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To:	Hazelwood Info Shared Mailbox
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To the inquiry Participants.
Please accept my submission for the Mine Rehabilitation
Thank you
Daniel Caffrey Traralgon

SUBMISSION TO HAZELWOOD MINE REHABILITATION INQUIRY

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PUMPED HYDRO PROPOSAL

Pumped hydro is one of the most extensively used ways of storing energy in the world. At the moment, there are just two pumped hydro schemes in Australia – in the Snowy Mountains and a smaller scheme on the Shoalhaven River in NSW.

The concept of pumped hydro is that water is held in an upper dam and that when electricity is needed, water is run downhill by the force of gravity and through turbines, which generate electricity located at the bottom of penstocks conducting the water through them. This water is captured in a bottom dam for re-use. When the demand for grid electricity falls, so will the spot market price and electricity from the grid is used to pump the water back up to the upper dam. The profit is made due to the difference in the price at high demand and that of low or off-peak demand. The greater this difference, the more profitable will be the operation. The Australian Energy Market Operator, AEMO manages the distribution of the energy through the electricity grid and sets the price according to demand every 30 minutes.

Tumut-3 Power station in the Snowy Mountains: Each penstock feeds a hydro-generator and the water is then collected in the Tumut reservoir below the turbines and pumped back up to the Talbingo Dam using off-peak electricity.

The whole process of pumped hydro is very much a closed cycle with the water being used over and over again. It will just need minor topping up due to losses from evaporation.

With regards to a Pumped hydro scheme at the Hazelwood Mine, the upper lake is already in existence and known as the Hazelwood Pondage. The lower lake would be carved out of an area at the bottom of the open cut. Admittedly this lake would need some sort of covering for the bottom to separate it from the coal in the mine and this would need some investigation as to the best way of doing this.

There is possibly up to 100 m fall from the top lake to the bottom lake and given the amount of water in the Pondage, the Melbourne Energy Institute has estimated that it may support a 1000 MW hydro turbine system.

The mine itself has a lot of north facing slopes, which would be ideal for supporting solar panels to produce much of the electricity to pump the water back up to the top lake. In conditions where electricity demand has been created by a string of hot summer days and refrigeration and air-conditioning units are putting a lot of strain on the grid supply, the pumped hydro scheme could be operating and with water being pumped back up at the same time, large volumes of electricity could be supplied to the grid for extended periods and making up for shortfalls caused by the high demand.

At the moment, due to the amount of excess electricity capacity in the National Electricity Market (NEM), the demand is very rarely greater then the supply from conventional coal, wind and conventional hydro sources. To compound matters of over-supply, rooftop solar is penetrating the market to a level that disrupts the existing business models of the big generators and impacts their profitability to a degree disproportionate to the amount of actual energy supplied by them. This is because they produce the most in the middle of the day, when traditionally the spot price is highest because of demand from industry and in summer the demand from air-conditioners and coolers. In the present circumstances, a pumped hydro scheme does not make a very good business case.

However, the world is now moving ever more quickly towards greenhouse gas free forms of energy in order to prevent catastrophic climate breakdown in the near to medium term future. It is inevitable that Australia will join the rest of the world in taking strong action to limit emissions from fossil fuels. A price on carbon is central to effective action to fight climate change. Given that brown coal is the most emissions intensive of all fossil fuels used for electricity production, it is not hard to believe that the two older power stations in the Latrobe Valley have a very short-term future once an emissions trading scheme is introduced.

With less generation capacity after the closures of Hazelwood and Yallourn, the supply side of the equation will drop back to roughly match the demand side. If this happens, then prices for peak-supplied electricity will rise and make the financial attractiveness of a Pumped Hydro Scheme at Hazelwood more enticing.

SIDE BENEFITS

MINE REHABILITATION OPPORTUNITIES

With a dam in the lower part of the mine and no more coal extraction from the pits, then full rehabilitation can be planned out to stabilise the steeper slopes and ensure the freedom from future coal fires by having a self regulating system of recharge water and pumped water where natural recharge is not possible.

With stabilisation of the slopes and sealing of the coal with earth to prevent fires from ember attack, then serious landscaping work could be carried out to turn the old mine area into attractive natural forest area that would allow echidnas, goannas, koalas, wallabies, native birds and other native animals to recreate a natural eco-system which would attract more visitors wanting to experience the area.

Other tourist type attractions could be built in to the area. Things like toboggan runs and ropes courses, mountain bike rides, horse tours and so forth could use the steep sides to create an enticing tourist experience with the two lakes being central to the attraction.

Even in drought times, these are going to be damp areas and unique possibilities can be imagined for the types of forests and plants that could be supported in these low lying situations.

TOURISM

If the Hazelwood Pumped Hydro Scheme became a reality, then other businesses could be leveraged off it. Tourism could throw the pitch of "Visit Morwell and see the transition from a Planet Wrecking local economic basis to one that sets the example of transitioning to a zero carbon, permanently sustainably based economy that works with nature and does not destroy it.

Visitors could be treated to the sight of water rushing down out the turbine houses into the lower lake each day at 12 noon for 15 minutes at least, unless there was a need for it to continue longer in high demand times.

JOBS

While it would be envisaged that only a few dozen jobs would be ongoing with the running and maintenance of the pumped hydro scheme, hundreds of construction jobs would be had in the building phase of scooping out the lower dam and installing the penstocks and turbine generators.

As well as creating jobs, existing jobs can be saved as a lot of the necessary grid infrastructure can be used for a pumped hydro scheme. In particular the switch-yard at Hazelwood Power station and the other vast power line network that exists here.

As well, the ongoing landscaping and geo-engineering to manage the water levels would require a quite a large permanent workforce. Add to these the people involved in the prospective tourism activity that would be engendered and Morwell could be the centre for hundreds of clean well paid jobs that till now could never be envisaged.

The area will once again become an attractive place to live, because the air will be much cleaner with no more or very much reduced burning of coal and the citizens will be much healthier, because of the cleaner air. This will bring in more people to live in the area, as people are discouraged by the air pollution and the threat of coal mine fires at present.

For further technical details, refer to the Melbourne Energy Institute Reports below

http://seng.org.au/sites/default/files/chapteradmin/vicfiles/20141028.pdf

http://reneweconomy.com.au/2015/lets-turn-latrobe-valley-coal-pits-into-hydro-storage-for-renewables-91630

Other Articles
http://www.latrobevalleyexpress.com.au/story/3116082/mine-rehabilitation-option-the-valleys-silver-bullet/

IN CONCLUSION

I would like to thank the Inquiry for investing the time to address this extremely important issue of mine rehabilitation and I value the opportunity to present this submission to the Inquiry.
Daniel Caffrey