



# Ancillary Services Code

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## Ancillary Services Code

### ASC 1 Introduction

Ancillary Services are services ancillary to the transmission of electricity that OETC requires to operate the Transmission System in accordance with its statutory obligations.

OETC has a number of specific obligations regarding Ancillary Services;

- OETC is required to ensure sufficient Ancillary Services will be available on the day ahead when preparing the Generation Schedule and Desalination Schedule (see SCD1); and
- OETC is required by the terms of the Transmission and Dispatch Licence to cooperate with PWP in determining which Ancillary Services should be procured by the PWP from Production Facilities.

This Ancillary Services Code (ASC) lists the Ancillary Services required by OETC, the contractual arrangements governing the provision of such services and details of the Ancillary Services to be provided by Power Producers and other Users. This code also sets down the form of instruction that will be used by OETC to implement the requirements for Ancillary Services.

### ASC 2 Objectives

The objectives of the ASC are as follows;

- to list the Ancillary Services that OETC requires to operate the Transmission System in accordance with statutory requirements;
- to clarify the contractual arrangements governing the purchase of Ancillary Services from Power Producers and Users; and
- to clarify the process for scheduling and instructing the requirements for the use of Ancillary Services.



### **ASC 3 Scope**

In addition to OETC, ASC applies to;

- PWP (as the purchaser of Ancillary Services from Power Producers);
- Power Producers;
- Licensed Distributors;
- Licensed Suppliers;
- Directly Connected Consumers;
- International Interconnected Parties;
- Internally Interconnected Parties; and
- RAEC if Connected to the Total System.

### **ASC 4 Requirement for Ancillary Services**

The requirements for Ancillary Services can be categorised as follows;

- Regulation of System Frequency;
- Reactive Power and voltage control; and
- Black Start capability for System Restoration.

#### **ASC4.1 Regulation of System Frequency**

OETC is required to maintain Frequency within the following limits.

During normal operating conditions, the nominal System Frequency of the Transmission System shall be 50.00 Hz and will be controlled normally between 49.95Hz and 50.05Hz. During exceptional steady state conditions, Frequency deviations will not exceed 49.90Hz to 50.10Hz unless disturbed circumstances prevail.

Under disturbed conditions, System Frequency could rise transiently to 51.50 Hz or fall to 48.0 Hz.

The Frequency of the Total System is responsive to changes in the balance between Demand and total Available Generation Capacity. OETC must therefore ensure that at all times sufficient Generation Capacity and Demand is Available and Connected to the System to respond automatically to Active Power imbalances and correct any credible Frequency change.

The Grid Code requires all CDGensets to have the capability to contribute to Frequency control. Synchronised Gensets can provide continuous Frequency control through their automatic governing systems. Frequency control will also be assisted by synchronised Gensets through changes in output in response to Dispatch Instructions issued by OETC.

Frequency control can also be provided through Demand Side Management arrangements with Users that allow demand to be adjusted for short periods for the purposes of Active Power balance and Frequency control.



## **ASC4.2 Reactive Power and voltage control**

OETC is required to maintain voltage control within certain limits. The voltage on the 220kV and 132kV parts of the Transmission System at each Connection Site with a User will remain within the limits of a minimum voltage of -10% and a maximum voltage of +10%.

The voltage on the 33kV and 11kV sides of Transmission transformers at Connection Sites with Users will normally remain within the limits +/-6% of the nominal value unless abnormal conditions prevail.

During some System Disturbances such as where short circuits occur, the voltage may collapse transiently to zero at the point of fault until the fault is cleared.

Voltage regulation requires both Active and Reactive Power flows across the Transmission System to be carefully controlled. The physical characteristics of the Plant of the Transmission System also give rise to the Generation and absorption of Reactive Power. Reactive Power flows across the System can give rise to substantial voltage differences and it is therefore necessary to maintain Reactive Power balances between sources of Capacity and demand on a “zonal” basis.

Unlike Frequency, which is consistent across an interconnected Transmission System, voltages at different points on an interconnected System are determined by the local sources of demand and Capacity, by the prevailing network configuration and by the Reactive Power flows across the network. The voltages at different points on a interconnected System thus form a “voltage profile”.

The management of voltage requires control of Reactive Power and this can be provided by CDGensets, Autogenerators, or by means of synchronous or static compensators/reactors.

## **ASC4.3 System restoration**

Black Start is an Ancillary Service required to restore the Total System following a Partial Shutdown or Total Shutdown of the System. System Restoration Procedures and the procedures to be followed in Black Start situations are dealt with in section OC7 of the Grid Code.

Black Start capability would normally be Available as required from certain Power Producers in accordance with the terms of a PPA or PWPA. Autogenerators may also have Black Start capability.

## **ASC 5 Ancillary Service contractual arrangements**

The Sector Law requires that Ancillary Services are provided for in either (i) an agreement between a Licensed Generator or a Licensed Generator/Desalinator and the PWP or (ii) an agreement established under the Grid Code or the Distribution Code.

OETC can enter Ancillary Service Agreements with Users for Ancillary Services provided the facilities providing the Ancillary Services are not party to a PPA or a PWPA with PWP.



