Observations of the report into the Initial feasibility of Project Marinus

It would appear the analysis is very conservative in terms of using the highest cost estimates while the estimates of the benefits seem lower than realistically can be achieved.

We note the cost estimate used was "the most expensive of the favoured route options was chosen" rather than an average of the project costs or the range. If a lower estimate was used this would improve the benefit cost analysis provided in the report.

In terms of the benefits and modelling we offer a number of observations:

- We note the "targeted capacity factors" for new wind in Tasmania is 40 percent. We feel this is well under what can be achieved as UPC modelling has modelling of its Robbins Island/Jim's plain wind farm of 47-50 percent capacity factors (range dependent in size). Further, the update ISP assumptions have capacity factor for high wind sites in North west Tasmania at 51 percent. We consider the modelling should be updated to recognised particular defined projects like Robbins Island/Jim's Plain as they can offer materially greater benefits. For example using a 47 percent capacity factor for 1100 MW can deliver over 15 percent more energy than currently assumed. This will further delay other investment and could offset the black coal generation assumed in the modelling.

- While we consider projects of similar size will cost effectively the same across regions (this is supported by the new ISP methodology on this), the ability to build at scale in Tasmania, and the potential cost savings this brings, is not reflected in the modelling. For example, the development of the second stage of Robbins Island and Jim's plain will not need to cover significant transmission costs. In addition, the potential to get better pricing for the wind farm equipment with the significant order also seems to be missed in the modelling. In fact it would appear that the modelling adds a dedicated increment (say 100 MW). While this has some merit the further out the development, taking projects that would be seen to be "advanced" should be considered and as such economies of scales can be captured. We see at the very least this should be considered for Robbins Island and Jim's plain full 1100 MW development. We would also offer the excellent opportunity of project of over 1200 MW in the North east Tasmania where UPC have secured land and advanced connection enquiry into Georgetown.

- In terms of pumped hydro opportunity and cost, it is good to see the recognition of the low-cost Tasmanian opportunities that Hydro Tasmania and ARENA have identified. It is also good that some effort has gone into better quantifying the pumped hydro opportunities in other states. However, UPC still consider the other state's costs for general pumped hydro projects is too low at around $1.5M/MW. We note the most recent work by Entura that hasn't been included in the modelling could change the shape of the value of Tasmania pumped hydro and hence firming costs in the NEM. Again this would add to the value of Tasmania opportunities to the wider NEM outcomes. On the Entura pumped hydro report, UPC still considers the hypothetical pumped hydro options costs are too low given in the same report the

expectation on costing of actual projects all seem to be above $2m/MW. A case in point is the SA Projects (with Cultana sea water option removed as this will be more expensive) having an average cost of over $2m/MW for 8 hours storages but the hypothetical pumped hydro (6 hours storage) is $1.93m/MW (note assumes two storages to be built) and the amount available is already well above the theoretical capacity/energy potential outlined by Entura. The observation also, if these theoretical options are real then why aren't some being developed in Vic/NSW. UPC has also had some work done by an international consultant with experience in pumped hydro development that indicated projects cost could range from $1.6M/MW (one storage existing and one storage built) to $2.5M/MW (two storages to be built). Using these estimates would enhance the value proposition of the Tasmanian pumped hydro opportunities.

The issue with the above assumptions in terms of the Tasmanian opportunity, is if the modelling is using broad assumptions where cost and capacity factors are similar across regions, it will continue to promote more local projects (real or not) ahead of more interconnection to tap into higher value or low-cost resources in particular regions. Tasmania is a good example with both excellent wind and pumped hydro options.

In terms of the modelling outcomes we are also concerned with:

- The fact that in the higher emission scenario (i.e. 52% reduction) more black coal is used seems to contradict the scenario. This is particularly the case for the 1200 MW link option and is depicted in Figure 46 in the report. It seems stage that adding more renewables from Tasmania through a larger link would favour the higher cost black coal generation over the lower cost brown coal generation. The implication is Tas wind would lower prices in Victoria making existing brown coal unaffordable (i.e. effectively indicating part of Yallourn would close by 2026), although why wouldn't the cheaper brown coal be exported to NSW to put more pressure on early closure of Black coal in NSW. In some respect this is highlighted by the Marinus 1200 Staggered EC 90 case where a two-year delay in the second stage promotes more brown coal and less black coal. This raises the issue of how the 52 % emissions reduction target is modelled and whether this is realistic or has added other drivers that cause this result. Even with more PHES capacity in Tasmania it is difficult to reconcile that more black coal generation would eventuate. Finally while it's not reported it is assumed in all the EC90 cases the same emissions reduction is achieved. Hence, it would imply with changed assumptions the need for more black coal could be avoided.

- It seems unusual that any time in the future large scale solar would be more cost effective than large scale wind (i.e. significant scale is developed by mid 2030's) in Tasmania. This may be a result of the relativity of capacity factors and costs assumptions used and if more representative wind farm, capacity factors and costing were used (as discussed above) then this may be reversed to seeing more wind in Tasmania.

There are also a number of aspects that are not covered to any greater extent in the modelling. These are listed below:

- There is no actual price comparison between scenarios. This may be valuable to understand the benefits and impacts to customers. It would also be useful to have some work done on impact to customers in terms of $/MWh and typical customers' bills (similar to that included in the SA-NSW interconnector work by Electranet)

- It is unclear on the MLF assumptions for new projects. If these align to the ISP then we make a number of observations. While this approach may be valid for the longer-term incremental projects (i.e. 100 MW capacity increment) it will be different for specific projects. Again we offer the Robbins Island case where a 165 km Transmission line will connect it back into Sheffield. This should offer a much high MLF than if assumed to connect into the North West (i.e. 2018-19, Bluff point 0.895 versus Devils Gate (closest point to Sheffield) was 0.966) which could result in material differences. Where specific proposals are highlighted then all aspects including the most appropriate MLF should be applied.

- We note in the Tasmanian Government report (Current situation – Marinus Link/Battery of the Nation) that they provide more detail into the issues of who pays based on current considerations and the beneficiaries pays analysis. It would be good to calculate this out to identify the actual impact to customers. For example, the annualised cost for the report for a 1200 MW link is stated as $189m/annum. If the allocation is 59% to Vic (or $112m) and 41% to Tasmania (or $77m) then the effective transmission charges would be around $2.5/MWh and $7.4/MWh for Vic and Tasmanian customers respectively. Looking at typical household usage this implies around $10/annum[1] and $59/annum for Vic and Tasmanian customers respectively. Given the beneficiary are predominantly on the Mainland (i.e. 97 %) then this would demonstrate the disparity with a Tasmanian network cost $0.6/MWh or less than $5/Annum using an allocation more aligned to the benefits (this doesn't include lower wholesale prices which should mean a significantly lower electricity bill). Also this could be compared to the net lower wholesale prices to provide greater context on typical bills.

- We think the lack of discussion on economic impact and rather a focus on NEM outcomes has seriously compromised the work undertaken. It is clear in the report that the direct and indirect value is significant for a 1200 MW at over $7 billion. The jobs potential for Tasmania and Victoria is substantial and this should have been discussed and highlighted upfront. Such value could be drivers for Governments to underwrite such an investment and should be promoted.

[1] Assuming 3,865kWh for Victorian customers and 7,908 kWh for Tasmanian customers – AEMC 2018 retail pricing review - https://www.aemc.gov.au/market-reviews-advice/residential-electricity-price-trends-2018.