European Network of
Transmission System Operators
for Electricity

entsoe

INCIDENT CLASSIFICATION SCALE

- Final version for SOC approval -

Incident Classification Scale Subgroup

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1. General

Incident Classification Scale has been developed in accordance with Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 and updated to fulfil the objectives of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation [hereinafter SO GL] Article 15.

Article 15 of SO GL sets the obligation on transmission system operators [hereinafter TSOs] of each European Union Member State to provide ENTSO-E with the necessary data and information for the preparation of annual report based on Incident Classification Scale [hereinafter ICS], and on ENTSO-E to publish the annual report.

With the ENTSO-E System Operations Committee decision on 11 April 2018 approving the current methodology, all ENTSO-E member TSOs, including those from non-EU countries, agree to provide the necessary data and information for the preparation of annual report and the publication of the annual report, considering that each annual report will be approved separately by System Operations Committee for publication.

Incident Classification Scale aims at:

- providing overview of operational security indicators specified in article 15 of SO GL;
- identification of any necessary improvements, which are necessary in order to support sustainable and long-term operational security;
- identification of any appropriate improvements to network operation tools required to maintain operational security and related to real-time operation and operational planning to support TSOs in their task identified in the article 55(e) of SO GL;
- providing explanations of the reasons for incidents at the operational security ranking scales 2 and 3 as per the incidents classification scale adopted by ENTSO for Electricity; those explanations shall be based on an investigation of the incidents by TSOs which process shall be set out in the incidents classification scale.

The deliverable of Incident Classification Scale is the annual report based on the incidents classification scale prepared in accordance with article 15 of SO GL.

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2. Incident Classification Scale

2.1 General overview and criteria prioritization

Incident Classification Scale consists of 4 scales with levels of severity ranging from local incidents up to major incidents. The severity levels are compliant with the system state classification in accordance with the article 18 of SO GL:

- Scale 0 for anomalies, local incidents; the system remains in normal state;
- Scale 1 for noteworthy incidents, probability of wide area incidents; the system is in alert state;
- Scale 2 for extensive incidents; the system is in emergency state;
- Scale 3 for wide area incidents or major incidents in the control area of one transmission system operator; the system is in blackout state.

Table 1 Incident Classification Scale

Scale 0 Anomaly		Scale 1 Noteworthy incident		Scale 2 Extensive incidents		Scale 3 Wide area incident or major incident / 1 TSO	
Priority / Short definition (Criterion short code)		**Priority - Short definition (Criterion short code)**		**Priority - Short definition (Criterion short code)**		**Priority - Short definition (Criterion short code)**	
#20	Incidents leading to frequency degradation (F0)	**#11**	Incidents on load (L1)	**#2**	Incidents on load (L2)	**#1**	Blackout (OB3)
#21	Incidents on transmission network elements (T0)	**#12**	Incidents leading to frequency degradation (F1)	**#3**	Incidents leading to frequency degradation (F2)		
#22	Incidents on power generating facilities (G0)	**#13**	Incidents on transmission network elements (T1)	**#4**	Incidents on transmission network elements (T2)		
#23	Violation of standards on voltage (OV0)	**#14**	Incidents on power generating facilities (G1)	**#5**	Incidents on power generating facilities (G2)		
#24	Reduction of reserve capacity (RRC0)	**#15**	N-1 violation (ON1)	**#6**	N violation (ON2)		
#25	Loss of tools and facilities (LT0)	**#16**	Separation from the grid (RS1)	**#7**	Separation from the grid (RS2)		
		#17	Violation of standards on voltage (OV1)	**#8**	Violation of standards on voltage (OV2)		
		#18	Reduction of reserve capacity (RRC1)	**#9**	Reduction of reserve capacity (RRC2)		
		#19	Loss of tools and facilities (LT1)	**#10**	Loss of tools and facilities (LT2)		

The priority of each criterion is shown in table 1 with a number from 1 to 25, where 1 marks the criterion with highest priority and 25 marks the criterion with lowest priority. **When an incident meets several criteria, the incident is classified according to the criterion that has the highest priority.**

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Scale 0 considerations

Incidents are classified as scale 0 incidents taking into account the following considerations:

The system is in normal state after the incident - the system is within operational security limits in the N-situation and after the occurrence of any contingency from the contingency list, taking into account the effect of the available remedial actions (SO GL article 3(5)).

Scale 1 considerations

Incidents are classified as scale 1 incidents taking into account the following considerations:

The system is in alert state after the incident - the system is within operational security limits, but a contingency from the contingency list has been detected and in case of its occurrence the available remedial actions are not sufficient to keep the normal state (SO GL Article 3(17)).

