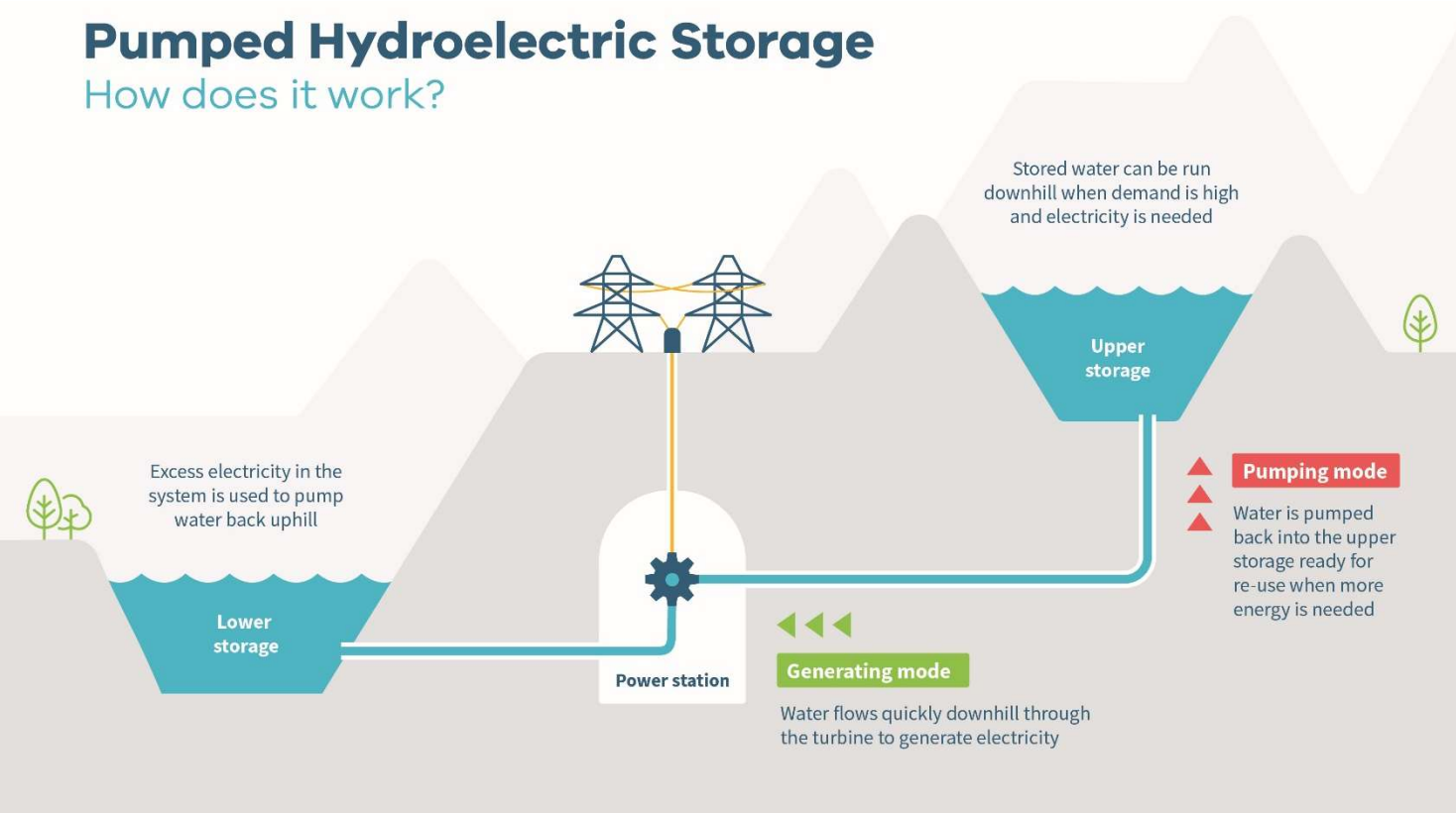
PUMPED HYDRO ENERGY
Fact Sheet

Pumped Hydro Energy Storage in Victoria



Victorian Renewable Energy Target

The Victorian Renewable Energy Target (VRET) will see 25 per cent of the State's electricity generation supplied from renewable sources by the year 2020, increasing to 40 per cent by 2025 and 50 per cent by 2030.

