Generator Forecasting Compliance Procedure

Response to Stakeholder Submissions

PowerWater

1 Introduction

Clause 3.3.5.17 (f) of the Network Technical Code requires the System Controller to publish a procedure that specifies the process that will be used to detect and respond to non-compliance with the capacity forecasting performance standard. To meet this obligation, Power and Water Corporation published a proposed draft Generator Forecasting Compliance Procedure (Procedure) on 16 April 2020. Consultation was held over a 4 week period, with submissions due by Friday 15 May 2020.

Submissions were received from:

- Assure Energy;
- Epuron;
- NT Solar;
- ENI Australia (EAL); and
- Territory Generation (TGen).

Power and Water acknowledges and appreciates the effort of stakeholders in making submissions on the draft Procedures.

Power and Water has reviewed each issue raised and has structured this document to systematically respond to those issues. We have attempted to group like issues raised by stakeholders and respond accordingly wherever possible. A table is included at the end of this document that provides a more detailed cross reference between each theme and specific stakeholder submissions.

2 Key issues raised in submissions

The following sections present the key themes raised in the submissions, namely:

- Constraints processing
- Response to frequency disturbances
- Forecasting methodology
- Compliance
- Forecasting compliance during droop response
- Wording consistency with the code

The following subsections discuss these key issues in depth and their relevance to the final Procedure, including the revisions that have been made in the final Procedure to address the issues raised by stakeholders.

2.1 Constraints processing

2.1.1 Assessing the GOTR

The draft Procedure requires generators with a detected non-compliance to submit a Generator Outage and Testing Request (GOTR) to System Control. Stakeholder submissions considered the nominal processing time for GOTR's of 10 business days to be excessive in this case.

In response, any reference to 10 days processing time for a GOTR has been removed in the final Procedure. The timeframe for assessing system security concerns and scheduling of any testing will be situation specific. For example, a minor issue may be repaired or addressed on the same day and only require 30 minutes of testing/monitoring. Significant changes to the generator's capacity forecasting system may require a more complete review by System Control to assess the impact of the proposed change and determine any risks to the secure operation of the power system and to other system participants. More significant changes are likely to require more extensive testing. Therefore, prescribing a timeframe for processing a GOTR would not be appropriate.

2.1.2 Removal of constraint

Stakeholder responses requested more detail on the processes for a generator to expedite the removal of a constraint once they have been applied.

Power and Water Corporation advise that the process for removing constraints follows the standard process for emergency or performance issue outages. The details of the process for removing an applied constraint has now been published in the "System Control Plant Outage Procedure", which has been released for consultation[1]. This document has been referenced in the final Procedure and should be referred to by generators seeking a more detailed understanding of the process they will need to follow to provide sufficient evidence for the constraint applied to address forecast inaccuracies to be revoked.

2.1.3 Relaxation of constraint

The draft Procedure allowed System Control to impose a more relaxed constraint discretionarily. Stakeholders expressed concern about this allowance not being predictable. Power and Water Corporation acknowledge these concerns, and note that this allowance was included to cover rare situations for managing power system operations. To give certainty to generators that they will not be penalised unfairly, the wording in the final Procedure has been modified to only allow a manual relaxation of the constraint, and not to not allow manual increases to the constraint. It is intended that System Controller will manually relax constraints in very rare circumstances only.

[1] https://www.powerwater.com.au/market-operator/consultation-papers

2.1.4 Potential for application of 100% constraint

Concern was raised that if a generator exhibited continued forecasting non-compliance over a given period, the draft Procedure wording left the potential for the output of a generator to be constrained excessively to zero.

Instead of allowing for a potential 100% constraint to be applied for forecasting compliance, the final Procedure has been updated to ensure that regardless of the assessed level of non-compliance with the capacity forecasting requirements, the generating system will be allowed to operate at an output of at least 1 MW or 5% of nameplate rating, whichever is the lesser. This will ensure that, even if significant breaches of the capacity forecasting performance standard is detected, the constraint will limit the impact on system security to an acceptable level while still allowing some output from the generator.

The constraint applied to a detected non-compliance will always be proportionate to the level of non-compliance detected. The final Procedure has been clarified to confirm that the constraint applied will be the minimum required to correct an observed non-compliance.