Scale 2 considerations

Incidents are classified as scale 2 incidents taking into account the following considerations:

The system is in emergency state after the incident - one or more operational security limits are violated (SO GL Article 3(37)).

Scale 3 considerations

Incidents are classified as scale 3 incidents taking into account the following considerations:

The system is in blackout state after the incident - the operation of part or all of the transmission system is terminated (SO GL article 3(22)).

The real-time status of the system state (alert, emergency or blackout) is reported through the ENTSO-E Awareness System [hereinafter EAS]. The EAS is focused on real time consequences of incidents and the actual situation in the grid. Consequently, it should be possible to classify all the incidents which are declared in the EAS according to the scales defined in the ICS.

Since the EAS is operated in real time, the state of the system is determined using only the information that is readily available. Under certain circumstances, this can result in discrepancies between system state declared in EAS and classification of an incident at a later stage.

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2.2 Definitions of ICS criteria

2.2.1 Blackout (OB)

General description

After the incident occurs, the system is in blackout state. Blackout is only counted on scale 3 (OB3). An incident is classified according to this criterion in case one of the following conditions from SO GL article 18(4) is fulfilled:

- loss of more than 50% of demand in the concerned TSO's control area; or
- total absence of voltage for at least three minutes in the concerned TSO's control area, leading to the triggering of restoration plans.

Exceptions

The following exceptions apply for the description of the criterion above:

- A TSO of GB and IE/NI synchronous areas may develop a proposal specifying the level of demand loss at which the transmission system shall be in the blackout state according to SO GL article 18.4
- For isolated systems, the system is in blackout in case of loss of more than 70% of load (load-shedding) at the time of the incident or total shut down.

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- An estimate of disconnected load (MW);
- Energy not supplied (MWh).

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2.2.2 Incidents on load (L)

General description

Disconnection of load with duration of at least 3 minutes is classified according to this criterion in case one of the following conditions is fulfilled:

- Disconnection due to tripped network elements; or
- Activation of system defence plan measures (automatic low frequency and low voltage demand disconnection); or
- Manual disconnection of load or activation of controlled load reduction for adequacy.

Exceptions:

The following exceptions apply for the description of the criterion above:

- Disconnection of load less than 200 MW is not reported;
- Manual disconnections of load that participate in the interruptible load services are not reported.

Table 2 Thresholds by scale for incidents on load

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0						
Scale 1 L1	Loss of 1 to 10% of load in a TSO's control area					Loss of 5% to 15% of load in a TSO's control area
Scale 2 L2	Loss of 10 to 50% of load in a TSO's control area					Loss of 15% to 70% of load in a TSO's control area
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- An estimate of disconnected load (MW);
- An estimate of disconnected generation (MW);
- An estimate of frequency deviation (mHz);
- Energy not supplied (MWh).

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2.2.3 Incidents leading to frequency degradation (F)

General description

All steady state frequency deviations should be reported. An incident is classified according to this criterion in case the frequency deviation reaches the thresholds defined in the table below. The thresholds for scale 0 are specified in accordance with SO GL article 18(1)(b), the thresholds for scale 1 in accordance with SO GL article 18(2)(c) and the thresholds for scale 2 in accordance with SO GL article 18(3)(b).

Frequency deviations are reported by the synchronous area monitor of each synchronous area defined in the synchronous area operational agreement according to article 133 of SO GL. Until the synchronous area operational agreements are concluded, the frequency deviations are reported by the TSOs specified below:

- for Continental Europe (CE) synchronous area: Amprion for odd months and Swissgrid for even months;
- for Nordic synchronous area: Svenska Kraftnät;
- for Great Britain (GB) synchronous area: National Grid;
- for Ireland and Northern Ireland (IE/NI) synchronous area: EirGrid;
- for Baltic synchronous area: AST.

Table 3 Thresholds by scale for incidents leading to frequency degradation

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0 F0	Frequency deviation 50-100 mHz, 3-15 min. OR 100-200 mHz between 0 and 5 min.	Frequency deviation 100-250 mHz, 3-15 min. OR 250-500 mHz between 0 and 5 min.	Frequency deviation 200-250 mHz, 3-15 min. OR 250-500 mHz between 0 and 10 min.	Frequency deviation 200-250 mHz, 3-15 min. OR 250-500 mHz between 0 and 10 min.	Frequency deviation 50-200 mHz, 3-15 min. OR 200-400 mHz between 0 and 10 min	Frequency deviation 100-250 mHz, 3-20 min. OR 250-500 mHz between 0 and 10 min.
Scale 1 F1	Frequency deviation 50-100 mHz over 15 min. OR 100-200 mHz, over 5 min.	Frequency deviation 100-250 mHz, over 15 min. OR 250-500 mHz, over 5 min.	Frequency deviation 200-250 mHz, over 15 min. OR 250-500 mHz, over 10 min.	Frequency deviation 200-250 mHz, over 15 min. OR 250-500 mHz, over 10 min.	Frequency deviation 50-200 mHz, over 15 min. OR 200-400 mHz, over 10 min.	Frequency deviation 100-250 mHz, over 20 min. OR 250-500 mHz, over 10 min.
Scale 2 F2	> 200 mHz	> 500 mHz	> 500 mHz	> 500 mHz	> 400 mHz	> 500 mHz
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Maximum frequency deviation (mHz);

