15th May 2020

Matthew Phillips
Manager Wholesale Market Services
Power and Water Corporation
Level 7, Mitchell Centre,
55 Mitchell Street, Darwin
market.operator@powerwater.com.au

Dear Matthew,

Thank you for the opportunity to comment on the proposed Generator Forecasting Compliance Procedure, 16 April 2020, that was released for consultation.

NT Solar's comments are as follows:

1. **System Controller Response to Non-compliance** – It is proposed that non-compliances are dealt with automatically (real or near real time) but removal of constraints is a manual process via a Generator Outage and Testing Request (GOTR) process. This creates a dichotomy, whereby the constraint is applied quickly but release is slow (GOTR drafting, System Controller review and approval, scheduling of the tests, testing, evaluation of results will take many weeks). For forecasting algorithm non-compliance (Type 2) removal of constraints should similarly be automatic following a period of 'good behaviour'. For example, good behaviour could be complying with their forecasting for 24 hours. Non-compliances could be categorised such that minor breaches have a shorter automatic restoration time to extreme breaches that have no automatic restoration time and need to be manually assessed. This could align with the actions to be taken by the System Controller on page 4/5. Further work needs to be done here to make it fair and reasonable.
2. **System Controller Response to Non-compliance** - This is a severe and punitive regime, with no ability for generators to rectify prior to constraints imposed. There will be teething issues with any generator's forecasting system, and it would be appropriate for warnings to be issued such that a generator can rectify and further tune their forecasting system. 3 warnings would be appropriate. Need to recognise that with the capacity forecasting in place, System Control's ability to manage the system (with all large generators being scheduled) should be far superior to now, and hence the risk to system security will be far less. System Control need to work with Generators rather than use a 'big stick' approach. Generators want to and are obligated under the NTC to do the right thing. This will lead to a far better outcome for NT electricity consumers, as Generators can maximise their output and minimise electricity prices to retailers/consumers.

3. **System Controller Response to Non-compliance** – Forecasting is a developing field and the forecasting regime in the NT is unique. This needs to be recognised, and hence a more lenient compliance procedure implemented as per above.
4. **System Controller Response to Non-compliance** – constraints should not be automatic, particularly early on when forecasting is first implemented in general and for new large generators. There may also be errors in the data and the calculations that need human assessment to work out if a non-compliance has occurred or not. Even once implemented for some time, data or processing errors may still occur. To impose constraints on a generator due to a data or processing error (which is of no fault of the generator) leaves System Control open to claims for damages. Only once the 100% reliability of the system is established in years to come, should automatic constraints be put in place.
5. **Page 4** – "*The capacity forecasting performance requirements must be met even if a generator has responded to a frequency disturbance*." This statement is false. As per NTC v4.0 clause 3.3.5.14 (e) – "Active power output of the generating system may differ from dispatch instructions as a result of actions to correct system frequency in accordance with other provisions of this Code". This statement needs to be removed. In addition, there needs to recognition in the compliance procedure that following a generator correcting system frequency that forecasts for a period of time post the correction event may not be compliant and there should be no penalty for this. This would be consistent with the NTC wording "*as a result of actions to correct system frequency…*". Suggested time period of 1 hour post a frequency correction event to allow time for a generator to adjust their forecast considering current generator status.
6. **Page 4** – "*Generators that utilise energy storage systems to achieve capacity forecast performance should ensure those systems are not discharged to such an extent in responding to an under-frequency event, that the capacity forecast requirements are unable to be achieved for future dispatch intervals*". This statement should be removed as it is not relevant to the procedure. This is dealt with elsewhere in the NTC.
7. **Page 6** - "The generator shall not modify the forecasting algorithm at any time without prior notification being issued to the System Controller. The System Controller will determine what tests will be required to be performed to assess the forecasting algorithm compliance". We reject this requirement. It is up to generators to ensure compliance with the NTC and it is in the generator's commercial interest to comply. The System Controller reaching into the Generators internal commercial forecasting procedures and algorithms is a step too far. A forecasting algorithm is not a fundamental feature of the generator such as a governor control system. Forecasting algorithms will be based on a range of technical, financial and other factors. Forecasting algorithms will be constantly evolving given the developing nature of forecasting and the unique and new nature of the NT forecasting requirements.
8. **Constraint Algorithm** – Capacity Forecast Performance – formulas appear consistent with the NTC.
9. **General** - Forecasting algorithms are very commercially sensitive and there is no adequate mechanism in the NTC or the procedure to deal with the commercial-in-confidence nature of these algorithms.
10. **General** – There is no recognition of the commerciality of the procedure proposed. For example, this procedure will encourage large solar generators to under forecast to ensure compliance, and thereby drive up the electricity price it needs to charge to enable capital and operating cost recovery. Alternatively, large solar generators need to install or contract more battery capacity to

