Guidelines for Power Park Modules during Alert and Emergency States

Standing Procedure

October 2022

EIRGRID GROUP

Executive Summary

This procedure forms part of the EirGrid Group's power system emergency response planning. It sets out the actions to be taken by Power Park Modules in response to System Alert and Emergency States. EirGrid and SONI have realigned the system states to match the requirements of the European Network Codes.

System States

The status of the system has been defined in Figure 1 with the previous system states listed on the right and the associated new system state listed on the left.

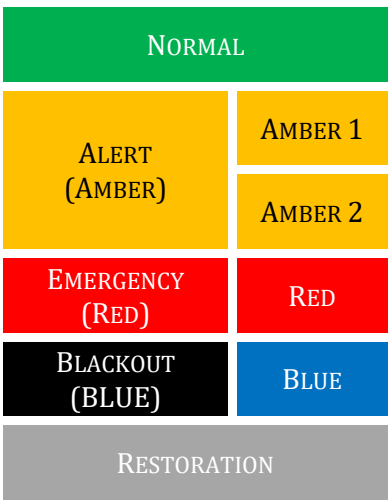

Figure 1 Realignment of System States

The main changes to the system state are;

1. Merger of amber alert 1 and amber alert 2 into the alert state,
2. Substitution of red alert for emergency alert, and
3. Substitution of blue alert to blackout.

To make this transition to these new states seamless, system operators will include in brackets the colour of the state in initial correspondence. All alerts that are communicated via the EMS (Energy Management System) will remain communicated via colour.

Power system states are issued on a jurisdictional basis.

System State Conditions

The transmission system shall be in one the following states when the listed conditions are fulfilled.

NORMAL STATE	ALERT (AMBER) STATE	EMERGENCY (RED) STATE	BLACKOUT (BLUE) STATE
1. The steady state system frequency **a)** remains between 49.8 – 50.2 Hz; or **b)** does not breach alert or emergency state thresholds. **2.** Voltage and power flows are within the operational security limits; **3.** Operation of the transmission system is and will remain within operational security limits after the activation of remedial actions following the occurrence of a contingency from the contingency list.	Voltage and power flows are within operational security limits (base case secure) and one or more of the following conditions are fulfilled: **1.** The steady state system frequency is within a range of 49.5 – 50.5 Hz but has continuously been: **a)** outside 49.75 - 50.25 Hz for a time period longer than 10 min; or **b)** outside 49.8 - 50.2 Hz for a time period longer than 15 min; or **2.** At least one contingency from the contingency list leads to a violation of operational security limits, even after the activation of remedial actions; or **3.** Multiple contingencies are probable because of adverse weather; or **4.** The jurisdictional margin is such as the tripping of the largest set, would give rise to a reasonable possibility of failure to meet the System Demand using the following formula as a guideline: LSI > MAR Where: LSI = largest MW infeed to jurisdiction **MAR = [GEN + WIND/PV +/- ICF] – DEMAND + TLS** *Equation definitions in Appendices* **5.** The All-Island reserve capacity is reduced by more than 20% for longer than 30 minutes and there are no means to compensate for that reduction in real-time system operation.	**1.** It is likely/ imminent that in the period immediately ahead (i.e. in the next four hours) there is a high risk of failing to meet System Demand. **2.** Dynamic reserves (excl. batteries) have been reduced to 70MW (50MW IE and 20MW NI). **3.** The steady state system frequency is outside a range of 49.5 - 50.5 Hz for more than 1 min. **4.** LSAT (real-time) continually forecasts a frequency Nadir of below 49 Hz for a period of 30 min and there are no means are available to address this. **5.** Any of the following system defence plan measures are activated; **a)** activation of UF load shedding where frequency does not recover within +/- 500mHz less than 1 minute; or **b)** widespread (multiple station) UV load shedding; or **c)** activation of manual demand disconnection; or **d)** activation of system separation protection. **6.** There is at least one violation (base case) of voltage limits, short-circuit current limits, or current limits in terms of thermal rating (e.g. tie lines) even after the activation of remedial actions; or **7.** There is a failure in the functioning of; **a)** EMS / SCADA or **b)** Phones (Corporate and Optel / Tetra) resulting in the unavailability of those tools, means and facilities for longer than 30 minutes.	**1.** Loss of more than 50% of demand in the concerned TSO's control area; **2.** Total absence of voltage for at least three minutes in the concerned TSO's control area, leading to the triggering of restoration plans. **3.** Restoration Plan has been activated.