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- An estimate of disconnected load (MW);
- Energy not supplied (MWh);
- An estimate of disconnected generation (MW).

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2.2.4 Incidents on transmission system elements (T)

General description

Disconnection of an alternating current [hereinafter AC] transmission system element connected to voltage level 220kV or higher that is included in the contingency list established according to SO GL article 33 is reported in case of:

- forced outage (for human and asset safety) in cases where there is no time for security analysis and/or activation of remedial actions; or
- tripping by a protection device.

For equipment not capable of automatic reconnection, tripping is deemed to be final if reconnection has not occurred after 3 minutes.

No reporting is required in the following cases:

- planned manual disconnection of the AC transmission system elements; or
- tripping of the transmission lines where successful automatic re-closure has occurred.

Disconnection of a high-voltage direct current [hereinafter HVDC] system is reported in case of:

- forced outage or reduction in capacity (for human and asset safety) in cases where there is no time for security analysis and/or activation of remedial actions; or
- tripping or reduction in capacity by the operation of protection devices; or
- forced outage or reduction in capacity results in degradation of operational security standards (voltage, frequency) and/or N-1 violation.

No reporting is required in the following cases:

- planned manual disconnection of HVDC interconnectors;
- reduction in capacity to satisfy market/commercial conditions;
- loss of HVDC capacity to an island system.

In case of disconnection of a tie-line or a link between more than one TSO (including HVDC), only the TSO in whose control area the event which caused the incident was located should report in order to avoid double reporting.

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Table 4 Thresholds by scale for incidents on transmission system elements

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0 T0	Disconnection of: • highest voltage element(s) of the contingency list, or • tie-line, or • HVDC system without any consequences reaching the threshold of any ICS criteria.					
Scale 1 T1	Disconnection of: • highest voltage element(s) of the contingency list, or • tie-line, or • HVDC system in case, as a consequence of the incident, N-1 criterion ceases to be fulfilled.					
Scale 2 T2	Disconnection of: • highest voltage element(s) of the contingency list, or • tie-line, or • HVDC system in case, • as a consequence of the incident, there is at least one violation of a TSO's operational security limits defined in accordance with Article 25 of SO GL; or • in case of wide area consequences on regional or synchronous area level resulting in the need to activate at least 1 measure of the system defence plan.					
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Type of disconnected transmission system element(s);
- Estimated impact on cross zonal capacity in both directions between bidding zones (MW);
- Type of contingency (for disconnection of the transmission network element): ordinary, exceptional, out-of-range.

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2.2.5 Incidents on power generating facilities (G)

General description

An incident is classified according to this criterion in case of unexpected reduction of generation (no time for security analysis and/or activation of remedial actions) or disconnection from the grid of power generating facilities connected to transmission system or distribution network in one TSO's control area with an output greater than the thresholds defined in the table below in less than 15 minutes.

Table 5 Thresholds by scale for incidents on power generating facilities

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0 G0	600 to 1500 MW	600 to 1500 MW	600 to 1500 MW	200 to 500 MW	200 to 450 MW	Biggest unit in the system
Scale 1 G1	1500 MW to 3000 MW	1500 to 3000 MW	1500 to 3000 MW	500 to 800 MW	450 to 900 MW	Larger than the biggest unit
Scale 2 G2	More than 3000 MW	More than 3000 MW	More than 3000 MW	More than 800 MW	More than 900 MW	Power plant with the biggest unit in the system
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Total loss of generation (MW);
- Frequency deviation (mHz);
- Impact on the availability of reserves by the type of reserve,
    - reduction of frequency containment reserves [hereinafter FCR] capacity;
    - reduction of frequency restoration reserves [hereinafter FRR] capacity, separated by automatic FRR [hereinafter aFRR] and manual FRR [hereinafter mFRR];
    - reduction of replacement reserves [hereinafter RR] capacity.