ensure compliance, nearby driving up electricity prices. A less severe regime as outlined above would still drive the right generator behaviour and maintain system security and reliability but will do so at lower economic cost.

11. **General** – **Ramping** – There is limited discussion and procedures around how ramp rates as per NTC Clause 3.3.5.14 apply to capacity forecasting, except on page 4 where it says, "*In addition to the above measures a further measure is applied to assess how closely the active power produced by the generator across each dispatch interval aligns with the dispatch instruction for that interval considering the firm offer (forecast made at t=0min covering the period to t=5min) and plant ramp rates.*" Generators will submit forecast and firm offer values assuming that their ramp rate between dispatch intervals can be achieved. System Control, will determine what the actual ramp rate will be, and hence the level of dispatch up to the firm offer. This should at least be included in the example spreadsheets and worked through with industry.

    For example, a 42MW solar generator with battery support may forecast 8MW due to heavy cloud and then 42MW in the following 5-minute interval due to heavy cloud dissipating. Assuming the solar farm is dispatched at 8MW, then System Control may decide, as per the NTC, that only a 5% per minute ramp is allowed for the subsequent 5-minute period. The actual level of dispatch would be 18.5MW at the end of this 5 minute interval. If possible, this additional energy will be stored in a battery by the generator. Note: Whilst we appreciate System Control's feedback that generators will be ramped on as fast as possible while maintaining system reliability and security, the capacity forecasting procedure need to deal with the NTC as written.

    This example shows that System Control's decisions around ramp rates can significantly affect a generators economics due to the actual level of dispatch. It could also affect a generator's future forecast decisions. E.g. if a generator has been dispatched below its firm offer, then it may forecast more capacity in future intervals to ensure solar energy stored within a battery is dispatched.

    Also, future ramp rates impact on decisions around whether to charge and discharge batteries. Just like the solar resource is variable, so too will be the ramp rates on the system, and hence generators need to know this information to make effective decisions.

    System Control should provide a ramp rate forecast to each generator for the rolling 24-hour period and included in the capacity forecast procedure. This would inform and allow generators to make effective forecasting decisions based on the forecast ramp rates likely achievable on the system. Generators would then have greater certainty of future dispatch, and can optimise their generation plant. System Control would have generator forecasts that better match the actual dispatch capability. An example, of System Control and generators working together for the betterment of the system.

12. **Example spreadsheet (2 trading intervals)** – appears consistent with the NTC and compliance procedure.
13. **Example spreadsheet (24 hours)** – this was provided late and hence limited time to review before submission. Does not appear to be a good example of a typical generation plant. Also appears to

have errors as the firm offers G(t) are not the same for each trading interval (t). This created more confusion that clarity.

We provide our submission in the interest of achieving a workable procedure and look forward to working with PWC further on this. The Darwin Katherine Interconnected System (DKIS) is relatively small, with a limited number of generators, and hence we should all work together for a reliable and secure system.

Yours sincerely,

Ilana Eldridge
Director