Frequently Asked Questions

Borumba Pumped Hydro Project

What is the Borumba Pumped Hydro Project?

The Borumba Pumped Hydro Project is a proposed pumped hydro energy storage development at Lake Borumba, near Imbil southwest of Gympie. If it proceeds, the Borumba Pumped Hydro Project will play a significant role in Queensland's renewable energy transformation. Queensland Hydro and the Queensland Government are aiming to have the project operating by the end of the decade.

Lake Borumba is well located to existing high-capacity transmission infrastructure and to the existing electricity network to support development of more renewables in the Southern Queensland Renewable Energy Zone (QREZ).

The Borumba Pumped Hydro Project will be capable of producing 2,000 MW and storing up to 24 hours of energy.

The Borumba Pumped Hydro Project requires expansion of the existing Lake Borumba (the lower reservoir) and a new dam to be constructed at a higher altitude to create an upper reservoir. An underground powerhouse will link the two reservoirs to enable water to be pumped from the lower reservoir to the upper reservoir, and for water released from the upper reservoir to drive turbines to generate electricity.

The Queensland Government committed $35 million to investigative studies to inform an investment decision for the Borumba Pumped Hydro Project. These studies were completed in early 2023.

Where is the Borumba Pumped Hydro Project?

The Borumba Pumped Hydro Project is located at Lake Borumba, near Imbil, southwest of Gympie in Queensland. The Borumba Dam wall crosses Yabba Creek and forms a reservoir called Lake Borumba. The Borumba Dam was constructed in 1964. Existing uses of water from Lake Borumba include irrigation, potable water supply and recreation purposes.

Why is this pumped hydro project needed?

As part of the Queensland Government's Energy and Jobs Plan (QEJP), the Queensland Government has committed to unlocking renewable investment and to achieving a renewable energy target of 50 per cent by 2030 and 80 per cent by 2035. Pumped hydro will play a critical role in achieving these renewable energy targets and enabling the move to zero net emissions by 2050. Queensland needs more large-scale energy storage as the State progresses towards this target.

Pumped hydro energy storage will play a vital role in the transformation of the energy system to renewable energy and a more diverse generation mix across Queensland.

There is a need for both pumped hydro and batteries in the future. Batteries play an important role providing short-term storage and an immediate response to changes in the power system. However, the capacity of large-scale pumped hydro projects is significantly greater than the biggest utility-scale batteries, delivering electricity to consumers long after batteries have discharged.

Why pumped hydro?

Pumped hydro is a proven technology. Long duration pumped hydro has the scale, operational flexibility, and low energy costs necessary to ensure the ongoing security and reliability of supply for Queensland's future clean electricity system, along with high levels of wind and solar generation.

Pumped hydro allows for renewable energy to be stored and dispatched at times when the sun isn't shining, and the wind isn't blowing.

Rather than shifting energy between places, pumped hydro allows us to shift energy between times. This will become increasingly important as the share of renewables in Queensland's energy system grows to continue to provide a stable and reliable energy system for Queensland.

Long duration pumped hydro assets can supply power over a 24-hour period, or longer. Long duration pumped hydro stores energy while renewable generation is plentiful and discharges it when there is insufficient generation to meet demand.

There is a need for both pumped hydro and batteries in the future. Batteries play a role in providing an immediate response to changes in the power system. However, the scale and capacity of long duration pumped hydro is significantly greater than the biggest utility-scale batteries, enabling cost efficient delivery of electricity to consumers long after batteries have discharged.

What is pumped hydro?

Pumped hydro is a type of hydroelectric energy storage created using two reservoirs at different elevations. Power is generated as water flows from the upper reservoir down to the lower reservoir. The water is then pumped back to continue the cycle. Pumped hydro is flexible, reliable and complements renewable energy generation such as solar and wind. Its ability to store significant amounts of energy will allow for more renewable generation to enter the market in Queensland.

Hydro energy will play a vital role in the transformation of the energy system to renewable energy and a more diverse generation mix across Queensland. For more information on pumped hydro in Queensland, you can visit the Department of Energy and Public Works website.

Why is Lake Borumba a potential pumped hydro site?

The Borumba site has been identified as a potential pumped hydro site since the 1980s. From initial state-wide studies, Borumba was identified by the Queensland Government as one of two potential sites for pumped hydro in Queensland. Reasons include existing dam infrastructure, land reserved for pumped storage hydro development, proximity to existing high-capacity transmission infrastructure and its strategic location to the existing electricity network to support development of more renewables in the Southern Queensland Renewable Energy Zone (QREZ).

If approved, the Borumba Pumped Hydro Project will be capable of dispatching 2,000 MW and storing up to 24 hours of energy. That's triple the generation capacity and storage of the existing Wivenhoe Dam pumped hydro scheme.