A generator's capacity forecast would need to differ from the firm offer by greater than 95% of its rated capacity for the maximum curtailment constraint to be applied. This would be unlikely to occur under normal operation provided a generator has a capacity forecasting system in place which is capable of producing reasonably accurate forecasts.

2.2 Response to frequency disturbances

In a number of submissions questions were raised concerning the requirement for generators to achieve forecast accuracy obligations after responding to under-frequency events. This stems from the following wording in the draft Procedure: "The capacity forecasting performance requirements must be met even if a generator has responded to a frequency disturbance".

This issue has been considered further, and Power and Water Corporation maintain that forecasting accuracy should be maintained during time periods that follow a frequency disturbance, but clarify that this does not necessarily apply during the frequency disturbance itself.

The intention is not to rely on a C-FCAS response that is greater than a generator's firm offer. Instead it a generator's responsibility to ensure that it continues to maintain sufficient reserves such that subsequent firm offers achieve forecast accuracy requirements following an under-frequency event.

Depending on the available energy storage capacity, a generator is required to ensure that their droop response is only to a level that ensures that they can continue to achieve its capacity forecasts. In the interests of system security, such an interpretation will avoid scenarios where a storage device at a solar farm is discharged in responding to an under-frequency event and a subsequent cloud cover event causes the capacity forecast not to be achieved. If this were to occur,

it could result in a second under-frequency event potentially triggering Under Frequency load Shed (UFLS) events.

It is also important, and necessary, for the control room staff to have visibility and confidence regarding the response they can expect from connected generators. If a generator's response is unpredictable following an under-frequency event, then there is an increased likelihood that the event, and hence frequency control, will deteriorate further.

The issue may be illustrated by considering a scenario where a generation unit trips removing 20 MW of capacity from the system while the system is running the required 25 MW of spinning reserve, as follows:

- The 20 MW generation unit loss will be absorbed by spinning reserve, reducing the available spinning reserve from 25 MW to 5 MW until such time as an additional generation unit could be dispatched.
- A solar farm has installed a battery to meet its forecast accuracy requirements that is capable of generating 10 MW for 3 minutes. If the battery is configured to respond under droop control to the under-frequency event, its superior speed of response will outpace the spinning reserve resulting in the stored energy in the battery being fully depleted after 3 minutes. At this time the spinning reserve will be required to respond with the net result being that 5 MW of spinning reserve remains unused and the battery is fully discharged.
- If a subsequent cloud cover event causes the solar farm output to fall by 10 MW, this will create a 5 MW power imbalance as all of the remaining 5 MW of spinning reserve is utilised but is insufficient to meet the entire generation shortfall. Such an event is likely to trigger UFLS.
- The UFLS could have been avoided if the response of the battery at the solar farm had been limited to preserve the stored energy necessary to meet the solar farm's capacity forecast and not make up a temporary shortfall in generation during the time taken for the spinning reserve to pick up the shortfall.

The final Procedure clarifies that generators are only required to respond to an under-frequency event to the level that ensures they are compliant with the forecasts for the subsequent 30 minutes. It is assumed that this response will be to the level of its firm forecast. This is to ensure that during the recovery from an under-frequency event, System Control has certainty regarding the response of generators that remain on the system.

2.3 Forecasting methodology

2.3.1 Specification

Concerns were raised in submissions with forecasting methodology on the basis that it would not be appropriate for Power and Water Corporation to specify the methodology to be used for forecasting and that the algorithm used in the methodology would need to be disclosed. There was also concerns about the difficulty for a generator to seek to modify its forecasting methodology.

The final Procedure has sought to clarify that generators can use any forecasting methodology that they consider appropriate. The final Procedure states that the choice of methodology rests with the generator.

2.3.2 Disclosure

The final Procedure states that there is no need for any generator to disclose any specific details of its forecasting algorithms. As per the Plant Outage Procedure[2], generators are responsible for highlighting if any information disclosed on the GOTR or Return to Service (RTS) form is to be treated as commercial-in-confidence when submitting.

2.3.3 Modification of algorithms

Concerns were expressed about the requirement for generators to gain approval from System Control to modify forecasting algorithms. Power and Water Corporation understands that generator forecasting methodology will be subject to incremental changes and updated technology, and wishes to encourage generators to make incremental improvements. There is, however, a need for System Control to facilitate appropriate coordination or scheduling of any changes to the forecasting methodology in order to reduce the potential for an adverse impact on system operation. For example, revisions may be best scheduled and tested during periods of low solar generation.

