

Guidelines for Power Park Modules during System States

Standing Procedure

October 2022



Executive Summary

In the event of a system emergency the system operator may issue a system alert. The European Network Codes¹ have altered the criteria for the system states and the definition of these states. To achieve compliance with the European Network Codes, EirGrid and SONI have realigned the system states to match these standards.

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.

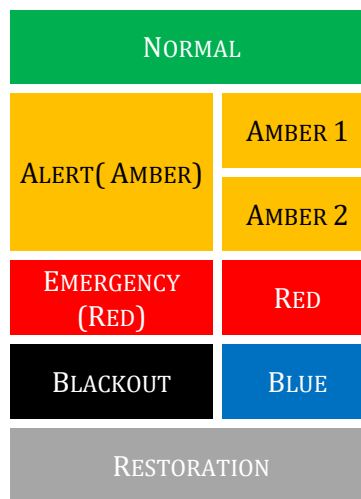


Figure 1 Realignment of System States

The main changes to the system state are;

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

To make this transition to these new states seamless, EirGrid Group will endeavour to 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.

¹ https://www.entsoe.eu/network_codes/sys-ops/
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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
<p>1. Voltage and power flows are within the operational security limits;</p> <p>2. Frequency meets the following criteria:</p> <p>a) the steady state system frequency deviation from nominal is within ± 200 mHz; or</p> <p>b) the absolute value of the <i>steady state system frequency deviation</i> from nominal is not larger than 500 mHz and the system frequency limits established for the alert state are not fulfilled;</p> <p>3. Active and reactive power reserves are sufficient to withstand contingencies from the contingency list without violating operational security limits;</p> <p>4. 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.</p>	<p>Voltage and power flows are within operational security limits (base case secure) and one or more of the following conditions are fulfilled:</p> <p>1. Frequency meets the following criteria and the absolute value of the steady state system frequency deviation from nominal has continuously exceeded:</p> <p>a) 500 mHz for a time period longer than one minute; or</p> <p>b) ± 200 mHz for a time period longer than 15 minutes; or</p> <p>c) ± 250 mHz for a time period longer than 10 minutes; or</p> <p>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 ; or</p> <p>3. Multiple contingencies are probable because of adverse weather; or</p> <p>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:</p> <p style="text-align: center;">LSI > MARGIN</p> <p>Where:</p> <p><i>LSI = largest MW infeed to jurisdiction</i></p> <p><u>MARGIN = [GEN + WIND/PV +/- ICF] – DEMAND + TLS</u></p> <p><i>GEN = Readily available generation</i></p> <p><i>WIND/PV = Expected generation from wind and PV</i></p> <p><i>ICF = Flow on the EWIC/Moyle Interconnector</i></p> <p><i>DEMAND = Expected system demand</i></p> <p><i>TLS = Tie Line Support (capped by TTC), and is defined as follows</i></p> <p style="text-align: center;"><i>TLS = min (TTC, +/-TL + ATLS) where</i></p> <ul style="list-style-type: none"> • TL = Tie Line flow • ATLS = Additional Tie Line Support = surplus margin in the other jurisdiction • TTC = Total Transfer Capability (in the relevant direction); or <p>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.</p>	<p>1. There is at least one violation (base case) of voltage limits, short-circuit current limits, or current limits in terms of thermal rating; or</p> <p>2. Frequency does not meet the criteria for the normal state or alert state definitions; or</p> <p>3. Any of the following system defence plan measures are activated;</p> <p>a) activation of UF load shedding where frequency does not recover within +/- 500mHz less than 1 minute; or</p> <p>b) widespread (multiple station) UV load shedding; or</p> <p>c) activation of manual demand disconnection; or</p> <p>d) activation of system separation protection.</p> <p>4. There is a failure in the functioning of;</p> <p>a) EMS / SCADA or</p> <p>b) Phones (Corporate and Optel / Tetra) resulting in the unavailability of those tools, means and facilities for longer than 30 minutes.</p> <p>The "RED ALERT" signal should also be initiated by NCC or CHCC when it is likely/ imminent that in the period immediately ahead (i.e. in the next four (4) hours) there is a high risk of failing to meet System Demand.</p>	<p>1. Loss of more than 50% of demand in the concerned TSO's control area;</p> <p>2. Total absence of voltage for at least three minutes in the concerned TSO's control area, leading to the triggering of restoration plans.</p> <p>3. Restoration Plan has been activated.</p>



STATE	INTERCONNECTOR ACTION
Normal	Trade out
Alert	Emergency Assistance
Emergency	Emergency Instruction

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
<ol style="list-style-type: none"> 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). 	<ol style="list-style-type: none"> 1. Immediately implement (Amber) Alert responses. 1. Consider stopping all works on radials and be available for more MW/MVAR. 2. Do not call NCC/CHC unless emergency (email can be used to communicate).

Batteries Required Response

ALERT (AMBER) STATE	EMERGENCY (RED) STATE
<ol style="list-style-type: none"> 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 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). 	<ol style="list-style-type: none"> 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 System Alert process is governed by OC9 of the Grid Code ² and BP_SO_09.2 Declaration of the System Process³.

The Grid Code specifies that the standing procedures to be activated in response to a change in system state (alert or emergency) are developed by the TSO, in consultation with the Users and notifies each user as appropriate (OC9.4.3.2) and (OC 9.4.4.2). Each User is responsible for internal procedures necessary to execute the standing procedures.

² https://www.eirgridgroup.com/site-files/library/EirGrid/Grid_Code_Version_8_1.pdf

³ https://www.sem-o.com/documents/general-publications/BP_SO_09.2-Declaration-of-System-Alerts.pdf
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