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Australian Energy Market Operator
ISP Forecasting & Planning Team
forecasting.planning@aemo.com.au

RE: AEMO forecasting approach

Dear AEMO ISP Forecasting and Planning Team,

Fluence is a global energy storage technology solutions and services company. Our solutions are built on the foundation of industry-leading technology platforms that are optimized for different application groupings, and Fluence leads the industry with over 1,600 MW of projects deployed or awarded in 21 countries and territories.

Fluence also offers a comprehensive services suite to ensure customers are staying ahead of the market. From early stage feasibility and cost-benefit analysis that stand up in the real world, to ensuring optimal performance of storage assets, Fluence provides expert advice and services to propel customers' projects forward.

Fluence offers the set of comments below as part of our submission on the inputs and assumptions to be used in its Forecasting and Planning publications for 2020.

BESS pricing assumptions

Battery Pricing

In section 3.2.12 of the CSIRO, GenCost 2019-20 draft report, there is an indication that the battery pack prices are currently at $250/kWh, this is not accurate and our current cost of supply for batteries we procure for our solution is below this number. As a reference if you were to review the December 2019 Bloomberg New Energy Finance (BNEF) article "Battery Pack Prices Fall As Market Ramps Up With Market Average At $156/kWh[1] In 2019," BNEF reports that prices of batteries have fallen quite substantially to a number below the CSIRO number indicated.[2] Fluence is able to confirm that the price offered today to customers is lower than indicated in the assumptions taken for this exercise. Further to this, it is projected by suppliers that prices will reduce further in the coming years, as compared to the relatively flat projections in the draft report for the next few years till mid-20's. We request this be evaluated with Battery suppliers and integrators, who today are committing to long term pricing with customers.

[1] USD
[2] https://about.bnef.com/blog/battery-pack-prices-fall-as-market-ramps-up-with-market-average-at-156-kwh-in-2019/

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Overall Solution pricing

In Figure 2.2 of the CSIRO GenCost 2019-20 draft report, under the most aggressive pricing shown, which was estimated by Aurecon in 2019, we believe the 1-hour, 2-hour and 4-hour duration pricing, are all roughly 40% higher than the price of what solution providers offer today. This price differential can vary upward/downward with the connection point changing from Medium Voltage or High Voltage, the asset being a stand-alone battery, or combined with solar or wind. Regardless of the variations highlighted, the price points today are still lower than those indicated in the assumptions.

Fluence today offers turnkey solution pricing for a significantly lower cost than shown in the assumptions. We are happy to support AEMO in working with other solution providers to ensure a dataset of prices are confidentially provided to support accurate assumptions for the ISP modelling. We would encourage collecting benchmark pricing that involves different durations (1-hour, 2-hour and 4-hour) but also with batteries having, at minimum, 2 different use cases that varies the cycling requirement (20 cycles per year and 365 cycles per year).

Looking at actual deployed projects shared on the ARENA website[3], we can see pricing for projects confirmed 2 years ago and can say with certainty how those prices have come down, due to a combination of declining component pricing (both batteries and balance of plant), new efficiencies in solution design, and greater familiarity with AEMO's requirements for interconnection.

- Lake Bonney: 25MW/33MWH cost $41.6MM= $1,664/kW or $1,260/kWh
- Ballarat: 30MW/30MWh cost $19.93MM= =$1,507/kW or $1,507/kWh
- Gannawarra:25MW/50MWh cost $41.6MM=$1,664/kW or $832/kWh

BESS modelling approach

We understand in the modelling the BESS systems used are 2-hour and 4-hour duration, but we wanted to highlight several issues with this:

- Based on the assumption for modelling 2-hour and 4-hour and the lifecycle chosen, it seems like the utility-scale battery is being modelled for energy shifting alone and no other application, which downplays the value a BESS can bring to the power system.
- We believe it is important to model in multiple revenue streams the BESS can stack, factored into a merit curve as single asset. For example, when the least-cost model determines if a BESS can be built, it should factor in multiple value benefits of energy shifting, peaking capacity and frequency regulation. Our understanding is only one application is modelled in when an asset is built. This may be a significant omission that impacts the LCOE of a BESS in the least-cost modelling.
- Are BESS assets being modeled for and compared against other storage technologies *including* the cost and time of transmission upgrades that may be required, or simply

[3] https://arena.gov.au/projects/?project-value-start=0&project-value-end=200000000&technology=battery-storage

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comparing the costs of one deployed technology to another (i.e., BESS vs PHES)? The reason for this question is we believe a utility-scale battery provides significant value in terms of construction time, modular design enabling deployments from 100s of kWh to GWh scale, and can be located nearer to load centers with a smaller land requirement.

- We believe the ISP and GenCost study are missing a 1-hour duration battery, which has proven cost-effective in Australia for frequency regulation and other system security services. Including this valuation would make clear in the ISP's the near-term outlook the significant value battery-based storage offers to support required system reliability.
- There are other applications that would require more complex modelling and analysis with perfect foresight to be accurately accounted for; for example:
    - the ability to displace transmission upgrades by using BESS near a demand center or to augment an existing power line;
    - the ability to displace power assets that are dispatched for less than 4 hours a day. Utility-scale energy storage has already been proven in other markets to be an effective asset in displacing inefficient peaking plants or meeting peaking requirements of existing power plants, enabling generators to optimize operations of baseload plants, which can bring down overall system costs.

      We understand limitations of modelling for the impact of this, but request a way to overlay these possibilities in the results.

Fluence understands that re-establishing assumptions will require additional analysis, time and further research, but that doing so ensures that additional opportunities to optimize the NEM's operations and markets go unnoticed or unexamined. Fluence is willing to work closely with AEMO to provide input on the assumptions that reflect pricing in line with offerings provided by the Industry. Additionally, Fluence would be happy to support the AEMO team in better evaluating the diverse applications that energy storage can provide in the NEM and how these can be evaluated in an integrated planning model (i.e., similar to how Fluence has worked alongside network planning teams in the United States, Germany, the United Kingdom, India and other markets).

Thank you for the opportunity to provide feedback on this important topic. If you have any questions, please do not hesitate to contact us.

Sincerely,

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