If a generator anticipates regular low risk refinements to its capacity forecasting methodology, such as machine learning, they are encouraged to contact System Control to agree to a standing exemption. System Control will document the agreed process and conditions for implementing revisions in the relevant Operating Protocol. This will avoid any requirement to lodge a GOTR to make a planned refinement to a forecasting method.

While the risk of constraint due to a forecasting non-compliance falls with the generator, System Control must manage the risk to network security and reliability that results from forecasting errors. For this reason, System Control must be informed, in writing, prior to changes being made to operational aspects of the generating systems, including the capacity forecasting systems. To clarify the process to modify a generator's forecasting algorithm, the final Procedure has been updated to state that, unless a specific exemption is documented in the relevant Operating Protocol, the generator must notify System Control of any intended changes to the forecasting algorithm via a GOTR and that System Control will need to approve, in writing, the GOTR prior to the generator making the change.

2.4 Compliance

2.4.1 Ability to meet automatic access standard

Stakeholders raised concerns about how rigid the access standard is, and that the thresholds for forecasting compliance (Km, Kp and D) are too low. Given the compliance thresholds (Km, Kp and D) have already been consulted on during the development of the Generator Performance Standards in the Code, Power and Water Corporation consider that it is not appropriate to change the values used for these factors in developing the Procedure.

[2] Plant Outage Procedure is currently published for consultation on the Market Operator's consultation web page: https://www.powerwater.com.au/market-operator/consultation-papers

2.4.2 Allocation of risk

In relation to the concern expressed that the generators bear the entire risk of not meeting the capacity forecasting automatic access standard, it should be noted that System Control has the responsibility for maintaining system reliability and security.

The Code as well as any associated procedures are used to maintain an appropriate level of system security. It is a generator's responsibility to ensure compliance to the generator performance standards in the Code. As such, the generator is able to determine the level of risk that it may wish take in complying with its performance standards and the measures that it will implement to manage these compliance risks. For example, a generator may choose to take a more conservative approach initially to forecasting capacity to determine the effectiveness of its chosen methodology and thereby reduce the risk that they might be constrained. This may be a worthwhile strategy particularly while forecasting methods are being refined by generators. Once sufficient experience and confidence in the generator's forecasting techniques have been obtained, the generator may choose to adopt a less conservative forecasting approach.

The Procedure does not restrict the approach that a generator may adopt to achieve forecast accuracy sufficient to meet its capacity forecasting performance standard. This lack of restriction allows the generator to consider the strategy that best addresses its risk appetite and delivers its required balance between investment costs, the volume of power generated, and amount of revenue earned.

2.4.3 Negotiated access standard

Further concerns were raised that the draft Procedure restricts or impedes the ability of a generator to agree a negotiated capacity forecasting performance standard. Clause 3.3.5 of the Code provides a process for a generator to propose and negotiate with the Network Operator an alternative performance standard. A negotiated performance standard may allow for different factors to be taken into account in assessing compliance than specifically detailed in the Procedure.

The final Procedure has been amended to include reference to the requirements of the automatic access standard and that generators that have an agreed negotiated performance standard will be assessed against the level of performance described in that standard. This has been done to recognise the potential need to modify the compliance assessment approach for a generator with a negotiated performance standard.

Power and Water therefore consider that the Procedure does not restrict the ability to agree a negotiated performance standard. However, the process of any negotiated standard, the forecast accuracy requirements will be defined in sufficient detail to allow any necessary modification to the compliance assessment process for that generator.

2.5 Forecasting compliance during droop response

An issue was raised stating that it was possible that a normal droop response to a frequency change within the normal operating frequency band could alter the output of a generator by more than the 0.5% maximum allowable dispatch discrepancy (e.g. more than 150 kW for a generator dispatched at 30 MW).

In order to remove the possibility that this could be identified as a non-compliance with the active power control performance standard, the wording in the final Procedure has been modified to state that failure to follow a dispatch instruction is not a forecasting error per se, but will be assessed against the Code clauses in 3.3.5.14 which allows for a variation as a result of actions to correct frequency (i.e. a normal droop response).

All other feedback received from stakeholders through their submissions has been addressed in the detailed responses to submissions in the following section.