These targets will encourage investment in new energy projects, create jobs, lower electricity prices and secure Victoria's electricity supply.

Increasing renewable energy capacity will also reduce greenhouse gas emissions. Victoria aims to achieve a 15 to 20 per cent reduction in emissions by 2020 (from 2005 levels) and net zero emissions by 2050.

What is pumped hydro?

Hydro power technology harnesses the gravitational energy in water. Water is stored in an upper reservoir and released through turbines into a lower reservoir, generating electricity. Unlike a conventional hydro scheme, at a pumped hydro facility, the water is not discharged from the lower reservoir but pumped back into the upper reservoir during off-peak periods or when there is excess power in the electricity grid. It is then stored until power is needed again, creating a closed loop system.

How does it integrate with renewable energy?

Pumped hydro energy storage facilities act like a big battery however typically has a longer discharge duration than most batteries (batteries can provide very fast discharge over short periods).

Combining renewable energy generation, such as wind and solar power, with large-scale energy storage will

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help meet the growing demand for electricity at peak times in Victoria, as well as help lower power prices. For example, the technology can take solar power that is generated during the day and store it as 'back-up' energy, returning it to the grid to meet demand at night. While the widely used term is pumped hydro, hydroelectric storage more accurately reflects the technology's benefit.

Case study: Tumut 3 Hydro Power Station (NSW)

Tumut 3 Power Station is located at Talbingo Dam in N.S.W. and owned by Snowy Hydro Limited. The power station was completed in 1973 and had a major upgrade in 2009. The power station has six turbines with a generating capacity of 1,500MW. It has a 150.9m head of water.

In 2003, Snowy Hydro commissioned six 140 kW micro-hydro generators on the existing cooling water systems on each of the generating units. These units enable Snowy Hydro to save approx. 3,137 tonnes of carbon dioxide per annum.

What is the future of pumped hydro in Victoria?

Pumped hydro is a proven technology for storing large-scale clean energy and accounts for 96% of the world's electricity energy storage (Hydro-Electric Corporation, 2019).

A study by ANU identified more than 4000 potential sites in Victoria with a combined energy storage capacity of 11,274 GWh, which is around 100 times more than is needed to support a 100% renewable electricity system in the state. Pumped hydro has some specific required characteristics in terms of required head (drop of water), proximity to grid, etc. These can result in significant capital expenditure

Who is responsible for granting permits for pumped hydro energy projects?

Planning processes can be involved for pumped hydro. The approval process sits with the local council, however there are can be many other permits required depending on the land, water access and other environmental factors.

What role can the community play?

The use of pumped hydro could form part of a broader cheap, reliable, renewable community power system which can be attractive to both existing and new industry through investments and jobs. It will also provide new jobs during the construction and operational phases of the project. The pumped hydro can also be part of a renewable community power project.

Integrating renewable generation and retail operations would also allow contracted purchase of the energy by the community from their own renewable generators. Pumped hydro would help with the load shifting that is needed to use variable renewables when they are not generating, i.e. wind farm with no wind. It would also provide a barrier against large spot market rises.

For further information:

https://www.energy.vic.gov.au/renewable-energy/pumped-hydro
https://arena.gov.au/assets/2018/10/ANU-STORES-An-Atlas-of-Pumped-Hydro-Energy-Storage-The-Complete-Atlas.pdf

Reference: Hydro-Electric Corporation, 2019
https://www.hydro.com.au/clean-energy/battery-of-the-nation/pumped-hydro

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