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2.2.6 N and N-1 violations (ON)

General description

The situations where a TSO is not required to comply with the (N-1) criterion are listed in the articles 35(4) and 35(5) of SO GL.
This criterion does not apply to isolated systems.

Table 6 Thresholds by scale for N and N-1 violations

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0						
Scale 1 ON1	At least one contingency from the contingency list can lead to deviations from operational security limits **with consequences on neighbouring TSOs**, even after the activation of remedial action(s)					
Scale 2 ON2	There is at least one wide area deviation from operational security limits after the activation of remedial action(s) in N situation.					
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Description of the N or N-1 situation (transmission system elements affected, identification of out-of-range contingencies, etc.).

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2.2.7 Separation from the grid (RS)

General description

An incident is classified according to this criterion in case of a system incident leading to a situation where a synchronous area is separated into two or more asynchronous systems.

This criterion does not apply to isolated systems. DC interconnections are not considered for this criterion.

Table 7 Thresholds by scale for separation from the grid

<table>
<tr><th></th><th>CE</th><th>Nordic</th><th>GB</th><th>IRE/NI</th><th>Baltic</th></tr>
<tr><td>Scale 0</td><td colspan="5"></td></tr>
<tr><td rowspan="2">Scale 1
RS1</td><td colspan="5">Separation from the grid, involving only one TSO, in case at least one of the asynchronous systems has a load larger than:</td></tr>
<tr><td colspan="3">1500 MW</td><td>500 MW</td><td>450 MW</td></tr>
<tr><td>Scale 2
RS2</td><td colspan="5">Separation from the grid involving more than one TSO in case at least one of the asynchronous systems has a load larger than 1500 MW</td></tr>
<tr><td>Scale 3</td><td colspan="5"></td></tr>
</table>

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Frequency deviation (mHz);
- Load shedding (MW);
- Loss of generation (MW);
- Information about the management of the separated network.

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2.2.8 Loss of tools and facilities (LT)

General description

An incident is classified according to this criterion in case a TSO experiences the loss of real time tools and facilities specified in SO GL article 24(1):

- facilities for monitoring the system state of the transmission system, including state estimation applications and facilities for load-frequency control;
- means to control the switching of circuit breakers, coupler circuit breakers, transformer tap changers and other equipment which serve to control transmission system elements;
- means to communicate with the control rooms of other TSOs and regional security coordinators [hereinafter RSCs];
- tools for operational security analysis; and
- tools and communication means necessary for TSOs to facilitate cross-border market operations.

Table 8 Thresholds by scale for loss of tools and facilities

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0 LT0	Loss of any tool for more than 30 minutes without consequences for neighbouring TSOs					
Scale 1 LT1	Loss of any tool with consequences for neighbouring TSOs for more than 30 minutes, including the unplanned evacuation to the back up control room					
Scale 2 LT2	Loss of all tools, for more than 30 minutes					
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Type of the tool lost (based on the list provided in SO GL article 24(1) and NC ER article 42)

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2.2.9 Violation of standards on voltage (OV)

General description

Violation of standards on voltage is reported when in steady-state a network node is operated outside the voltage ranges defined in table 1 and 2 of Annex II of SO GL, taking into account the thresholds defined in the table below and the following:

- The relevant TSO in Spain may require power-generating modules connected to nominal voltages between 300 and 400 kV to be capable of remaining connected to the network in the voltage range between 1,05 pu and 1,0875 pu for an unlimited time according to article 27(2) of SO GL;
- Where the relevant TSO in the Netherlands operates nodes at a nominal voltage of 380 kV it reports voltage violations above 418 kV;
- For isolated systems, the violation of standards on voltage is reported when a network node is operated at voltage exceeding the pre-incident voltage level by ±10% for 15 minutes.

Table 9 Thresholds by scale for violations of standards on voltage

	CE	Nordic	GB	IRE/NI	Baltic	Isolated system
Scale 0 OV0	More than 30 minutes in one substation					exceeding pre-incident voltage level ±10% for 15 minutes
Scale 1 OV1	More than 30 minutes for more than one substation in one TSO					
Scale 2 OV2	More than 30 minutes in more than one TSO for neighbouring substation					
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- Maximum voltage violation (kV)

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2.2.10 Reduction of reserve capacity (RRC)

General description

An incident is classified according to this criterion in case of reduction of reserve capacity in a TSO's control area reaching the thresholds defined in the table below.
Reduction of reserve capacity for less than 15 minutes is not reported.