2.6 Wording consistency with the code

There was an inconsistency between the words used in Clause 3.3.5.17 of the Code stating how compliance would be assessed compared to the words used in the draft Procedure that was released for consultation. To ensure removal of any confusion the final Procedure has been updated to use the same wording as the Code.

3 Detailed Responses to Submissions Received

Please note that the words used in Issue/Comment column in the table below are in general our summarised interpretation of the issues raised by stakeholders and are not a verbatim quote from individual submissions. The submissions are available on our website (other than those identified as confidential). The Reference Number (Ref#) in the table is an internal tracking number to ensure all issues have been addressed. The comments made by stakeholders have, where possible, been grouped into themes so that similar issues can be addressed together. Where our response has recommended a change in the draft Procedure, this has been noted in the response.

Ref#	Theme	Stakeholder	Issue/Comment	Power and Water Response
1	Constraints	Assure Energy	Assure Energy has asked how does a generator qualify for a more relaxed constraint? More details are required on the application and removal of manual constraints and how to interact outside of business hours after application of constraints.	The wording in the Procedure has been modified as described in Section 2.1.3 of this report to only allow a manual relaxation of the constraint. Details on how to contact System Control are made available in the Operating Protocol established with the Generator. The aim is to allow return to service when practicable and is generally not expected to be before the next business day.
	Constraints	Assure Energy	Assure Energy has stated that it requires detail on how a shorter processing time for a GOTR can be achieved (10 business days is too long for Department of Defence energy security). More detail required on how to remove constraints. Confirmation required that forecast constraints will remain in place until GOTR processed. What testing procedures need to be performed following non-compliance? Prefer 0.1% increments of constraint rather than 1%.	The wording in the Procedure has been modified as described in Section 2.1.1 of this report to remove any reference to 10 days processing time for GOTR. The wording in the Procedure has been modified as described in Section 2.1.2 of this report detail how constraints can be removed. The size of increments (1%) for the application of constraints is not material to the generator output because the absolute amount of constraint for each increment is proportional to the size of the generator.
	Constraints	ENI Australia (EAL	EAL would like a minimum curtailment value rather than the possibility that the plant could be constrained to zero output. They specify that the maximum curtailment should be limited to 80% as this was implied in the Utilities Commission final decision.	The Utilities Commission final decision did not imply that the maximum curtailment due to capacity forecasting non-compliance would be limited to 80%. The 80% referred to in the Utilities Commission final decision is the indicative discharge capacity and storage capacity of a battery energy storage system (BESS) compared to the maximum capacity of the solar

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				generator and maximum energy output respectively that a proponent might consider to limit its exposure to forecasting non-compliance. It was also noted, by the Utilities Commission in its decision, that there may be economic benefit for a generator to elect to delay investment in any BESS until the need is proven. As described in Section 2.4.2 of this report the generator can determine the level of risk that it may wish take in complying with its performance standards and the measures that it will implement to manage these compliance risks. This may include taking a more conservative approach initially to forecasting capacity in order to reduce the possibility a constraint being imposed on its operation. The wording in the Procedure has been modified as described in Section 2.1.4 of this report to remove the possibility of a 100% constraint being applied.
	Constraints	Epuron	Concern that leniency needs to be provided throughout the forecasting process, especially initially, to ensure the best outcome is achieved because the ability to forecast output at the required level of accuracy is non-trivial.	Leniency will have to be compensated for by providing additional spinning reserve to account for the possibility of larger forecasting errors. As articulated in section 2.4.1 of this report any response to forecasting non-compliance by a generator is proportionate to the size of the forecasting error. Furthermore, as discussed in Section 2.4.2 of this report the generator can decide the level of risk that it may wish to take regarding capacity forecast compliance and adopt measure to reduce this risk.
	Constraints	NT Solar	NT Solar note that forecasting is a developing field and that the NT is somewhat unique in the issues that are faced and hence a more lenient approach to compliance could be adopted.	The Code has already been implemented and this sets the limits of compliance that need to be achieved for the automatic access standard. The Procedure sets out how compliance is assessed against those limits. Any response to non-compliance is proportionate to the extent of the forecasting error because any constraint applied will only be sufficient to ensure compliance.
	Constraints	Epuron	Epuron considers that the return to service process, especially the time taken, is more suited to hardware issues on inverter or thermal generation. The constraint should be automatically removed after a set time-period of compliance, such as 24 hours.	The wording in the Procedure has been modified as described in Section 2.1.1 of this report to remove any reference to 10 days processing time for GOTR. The Procedure has been modified as described in Section 2.1.2 of this report to clarify how constraints can be removed.

