



## **SUPPLEMENTARY CONSULTATION PAPER**

**Contingency Frequency Control Ancillary Services (C-FCAS)**

**GENERATOR PERFORMANCE STANDARDS**

***NORTHERN TERRITORY REGULATED POWER SYSTEMS***

20 March 2019

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## Purpose

The purpose of this paper is to assist parties in assessing the impact of the proposed Generator Performance Standards (GPS<sup>1</sup>) obligation for Contingency Frequency Control Ancillary Service (C-FCAS) capability on investment decisions.

This paper explains why the C-FCAS/Inertia capability requirement is included in the proposed GPS and how this capability will be dispatched. The paper covers the Interim - Northern Territory Electricity Market (I-NTEM) arrangements for the Darwin – Katherine power system and the ongoing arrangements for Alice Springs and Tennant Creek power systems.

## Why do we need generators to provide C-FCAS?

Ancillary services are an integral part of the supply of electricity. Frequency control as a component of electricity supply is no less important than the provision of energy in an A.C. power system. The principle behind the proposed GPS clause on C-FCAS is to ‘do no harm’ in regards to reducing the system capability to maintain power system frequency through the transition to renewables and the associated future generator technology mix.

To facilitate the level of PV generator connection applications already received and to progress towards the Territory’s renewable energy target, it will be required that renewable technologies supply a significant portion of energy. For solar PV, which is currently the most feasible renewable technology in the Territory, this will require that a large majority of energy (trending towards 100%) is supplied by solar PV for some periods of the day. As such this technology must also be able to provide all the components of electricity including frequency control.

New generators, including renewables need to provide the equivalent capability in supporting the management of frequency as the generators that they displace. These requirements are a step to enable the system to support a significant penetration of renewable energy.

## Consultation overview

There are two separate consultation processes underway at present.

1. A formal consultation process for code changes regarding the GPS involving changes to: System Control Technical Code (SCTC), Network Technical Code (NTC) and Secure System Guidelines (SSG), under the leadership of Power and Water;
2. Consultation seeking feedback on the NTEM Functional Specification which is a high level design document under the leadership of the Department of Treasury and Finance.

A number of proponents are actively working through the connection process and are seeking certainty on connection arrangements as soon as possible, which can be achieved by finalising the proposed GPS amendments.

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<sup>1</sup> The GPS is found in clause 3.5 ‘Technical Requirements’ of the proposed Network Technical Code, which is currently undergoing public consultation in the Northern Territory.

The proposed new GPS will apply to any generator connecting after the code amendments are approved.

Following the consultation on the NTEM functional specification, feedback will be considered and be incorporated in drafting instructions for the required code amendments. To enact the changes in code, a formal stakeholder consultation process including industry workshops will be held along the same lines as the current GPS process. This formal code consultation opportunity will be repeated for each transitional step towards the long term NTEM.

## **Proposed Approach to C-FCAS Capability**

The GPS specifies the automatic access Technical Requirements ('Capabilities') that a generating system must meet to connect to the regulated power systems. The instrument outlining the GPS obligations is Power and Water's Network Technical Code (NTC).

Proponents of new generating systems will be required to connect in accordance with the proposed NTC clause 3.3.5.15 "Inertia and Contingency FCAS". Although the GPS specifies to meet the automatic standard the performance is to be achieved at the point of connection, it is intended that the proponent may negotiate for the standard to apply across more than one connection point if it benefits the system. This would be through the process outlined in the proposed NTC clause 3.3.5 on the basis that the connecting generator retains responsibility at all times.

Options to demonstrate C-FCAS capability may include operating at an output below maximum on-line capacity, use of battery capabilities or other technical solutions. The incremental cost for a generator to demonstrate this capability as opposed to providing it is likely to be insignificant (e.g. inverter control system with an equivalent "governor" droop characteristic).

Each generating system (including existing generation) will be tested by the System Controller in conjunction with the Network Operator and its capability accredited as part of a compliance testing regime.

