. This helps create an ecosystem of education, support, trust and confidence, and demonstrates both the value and scalability of the STEM grant funding.

Throughout the year, the agile Snowy STEM Academy transforms to take education out to the community. A pop-up version of the Academy delivers hands-on problem solving

activities to regional festivals and high profile events to further extend our reach and commitment to make STEM accessible to every child, no matter their circumstance.

In 2023, Snowy Hydro delivered STEM-focused pop-up experiences, engaging with kids at 22 festivals and events across the Snowy Mountains and beyond.



## CASE STUDY 3

## Collaboration is the key to creating impactful learning opportunities

*“This program has encouraged students of all ages and genders to become enthusiastic about coding and robotics, and consider how these skills can support them in their future. It also has had a positive impact on student wellbeing providing a space for kids to explore and flourish.”*

- Chrissy Graham, library and STEM teacher at Cooma North Public School

Cooma North Public School applied for Snowy Hydro STEM funding to purchase Lego expansion kits for their robotics club, enabling them to participate in the 2023 Spike Prime Challenge.

The students attended a workshop in Canberra to develop their robotics and coding skills, and prepare for the competition. Working at their own pace, as the students encounter problems, they learn to come up with solutions.

Snowy Hydro engineers Ben Nicholson (pictured) and Tim Wassink joined the students to help with problem solving and critical thinking. The engineers' involvement also helps young learners connect the fun of their robotics club with future career options in STEM-based pathways.

The robotics club kids have grown their technical ability to understand complex electronics, and increased their awareness of current and emerging technologies. Teachers believe these early-in-life experiences will give students an advantage as they move into higher education.

The impact of the Local School STEM funding is being felt further afield as Cooma North Public School looks to become the region's centre of STEM excellence with the potential development of a regional academy supported by the NSW Department of Education.





## Future Stars at Tumut High School

Snowy Hydro is proudly supporting a new mentoring program for female Indigenous students at Tumut High School in partnership with the **Stars Foundation**.



**Stars Foundation** began in 2015 and today supports and mentors 2,600 girls and young women in 49 schools across Australia. The Snowy Hydro Stars Foundation partnership continues our commitment to initiatives that support young people in local communities to develop and thrive.

The three-year sponsorship commenced in 2023 and will help the **Stars Foundation** deliver programs for Indigenous girls and young women focussed on their health, education and future employment.

Along with school study, the program offers art, sport, music, cooking and wellbeing activities to encourage the girls to complete year 12 and transition into work or further study. Stars students are also encouraged to volunteer in community and cultural activities to help build their confidence and life skills.

## Engineering is art in action



Snowy Hydro launched a new major sponsorship with the world-class NSW **Snowy Valleys Sculpture Trail** to install seven artworks and support development of a school education program that offers sculpture workshops to 17 local schools.

Created by the team behind Sculpture by the Sea at Bondi (NSW) and Cottesloe (WA), the 150km **Snowy Valleys Sculpture Trail** meanders from Adelong to Tooma along the picturesque Snowy Valleys Way.

More than 1,500 students from primary schools in the Snowy Valleys region, along with two schools in Cooma and the Adaminaby Public School, will immerse themselves in a world where art meets creative engineering, with Snowy Hydro engineers taking part in the artist-led workshops.

The program aligns with Snowy Hydro's suite of education programs and activities designed to inspire the next generation of engineers and artists in our local community.

## CASE STUDY 4

## Connecting kids through coding

Snowy Hydro partnered with the Australian Academy of Robotics and STEM (AARAS) Education to bring the Power of Water STEM competition to students across Australia. Through their entries, kids explored future renewable energy solutions and used coding to showcase their ideas and solutions.

Students from year 2 to high school (5-18 years) in NSW, Victoria and WA participated in the competition, which was designed to encourage teamwork, critical thinking and problem-solving skills.

Depending on the age-group, the competition task ranged from a physical model through to stories or animation coded in Scratch, showcasing students' learning and ideas about renewable energy and hydroelectricity.

Lesson plans, materials and tailored training and support were developed in collaboration with teachers which enabled them to incorporate coding in the context of renewable energy as a fundamental subject in the classroom. A foundational learning module about Snowy Hydro was developed as a support tool for teachers to better equip students investigating the Power of Water themes and concepts.

The competition was also a training opportunity for teachers who were able to attend accredited professional development sessions online or through Burwood and Casula (NSW) libraries.









# A WEALTH OF RESOURCES

## From the Snowy Mountains to the world

The Snowy STEM Academy online learning platform was launched in 2021 to make the Snowy Scheme, one of the engineering marvels of the modern world, more accessible for teachers, students and families across Australia and beyond.

The platform is scalable and flexible with the online hub expanding to 12 modules since launch. The Snowy STEM Academy's virtual classroom has become an important educational destination offering flexible options for educators along with new and relevant real world learning for students, anywhere, anytime. The Academy's success is reflected in the audience's ongoing and increasing engagement with the platform:

**85,000+**

TOTAL PAGE VIEWS

**105,000**

TOTAL CLICKS ACROSS ALL  
EDUCATION PAGES

The online Snowy STEM Academy is an ever-evolving resource providing new and engaging activity sheets, lesson plans and other interactive content that can support a full lesson or supplement a pre-planned lesson.

Snowy Hydro offers live stream events on diverse STEM topics, with recorded sessions available on the online learning platform. Additionally, a customised virtual incursion program encourages direct conversations between students and STEM experts, supported by a pre-learning package designed for collaborative research and question preparation.

The Snowy STEM Academy remains up-to-date and in step with current curriculum and STEM innovation through a process of co-design and feedback with educators. The Snowy Hydro Education team works in collaboration with Snowy Hydro experts, other industry partners and our educator network. This keeps our learning experiences fresh, relevant, diverse and engaging for audiences across Australia and potentially overseas.

We strive to deliver programs that are versatile with easy-to-use resources and materials which have been created with the educator, students, and learning in mind.

# Programs








## Year Level

Preschool




Primary School

High School

### Foundation programs

 Power Up @ Snowy	✓	✓	✓
 Kilowatt STEM	✓	✓	✓
 Megawatt STEM	✓	✓	✓
 Gigawatt STEM		✓	✓
 The People Behind the Power Program		✓	✓
 Energise Your School Program		✓	✓
 Community Outreach Program	✓	✓	✓

### Targeted programs

 HSC STEM			✓
 Maths at Work			✓
 The Science Behind the Snowy Scheme with Kirsten Banks		✓	✓




### Outside School Hours programs

 H2O Kids Outside School Hours Program	✓	✓	
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### Competitions

 Powering the Future Competition		✓	
 Energise Your Future Competition in partnership with AARAS		✓	✓

### Events

 Snowy STEM Academy STEM events	✓	✓	✓
 Snowy STEM Academy celebrates National Science Week	✓	✓	✓
 Snowy Hydro Careers Day			✓

# STEM

Science

Technology

Engineering

Maths

# Delivery Mode

Discovery  
Centre

Virtual

Online  
Learning  
Platform

In  
Classroom

Events &  
Festivals







Discover more about the  
Snowy STEM Academy  
on our online learning hub!

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