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	Constraints	Epuron	Epuron considers that the process to resolve a Type 2 non-compliance is exceedingly lengthy and that in some instances the cause of the non-compliance could be resolved in less than an hour or relate to unusual cloud conditions that occur very infrequently. Epuron suggests that the guidelines allow the constraint calculation process to manage algorithm accuracy and remove Type 2 non-compliance from the guidelines completely. It would appear that Epuron would like the ability to notify System Control when the non-compliance has been addressed and then have any constraint removed at that time.	As detailed above.
	Constraints	NT Solar	NT Solar is concerned that constraints for non-compliance are applied quickly but the process to remove the constraint can be quite long. They suggest that 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 accuracy requirements 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.	As detailed above.
	Constraints	NT Solar	NT Solar suggest that rather than implementing a constraint for non-compliance immediately, a series of warnings be issued to the generator prior to implementing a constraint	There is already a proportionate response to non-compliance based on the severity of the error. The value of non-zero forecasts that have exceeded the firm offer (D) can be up to 10% of the total non-zero forecasts. It would not be appropriate to tolerate a longer series of severe errors prior to implementing a constraint due to the impact this could have on system security because failure to meet forecasts could deplete the available spinning reserve.
	Constraints	NT Solar	NT Solar does not consider that constraints should be applied automatically for a non-compliance and that a more considered approach be used (at least initially) to ensure generators are not constrained as a result of errors made by System Control.	System Control has built a forecasting computer system to calculate constraints automatically in accordance with this procedure every 5 minutes on receipt of the generators forecast data. This removes the risk of human error during calculation.

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2	Response to frequency disturbance	Assure Energy	Concern was expressed by Assure Energy about need to meet capacity forecasting requirements following a response to a frequency disturbance. Suggest that a temporary constraint constant (q) be applied for a period following a response to a frequency disturbance in order to relax forecasting compliance	The wording in the Procedure has been modified as described in Section 2.2 of this report which describes the expected response during and following frequency disturbances.
	Response to frequency disturbance	Epuron	Epuron has questioned the following wording: "The capacity forecasting performance requirements must be met even if a generator has responded to a frequency disturbance". This wording of this is ambiguous about whether this applies to the time-period which included the frequency disturbance or if it applies to the forecast in the time periods following the frequency disturbance.	As detailed above.
	Response to frequency disturbance	NT Solar	NT Solar considers forecasting compliance should be suspended for a period of 1 hour following a frequency disturbance and that the wording of the sentence "The capacity forecasting performance requirements must be met even if a generator has responded to a frequency disturbance" is incorrect.	As detailed above.
	Response to frequency disturbance	NT Solar	NT Solar considers that the sentence "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" should be removed as it is not relevant to the procedure because this is dealt with elsewhere in the Code.	This issue is not dealt with elsewhere in the Code so the sentence should remain. The wording in the Procedure has been modified as described in Section 2.2 of this report. This modification describes the expected response during and following frequency disturbances.
3	Technology discrimination	ENI Australia (EAL)	EAL considers there is "Indirect Technology Discrimination" in that they consider a rotating synchronous machine generator can trip many times (Type 1 – Asset Failure) a day or on consecutive days and rely on C FCAS to maintain system security without any penalty whereas a solar generator cannot utilise C FCAS capacity to compensate for forecasting errors (Type 2 – Forecasting Algorithm Failure)	The asset failure referred to in Type 1 events in the Procedure is an asset failure associated with the capacity forecasting system (e.g. a cloud camera failure, not a generator trip) and a Type 2 failure is an algorithm failure associated with the capacity forecasting system which results in an error in the forecast. These events are not related to generator plant failure causing the entire plant to trip. Our published Plant Outage Procedure details the

