

6th March 2019

Response to Review of the Generator Performance Standards

Northern Territory Solar Futures Developments Limited (NTSFDL) welcomes the opportunity to provide comment on the proposed changes to the Generator Performance Standards for the Northern Territory. NSTFDL are proposing the 50MW Livingstone Solar Farm near Berry Springs and has other renewable projects in the pipeline. Our input is therefore from the perspective of a Renewable Energy Developer.

The NT government is committed to a target of 50% renewable energy by 2030. Our input is therefore also based on achieving this target.

Our constructive input on each of the documents is provided below (collectively referred to as the Codes). Given the significance of our proposed changes to the Codes and the fact that new material was presented at the recently held Information Session, it would be appreciated if further consultation meetings are held once the comments have been worked through. The NT electricity industry is at an important and exciting crossroads and it is imperative that we get key documents right for the future.

General comment - Strategic System Planning

At present there are various mechanisms for individual players in the NT electricity industry to undertake system planning within their own area of influence. Power systems require precise and comprehensive system planning and are unlikely to operate efficiently without such planning. It is therefore necessary that measures be put in place to facilitate system-wide strategic planning. This was proposed by the Expert Panel in the Government's Roadmap to Renewables Report.

An example of the need for strategic system planning is the likely need for future augmentation of the Darwin-Katherine Transmission Line. A planning mechanism that can deal with this contingency must be in place within the Codes and/or NTEM well before such a need arises.

In forward planning and management of the system it is imperative that Networks and System Control are truly independent. Decisions around access that are managed by Networks must be unbiased and seen by all proponents as fair. This will only happen if the organisation is independent of PWC. Likewise, System Control has the power to curtail or inhibit dispatch and must also be seen to be unbiased and independent of PWC.

System Control Technical Code V5 (SCTC)

Maximising Renewable Energy

Clause 1.7.4 – Obligations of the Power System Controller

There is no obligation on System Control to operate the power supply system in order to maximise the amount of renewable energy injected into the network. There should be an obligation placed on System Control within clause 1.74 (and/or in Section 38 of the Electricity Reform Act) for System Control to

dispatch the maximum amount of renewable energy whilst maintaining system security and to minimise the amount of renewable energy spill. If renewable energy is contracted under PPAs then volumes under these contracts should be dispatched first.

System Control will play a key role in achieving the 50% RE by 2030. This intent of maximising renewables was welcomed by System Control at the 18th Feb 2019 GPS Information Session.

Clause 1.7.2 - Obligations of the Network Operator

Similar to the above argument there should be an obligation on the Network Operator to facilitate renewable energy through the provision of transmission and distribution capacity, reconfiguration of the existing network, changes to protection arrangements, etc.

The Network Operator should be independent of PWC.

Clause 3.2.3 Generation components of the power system

The semi-scheduled generator classification must be retained to facilitate early entrant intermittent renewable energy generation. Proposed removal of this classification places an unnecessary cost burden on new intermittent generators entering the market. In both the National Electricity Market (NEM) and the Wholesale Electricity Market (WA) (WEM) there are semi-scheduled and non-scheduled classifications that work well to enable intermittent generation. The removal of the semi-scheduled generator classification will make the NT unattractive for investment due to complexity and cost.

The balancing requirement for intermittent generation is better and more economically provided centrally at a system level (and therefore provided as a market ancillary service), once the aggregate output of all various intermittent RE generators is considered.

Clause 3.11.1 System Participants/Customers forecasts

In the consultation papers there is a lack of detail regarding the forecasting information requirements for generators. During the Information Session held on the 18th February 2018 a new proposal setting out how forecasts may be handled from an operational perspective was proposed. This needs to be documented.

The proposal was for:

1. Day ahead 30 minute forecast on a 90% exceedance basis.
2. 12 hour ahead 10 minute forecast on an 90% exceedance basis.
3. 60 minute ahead on a 1 minute forecast on a 95% exceedance basis.