Accreditation and other relevant standing data associated with the GPS will be recorded in an appropriate formalised document that enables the agreed GPS capabilities to be enforced and subject to an ongoing compliance regime.

## **C-FCAS Operating Availability and Payment – Alice Springs and Tennant Creek Power Systems**

In Alice Springs and Tennant Creek, there is no plan to introduce market arrangements. As such, the existing arrangement in the SCTC for security constrained load following is expected to remain unchanged. The SCTC authorises the System Controller to direct or constrain any generating plant as necessary for power system security and to set the frequency control mode of all plant.

In Alice Springs and Tennant Creek, there is no default provider of ancillary services nor is there a mechanism to pay another generator to provide a greater share of C-FCAS. As such, the application of security constraints such as C-FCAS provision is that it will be sourced at equitable levels across all generator participants.

## **C-FCAS Operating Availability and Payment – Darwin-Katherine Power System**

### ***I-NTEM – Current***

For the Darwin – Katherine power system, the approach to the availability and payment of C-FCAS prior to the commencement of the Northern Territory Electricity Market (NTEM) will be in accordance with the current I-NTEM arrangements.

The existing I-NTEM dispatch arrangement outlined in the SCTC is for Security Constrained Economic Dispatch. The SCTC also authorises the System Controller to direct or constrain any generation as necessary for power system security and to set the frequency control mode of all plant. Under these arrangements the System Controller meets security requirements by ensuring that plants operate with C-FCAS capability provided (where headroom permits) and may constrain plant down to obtain this headroom.

All generators dispatched are expected to be operated in frequency response (“droop”) mode. In practice if a low cost generator is economically dispatched and unconstrained it will likely operate at maximum capacity with the possibility of reducing output in response to a sudden rise in frequency.

In the I-NTEM, Territory Generation (TGen) is the primary provider of all Ancillary Services including C-FCAS. Other generators are only called upon for system security purposes where TGen is unable to do so. This does not occur frequently. Should it occur, there is no mechanism in the I-NTEM for payments to other generators providing C-FCAS. TGen is paid a rate to compensate it for operating away from its most efficient operating points. This rate is embedded in the SCTC and will be reviewed in the near future.

As TGen is the only provider of ancillary services other generators are required to pay TGen for providing ancillary services at the rate in the SCTC<sup>1</sup> proportional to the demand these generators serve. The regulated price covers voltage control, reactive power control, regulating frequency control, contingency frequency control and black start capability.

### ***NTEM - Future***

This section has been developed in consultation with the Department of Treasury and Finance as it relates to their consultation currently underway on the NTEM design.

Particularly in regard to C-FCAS, the transition from the I-NTEM to the long term NTEM is intended to be managed in a staged manner.

There are a number of technical and commercial processes and procedures needed to enable multiple parties to provide ancillary services and for these different parties to be paid. Therefore, initially the I-NTEM arrangement will continue and only TGen will be scheduled to provide C-FCAS and other ancillary services. TGen will continue to be compensated for being scheduled away from the efficient operating point(s) of its generator(s).

As soon as practicable an arrangement will be introduced whereby C-FCAS can be scheduled from other facilities (in particular those that include batteries) where this is economic and

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<sup>1</sup> Refer SCTC A6.11

within security constraints to do so. This will include an associated payment mechanism introduced through changes to the SCTC and will be subject to consequent rounds of consultation.

The intent is to commence the transition as soon as possible as the current I-NTEM arrangement is potentially sub optimal as any other facilities with capability to provide C-FCAS will not be scheduled and also will not be paid.

The long term NTEM design is for ancillary services including C-FCAS to be acquired by the System Controller under a competitive process. The System Controller would then schedule in a manner that minimises total cost to produce energy and ancillary services subject to security constraints.

The Department of Treasury and Finance are currently running a consultation on the design of the NTEM including short term transitional pathways and are seeking industry feedback in regards to the provision and payment of C-FCAS amongst other matters. Any comments received on the NTEM arrangements will be provided to the Department for consideration.