

Lake Lyell PHES Concept Launch Webinar

Q&As



20 December 2023

General

How efficient is pumped hydro?

The efficiency of a pumped hydro facility depends on both the site topography and the pump-turbine equipment selected. A round trip efficiency of around 80 per cent is achievable which is directly comparable to the efficiency of a large-scale battery energy storage system.

What is the approximate timeframe for construction starting?

Construction is dependent on Project Approvals and is not expected to start until 2026. The construction period is anticipated to take at least four years.

What does the program look like from here?

We will continue our detailed concept planning and design to further analyse technical, economic, environmental, and social aspects of the project. This information will be submitted as part of our Environmental Impact Statement (EIS). Public consultation and regulatory approvals continue to play an important part in this process. The EIS is planned to be submitted in Q3 2024, an investment decision on construction of the project is expected in the second half of 2025.

Does dewatering mean draining the lake?

No, the lake will not be drained for construction of the pumped hydro project. The area to be dewatered will be limited to a small section of the Farmers Creek arm where the inlet/outlet construction will be located. Temporary cofferdams will be built to keep the lake water out. Dewatering is the process of removing water, to provide a dry construction zone and safe access for construction workers and equipment. Water pumped out during the de-watering is filtered into Lake Lyell. We'll reinstate the area once construction is complete.

When will the drilling results from February be released?

The results of the geotechnical programs will not be released to the public. The programs' purpose is to guide EA's engineering planning. Aspects of the geotechnical investigations will be used to inform the technical assessments included in our EIS, that will be publicly exhibited in 2024.

What are the main uses anticipated by EnergyAustralia for this facility - will it be for renewable intermittency or supporting daytime peak power demand?

The pumped hydro facility will be used for storing renewable energy when there is a surplus and returning it to the network to cover intermittency in wind and solar and to support peak power demands at any time of the day or night. For example, on very hot days, or in evening demand peaks.

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Where does the concrete come from?

The new upper reservoir design is a rockfill dam design instead of the original roller compacted concrete design. The reservoir walls will be constructed using rock processed from excavation of the upper dam site. Concrete will be used in the structural elements of the project including the dam, in tunnel linings, footings and foundations for the equipment. Where needed, concrete would be prepared in on-site batch plants, using sand and gravel produced on site.

When can we expect the next update?

We're seeking feedback on the concept design, and we'll share more updates early next year. Our website and Facebook page is a good way to keep in touch with the project activities.

You can visit us at the Project HQ or contact us if you have questions or feedback.

Email: community@energyaustralia.com.au

Phone: 1800 574 947

Project HQ: 124 Main Street, Lithgow

Website: www.lakelyellpumpedhydro.com.au

Technical

What are the services and ventilation routes to/from powerhouse station?

Access to the powerhouse will be via two tunnels from portals built on the north side of Farmers Creek. The exact orientation and location are dependent on further site investigations.

What is the advantage of having two shafts? Are they chosen due to selected construction method like a limit on raise boring machine diameter or to perform the maintenance works separately with a minimum shutdown period?

The two tunnel shafts connect the waterways from the upper reservoir to the powerhouse and down to the lower reservoir. Having two shafts allows a smaller diameter which enables raise boring as a construction method for the vertical sections. Two shafts also enable the two units to be operated independently of each other and reduces the risk of a single maintenance issue impacting both units.

How many permanent access tunnels to the powerhouse have been considered to comply with the Fire and Life Safety (FLS) requirement?

Fire and Life Safety (FLS) is an important design stream which will be refined further as the design progresses. The FLS design will need to be approved by relevant authorities as part of project design review and approvals. The Concept Design currently includes a Main Access Tunnel and an Emergency Cable and Ventilation Tunnel. The FLS design when it is progressed will include details of how these tunnels and other provisions are used to provide multiple paths of safe egress and safety options for personnel in all the applicable emergency scenarios.

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Where has the path of overflow from upper reservoir been considered to connect to?

