<u>Supplementary</u> Submission from Kate Boyd on SSI-12422997
Oven Mountain Pumped Hydro Energy Storage (OMPHES)
13 November 2023

This supplementary submission includes a correction to the submission which was submitted on 20 October 2023, and some additional comments regarding filling of the storages and minimising impacts on surface water, and associated ecosystems. My original submission, which is in the form of comment rather than support or objection, is appended below.

1. Correction to my submission

On the third page the second paragraph I requested raising the flow rate required when pumping could occur and suggested the 75th percentile. Higher flow rates are exceeded less often, so I meant to refer to the 25th percentile. The sentence should read:
The level at which water may be taken from the river for filling or top up should be raised considerably, perhaps to about the 25th percentile.

2. Why initial filling and top-up should be restricted to higher flow rates

The proponent requests to be permitted to fill or top up the storages whenever flows at the Macleay River gauge site below Georges Creek exceed the level that has been exceeded for 50% of the time since that gauge was established – 597 ML/day. It is exceeded more often in wetter seasons and years than in dry seasons and years. This is not a level that is exceeded very much of the time in a drought year but it may be exceeded for a few weeks at a time or a few hours, depending on the drought. Our climate is too variable, especially with climate change, to predict how long droughts will last or how severe they will become, so each high flow is valuable in enabling an increase in the ecological productivity of the aquatic ecosystem. Fish need that ecological productivity to survive through droughts. Periods of high flows are sometimes important in improving water quality. High flows might contribute to alluvial groundwater levels and survival of groundwater dependent trees and associated animals through a drought.

In 2018 there was a drought in the Macleay but there were flows above that 597ML/day 50th percentile level for 2 weeks in March (7 days above the 25th percentile), less than 1 day in July then 2 weeks in October (10 days above 25th) and 8 days in December (4 above 25th). In 2019 that 50th percentile level was only exceeded for about 2 days twice in January then for less than one day in July. If the storages were being filled whenever flows exceeded 597 in a year like 2018, could this have significantly reduced the ecological productivity of the river? They could not have been filled in 2019 and attempting to top them up would have impacted on ecosystems and possibly human users downstream. The EIS has not assessed the impacts in the context of the droughts or seasonal conditions that could occur.

If pumping was restricted to higher flow levels the impacts would be less. The proponents should explain what they will do if a drought occurs during construction and if they have to delay filling the storages. They should expect to delay the start of operations, perhaps for a couple of years.

Thank you for considering my comments on the Oven Mountain proposal including this supplementary submission.

Kate Boyd

Submission from Kate Boyd[1] on SSI-12422997
Oven Mountain Pumped Hydro Energy Storage (OMPHES)

Introduction

This submission provides comment on the proposal and requests to decision makers including those in DPE-Water, the Department of Planning, those who determine the application and the proponents.

I have focussed on the issue of proposed water extraction from the Macleay River, although I am also concerned about other issues and the important question of how Australia can rapidly reduce greenhouse gas emissions without causing serious adverse impacts on local environments in NSW or elsewhere.

My main concern is that the times and river flow rates when pumping from the Macleay River is permitted should be much more limited than the proponent proposes. This applies to pumping for construction purposes during any period of lowish flows and to filling or topping up the reservoirs. The impacts of the proposal on aquatic ecosystems and downstream water users will be significantly greater than the EIS claims, both in the 8km reach of the Macleay River upstream of Georges Ck junction and during prolonged dry seasons in all downstream reaches of the Macleay. Significant changes to the proposal should be required, if necessary reducing its generation. If this and other requirements to avoid or limit other adverse environmental or social impacts make the proposal impossible or uneconomic, so be it. Rapid reduction of greenhouse emissions is essential but ways to achieve this that do not cause serious local problems are needed, including a far greater focus on demand management. This should include very significant reductions in per capita total demand for energy as well as changing the sources of energy, which can include more electrification, but should recognise that energy supply, electrical or otherwise, is not more important than everything else. Water is essential in many ways, not just enough to drink. Appropriate flow regimes as well as presence of flowing water in all naturally permanent rivers, including all reaches of the Macleay, are essential for both people and the species that live in or depend on the river and estuary.

