

Borumba Pumped Hydro Project

Hydrology studies

Queensland Hydro is undertaking detailed analytical studies to investigate Lake Borumba as a potential site for a pumped hydro energy storage (PHES) facility. Assessment of the hydrology, or the flow of water, within the Mary Basin forms an important component of this infrastructure project.

The hydrology study will demonstrate how the project aligns with water planning* and quantify the relative hydrologic implications of the PHES project in terms of:

- the hydrologic performance of the Borumba PHES
- environmental flows downstream of the project
- performance of existing downstream water entitlements throughout the Mary Basin
- sensitivity of the project scenarios to the potential effects of climate change.



Source: Queensland Government, 2022

Preliminary hydrology study results:

Implications for basin-wide environmental flows

- All mandatory Environmental Flow Objectives under the Water Plan (Mary Basin) 2006 are met in all project scenarios.
- Minimal increases¹ in adverse impacts were observed for all project scenarios (compared to the no-PHES base case, in which no PHES is constructed at Lake Borumba) under historical climate conditions.
- Applying dry climate change scenario conditions with the PHES operating and Borumba Dam raised to 155 m Australian Height Datum (AHD) resulted in only a slight exacerbation² of the level of impacts compared to those observed in the no-PHES base case under a dry climate change scenario.

Implications for existing downstream water entitlements

- Supplemented water allocation security objectives under the Water Plan (Mary Basin) 2006 were met for all project scenarios.
- No, or minimal, increases¹ in adverse impacts to downstream water entitlements were observed for the PHES project scenarios (compared to the no-PHES base case) under historical climate conditions.
- Applying dry climate change scenario conditions with the PHES operating and Borumba Dam raised to 155 m AHD (218,000 ML) resulted in only a slight exacerbation² of the level of impacts compared to those observed in the no-PHES under a dry climate change scenario.

Implications for water availability for Borumba PHES

- The modelled volume of water in Lake Borumba did not drop below 120 m AHD (5,445 ML) in the PHES project scenarios under either historical or dry climate change scenario conditions.
- The percentage of time that Lake Borumba dropped below 130 m AHD (25,833 ML) in the project scenarios under historical climate conditions was around 0.3%.
- Applying dry climate change scenario conditions with the PHES added and Borumba Dam raised to 155 m AHD:
 - did not result in the lake dropping below 120 m AHD
 - increased the percentage of time that Borumba Dam dropped below 130 m AHD by about 6.4% compared to the no-PHES base case.

Implications for initial fill

- There is a 50% chance that the raised storage will fill within 4.5 to 5 years.
- Based on extrapolating the modelled results, there is about a 95% chance of the raised storage filling within 10 years.
- At 80,000 ML (the minimum volume required to commission the Borumba PHES), there would be around 40% chance that the PHES will be able to operated in the first 1.5 years, rising to 50% chance in 1.5 to 2 years, and 80% chance in 5 years.
- The initial fill analysis assumes that the current water sharing rules and operational releases for existing downstream water entitlements would continue during the construction period. The temporary operational arrangements of Borumba Dam, during construction, will be developed during detailed design.

* The 2006 Mary Basin water plan is being updated by the Department of Regional Development, Manufacturing and Water (DRDMW). The updated draft water plan is expected to be released for comment by the Minister for Regional Development, Manufacturing and Water in 2023.

¹ Assessments to date are conservative in nature. Minimal increases in adverse impacts are defined as impacts that are likely to be mitigated through optimising the timing and quantity of downstream releases.

² Slight exacerbation is defined as minor in nature when compared to wider climate change impacts for water needed for energy generation.



For more information

Scan the QR code to view the project web page and contact details

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