The upper reservoir has no catchment other than its own surface area. The upper reservoir has a capacity of 4.65 gigalitres. Overflow has been factored into the design of the reservoir as a safety measure. Water will simply cease being pumped up to the top reservoir when it is at capacity.

What area does the infill take up?

We will use rock material from the tunnels and cavern powerhouse to fill the end of the Farmers Creek arm in Lake Lyell. This will create a barrier to protect the inlet/outlet from floods and serve as a storage area for extra material. We will access the site compound buildings and tunnel portals by a road constructed over the infill. The infill area is about 2.5 hectares.

Have you confirmed that the excavated material will be suitable for the reservoir wall? What excavation method do you envisage?

We'll utilise a cut and fill construction method which means we'll reuse the materials that we extract for construction. We have confirmed that the excavated material will be suitable for construction of the reservoir wall. The exterior dam face will be constructed using natural stone boulders extracted from Mount Walker. The excavation method is expected to be a combination of mechanical ripping and rock breaking (dozers and scrapers) and blasting methods.

What are the expected pump up and generation times - how quickly will the water be pumped up with this design?

Using the two units, the facility will have the capability to pump the full volume of 4.65GL up to the upper reservoir in 8 hours, and later use all of that water to generate at 335 MW for 8 hours. The plant will also be able to operate with only one unit in service, which would require 16 hours to pump the full volume but could then generate at 167MW for 16 hours.

It appears that there are no surge shafts. Are you able to comment on this in relation to the length of the waterway tunnels and expected pressure variations?

The Concept Design is utilising relatively short waterways. Penstock horizontal length is approximately 650m from the upper reservoir to the powerhouse. The tail race from powerhouse to the lake is approximately 450m. Initial transient analysis by the designers has shown that surge shafts and chambers are not necessary. More detailed transient analysis will be performed as the design progresses.

The minimum operating level is listed as 5.5 metres below full capacity. With severe drought how often do you expect this minimum level to be achieved?

If the water level in Lake Lyell dropped below the intake for the pumped hydro project during an extreme drought event, then the plant would simply stop operating. We'll be doing more work to determine these operating levels and the likely return period for severe drought as we develop the

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design further. One factor which may improve water security over time is the likelihood that Mt Piper Power Station will use less water from Lake Lyell as we transition away from coal fired generation.

Which material will be used to line the tunnels?

The vertical penstock shaft and the horizontal penstock section are likely to be concrete and steel lined to contain the pressure and minimise the turbulence of the water passing through them.

Has there been any consideration to the implementation of floating solar farms as part of the reservoirs?

Floating solar farms are not within the scope of the project.

What methods are proposed to construct the upper inlet/outlet within the active reservoir? Any specific methods to protect water quality in the reservoir during construction?

It is expected that construction of the upper reservoir will include civil excavation and construction, quarrying, drilling, and blasting. There will be no water in the upper reservoir while it is being constructed. Construction of the inlet/outlet works in the end of Farmers Creek arm of Lake Lyell will require excavation and construction below the normal lake levels. This will be achieved by the placement of cofferdams and dewatering of the construction zone to provide a dry work area. Some dredging within the Farmers Creek arm of Lake Lyell may also be required. Sediment control such as silt curtains will be applied to ensure that the main areas of Lake Lyell are not impacted. It's also possible that in the longer term, the operating project will improve water quality, for example, by reducing the incidence of algal blooms.

Biodiversity

What happens when fauna gets sucked into the inlet?

The proposed diversion of Farmers Creek is one example of how we are looking to avoid and minimise ecological impacts through site sensitive design. Essentially, this diversion will provide separation between the water intake infrastructure and the lake channel where aquatic species are likely to travel up and down Farmers Creek. The need and design of any intake screening is still under consideration and will be developed to respond to the ecological risks identified through the EIS process.

Lake Lyell

With the water level rising and falling, what impacts can we expect to see?