OETC is responsible for identifying the Transmission System Ancillary Services requirements both in the short term, when preparing the day ahead Schedule, and in accordance with the System expansions plans of the PWP.

The Transmission and Dispatch Licence and the Power and Water Procurement Licence require OETC and the PWP to liaise and cooperate on the issue of providing and contracting for Ancillary Services.

All Ancillary Services whether provided through a PPA, PWPA or Ancillary Service Agreement shall be utilised in accordance with OETC instructions and the requirements of the Grid Code.

## **ASC 6 Ancillary Services provided by Power Producers**

The PPA or PWPA for each Power Producer shall state the Active Power and Reactive Power ranges for each CDGenset. It also shall state that each CDGenset must be capable of contributing to Frequency and voltage control by continuous modulation of Active Power and Reactive Power supplied to the Transmission System or the User System in which it is Embedded. These services cover the requirements for Primary Response, Secondary Response and Tertiary Reserve and the provision of Reactive Power response from Power Producers.

The Turbine Speed Controller of a CDGenset in co-ordination with other control devices must control the Active Power output with stability over the entire operating range of the CDGenset. The speed governor shall be capable of being set so that it operates with an overall speed droop of between 3.0% and 5.0%.

OETC may instruct a CDGenset to operate anywhere within the operating envelop defined in its Generator Performance Chart. This envelope is contained between declared Active Power capability and registered Minimum Generation and between the practical stability limit line (leading Reactive Power) and the lagging Reactive Power line determined by the rotor-heating limit. The Reactive Power limits are shown by way of illustration in Appendix D of OC2.

Each CDGenset should be capable of providing constant voltage control at its terminals over the entire operating range without instability. This shall be by a continuously acting Automatic Voltage Regulator which should be in service at all times when the CDGenset is Synchronised unless otherwise instructed by OETC

It is essential that OETC has Black Start Capability Available to it. Black Start Capability will be provided in accordance with a PPA or PWPA. Non-availability of this capability must be declared in the Daily Status Form.

## **ASC 7 Ancillary Services provided by Users**

OETC may have Ancillary Service Agreements with Licensed Suppliers, Directly Connected Consumers and/or other Users not party to a PPA or PWPA for the provision of Ancillary Services such as Demand Control, Reactive Power output and response and Black Start capability.

Licensed Suppliers, Directly Connected Consumers or other Users not party to a PPA or PWPA may make arrangements for the switching out of or a reduction in discrete levels of Demand.



Switching out of Demand or reduction of Demand may take place following;

- instructions from OETC or a Licensed Distributor to reduce Load on the respective networks; and
- instructions from OETC to assist in matching Available Active Power output to Demand.

An Ancillary Service Agreement may also provide for automatic operation of under Frequency relays to switch off Demand to assist System response in cases of emergencies. The Frequency settings and any time delays of relays will be agreed between OETC and the User.

Additionally, Ancillary Service Agreements with Licensed Suppliers, Licensed Distributors and/or other Users not party to a PPA or PWPA may provide for the Supply of Reactive Power capability and/or response. This may be provided from rotating Plant or switched static Plant.

OETC will instruct the use of such Ancillary Services at the appropriate time.

Autogenerators or other Users with Gensets not centrally Dispatched may wish to offer Black Start capabilities to OETC to assist restoring the Total System following Emergency Conditions. Appropriate commercial arrangements may be put in place for this purpose. OETC would issue the necessary instructions calling for the use of Black Start capability at the appropriate time.

## **ASC 8 OETC instructions to Users**

OETC will normally schedule the requirements for use of Ancillary Services within in its day ahead Scheduling plans provided for in Code section SDC1. Users will be informed by 16:00 hours on the day preceding the relevant Schedule Day of the potential requirements.

Potential requirements are not firm Instructions but are indicative only, and are provided as a guide to the expected output requirements from Ancillary Service Providers.

Instructions to Ancillary Service Providers relating to the Schedule Day will normally be issued as a list of special actions in respect of that Schedule Day at any time during the period beginning immediately after the issue of the Generation Schedule and Desalination Schedule at 16:00 hours as provided for in SDC2. OETC will issue instructions directly to the Users at each Control Centre in relation to special actions and Demand Control. Instructions may include;

- a requirement for Demand reduction, de-energisation or restoration;
- an instruction to effect a Load transfer between Connection Points;
- an instruction to switch in a Demand Intertrip Scheme; and
- an instruction to switch in or out Reactive control plant.

The procedure for a Black Start situation will be that specified by OETC at the time of the Black Start situation as provided for in OC7. Users shall abide by OETC instructions



during a Black Start situation provided the instructions are to operate within the declared operational capability of the Plant.

OETC may issue instructions to;

- a Production Facility with Black Start Capability or to a Licensed Distributor with an Embedded Production Facility with Black Start Capability relating to the commencement of Generation output;
- a Licensed Distributor or to a Directly Connected Consumer relating to the restoration of Demand; and
- a Production Facility relating to commencement of Generation output when an external Power Supply is made available to it.