However, while such an arrangement is feasible it is onerous on renewable energy generators. The above would require a combination of satellite and onsite forecasting systems to implement. In addition, the probability of exceedance values is very high and may lead to significant under forecasting of actual renewable production. This would lead to unacceptable investor return and/or higher energy prices to be able to realise a commercial return on solar farms.

Rather than the above arrangement our strong preference would be for a NEM type arrangement, where System Control takes overall responsibility for solar (and wind) day ahead and 12 hour forecasting for individual generators. Intermittent generators remain responsible for availability forecasting.

System Control is best placed to provide this service, particularly when it needs to manage the system with substantial distributed 'roof top' uncontrolled solar. Adding additional discrete renewable energy generator locations into that forecast would be simple. In combination with the System Control forecast,

individual renewable energy generators would provide 60 minute ahead 1 minute forecasts from onsite solar forecasting systems.

In the NEM, Market Participant 5 min Self-Forecasts were introduced in 2018 and are currently optional. However, given the benefits of solar forecasting, we would consider this a mandatory requirement for better management of the system. Solar forecasting systems are relatively new for commercial solar farms and are reasonably accurate up to 15 minutes (depending on the cloud speed) with decreasing accuracy thereafter. We propose 1 minute forecasts to be provided on a 50% and 90% exceedance basis. This would provide System Control with significant confidence by comparing the 50 and 90% values to manage the power system.

There has been a lack of discussion in the area of forecasts. NTSF would welcome further rounds of consultation in this regard.

4.3 Dispatch

Within the principles and criteria for dispatch, System Control needs to include the maximising of renewable energy contribution, consistent with the comments at Clause 1.7.4. Without this undertaking, the tendency of System Control will be to focus on system security and reliability to the detriment of renewable energy. It is recognised that this is a paradigm shift but it needs to happen to support a renewable energy future. This criterion should be listed as (2) behind System Security given the Government's commitment to a 50% renewable energy target by 2030.

4.4B Generation Commitment and Dispatch submissions in respect of the Darwin-Katherine power system

Clauses 4.4B, 4.7 and 4.8 need to be revised in light of the NTEM specification and best sit with the NTEM market documentation. They should be relocated and updated.

5 Ancillary Services

During the information session held on the 18th February 2019, it was stated that it was the intent of the System Controller that ancillary services "shall be available from generators". This is contrary to the current wording. In addition, the current wording needs to be modified based on the proposed NTEM arrangements. The requirement to provide ancillary services should be optional and be procured as per the NTEM.

Network Technical Code (NTC) V4, December 2018

General - Semi-scheduled and non-scheduled generator classifications

References to non-scheduled and semi-scheduled have been removed (in fact they do not even appear in the track changes!). As per the above comments on SCTC Clause 3.2.3 this places a significant technical and cost burden on intermittent renewable energy to meet the Code. This makes the NT market more onerous than the NEM and WEM and will stifle investment in the NT. This also makes for inconsistencies between the NTC and SCTC where non-scheduled generators are still present in the SCTC.

Semi-scheduled and non-scheduled classifications should remain in the Code.

General - Connection Point

Connection Point should be interpreted as a flexible concept. Components of a generator may be connected at different points in the system. i.e. solar generator input at one point and backup generation (e.g. to provide active power control to cover cloud changes) at a different point. Proponents should be

free to propose different connection points for different services that make up a Generator (including Active Power Control, Frequency Control, Reactive Power, Inertia and Contingency FCAS, System Strength). Also, the Network Operator, System Controller and Generator proponent may work together to achieve the best outcomes for the power system.

Clause 3.3.5.1 – Reactive Power Capability

The reactive power requirements are onerous (0.55 x Active Power at any time) and lead to significant oversizing (and cost) of inverters and/or curtailment of renewable energy generation. Strong preference would be to leave the reactive power requirement under normal operation as is (0.95 pf) and to specify separately a contingency reactive power requirement. The amount of contingency reactive power is to be studied more generally by PWC (when PowerFactory models of the network/s are available) and put into the Code to determine an appropriate default level of Contingency Reactive Power Capability. Contingency Reactive Power Capability should be able to be provided at other locations within the network. Until such time as modelling and assessment is completed, any requirement to increase the reactive power capability should be left out of the Code. In addition, the actual amount of reactive power required at a given connection point should be subject to Preliminary Assessment.