How is this project different from Traveston Dam?

The Borumba Pumped Hydro Project is vastly different to the Traveston Dam proposal.

The proposed Traveston Dam was a water storage dam and the proposal was cancelled in 2009.

The Borumba Pumped Hydro Project is critical infrastructure for our energy system to reach 70 per cent renewables by 2032. It will generate hydroelectricity and is in a different location to the proposed Traveston Dam.

Will the project impact environmental low flows or water allocation?

If it proceeds, the Borumba Pumped Hydro Project will not impact on environmental low flows. There will be no changes to water allocation for downstream users as a result of the project.

The project will expand the amount of water that is currently held in Lake Borumba (the lower reservoir) so the project can operate and to allow for existing water allocations and environmental low flows continue. Queensland Hydro

acknowledges the importance of environmental low flows and will continue to consult with environmental and conservation groups during all phases of the project.

How would pumped hydro be constructed?

The creation of a pumped hydro energy storage at Lake Borumba requires a new dam wall to increase the capacity of the lower reservoir. Borumba Dam is now more than 60 years old. Although safe, it requires significant upgrades by late 2035 to comply with the national guidelines set by the Australian National Committee on Large Dams (ANCOLD).

For pumped hydro, a new dam is required upstream and to the south of Lake Borumba to create the upper reservoir. Transfer tunnels, known as headrace and tailrace tunnels, and an underground powerhouse will link the two reservoirs. This enables water to be pumped from the lower reservoir to the upper reservoir, and for water released from the upper reservoir to drive turbines to generate electricity. For the underground infrastructure (including the main access tunnel, emergency cable and ventilation tunnel, transfer tunnels, and powerhouse), Queensland Hydro will be using drill and blast methods to construct underground infrastructure.

Where would transmission infrastructure be constructed?

New transmission infrastructure is needed to connect the Borumba Pumped Hydro Project to the existing high voltage network. The transmission infrastructure will allow renewable energy from across Queensland to be stored at the site during the day, and then released to meet customer demand at night.

Powerlink is currently investigating potential transmission routes. Due to the potential generation capacity of the project, new transmission lines will need to connect directly to a substation to maximise the amount of energy that can be transported to Queensland households and businesses.

Powerlink is investigating connection points at the Woolooga Substation, northeast of Lake Borumba and Tarong and Halys substations, to the southwest.

Further information about Powerlink's transmission study can be found on Powerlink's website.

Where is the project up to now?

While Lake Borumba has been identified as a potential site for a new large-scale pumped hydro, further studies are required to better understand the impacts and benefits of pumped hydro energy storage at this site.

Throughout 2022, Queensland Hydro completed a range of studies to support the development of a Detailed Analytical Report (DAR). These studies include geotechnical investigations, engineering design, environmental, social, and cultural assessments. The DAR was provided to the Queensland Government in early 2023 to help support an investment decision.

Queensland Hydro has also been formally engaging with stakeholders to capture feedback throughout the detailed analytical studies for the Borumba Pumped Hydro Project.

Should the Queensland Government's investment decision support the development of the Borumba Pumped Hydro Project, the project will progress with an environmental impact statement and approvals process. Concurrently, Queensland Hydro will undertake exploratory works to supply information on the geotechnical conditions along one of the tunnel routes. This is useful as it will provide a comprehensive understanding of the below ground conditions. Information from exploratory drilling will complement surface borehole investigations to increase our understanding of below ground conditions.

How will potential environmental impacts be assessed?

Should the Queensland Government's investment decision support the development of the Borumba Pumped Hydro Project, the project will progress with an environmental impact statement and approvals process.

The primary project approval process will be an environmental impact statement (EIS) under both state legislation (i.e. the coordinated project process under the State Development and Public Works Organisation Act 1971 (Qld)) and Commonwealth legislation (i.e. the controlled

action assessment process under the Environment Protection and Biodiversity Conservation Act 1999 (Cth)). A broad range of secondary approvals will also be required under other state planning and environmental legislation.

The Queensland Government is committed to undertaking a detailed, transparent assessment of the environmental impacts of pumped hydro at Lake Borumba. Conservation of national parks and protected areas will be prioritised as far as practicable.

Queensland Hydro will be actively working with landholders, the community, Traditional Owners and environmental groups during these studies.

Studies will cover a range of important environmental areas including water quality and aquatic species, and the potential effects of any inundation.

Based on the current indicative project schedule, this formal EIS process will commence in 2023 and is estimated to conclude in 2025.

How will water allocation and quality be assessed?

While an earlier preliminary study by Seqwater was undertaken for usual planning work around water supply and flood capacity, this work will not form the basis of hydrological assessment of a pumped hydro project at Lake Borumba.

