General fact sheet

The Snowy Mountains Scheme & The MIA

The Snowy Mountains Scheme is one of the most complex integrated water and hydro-electric power schemes in the world, generating on average around 4,500 gigawatt hours each year of clean, renewable energy.

The Scheme collects and stores the water that would normally flow east to the coast and diverts it through trans-mountain tunnels and power stations. The Snowy Scheme was designed to produce electrical energy, however one of the key objectives of the Scheme was to mitigate the effects of drought on irrigated agriculture in NSW and Victoria by improving the security of water supply to farmers along the Murray and Murrumbidgee Rivers.

History of the Scheme*

The concept of diverting water from some of Australia's best known rivers – the Murray, Murrumbidgee, Snowy and Tumut Rivers – dates back as far as the 1880's. However, it was not until 1944 that a committee of Commonwealth and State representatives was formed to examine, from a broad, national viewpoint, the development of the water resources of the Snowy Mountains area.

On July 7 1949, the Commonwealth Parliament passed The Snowy Mountains Hydro Electric Power Act 1949, that established the Snowy Mountains Hydro-electric Authority, the operating body of the Snowy Mountains Scheme. Construction started on the Scheme on 17 October 1949 and was completed in 1974, for a total historical cost of $820 million (equivalent to around $6 billion today).

More than 100,000 people from over 30 countries came to work in the mountains to realise a vision of diverting water to farms in areas such as the MIA, to feed a growing nation and to build power stations to generate renewable electricity for homes and industries. Sixteen major dams, seven major power stations (two underground), a pumping station, 145kms of inter-connected transmountain tunnels and 80kms of aqueducts were constructed. Even before the Scheme was completed, it was named as one of the civil engineering wonders of the modern world.

Changing the face of Australia*

Between 1949 and 1974, over 100,000 men and women from more than 30 countries worked on the Scheme. The largest nationality group working on the Scheme were Australians, making up one-third of the workforce, which reached a peak of 7300 in 1959.

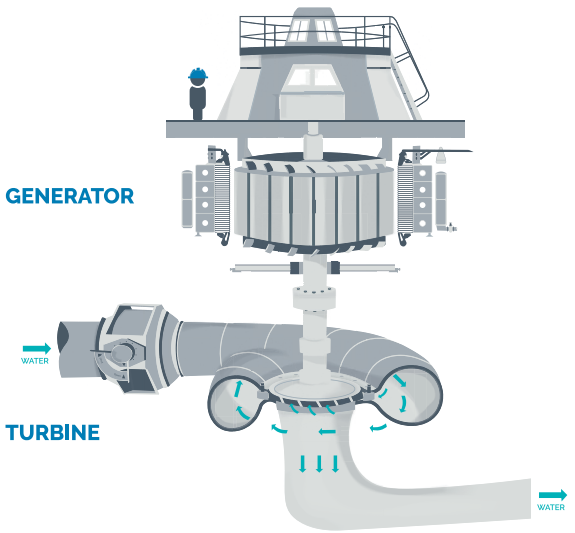
Many migrants were seeking refuge from war-torn Europe and wanted to begin a new life in a new land, Australia. Working together on the Scheme, they became part of the Snowy family with former enemies and allies working side by side. During construction, seven regional townships and over 100 temporary camps were established throughout the Snowy Mountains. These towns and camps serviced the men, women and families who came to build the Scheme. In 1974, when construction on the Scheme was finished, many of the workers dispersed to new jobs in Australia and overseas. However, the majority of those who came to build the Scheme and a new life stayed, becoming Australian citizens. These new Australians with their energy and enterprise would change Australia's social and cultural skyline forever.

How the Scheme works*

Precipitation in the form of snow and rain falls in the catchment area of the Scheme. A catchment area is any part of the land where water drains to the lowest part. Water from melting snow and rain is collected and stored behind dams in lakes and reservoirs and then diverted through tunnels and pipelines down to power stations hundreds of metres below. Mountainous regions are ideally suited to the generation of hydro-electricity because there is plenty of rain and snow, low temperatures meaning less evaporation and high mountains to provide the steep fall that is needed for the water to spin the turbines.

In its simplest form, electricity is generated by rotation of a magnet inside a wire coil. In a power station, this process is enhanced; the magnet is an electro-magnet or "rotor" spinning inside the fixed coils or "stator" of the generator. Each generator is mounted on a vertical shaft above the turbine and water is used to drive the turbine, which operates the generator. Transformers boost generated voltage to a level that can be economically transmitted over long distances by transmission lines to the towns and cities of eastern mainland Australia.

Once the water has passed through the turbines in the power stations, it is released into rivers to be used to irrigate farms in the Murray, MIA and Coleambally regions.