Clause 3.3.5.14 – Active Power Control

Ramp rates should be set on a MW basis or % of name plate rating per minute basis for semi-scheduled and/or non-scheduled generation. The present minimum ramp rate of 5% per minute is onerous for intermittent renewable energy generation. Minimum ramp rates will be taken into account when determining the yield and hence will increase energy prices or decrease financial viability. More appropriate minimum ramp rates should be specified. For example, in WA the requirement is 10MW or 15% of name plate per minute whichever is greater, for non-scheduled generation (e.g. renewables), “except when more rapid changes are necessary due to the strength of the energy source moving outside the power station’s design range”. This is a more reasonable basis that considers system security whilst recognising the energy source and not unnecessarily restricting generator output. In addition, the actual minimum ramp rate should be assessed by system studies and may be above the minimum stated.

At the Information Session on the 18th February 2019 a new concept of dynamic ramp rates being provided by the ‘dispatch engine’ in the future was presented by System Control. In concept, NTSFDL would be fine with this, provided the dynamic ramp rates are above the minimum specified on the NTC or Access Agreement and contingent upon the System Controller being required to maximise renewable energy (as per previous comments).

Active Power Control compliance is currently a grey area and it should be specified that compliance will be reasonably assessed on a per minute basis (provided a generator on average complies with the per minute ramp rate then they comply). At present the criteria is not clear and this can lead to disputes over breaches in the future. It also influences how generators setup their control systems to achieve the ramp rates specified, and hence will affect the predicted solar farm yield and electricity cost.

Clause 3.3.5.6 – System Strength

The requirement to not cause an adverse impact on system strength as per AEMO System Strength Impact Assessment Guidelines v1.0 July 2018 and following an assessment by the Network Operator is understood but it would make it clearer if it were stated in the documentation as follows; *The current level of system strength may be decreased provided that it does not have an adverse impact on system strength (or similar)*. This would give more certainty to new generators coming into the market.

More broadly, there is likely to be a requirement to redesign protection systems due to inverter connected generation decreasing system strength. Looking forward to 50% RE on the network/s will ideally mean no synchronous generator on the system during sunny days. This may mean the requirement for different protection settings during daytime operation as opposed to night time operation. This is all part of the fundamental change to networks for a sustainable future. The cost of overall network design should not be met by individual generators but should be taken on and funded at a higher Government level and addressed. It is appreciated that this issue is much broader than, but quite relevant to, the code.

Attachment 5 – Test Schedule

This schedule is written mostly for synchronous generation. We need a test schedule that includes other forms of generation including inverter coupled solar generation. There is enough experience on the NEM and WEM for these requirements to be specified. This will reduce the need for each generator to negotiate these test requirements. Such negotiations represent significant risk and cost for generators. Addressing this issue will remove uncertainty and make it more attractive to invest in the new generation in the NT.

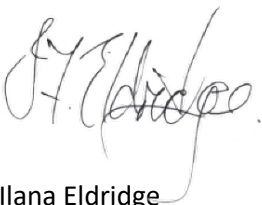
A6.4 Preliminary assessment of Access Application by the Network Operator

The time frame for completion of a Preliminary Assessment needs to be stated in this clause A6.4. A time period of 90 days from Access Applicants acceptance of cost estimate provided in the Initial Response would be appropriate. At present this is open ended and up to the Network Operator's discretion. The more certainty that can be provided to Proponents, the more likely investment is likely to happen in new generation for the NT.

A6.6 Access Agreement

Similarly, a timeframe for the Network Operator to provide an Access Agreement should be stated in this clause. A time period of 30 days from provision of Access Offer is reasonable.

Yours sincerely,



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Director