We will undertake specific hydrological analysis for the Borumba Pumped Hydro Project. Understanding the sustainable yield of the Yabba Creek catchment above the existing Borumba Dam is a project priority.

This hydrological analysis will examine the impact of pumped hydro on water flows and water users and the effects of climate change. A project objective is to make sure that existing water users and environmental low flows are not impacted.

We will work closely with the Department of Regional Development, Manufacturing and Water to consider the studies that form part of the draft Water Plan (Mary Basin) 2023, as well as during the preparation of the Borumba Pumped Hydro Project environmental impact statement.

How long will it take to fill the dam and what happens if it takes significantly longer?

Initial modelling indicates it will take two average wet seasons to fill the lower reservoir and meet existing water allocations – offtakes as well as environmental low flows. It may take longer if there is a dry period while the reservoir is filling. Once it has filled, local rainfall in the region is expected to offset the small amount of water lost through evaporation.

The Borumba Pumped Hydro Project can start to operate if the lower reservoir is not entirely full. If the natural inflows are low, the pumped hydro storage could still operate, at a reduced number of hours. Full generation capacity will be reached only when the reservoirs are at full supply level.

What water quality do the reservoirs have to be and how will it be maintained?

Preliminary assessments and modelling of water quality, both existing and once the Borumba Pumped Hydro Project is operational (if the project proceeds), have been undertaken as part of the Detailed Analytical Report (DAR) and will be developed in greater detail should the project progress to an environmental impact statement phase. This study will look at potential sediment, water and movement, and contamination. Based on investigation findings, the project design will incorporate measures to maintain water quality and to avoid and minimise any potential impacts.

What happens to the existing Borumba Dam?

The Borumba Pumped Hydro Project includes an increase in the water storage volume of Lake Borumba (the lower reservoir). This means that the full supply level for Borumba Dam will increase from approximately 135 m Australian height datum (AHD) to 155 m AHD. This will require construction of a new dam wall about 300 m downstream of the existing Borumba Dam.

While the new dam wall is being constructed, the existing Borumba Dam will remain fully operational. Once the new dam wall is complete and ready to impound water, there will be a need to modify the existing Borumba Dam to make sure the new dam wall is fully operational and

functional at any reservoir level (e.g. when in drought).

When decommissioning a dam, factors that may potentially influence (or be influenced by) the dam's removal must be carefully considered, including:

recreational use

public safety

fish passage

sediment management

removal/disposal of materials

timing of works.

Many dams have exclusion zones established in proximity to their hazardous structure(s) to prevent members of the public from inadvertently entering hazardous areas. There is an exclusion zone upstream of the existing Borumba Dam wall that is delineated by a line of fluorescent-coloured floating buoys and warning signs. This exclusion zone is expected to remain for the new dam wall.

How will the project impact recreational opportunities?

Queensland Hydro is committed to ensuring there are local benefits from the development of a pumped hydro energy storage project at Lake Borumba, including improvements to recreational values. The project will involve increasing the height of the existing dam wall, which may affect some facilities. There may be an opportunity to improve recreational facilities as part of the project, such as boat ramps, parking, amenities and tourism opportunities.

Once operational, recreational use of Lake Borumba will be possible. However, there may be safety related restrictions like what is currently in place near the Borumba Dam wall. Continued recreational use of Lake Borumba within operating and safety requirements will be a key consideration in design and will be investigated as part of the environmental impact statement.

Will the dam remain safe for the community to use?

Queensland Hydro and the Queensland Government understands that Lake Borumba is an important recreational area for the local community. Queensland Hydro understands the importance of continued recreational use of the lake with the hydro project. However, there may be safety related restrictions at times during construction, and restricted access close to structures – like what is currently in place near the Borumba Dam wall – during operations.

A best practice dam safety assessment will be undertaken as part of the project, as required by the Queensland Dam Safety Regulator.

Will feedback from the community be considered during project development?

Community engagement is a key priority. We are committed to engaging early and often with the community and key stakeholders. We want to deliver not only the best outcomes for Queensland, but also the local community.

Throughout the project, stakeholders will have an opportunity to provide input into relevant studies.

The project team will keep stakeholders and the wider community informed through project notifications, meetings and information shared on our project site and social media channels.

Our project team will meet regularly with a reference group to seek feedback about the Borumba Dam site and the scope of the detailed analytical studies and environmental impact statement. The reference group will be made up of community representatives and key stakeholders.

How can I provide feedback on the project and studies?

Queensland Hydro and the Queensland Government needs stakeholder input to make an informed decision about the Borumba Pumped Hydro Project. We encourage stakeholders and the community to provide feedback on the project through our communication channels.

Website: qldhydro.com.au/contact-us/
Email: borumba@qldhydro.com.au
Phone: 1800 433 939

To register your interest in the project, visit our website.