Table 10 Thresholds by scale for reduction of reserve capacity

	CE	Nordic	GB	IRE/NI	Baltic	Isolated systems
Scale 0 RRC0	More than 20 % reduction, with a duration of 15 to 30 minutes					
Scale 1 RRC1	More than 20 % reduction, with a duration of more than 30 minutes					
Scale 2 RRC2	Reserve capacity unavailable more than 30 minutes					
Scale 3						

Data to be reported in addition to common data for each incident report listed in Annex I of this methodology:

- FCR capacity reduction (MW);
- FRR capacity reduction (MW), separated by aFRR and mFRR;
- RR capacity reduction (MW).

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3. Operational security indicators

The calculation of operational security indicators defined in articles 15(3) and 15(4) of SO GL is based on all the incidents reported on scales 0 to 3. In addition, the ICS annual report shall show each indicator per scale.

3.1 Operational security indicators relevant to operational security

Operational security indicators relevant to operational security are defined in article 15(3) of SO GL. The calculation rules for the operational security indicators relevant to operational security are provided in table X.

Table 11 Operational security indicators relevant to operational security

Abbreviation	Name of the indicator and SO GL reference	Calculation rules
OS-A	Number of tripped transmission system elements per year per TSO - SO GL article 15(3)(a)	Add up the number of transmission system elements tripped reported for all the incidents on scale 0, 1, 2 and 3
OS-B	Number of tripped power generation facilities per year per TSO - SO GL article 15(3)(b)	Add up the number of power generation facilities tripped reported for all the incidents on scale 0, 1, 2 and 3
OS-C	Energy not supplied due to unscheduled disconnection of demand facilities per year per TSO - SO GL article 15(3)(c)	Add up the energy not supplied reported for all incidents on scale 0, 1, 2 and 3 due to unscheduled disconnection of demand facilities
OS-D1	Time duration of being in alert and emergency states per year per TSO - SO GL article 15(3)(d)	Add up the time being in alert and emergency states reported for all incidents on scale 0, 1, 2 and 3
OS-D2	Number of instances of being in alert and emergency states per year per TSO - SO GL article 15(3)(d)	Add up the number of incidents on scale 0,1, 2 and 3 in case alert or emergency state was reported
OS-E1	Time duration within which there was a lack of reserve identified per year per TSO - SO GL article 15(3)(e)	Add up the duration of incidents reported under the criteria RRC0, RRC1 and RRC2; and the duration of all other incidents on scale 0, 1, 2 and 3 in case the reduction of reserve capacity is reported
OS-E2	Number of events within which there was a lack of reserve identified per year per TSO - SO GL article 15(3)(e)	Add up the number of incidents reported under the criteria RRC0, RRC1 and RRC2; and the number of all other incidents on scale 0, 1, 2 and 3 in case the reduction of reserve capacity is reported
OS-F1	Time duration of voltage deviations exceeding the ranges from tables 1 and 2 of SO GL Annex II per year per TSO - SO GL article 15(3)(f)	Add up the duration of incidents reported under the criteria OV0, OV1 and OV2; and the duration of all other incidents on scale 0, 1, 2 and 3 in case voltage deviations exceeding the ranges from SO GL Annex II are reported
OS-F2	Number of voltage deviations exceeding the ranges from tables 1 and 2 of SO GL Annex II per year per TSO - SO GL article 15(3)(f)	Add up the number of incidents reported under the criteria OV0, OV1 and OV2; and the number of all other incidents on scale 0, 1, 2 and 3 in case voltage deviations exceeding the ranges from SO GL Annex II are reported

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OS-G1	Number of minutes outside the standard frequency range per year per synchronous area - SO GL article 15(3)(g)	Add up the duration of incidents reported under the criteria F0, F1 and F2; and the duration of all other incidents on scale 0, 1, 2 and 3 in case frequency deviation beyond standard frequency range are reported
OS-G2	Number of minutes outside the 50% of maximum steady state frequency deviation per year per synchronous area - SO GL article 15(3)(g)	Add up the number of incidents reported under the criteria F0, F1 and F2; and the number of all other incidents on scale 0, 1, 2 and 3 in case frequency deviation beyond standard frequency range are reported
OS-H	Number of system-split separations or local blackout states per year – SO GL article 15(3)(h)	Add up the number of incidents reported under the criteria RS1 and RS2
OS-I	Number of blackouts involving two or more TSOs per year - SO GL article 15(3)(i)	Add up the number of incidents reported under the criteria OB3, in case two or more TSOs are involved

3.2 Operational security indicators relevant to operational planning

Operational security indicators relevant to operational planning are defined in article 15(4) of SO GL. The calculation rules for the operational security indicators relevant to operational planning are provided in table X.