The 2 construction pumps and 1 reservoir-filling pump will all be upstream of the mouths of both Sunday Creek and Georges Creek. These are two of the most reliable streams in the Macleay catchment due to much of their high rainfall and this being absorbed and gradually released from their dense forests, making them significant contributors to low flows at the gauge site below Georges Junction. Flows at the pumping locations do not include these flows. Most of the catchment above the pump sites has much less rainfall and less sustained flow so these creeks often, though not always, provide a disproportionate contribution to flow below their junctions. When there is less than 13 ML/day at the gauge site below both these creeks there will often be much less flow at the pump locations. There will also be times when flows from the larger catchment above the pump sites is much more than from these creeks. Both situations need to be considered, although there is no data distinguishing these situations.

Pumping rules should relate to flow rates both where the pump is and at the river gauges downstream, not just to flows past the gauge below Georges Ck junction as proposed.

Pumping for construction purposes – why this is an issue

Pumping of up to 365ML/year at 1ML/day is proposed whenever the river flow gauge downstream of the Georges Ck junction is above 13 ML/day. **Appendix M** says flows this low were recorded "less than 1% of the time over the historical record"[2] (i.e. this level was exceeded more than 99% of the time).

[1] After completing a Bachelor of Science with ecology major and Diploma in Natural Resources, I had a career in natural resource management including water resource management. I have lived in Armidale for decades.
[2] Appendix M, 56th page of 309.

This is an extremely low flow, so in most years it would not restrict pumping at all – only in extreme droughts like 2019, but drought is likely during a 5+ year construction period and climate change makes extreme drought more likely than in the long period of records that the 1% figure is based on. And that data is not for the locations from which pumping from the Macleay is proposed which are shown on Appendix M figure 5.1.

While 13 ML/day is the minimum river level set in the Macleay Water Sharing Plan for pumping by the existing small licence holder(s) in the Macleay gorge water source area, the larger number of people below the Junction who have unregulated licenses will not be permitted to pump when flows are below 30 ML/day at Turners Flat and will be restricted to pumping for 10 hours or less per day when flows at Turners Flat are below 60 ML/day. Their commence-to-pump level was recently raised to this because the previous rule left too little water in the Macleay River for the environment, basic rights holders and for Kempsey town water supply. The amount of water Kempsey Council may pump per day is reduced when flows at Turners Flat are below 235 ML/day and limited to 8.5ML/day when river flows there are below 62 ML/day. Maintaining flows to and past Kempsey is important for maintaining the freshwater ecosystem, then the brackish quality and productivity of the estuarine ecosystems.

Taking of water by OMPHES will reduce flows available to all downstream users, including Kempsey and the fish and other environmental "users", and may undo some of the environmental and social benefits of the rules in the Water Sharing Plan **unless OMPHES use of low flows is much more restricted than the EIS proposes.**

While measurement of the depth of water at a gauge location is relatively easy, converting depth to an estimate of the volume of water passing the gauge location per day depends on accurate calibration of the gauge which is very difficult for depths that are not often experienced including these very low flows, particularly in rivers where the bed is gravel, rocks and sediment that may be changed by floods. This applies to both the Georges Junction and Turners Flat gauges which have limited accuracy at very low flows and had a massive flood in 2022 and recalibration will not have been possible at all flow levels since then. River levels have been dropping but may not be low enough to recalibrate the very low flow range. For example, the comparison plot of gaugings and latest ratings for the Macleay below Georges Junction gauge 206024[3] shows measurements when the river was about 0.15m deep on three occasions, equating to 50 and 60 ML/day on two of these but less than 20 ML/day on the other occasion. Therefore, the only effective way to set pumping levels that will not reduce very low flows is to apply a large margin for error

Recommendations if consent is to be granted:, the commence to pump conditions for OMPHS construction should require flows at the pump site to be above 60ML/day **and** either above a level significantly higher than 30 ML/d at the gauge downstream of Georges Junction or above 60 ML/day at Turners Flat – the advice of Save Our Macleay River, Kempsey Shire Council and other Macleay water users may be a good guide to an appropriate level.

The developer should be required to pay for installation and calibration of an additional gauge close to the pumping point from which data can be read by anyone on the WaterNSW Realtimedata website. Installation and initial calibration over several months should occur before construction commences. As calibration requires measurement of the speed of flow at different levels and times, it can only relate to the flows experienced when hydrographers are working at the site to measure the speed of flow in multiple points at that day's water level. Accurate calibration depends on measurement on numerous occasions when the flows are at different levels, and on recalibration if the river bed may have changed.

