



19 July 2019

Market Operator
Power and Water Corporation

By email: market.operator@powerwater.com.au

Dear Market Operator,

Generation Performance Standards Stakeholder Consultation – Tetris Energy

Tetris Energy (Tetris) appreciates the opportunity to further comment on Power and Water Corporation's (PWC) Generator Performance Standards (GPS) following the industry workshop on the 26th June 2019. Tetris is in the late stages of reaching financial close for the Batchelor and Manton Solar Farm, therefore the focus of our responses is to minimise risk of the GPS changes impacting the final investment decision.

Tetris has structured our response around the overarching engagement questions and sought feedback from potential financiers of the project.

1. Are the requirements arising from the propose code amendments understood?

Yes – confirmed

2. Having regard to the framework that will govern the Commission's approval of the code amendments (see Table 1.2), do stakeholders think there are any other viable options that Power and Water hasn't yet considered? If so, what is the option and what evidence can you provide to show that this is viable?

Tetris acknowledges the comment that *"Power and Water has applied a "no regrets" philosophy and holds the view that it is essential to set the "Framework for the Future" such that the outcomes are consistent with the NT objectives insofar as:*

- *promoting a competitive and fair market*
- *preventing misuse of monopoly or market power*
- *facilitating entry into relevant markets."*

Given the cost impost of some of the proposed changes, Tetris requests that PWC focusses on lowest cost options initially, reviewing the GPS framework as necessary for future connections, in step with technological developments. This facilitates the impending investment and provides transparency and flexibility for future refinements.

The areas that Tetris believes need further review are:

Solar Forecasting

Tetris acknowledges PWC's position, including the need to receive high-quality, forward-looking forecasts. We also understand PWC's legitimate concerns regarding securely managing the network



(particularly the dynamics of gas units that can take 30 minutes to come online) and appreciate the effort gone to assess the capability of solar forecasting technology.

Tetris suggests that PWC should modify the proposed forecast to 50% probability of exceedance (POE) forecasts, with a pre-determined maximum and minimum bound. Tetris suggests that given the geographical distribution of solar farms, the impact to the Darwin Katherine Interconnected System (DKIS) system from simultaneously incorrect solar forecasts is likely to be minimal. Tetris' approach would utilise leading solar forecasting technologies, removing the need to invest in co-located batteries, which come at considerable cost to solar project for minimal system benefit. Tetris recommends that once at least two solar farms are connected to the Katherine line, PWC can review the forecasting fluctuations coming into Channel Island, to influence the GPS for future connections.

The benefit of locating a central battery in Darwin

Ekistica's modelling of the dynamic line constraint on the 132 kV transmission line between Channel Island and Katherine showed that if a battery was installed north of Channel Island, potential curtailment for Batchelor and Manton Dam would be reduced by 3%. Given the accumulative curtailment of all other generators on this line, the lost renewable generation becomes substantial. The current GPS review has not considered the market efficiencies of having a central battery north of Channel Island in their assessment. Whilst solar proponents are required to have an onsite battery for questionable solar forecasting smoothing, the potential to install batteries in Darwin is limited.

The issue-specific engagement questions are:

3. Do you understand the difference between an energy and a capacity forecast?

Confirmed

4. Do you believe that providing a dispatchable offer at 30 minutes ahead and a firm offer at dispatch time would make your project non-commercial? Where do you believe the costs of securely managing commercial scale asynchronous generation uncertainty should be borne?

Please see our response to question 2 - Tetris believes there are lower cost alternatives to managing the uncertainty of renewable generators. Tetris is not disputing the objectives of this but rather the solutions by which generators can meet the obligations.

The ultimate decision maker for this question is the customer. The commerciality of a requirement is dependent on whether a retailer who is purchasing the solar electricity is prepared to pay for the increased cost of the impost, on top of the prevailing cost of solar generation in the DKIS.

5. Does the forecasting obligation as drafted in the proposed code, provide sufficient clarity on the obligation? If not, please provide suggested amendments.

The obligation is clear however as outlined in response #2, Tetris believes it is not best approach.

If this path is still to be pursued, it would provide much greater certainty if PWC specified the type of cloud forecasting infrastructure it wanted and the amount of storage it required to achieve what it considers to be a "firm enough" forecast.



6. Do you understand the factors that differentiate the feasibility of having a semi-scheduled generator classification from those present in the NEM and WEM?

Confirmed

7. Do you understand the terminology used to describe the capability, enablement, provision and delivery of C-FCAS?

Confirmed

8. Do you believe the droop characteristic will introduce additional cost to your project? How material is this?

No – we don't believe it to be a material issue.

9. Do you believe all generators should contribute to providing a C-FCAS/Inertia safety net for customers?

No – all generators are not equal and should not be treated as such. Where C-FCAS lower services are low cost for solar farms to provide, they should be enabled by the renewable generators. The provision of C-FCAS raise services should lie with conventional generators alone, as Tetris expects these existing assets to be able to provide these services at lowest cost. The long-term solution needs to align with the "Roadmap to Renewables Policy" because there is no mechanism in the NT to account for conventional synchronous generators increased carbon emissions. Our suggestion is that conventional generators provide FCAS and C-FCAS raise services in the market as a cost pass-through and renewable generator provide C-FCAS lower services.

The concept of inertia also needs greater consideration, as stand-alone power systems have demonstrated through grid-forming inverters that inertia is not an intrinsic requirement of power systems. However, Tetris acknowledges that without careful optimisation of solar and batteries, it may become challenging for conventional synchronous generators to follow the resulting frequency variations as inertia is reduced on the power system. Tetris recommends that PWC conducts detailed modelling to understand this risk, in order to understand how the DKIS will operate with reduced amounts of synchronous generation moving forward. However, this is not expected to be an issue in the short term (3-5 years), and therefore should not impact on the solar farms currently seeking connection.

10. Would you be interested in providing and delivering C-FCAS services if a market/competitive mechanism were introduced?

No. A pass-through mechanism for these costs in a system the size of the DKIS would provide more certainty and would be more "fit for purpose", given the size of the market. We remain concerned at the excessive cost for these services being charged for now and suggest these services be subject to a suitable regulatory test if this arrangement continues.



11. Have the revised code amendments provided sufficient clarity on the grandfathering arrangements?

Yes – the proposed grandfathering date is clear. Tetris however believes that this should be reviewed and be adjusted for projects that have signed and GUA and Power Purchase Agreement under the Jacana tender process. It was understood that there was going to be a GPS and Market Review however not one that results in an increase in project costs of 20-30% (Entura report). Tetris and other proponents have entered into a binding contract after a competitive market process, not extending the grandfathering terms to these projects creates a substantial investment risk. The roll out of the new GPS should integrate with the Road Map to Renewables Policy.

If you have any questions, please contact Frank Boland, Director, frank.boland@tetriseenergy.com.

Regards,

A handwritten signature in black ink, appearing to read "FJB", with a stylized flourish at the end.

Frank Boland
Director, Tetris Energy