Wind and PV Farm Required Response

Each station is to respond as per its own procedure. Station staff are required to respond to the respective alert received as follows.

ALERT (AMBER) STATE	EMERGENCY (RED) STATE
1. Relevant management to be notified. **2.** Phone to be monitored for further NCC/ CHCC instructions. **3.** Any routine operations with an associated element of risk to cease. **4.** On-load testing of relays, protection or other equipment to cease. **5.** Any unauthorised minor maintenance being done on non-running but available plant to be finished and plant cleared for running. **6.** Ensure Wind/PV Farm can respond to Wind Dispatch Tool. **7.** Operators to ensure that the generating units MW and MVAR declarations are attainable. **8.** Do not call NCC/ CHCC unless emergency (email can be used to communicate).	**1.** Immediately implement (Amber) Alert responses. **2.** Consider stopping all works on radials and be available for more MW/MVAR. **3.** Do not call NCC/CHC unless emergency (email can be used to communicate).

Batteries Required Response

Battery staff are required to respond to the respective alert received as follows.

ALERT (AMBER) STATE	EMERGENCY (RED) STATE
1. No charging during alert state unless instructed by NCC/ CHCC **2.** Relevant management to be notified. **3.** EDIL/phone to be monitored for further NCC/ CHCC instructions. **4.** Any routine operations with an associated element of risk to cease. **5.** On-load testing of relays, protection or other equipment to cease. **6.** Any unauthorised minor maintenance being done on available batteries to be finished and batteries cleared for dispatch. **7.** Ensure Batteries can respond to NCC/ CHCC SCADA Control (not on manual mode). **8.** NCC/ CHCC will dispatch batteries via EMS and accept EDIL instruction on batteries behalf if EDIL instruction isn't accepted by the battery. **9.** Operators to ensure that the EDIL declarations are achievable. **10.** Do not call NCC/ CHCC unless emergency (EDIL/email can be used to communicate).	**1.** Immediately implement (Amber) Alert responses. **2.** No charging during emergency state. **3.** Battery operator to prepare for possible mains loss to ensure continuous operation of their battery. **4.** Do not call NCC/ CHCC unless emergency (EDIL/email can be used to communicate).

Requirements

The TSO business process BP_SO_09.2 Declaration of the System Alerts1 and the documents referenced in the following table govern the Northern Ireland System Alert process.

Document Title	Description
SONI Grid Code	Operating Code No.3 ("OC3") sets out the different types of reserve which make up the Operating Margin that the TSO may use in the Control Phase
COMMISSION REGULATION (EU) 2017/1485 establishing a guideline on electricity transmission system operation	TITLE 1 OPERATIONAL SECURITY REQUIREMENTS The SO GL provides harmonised rules on system operation for transmission system operators (TSOs). CHAPTER 1 details the system states that all TSOs are required to assess their systems against.
COMMISSION REULATION (EU) 2017/2196 establishing a network code on electricity emergency and restoration	SYSTEM DEFENCE PLAN – Is activated when the power system is in an Emergency state. RESTORATION PLAN – Is activated when the power system is in a Restoration state. Both Plans aim to return the power system to the Normal state.
Operating Security Standards Ireland **Operating Security Standards Northern Ireland**	EirGrid plc and SONI ltd (the Transmission System Operators for Ireland and Northern Ireland), cooperate to ensure the all-island transmission system is operated in a secure and reliable manner

[1] https://www.sem-o.com/documents/general-publications/BP_SO_09.2-Declaration-of-System-Alerts.pdf