Initial storage fill and operational top-up

[3] https://realtimedata.waternsw.com.au/water.stm site 206024 prepared output accessed 16/10/2023

The EIS and appendix M misleadingly refer to taking water from the Macleay for these purposes as being limited to at higher rates for these purposed say "extraction will only occur during high-flow (greater than 50th percentile) conditions" but 50th percentile is exceeded 50% of the time (the flow rate is less than this 50% of the time), so it is a normal not high flow. High flow should be thought of as a level or flow rate that is significantly above a normal height or rate, such as a flow that is exceeded only 10% of the time. Most of the time flows should naturally be, and should continue to be, in the range between low and high, not reduced to or below very low. It is neither ecologically sustainable nor acceptable to significantly reduce the moderate flows or the low flows, as happened in the Murray Darling Basin making necessary the extremely costly Murray Darling Basin Plan.

The level at which water may be taken from the river for filling or top up should be raised considerably, perhaps to about the 75th percentile.

There should also be a requirement that the large pump/s **not be turned on suddenly** which would cause a sudden drop in water levels which has much worse impacts on the ecosystem downstream than the short period of lowered flows would suggest and can cause bank erosion. The natural rate of flow recession should be a guide.

The proposal should have focussed more on minimising the total top-up volumes needed, including by recycling unavoidable groundwater outflows. This includes but is not limited to drought periods.

Conclusion

The OMPHES proposal should not be granted consent on the basis of their current proposal and EIS. I am aware of many other issues[4] with the current proposal and inadequacies in the environmental assessment, in addition to the water issues detailed here.

The proponents should be required to redesign their scheme so that its environmental and social impacts are minimised and reduced to an acceptable level. Achieving net zero greenhouse gas emissions from energy supply is very important but that does not mean that any amount of environmental or social impact as collateral damage in achieving this is acceptable. Energy supply is not more important than water, aquatic ecosystems and other values. This submission only addresses the water issue, not the other values. An energy storage scheme such as pumped hydro can only be acceptable if it is designed to take very little from the environment especially during times of environmental stress, such as droughts.

Redesign would be needed to achieve this including details of how droughts during the construction period will be coped with to avoid taking river water at levels below those I have proposed. For

[4] One such issue that has not been assessed in the EIS is the amount of native vegetation that would be cleared and kept cleared to upgrade the Armidale-Kempsey transmission line from where the OPHES proponents propose to connect to the grid northwest to Armidale, which I understand will be necessary if OMPHES is to use and generate more than 600MW. I was advised by the OMPS staff at a community drop-in session in Armidale that such upgrading would be necessary. I note that EnergyCo's Network Infrastructure Plan includes such upgrading, although there would be no reason to upgrade this line if there is no OMPHES. A higher capacity transmission line would involve a wider cleared corridor, unless build underground, perhaps much wider if it involves duplication to avoid disrupting the supply to Kempsey region during construction. The existing line affects habitats of threatened species, such as Hastings River Mouse which is known to occur close to the existing line, so cumulative impacts with other activities, such as the current logging of Styx River State Forest, would need to be assessed. This has not been done although such clearing would be a direct result of the 900 MW proposal. All impacts associated with the proposal should be considered.

example, working out details of how taking water in droughts can be far more limited through construction of a system for trapping and storing water for construction use before much of the drilling and building of large dams commences, and details of how to recycle more of the local runoff and generated groundwater during operation to greatly reduce any need for reservoir top-ups during construction. Could construction of a small dam nearer the mouth of Fingerboard Creek blow the lower reservoir enable this?

Regardless of what redesign or additional detailed procedures can achieve, the proposal should be prohibited from operating in ways that result in unacceptable impacts. If the reservoir water levels decline during drought and cannot sustain generation of the proposed full capacity output for 12 hours, so be it: other storages such as batteries and/or load shedding should occur. Construction and operation of this scheme should not be given priority above the environmental needs of the Macleay River or the water needs of existing water users.

The requirement of the Water Management Act 2020 to give priority to the needs of the environment and the needs of town water supplies and basic rights holders should be complied with by the people determining this development proposal.

Thank you for considering this submission

Yours faithfully

Kate Boyd