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			without a penalty which will be ongoing until the forecasting algorithm is modified and tested. They consider that a Type 2 failure would have a more moderate impact on system security compared to a full trip of the generator which would be classified as a Type 1 failure. They state that forecasting compliance could be maintained at a solar plant by tripping for an unexpected cloud event. They also state that they consider there should only be one type of forecasting non-compliance as both Type 1 and Type 2 events should be treated equally.	investigation requirements for generator trips and outlines the processes required for addressing asset failures that result in a generator trip or performance issue. Restoring a generator to service following an event that resulted in the generator tripping is not trivial and in the majority of cases the time taken to investigate, resolve the issue and return the generator to service will be more than a day.
4	Forecasting methodology	ENI Australia (EAL)	EAL state that there is very considerable discretion given to Power and Water Corporation in the Type 2 non-compliance process to review and reject proposed forecasting changes made by generators which they consider is "a considerable and unprecedented over-reach on the part of PWC". EAL considers that Power and Water Corporation has complete control over how the generator meets the capacity forecasting performance standard and will mandate the forecasting methodology.	In order to have a constraint which has been applied as a result of forecasting non-compliance removed, the generator only needs to provide sufficient evidence that the problem that resulted in the non-compliance has been resolved. As discussed in sections 2.3 and 2.4 of this report the generator is free to implement their chosen forecasting methodology, and can propose the appropriate testing that would demonstrate the issue that resulted in the non-compliance has been resolved. System Control has the discretion to accept the proposed tests or request additional tests be performed to demonstrate compliance. The wording in the Procedure has been modified as described in Section 2.3.1 of this report to emphasise that the forecasting methodology utilised for capacity forecasting is at the discretion of the generator.
	Forecasting methodology	Epuron	Epuron take issue with the sentence: "The generator shall not modify the forecasting algorithm at any time without prior notification being issued to the System Controller". They consider that this is an overreach for System Control and may prevent the implementation of more modern algorithms. Epuron considers that the generator will be responsible for any risk associated	The wording in the Procedure has been modified as described in Section 2.3.1 of this report to emphasise that the forecasting methodology utilised for capacity forecasting is at the discretion of the generator. The wording in the Procedure has been modified as described in Section 2.3.3 of this report which clarifies the process that is required to update the forecasting algorithms and why that process is required.

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			with forecasting errors and as a result should have the option to implement possible improvements when they consider the risk of doing so is acceptable and as such the change is warranted.	
	Forecasting methodology	NT Solar	NT Solar state that the sentence "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" is an overreach and that the generator is responsible for the risk associated with changing their forecasting algorithms.	As detailed above.
	Forecasting methodology	NT Solar	NT Solar state that "forecasting algorithms are very commercially sensitive and there is no adequate mechanism in the Code or the procedure to deal with the commercial-in-confidence nature of these algorithms".	The wording in the Procedure has been modified as described in Section 2.3.2 of this report to emphasise that there is no requirement to disclose the forecasting algorithms.
5	Compliance	ENI Australia (EAL)	EAL consider that no forecasting systems have yet demonstrated that they can be compliant with the automatic access standard for 3.3.5.17 and that non-compliance cannot be predicted in advance. The entire risk of the forecasting system not meeting the automatic access standard is with the generator and Power and Water Corporation has a no risk position.	System Control has the responsibility for maintaining system security. The Code as well as any associated procedures (such as the forecasting compliance procedure) are used to manage the risk associated with maintaining system security to the appropriate standard. It is a generators responsibility to ensure compliance to the generator performance standards in the Code. As discussed in Section 2.4.2 of this report, the generator is able to determine the level of risk that they wish take in not meeting a performance standard and the measures that they will take to address that risk.
	Compliance	ENI Australia (EAL)	EAL considers the thresholds for the forecasting compliance factors (Km, Kp and D) are too low and could be increased without significant impact on system security.	Section 2.4.1 of this report notes that the compliance factors are out of scope for this consultation.
	Compliance	NT Solar	NT Solar considers that a less rigid compliance requirement would assist in reducing electricity prices.	The Code regime is designed to ensure system security and reliability of the network is maintained at an acceptable level. The Procedure implements the requirements of the Code and as a result assists in delivering required levels of power system security and reliability.
6	Negotiated Access Standard for	ENI Australia (EAL)	EAL state that establishing an agreement with other generators to meet the forecasting standard would not be possible. They have asked many questions	The process of reaching a negotiated performance standard and how this will be assessed are described in Section 2.4.3 of this report and

