Star of the South

Australian Energy Market Operator (AEMO) & The Commonwealth Scientific and Industrial Research Organisation (CSIRO)
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Submission: AEMO Draft Inputs, Assumptions and Scenarios report (IASR) & CSIRO GenCost 2020-21 Consultation Draft Report

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About Star of the South

Star of the South is Australia's first proposed offshore wind project off the south coast of Gippsland in Victoria. We are a private company comprised of Australian founders and Copenhagen Infrastructure Partners (CIP), who are a global leader in offshore wind.

Offshore wind is one of the fastest-growing renewable energy technologies globally, helping to transition energy systems to a consistent and reliable form of renewable power while creating jobs and economic investment in regional coastal towns around the world.

We have made significant progress on our project since receiving a Commonwealth Government licence to test the conditions out at sea – we are actively monitoring wind and wave conditions and have commenced formal planning and environmental assessment processes as part of the feasibility phase of the project.

We welcome the opportunity to provide feedback and expertise with respect to offshore wind in support of the development of the AEMO 2020-21 Draft Inputs, Assumptions and Scenarios report (IASR) and the CSIRO GenCost 2020-21 report.

The Growing Investment in Offshore Wind

Investment into offshore wind has increased exponentially over the last decade with 30GW of new offshore projects installed worldwide since 2001, 6.1GW of which was installed in 2019[1]. Estimates beyond 2035 anticipate offshore wind capacity to be over 330GW as the industry expands into new markets and counties set ambitious clean energy targets. Japan recently announced plans to install 45GW of offshore wind by 2045 while the EU presented their Strategy on Offshore Renewable Energy late in 2020 with targets to achieve 300GW of offshore wind installations by 2050[2].

Australian federal and state governments are currently developing regulatory and supporting policy frameworks for the exploration, construction and operation of offshore energy projects in Australia. The Victorian Government recently announced funding for innovative renewable technologies, such as offshore wind, while continuing to develop an offshore wind sector strategy. Public, government, and investor interest continues to grow resulting in increasingly rapid uptake of offshore wind projects worldwide.

Capital Costs for Offshore Wind

We would like to acknowledge The Australian Energy Market Operator (AEMO) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) for the studies conducted in the energy industry to provide vital research and guidance during the transformation of the electricity sector. Providing future price projections for both emerging and established technologies are crucial to achieving a cost effective and reliable grid for all Australians.

[1] Global Offshore Wind Report 2020 - GWEC, pg 11

[2] Boosting Offshore Renewable Energy (europa.eu)

We recognise the importance of the independent cost assessments conducted to accurately determine the future costings for all energy sources. We welcome the reduction in estimated capital costs for offshore wind in the most recent GenCost report in comparison to the 2019 edition. These reductions place the projections closer to the AEMO forecasts and recorded worldwide industry costings.

However, we believe the capital cost projections for offshore wind are still too high based on current industry trends and reports released by international institutions.

Global trends

Across the globe, offshore wind projects have seen sharp decreases in offtake prices, accelerating the investment into projects from industry and government alike. In September 2019, the UK's third CfD Allocation Round cleared at a record low A$86/MWh[3] for a 15-year, inflation-indexed CfD, reducing the previous record set just four years earlier by 65 per cent. Similarly, the US has also seen rapid reductions in CfD pricing with the 2018 Vineyard 1 receiving a support package (PPA, tax credits, capacity payments, i.a.) worth A$144/MWh and the most recent 2019 Mayflower wind receiving A$125/MWh. Taiwan has also experienced this reduction, with first round offers reaching more than A$250/MWh in 2018 and more recent allocations awarded in 2019 sitting at just $107-$121/MWh for projects being constructed by 2025. These reductions in prices are driven by increased efficiencies and turbine sizes, reduction in CAPEX[4], maturing supply chains and economies of scale[5].

The 2018 report by the US department of energy[6] shows that the current projects which have obtained approvals and that are under construction have substantially lower CAPEX per installed unit of capacity than those already in operation. It estimates the CAPEX pricing based on reported offtake prices and declared CAPEX values to provide a snapshot of the worldwide price reductions in future projects. This reduction is also present in the NREL 2020 ABT[7], which estimates a decrease in CAPEX prices for offshore wind to be between 25%-65% by 2050. This is substantially higher than the current estimates in the GenCost report and aligns overseas research with international industry trends.