Table 12 Operational security indicators relevant to operational planning

Abbreviation	Name of the indicator and SO GL reference	Calculation rules
OPS-A	Number of events in which an incident contained in the contingency list led to a degradation of the system operation state - SO GL article 15(4)(a)	Add up the number of incidents on scale 0, 1, 2 and 3 in case degradation of system operation state is reported and in case the cause of the incident is a contingency from contingency list
OPS-B	Number of the events counted by indicator OPS-A (events in which an incident contained in the contingency list led to a degradation of the system operation state), in which a degradation of system operation conditions occurred as a result of unexpected discrepancies from load or generation forecasts - - SO GL article 15(4)(b)	Add up the number of incidents counted by indicator OPS-A in case unexpected discrepancies from load and generation forecasts were reported as the cause of the incident
OPS-C	Number of events in which there was a degradation in system operation conditions due to an exceptional contingency - SO GL article 15(4)(c)	Add up the number of incidents on scale 0, 1, 2 and 3 in case degradation of system operation state is reported and in case the cause of the incident is an exceptional contingency
OPS-D	Number of the events counted by indicator OPS-C (events in which there was a degradation in system operation conditions due to an exceptional contingency), in which a degradation of system operation conditions occurred as a result of unexpected discrepancies from load or generation forecasts - SO GL article 15(4)(d)	Add up the number of incidents counted by indicator OPS-C in case unexpected discrepancies from load and generation forecasts were reported as the cause of the incident

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OPS-E	Number of events leading to a degradation in system operation conditions due to lack of active power reserves - SO GL article 15(4)(e)	Add up the number of incidents on scale 0, 1, 2 and 3 in case lack of active power reserves was reported as the cause of the incident

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4. Reporting rules

4.1 General rules

The Incidents Classification Scale must be applied by each TSO as defined in SO GL and by each ENTSO-E member TSO not bound by SO GL. The following principles shall be applied:

- each TSO shall nominate a single point of contact (ICS SPOC) that is responsible for:
    - reporting the incidents in accordance with Incident Classification Scale;
    - responding to inquiries regarding the reported incidents; and
    - validating the data of its TSO in the draft annual report. \
- the incidents are reported in case the effect(s) or initiating event(s) occur in the transmission network with an operating voltage at or above **220 kV**;
- each TSO shall define its own internal organisation to apply the ICS;
- the list of common data to be reported for each incident is given in the Annex I of this methodology; depending on the type of incident, additional data is requested to allow the investigation of incidents, these additional data items are listed under each criterion;
- reporting shall be done by the TSO in whose control area the incident has occurred and by all other TSOs affected by the initiating incident in case the consequences in their own systems reach at least the thresholds for scale 0 incidents;
- frequency deviations are reported by one TSO per synchronous area, specified in chapter 2.2.3 on incidents leading to frequency degradation.

Each TSO must perform the following:

- identify the origin of the incident;
- identify the consequences of the incident in its control area;
- measure the effect of the incident to the transmission system parameters;
- assess the effect of the incident outside its control area.

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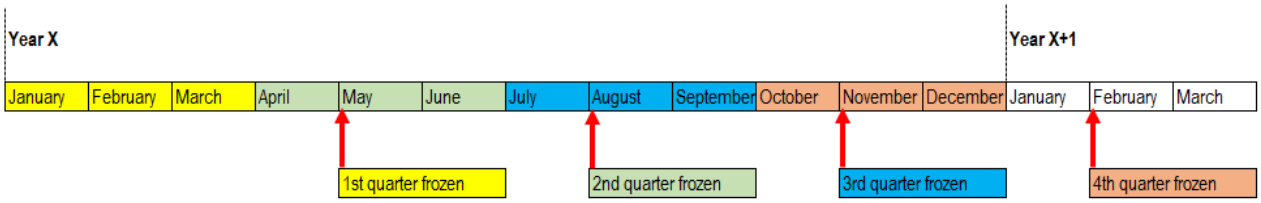
4.2 Reporting process and timeline

The reporting period for ICS annual reports is one calendar year. Each TSO shall report the incidents occurring between 1 January and 31 December. When an incident begins in one calendar year and ends in another calendar year, the incident is included in the ICS annual report for the year in which the incident began.

Each TSO shall report an incident classified in accordance with the criteria of ICS in the reporting tool at the latest by the end of the month following the month in which the incident began. Subgroup Incident Classification Scale [hereinafter SG ICS] analyses the incidents reported by TSOs and freezes the database of incidents after the end of each quarter of the year:

- the data related to the incidents occurring from 1 January to 31 March is frozen on 1 May;
- the data related to the incidents occurring from 1 April to 30 June is frozen on 1 August;
- the data related to the incidents occurring from 1 July to 30 September is frozen on 1 November;
- the data related to the incidents occurring from 1 October to 31 December is frozen on 1 February on the following year.