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	capacity forecasting.		about how such a relationship with other generators could be established. In particular they ask if the required accuracy of the forecast would remain at 1 MW even if multiple generators combine their forecasts to achieve the automatic access standard.	appropriate changes have been made to the Procedure to detail the assessment of performance against any negotiated standard. The Code does not prevent more than one party reaching an agreement to develop a negotiated access standard for forecasting compliance which can be submitted to us for approval. The process to achieve such an arrangement is at the discretion of parties involved and will not be detailed in the Generator Forecasting Compliance Procedure.
	Negotiated Access Standard for capacity forecasting	ENI Australia (EAL)	EAL states that "Broadly speaking, it appears that stand-alone or even shared batteries will be unable to comply with the NTC without substantial changes to both NTC Clause 3.3.5.17 and the draft GFCP". In EAL's view, this type of change cannot be accommodated using negotiated access standards without compromising the integrity of that process, as it requires complete removal of the requirement. EAL therefore requests another consultation process to change the Code to accommodate batteries and/or remove Clause 3.3.5.17	As above.
7	Load following	ENI Australia (EAL)	EAL have asked "if all generators must comply with the new NTC and meet their own half hour production forecasts, then who is following the load?"	System Control is responsible for managing dispatch for system load following. System Control will adjust the dispatch levels of all committed generator units to follow load within their band 2 quantity range (between minimum stable load and base capacity) on the basis of their offer prices. Under current arrangements, Territory Generation is responsible for providing ancillary services, hence the dispatch levels of their units will typically be lower than the maximum band 2 quantities, with their efficiency curves adjusted for contingency response via System Control's AGC.
	Load following	Territory Generation (TGen)	TGen has raised the issue that a normal droop response to a frequency change within the normal operating frequency band can alter the output of a generator by more than the 0.5% maximum allowable dispatch discrepancy (e.g. more than 150 kW for a generator dispatched at 30 MW)	The wording of the Procedure has been modified as described in Section 2.5 of this report to emphasise that compliance with dispatch instructions are subject to clause 3.3.5.14 of the Code.
8	Utilities Commission	ENI Australia (EAL)	EAL considers that the Utilities Commission should review all submissions prior to making their submission.	The Utilities Commission (the Commission) has oversight of the entire consultation process associated with the Generator Forecasting Compliance Procedure. The Commission has made comment on the

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				Procedure that was released for consultation and the Commission has received a copy of all submissions made during the consultation process. The Commission has been provided with a draft copy of this response report and a draft copy of the updated Generator Forecasting Compliance Procedure for comment prior to release.
9	Procedure wording	Epuron	The forecast (in MW) is the expectation of the minimum output that can be sustained over each five-minute period". Epuron believes this should read: "The forecasting (in MW) is the expectation of the maximum output that can be sustained over each five-minute period	The capacity forecast is intended to be the minimum output that the generator is committing to sustain over each 5-minute period. The Code states that "'capacity' means the minimum capability of a generating system to deliver an active power output at a continuous steady level over the relevant 5 minute interval". The wording of the Code is out of scope for this consultation.
	Procedure wording	NT Solar	NT Solar note that the wording for assessment of the forecasting performance is not consistent with the Code.	Agreed. The wording in the Procedure has been modified as described in Section 2.6 of this report to highlight that this inconsistence has now been removed.
	Procedure wording	TGen	TGen is concerned that they would need to forecast on a unit by unit basis rather than at an overall plant level.	Unless grandfathered or having implemented an approved negotiated access agreement, the automatic access standard for forecasting compliance will apply to a generating system.
10	Forecasting pilot project	Epuron	Epuron suggests that Katherine Solar (being the first large scale solar generator likely to be connected to the DKIS) and Power and Water Corporation work together as a pilot project to determine which parts of the forecasting guidelines need revision, ensure system security and remove the likelihood of unnecessary curtailment.	The Procedure is written to ensure compliance with the Code clause 3.3.5.17. The Procedure will be revised from time to time if required to ensure it remains up to date with code changes. ENI or any participants may provide feedback to ensure these outcomes are achieved. Transitional arrangements have been documented in the Code for previously connected generators and for those going through the connection process. Any delays in implementing a final version of the Procedure will increase uncertainty for connecting generators.
11	Ramp rates	NT Solar	NT Solar recommend that System Control implement a ramp rate forecast to assist generators in making decisions about charging batteries.	System Control will operate within plant ramp rate technical limits of the generating system. During commissioning the nominal ramp rates for operation will be determined and documented in the operating protocol. Generators may limit ramp rates in their operating protocol to facilitate battery charging.