The Scheme is operated and maintained by Snowy Hydro Ltd, which is jointly owned by the NSW, Victorian and Australian Governments and was created following the corporatisation of

the Snowy Mountains Hydro-electric Authority. Today, Snowy Hydro Ltd continues to play a vital role in the growth and the development of Australia's national economy, by diverting water that underwrites over $3 billion in agricultural produce and by generating clean renewable energy. Snowy Hydro Ltd currently provides around 70% of all renewable energy that is available to the eastern mainland grid of Australia, as well as providing fast response power to cope with the high demand during the morning and evening rush hours of the eastern capital cities.

**Images and information courtesy of Snowy Hydro Ltd. www.snowyhydro.com.au*

The Snowy Water Inquiry

The Snowy Water Inquiry was commissioned by the Commonwealth, Victorian and New South Wales Governments in 1998 with a brief to recommend environmental water options to compensate for the Snowy Hydro Scheme. The outcome of the Snowy Water Inquiry (Heads of Agreement) was to increase environmental flows to the Snowy River to 21% of the average natural flow in the upper reaches of the Snowy in a staged approach over 10 years. At that time, the environmental needs of the Murray River system was an emerging concern and it was subsequently decided as part of the overall water recovery program, to return 70GL to the Murray as part of this initiative. It was anticipated that the three governments would resume entitlement from water users to meet increased flows. However, Murrumbidgee Irrigation believed that this could be achieved by creating water savings through investment irrigation infrastructure and began exploring options for water savings projects in order to ensure the sustainability of the MIA and avoid the potential for the removal of water entitlements.

Murrumbidgee Irrigation proposed that 20,000 ML/year of water could be saved and returned to the rivers from the reconfiguration of Barren Box swamp, a natural drainage point in the MIA, and splitting it into more efficient and useable cells. The resulting Barren Box Storage and Wetland site is one of the largest water infrastructure projects undertaken in regional Australia and was awarded the prestigious Environment and Heritage Award at the Sydney 2006 Engineering Excellence Awards. The Award recognises projects that deliver direct positive benefits to the environment or conservation, with ecological sustainability being an integral part of this category.

Another significant outcome of the Snowy Water Inquiry was the development of the Snowy Water Licence, which is intended to give effect to the provisions of the Snowy Water Inquiry Outcomes Implementation Deed agreed upon by the three shareholder Governments during the inquiry. The licence is set up to regulate the water operations of the Snowy Mountains Scheme and governs Snowy Hydro Ltd's rights and obligations regarding the collection, diversion, storage and release of water from the Scheme. Under the terms of the Snowy Water Licence, Snowy Hydro Ltd is required to release an amount of water (Required Annual Release-RAR) annually into the River Murray (RAR 1,062 GL) and Murrumbidgee (RAR 1,006 GL) catchments which is calculated principally by reference to inflows. In extreme drought years like those being experienced in the last decade, the volume of water to be released from the Snowy Scheme is reduced under the formulae set out in the Snowy Water Licence. This is known as the Dry Inflow Sequence Volume (DISV) reduction. This reduction to the volume of water to be released from the Snowy Scheme has been applied since the 2006/07 water year, which was the lowest year on record for inflows into the Snowy Scheme. During this year, only 683 GL flowed into the Snowy Scheme storages compared to long term average annual inflows of around 2,800 GL.

Snowy Hydro Ltd does not directly control the final release of water to irrigators. They simply deliver the required amount of water to storages at Hume Dam on the Murray and Blowering Dam on the Tumut River for release by the Murray Darling Basin Authority (MDBA) and NSW State Water respectively. The NSW Office of Water determines the amount and timing of environmental flows to rivers, including the releases into the Snowy River from the Snowy Mountains Scheme.

The Snowy Scheme and the MIA

Water makes its way to the MIA via Blowering Dam and Burrinjuck Dam on the Murrumbidgee River. Blowering Dam stores water that has been released from storages further upstream in the Snowy-Tumut Development Section of the Snowy Mountains Hydro-Electric Scheme. Water releases from Blowering and Burrinjuck Dams are managed by NSW State Water, to provide for town water supply, irrigation and environmental use requirements. On the Murrumbidgee River, as at Gundagai, the Snowy Scheme contributes inflows of around 25% during average inflow years, but 60% during drought years. Water from the two storage dams flows down to Berembed Weir, a journey taking five days and a further two days to Gogeldrie Weir. From Berembed Weir water moves into Bundidgerry storage and onto the Narrandera Regulator, which is the start of the system owned and maintained by Murrumbidgee Irrigation.

Water can be diverted from Lake Eucumbene into either the Murray or Murrumbidgee River Systems

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