The movement of water between the two reservoirs will lead to fluctuations in the water levels of Lake Lyell. However, these variations will occur gradually over a span of up to 8 hours. As a guide, water levels will ebb and flow at around 25cm an hour, resulting in a total cycle variation of around

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two metres. The shoreline around the lake becomes wider or narrower as the water level changes such as is typical in tidal areas.

Before the project can receive approval, a comprehensive assessment of the impacts related to the cycling of water levels in Lake Lyell must be completed.

Is there scope to increase the upper reservoir water volume capacity?

The upper reservoir in the Concept Design will have a storage capacity of 4.65GL. We do not see any scope to further increase the upper reservoir volume, however through the subsequent design phases, there is opportunity to optimise, which may slightly reduce the size of the upper reservoir.

In regard to the draining of the lake what about public liability?

Lake Lyell will not be drained.

What temperature will Lake Lyell reach on the hottest days when the water is pumped up to capacity?

The pumped hydro operation may add heat to the water and warm the lake. Additionally, the upper reservoir's larger surface area will cause more evaporation and cool the lake. These combined effects will be examined in the EIS, and any impacts will be identified. Currently, the exact maximum temperature that Lake Lyell will reach on the hottest days has not been determined.

Construction impacts

What is the impact of truck traffic?

Sir Thomas Mitchell Drive and Magpie Hollow Road will be the main access route for construction traffic. During operation we'll utilise Sir Thomas Mitchell Drive to access our permanent facility. As part of our works, Sir Thomas Mitchell Drive will be upgraded to be suitable for construction traffic.

As part of the EIS a traffic assessment, noise and vibration assessment, and air quality assessment will be prepared. These assessments will include the evaluation of both construction and operational impacts, focusing on road traffic movements and noise at identified locations. Monitoring of existing traffic volumes along Sir Thomas Mitchell Drive and Magpie Hollow Road will be conducted in the coming months to gather relevant baseline data for the assessment.

The potential noise impacts arising from increased traffic on public roads during the construction and operational phases of the project will be assessed to help inform decision-making and the implementation of effective mitigation measures. Consultation with neighbours will be a key part of this process including how we work with neighbour to manage these impacts.

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During blasting what is the impact on residents of Sir Thomas Mitchell Drive? What kind of vibration will be created by this project?

Noise and vibration levels likely to occur during construction and operations will be assessed as part of the EIS process. Once we understand impacts, we will share those and work to develop mitigation measures in consultation with the community.

The NSW Environmental Protection Authority (EPA) also regulates major infrastructure projects to ensure the community and environment are protected from unacceptable impacts, such as noise, emissions, and pollution. Our approvals will need to meet these requirements.

Local procurement

How many jobs will this project create?

The project is expected to create more than 400 jobs during construction. A team of around 20 permanent workers will also be required to operate and maintain the asset over its 80-year lifespan.

Is there a formal way for suppliers to register their interest?

We want local businesses and suppliers to submit their interest in contributing to the construction of the project. While we are only at the feasibility stage, if the project proceeds, we will notify local businesses when we are seeking suppliers. The Lithgow region has great experience in the electricity generation sector, so we are committed to working with local businesses and suppliers as a priority when sourcing labour, materials, goods and services.

Will workers during construction be hired locally or Australian workers or bought in from overseas?

EnergyAustralia will prioritise the appointment of local workers and suppliers, ensuring a portion of investment flows directly to the Lithgow LGA and Central West region.

Why would you not use local hotel/motel or Airbnbs to house workers, instead of building accommodation camps?

Long term accommodation in the Lithgow LGA is in short supply. Hotels, motels and Airbnbs are already supporting tourism which provides valuable input to the local economy.

The accommodation camp will provide accommodation, food, laundry, recreational and entertainment services and facilities in one location for workers. The construction of an accommodation camp provides certainty for workers, ensuring the project can be sufficiently staffed throughout construction.