Bloomberg released a market update in early 2020 in which they project a learning rate of 10.7% for offshore wind turbines to 2030[8]. This is substantially larger than the 3% currently stated in the GenCost report and is the main driver of CAPEX reductions in the Bloomberg report. These reductions are largely due to the increasing turbine sizes and efficiencies which are unrestricted due to the lack of nearby residents for offshore turbines.

[3] All prices in this paragraph converted to AUD in 2020 prices

[4] GWEC offshore wind report (2020) pg 46

[5] Future of Wind – A Global Energy Transformation paper (irena.org) pg 47

[6] 2018 Offshore Wind Technologies Market Report (energy.gov) pg 59

[7] Data | Electricity | ATB | NREL

[8] Offshore Wind – A Market Update, Bloomberg, 2020, pg 57

Suggested changes and additions related to the cost of offshore wind

- As Australia does not currently have a regulatory framework in place to facilitate offshore wind projects, we believe Australian cost projections should follow global estimates and industry signals while also incorporating the cost of developing a new market. We consider the current CAPEX projections to not accurately reflect international research or recent market signals and we encourage CSIRO to incorporate these price indicators into their GenCost modelling.
- We also believe the learning rate cited in the report is too low, with many international agencies estimating a learning rate over 10%.[9] These claims are backed by industry figures and research in Europe, Asia and The US which are all reporting rapidly reducing project costs for both CAPEX and LCOE, with costs projected to continue dropping into the future. Looking at the modelling system used, it appears the main driver for these high CAPEX prices is the learning rate, so we recommend that the CSIRO re-evaluate this input.
- There are substantial differences between the offshore wind CAPEX estimates in the IASR and GenCost reports. We note that AEMO takes into consideration the efficiency increases driven by growing turbines and we question why they do not align with the CSIRO forecasts. We believe that both reports should have similar estimates due to the joint nature of these projects, the direct referencing to the GenCost report in the AEMO input and assumptions workbook and the consistent projections for the other technologies in the reports. We hope that through this process the two CAPEX estimates will align in future iterations of these reports.
- We believe OPEX projections are an important factor to consider when forecasting the future of the national grid and it is does not appear that either AEMO nor CSIRO have included the future OPEX of generators in the IASR. It is also important to note that we believe the OPEX estimates need refinement. In the NREL Electricity Annual Technology Baseline (ATB) 2020[10] it is forecast that the future offshore wind OPEX will drop substantially over the coming decade, up to 57% by 2050. This is in line with our expectations as OPEX reductions will be driven by the most recent generation of offshore wind turbines in the 12-15MW range. We find that the projection of OPEX reductions is substantial to future modelling and we encourage AEMO to incorporate OPEX forecasts into the IASR.

Other suggested changes

- We acknowledge the proposed risk scenarios outlined in Section 2.5 and the REZ resource limits estimated through an updated methodology in the IASR. We note, however, that neither the proposed risks nor the resource limit methodology seems to consider social licence caps on future renewable build-out. Several REZs across the NEM are already facing significant community opposition particularly to onshore wind farms and network upgrades involving new overhead transmission lines. Considering the amount of renewable energy build-out required across the various scenarios in AEMO's 2020 ISP, it would in our view be prudent to consider a scenario reflecting REZ-specific social licence caps on renewable build-out and/or factor in social licence constraints into the resource limit methodology.

[9] Offshore Wind – A Market Update, Bloomberg, 2020, pg 57;
2018 Offshore Wind Technologies Market Report (energy.gov) pg 58

[10] Data | Electricity | ATB | NREL

- We note that the transmission expansion cost assumptions are largely unchanged in the IASR (page 117) compared to the 2020 ISP. We find that it may be prudent to revise these upwards for new transmission upgrades based on recent events including increased cost estimates for Project EnergyConnect as well as increasing social licence pressures related to overhead transmission lines as exemplified by ongoing community concerns to move part of the Western Victorian RIT-T upgrade underground and Project Marinus Link's recent[11] decision to use underground cables for its onshore components. More underground transmission cables in future network upgrades would require notable cost increases compared to the current IASR assumptions.

Thank you for this opportunity to make a submission into these IASR and GenCost reports. We would be pleased to share further details of our analysis with both CSIRO and AEMO to inform future research in this area.

[11] https://www.marinuslink.com.au/wp-content/uploads/2020/12/Proposed-route-overview-to-support-community-input-Marinus-Link.pdf