TSOs may modify the data after the above deadlines subject to the approval of the SG ICS.

4.3 Procedure for multiple incidents and involving several TSOs

Where an incident (knowingly or unknowingly) affects multiple TSOs, each TSO will report on the incident as it affects their transmission network to aid the incident investigation. Where TSOs become aware that multiple incidents were caused by a single incident, such multiple incidents shall be combined into a single incident according to the prioritisation of the ICS criteria. An incident report will be prepared containing all the system impacts for all affected TSOs.

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5. Procedure for the investigation of scale 2 and scale 3 incidents

For incidents on scale 2 and 3, a detailed report shall be prepared by an expert panel composed of representatives from TSOs affected by the incident, leader of the expert panel from a TSO not affected by the incident, relevant RSC(s), representative of SG ICS, regulatory authorities and ACER upon request. The ICS annual report shall contain the explanations of the reasons for incidents on scale 2 and scale 3 based on the investigation of the incidents according to article 15(5) of SO GL.

TSOs affected by the scale 2 and scale 3 incidents shall inform their respective regulatory authorities before the investigation is launched according to article 15(5) of SO GL. ENTSO-E Secretariat will inform ACER about the upcoming investigation.

5.1 Expert Panel

An expert panel will be conduct the investigation on scale 2 and scale 3 incidents. The expert panel will consist of the following members:

- The leader of the expert panel: Steering Group Operations under ENTSO-E System Operations Committee shall nominate an expert from a TSO not affected by the incident as the leader of the expert panel to ensure neutrality of the investigation;
- Expert panel members: each TSO affected by the incident on scale 2 or scale 3 shall appoint an expert to represent the TSO in the expert panel, and when needed, a representative of the relevant RSC(s);
- SG ICS representative: Steering Group Operations under ENTSO-E System Operations Committee shall nominate a representative of SG ICS to ensure that the procedure for the investigation of scale 2 and scale 3 incidents is followed;
- Regulatory authorities and ACER, on request to be involved in the incident investigation.

Remark: In case of a scale 2 or scale 3 incident in the synchronous areas of Great Britain or Ireland and Northern Ireland, when the incident affects only one TSO, a TSO internal investigation is conducted. The affected TSO shall also in this case inform its respective regulatory authority before the investigation launched.

5.2 Timeline for the investigation of scale 2 and scale 3 incidents

The investigation has the following timeline:

- **Each TSO shall report the incidents on scale 2 and 3 classified in accordance with the criteria of ICS in the reporting tool at the latest by the end of the month following the month in which the incident began;**
- Latest by 6 months after the end of the incident, the expert panel shall prepare a factual report that will provide the factual basis for the final report;
- Latest by the publication of the ICS annual report for the year of the incident, the expert panel will prepare a final report on the investigation of the incident;
- Latest by the publication of the ICS annual report for the year of the incident, the expert panel will prepare the explanations of the reasons for incidents on scale 2 and scale 3, that shall be included in the ICS annual report.,

In case the TSOs affected by the incident receive urgent inquiries from their regulatory authorities or external stakeholders regarding the incident, the expert panel may decide to expediate the incident investigation.

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5.3 Data Collection

To perform relevant analysis of the incident, the expert panel shall use the data reported by the affected TSOs in the reporting tool covering the data listed in Annex 1, and depending on the type of the incident, additional data necessary for the investigation.

The expert panel shall gather the additional data and information, deemed necessary for the investigation, in the form of a questionnaire, that is to be filled and provided to the expert panel by the affected and other relevant TSOs.

5.4 Factual Report

After collecting the data, the expert panel shall prepare a **factual report** that provides at least:

- The description of the system conditions right before the incident;
- The description of the system conditions after the incident;
- Activated remedial actions and measures from system defence plan;
- The sequence of events, including the description of all violations of operational security limits and other consequences of the incident.

Each TSO that provided information shall approve the factual correctness of its information contained in the report, before the expert panel proceeds with performing further analysis and preparing the final report.

5.5 Final Report

The expert panel shall prepare the **final report** that shall include at least:

- The analysis on the causes of the incident;
- The evaluation of the activated remedial actions and measures from system defence plan;
- The evaluation of the actions of TSO employees in charge of real-time operation of the transmission system;
- The evaluation of the functioning of the equipment;
- The conclusions and the explanations of the reasons for the incident;
- The recommendations based on the conclusions of the investigation.

The method used to analyse incidents should be based on a well-known method such as the “fault tree analysis”.

The final report of incident scale 2 and 3 shall be published on the ENTSO-E public website.

