



# MT STROMLO MINI HYDRO

## What is the Mount Stromlo Mini Hydro?

The Mount Stromlo Water Treatment Plant (SWTP) hosts a 1x 630kW grid-connected mini hydro located in a bypass off the West Main inlet pipeline from Bendora Dam. The mini hydro system comprises the following:

- Oregine Francis turbine designed for flows between 60 – 200 ML/d (0.7 – 2.3 m<sup>3</sup>/s).
- 630 kW Siemens asynchronous generator.
- Grid connection to the local distribution network.

## Where is the Mount Stromlo Mini Hydro?

The mini hydro is located in a small building at the bottom of the Stromlo Water Treatment Plant site. The mini hydro building is visible from Mount Stromlo Road.



Mini hydro building

## When was it commissioned?

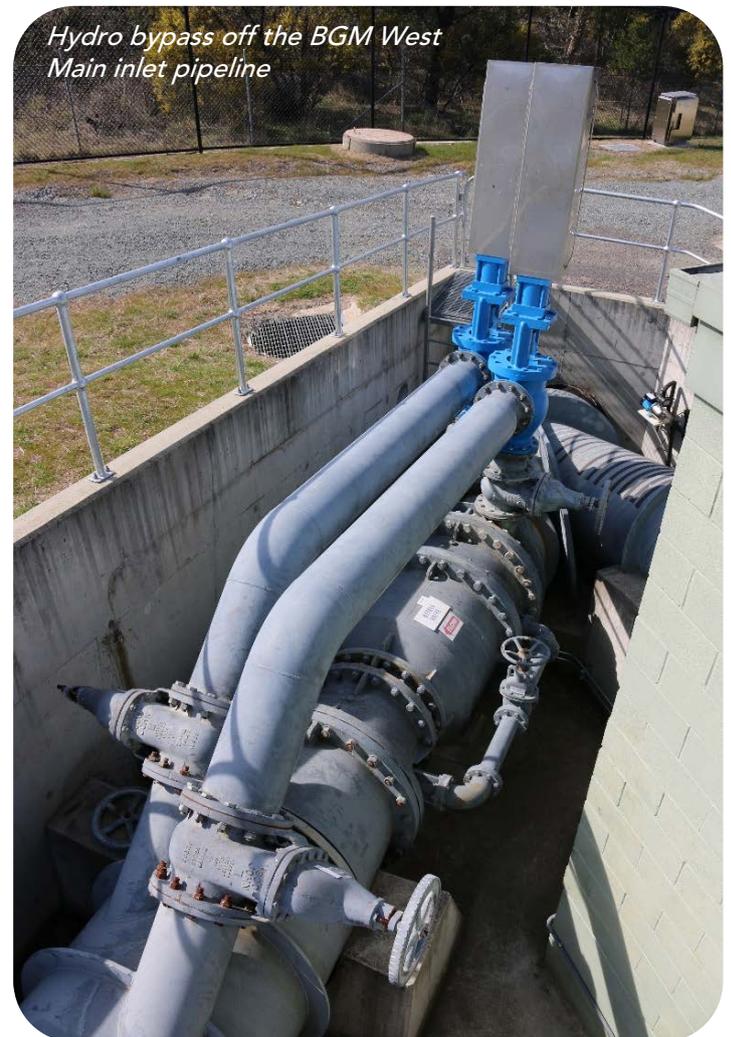
The mini hydro was originally commissioned in 2000 however it experienced generator failure in mid-2012. In 2014, a capital expenditure project was initiated to replace the generator and implement associated upgrade works. This project was completed and the mini hydro was back in service early 2017.

## Why does Mount Stromlo have a mini hydro?

The mini hydro generates renewable electricity. Icon Water sells the green electricity to a third-party resulting in a financial return on the capital investment. This displaces electricity generation that would have otherwise been produced from fossil fuel generators.

The mini hydro located at SWTP, uses an existing water supply — in this case, the gravity main from Bendora Dam to Mount Stromlo. Most hydro-electric developments require the building of dams and lakes.

This affects the flora and fauna in the valley, may involve the relocation of people, inundation of productive agricultural land and the changes to the downstream flow can be environmentally damaging due to reduction in volume and changes to the timing and temperature of flow. Corin and Bendora dams however were already in existence to supply Canberra with clean water, so there have been no additional environmental impacts involved.



Hydro bypass off the BGM West Main inlet pipeline

## How does it work?

The mini hydro operates from water that comes from the Bendora Gravity Main (BGM) that carries water 20 kilometres under gravity from Bendora Dam to the SWTP. Power is generated by utilising the excess head pressure from the elevation difference between Bendora Dam and the SWTP (approximately 80 metres).

The mini hydro is designed to operate whenever the flow in the BGM is within the turbine operating range. The



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generator starts to rotate when the bypass valve is closed and the turbine inlet valve is opened, diverting water through the turbine. When in operation, guide vanes within the turbine are automatically adjusted to control flow to the SWTP.

The electricity generated is exported into ActewAGL Distribution's Woden 11 kV network via a substation, where a transformer converts the power from 415 volts to 11,000 volts for efficient transmission.

Auxiliary equipment that supports the mini hydro system includes:

- a backup battery and charger, which provides power for essential equipment so that the mini hydro can be safely shut down in the event of a power failure
- a hydraulic power pack, which provides high pressure oil to operate the valves and guide vanes
- surge relief valves, to prevent the pipeline from being over-pressurised in the unlikely circumstance that a malfunction causes the flow to stop quickly.

Market (NEM)<sup>1</sup>. Hydro power generators registered in the NEM range anywhere from micro systems of 0.25 MW up to the very large 1,500 MW Tumut 3 hydro power station owned by Snowy Hydro Ltd which comprises 6 x 250 MW hydro generators.

## For more information

For further details about the Mount Stromlo Mini Hydro, go to [iconwater.com.au/mtstromlominihydro](http://iconwater.com.au/mtstromlominihydro) or contact us on 02 62483111 or email [talktous@iconwater.com.au](mailto:talktous@iconwater.com.au).



Turbine shown in background, 630 kW generator shown in foreground



Oregine Francis Turbine

## How does the Mount Stromlo Mini Hydro compare?

Hydro contribution to Australian electricity generation was 7.4% during 2013-14. Hydro is the largest contributor to renewable generation in Australia however this is quickly changing with installed hydro capacity remaining steady and significant growth in new wind and solar generation capacity.

The 630 kW (or 0.63 MW) Mount Stromlo Mini Hydro is small in comparison to the 7,800 MW total hydro generation capacity available in the National Electricity

## Mount Stromlo Mini Hydro capabilities:

- The Mount Stromlo Mini Hydro is capable of generating up to 3,400 Megawatt-Hours (MWh) per year, depending on Bendora Dam levels and operational profile of SWTP. This represents up to 10% of Icon Water's total electricity consumption in 2016-17 across its entire asset portfolio.
- 100% of power generation will be exported to the local distribution network.
- The mini-hydro produces the equivalent power supply of up to 425 homes.
- Up to 2,800 tonnes of greenhouse gas pollution is reduced as a result each year.

<sup>1</sup> The National Electricity Market (NEM) is the Australian wholesale electricity market that covers the electrically connected states and territories of eastern and southern Australia.