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6. Annual Report

According to article 15(1) of SO GL, each year by 30 September, ENTSO-E shall publish on their website an annual report on operational security indicators based on the ICS.

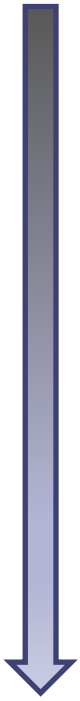
6.1 Contents of the annual reports

The annual report includes at least the following information:

- Operational security indicators listed in articles 15(3) and 15(4) of SOGL and calculated according to Chapter 3;
- Statistical overview on all reported incidents on scale 0, 1, 2 and 3;
- Analysis on the incidents for scale 1 and above;
- Explanations of the reasons for incidents on scales 2 and 3 based on the investigation carried out according to Chapter 5.

6.2 Process for the preparation of the annual report

The main tasks and milestones are:



- ICS SPOCs to provide incident reports – latest before the end of each month, incidents in the previous month
- When needed, trigger the investigation procedure for incidents on scale 2 and 3
- SG ICS to analyse data and freeze the database for previous quarter – after the end of each quarter
- Preparation of the annual report by SG ICS members, including calculation of the operational security indicators, analysis of the incidents, and retrieving the explanations of the reasons for scale 2 and scale 3 incidents, from the respective expert panel
- Validation of its data by each ICS SPOC
- Proofreading and layout of the annual report
- Review of the final draft by Steering Group Operation
- SOC review of the final draft
- Finalisation of the report by SG ICS
- SOC approval of the final report
- Publication of the final annual report – by 30 September each year

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Annexes

Annex 1 Common data for reporting

For each incident, at least the following data is reported:

a) reporting person;
b) phone number of the reporting person;
c) e-mail of the reporting person;
d) reporting TSO;
e) synchronous area where the incident took place;
f) other TSOs affected (checkmark);
g) other TSOs affected – list all affected TSOs (predefined list);
h) start time of the incident, date and time (CET, CEST);
i) end time of the incident, date and time (CET, CEST);
j) scale of the incident (predefined list: scale 0, scale 1, scale 2, scale 3);
k) criterion (as classified by TSO according to the priority list of criteria, predefined list);
l) comments (additional remarks regarding the incident that contribute to the investigation of the incident, initiating fault, geographical relevance, sequence of events etc.);
m) highest voltage level involved in the incident;
n) system state: system in normal state (checkmark);
o) system state: time in alert state;
p) system state: time in emergency state;
q) system state: time in blackout state;
r) cause(s) of the incident and the specification of the cause(s) (predefined list), comment for additional information regarding the cause(s), duration of cause(s) if relevant;
s) consequence(s) of the incident and the specification of the consequence(s) (predefined list), comment for additional information regarding the cause(s), duration of consequence(s) if relevant;
t) remedial action applied – yes/no;
u) no remedial action reason (predefined list);
v) remedial action applied to mitigate the consequences of the incident (predefined list).

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Annex 2 Specific data reported for depending on the ICS criterion

The data specific to each criterion is listed under the description of each criteria, and reported here for the purposes of having an overview. Additional data reported depending on the ICS criteria:

a) An estimate of disconnected load (MW);

b) Load shedding (MW);

c) Energy not supplied (MWh);

d) An estimate of disconnected generation (MW);

e) An estimate of frequency deviation (mHz);

f) Type of disconnected transmission system element(s);

g) Estimated impact on cross zonal capacity in both directions between bidding zones (MW);

h) Type of contingency (for disconnection of the transmission network element): ordinary, exceptional, out-of-range contingency;

i) FCR capacity reduction (MW)

j) FRR capacity reduction (MW), separated by aFRR and mFRR

k) RR capacity reduction (MW)

l) Description of the N or N-1 situation (transmission system elements affected, identification of out-of-range contingencies, etc.).

m) Information about the management of the separated network.

n) Type of the lost tool (from the list defined in SO GL article 24(1));

o) Maximum voltage violation (kV).

Annex 3 Additional data for the investigation of scale 2 and scale 3 incidents

Additional data reported for scale 2 and scale 3 incidents:

a) ex-ante data (day ahead and intraday);

b) real time snapshots;

c) measurements from SCADA or equipment in substation (behaviour of protection, actions of special protection schemes, automation, Wide Area Monitoring System, etc);

d) Excerpts from operational logs for data on operators' activities;

e) Information on the functioning of the equipment, transmission system elements, significant grid users;

f) Information on stopping of the load frequency control;

g) Automatic actions by the special protection system;

h) All automatic and manual defence actions that were executed;

i) If relevant, restoration and resynchronisation actions.

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