

**OPINION No 04/2019  
OF THE AGENCY FOR THE COOPERATION OF  
ENERGY REGULATORS**

**of 9 January 2019**

**ON ENTSO-E UPDATED COMMON INCIDENT  
CLASSIFICATION SCALE**

THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators<sup>1</sup>, and, in particular, Article 6(3)(b) thereof,

Having regard to Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003<sup>2</sup>, and, in particular, Article 9(2) thereof,

Having regard to the favourable opinion of the Board of Regulators of 12 December 2018, delivered pursuant to Article 15(1) of Regulation (EC) No 713/2009,

Whereas:

**1. INTRODUCTION**

- (1) Articles 8(3) and 9(2) of Regulation (EC) No 714/2009 require the European Network of Transmission System Operators for Electricity ('ENTSO-E') to develop a common incidents classification scale ('ICS') and to submit it to the Agency for an opinion.
- (2) Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation ('SO GL') laid down detailed requirements to safeguard operational security, frequency quality and the efficient use of the interconnected system and resources. Those requirements include, according to Article 15 of the SO GL, specific operational security indicators on which ENTSO-E shall report annually. Since some of these

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<sup>1</sup> OJ L 211, 14.8.2009, p.1.

<sup>2</sup> OJ L 211, 14.8.2009, p.15.

operational security indicators are not included in the ICS adopted before the entry into force of the SO GL<sup>3</sup>, ENTSO-E decided to revise it in order to bring it in line with the SO GL, in particular with Articles 15 and 18 thereof.

## **2. PROCEDURE**

- (3) In the course of updating the current ICS, ENTSO-E liaised with the Agency through bilateral meetings and by sharing draft versions of the document.
- (4) On 1 August 2018, ENTSO-E, with reference to Article 8(3)(a) of Regulation (EC) No 714/2009 and to the SO GL, in particular Articles 15 and 18 thereof, submitted to the Agency an updated ICS ('ICS 2018') for its opinion.

## **3. SUMMARY OF THE ICS 2018**

- (5) The ICS 2018 sets out its aims in section 1. Section 2 defines the criteria for classifying system incidents according to their type and severity. Section 3 lays out the calculation rules for the operational security indicators relevant to operational security and operational planning. Section 4 presents the reporting rules, including those that concern multiple incidents and involving several TSOs. Section 5 describes the procedure for the investigation of scale 2 and scale 3 incidents during which the system enters into emergency or blackout state. Finally, section 6 deals with the content and process for the preparation of the ENTSO-E's annual report based on the ICS ('ICS annual report').

## **4. ASSESSMENT OF THE ICS 2018**

### **4.1 Legal framework**

- (6) According to Article 6(3)(b) of Regulation (EC) No 713/2009, the Agency has to take into account in its opinion the objectives of non-discrimination, effective competition and the efficient and secure functioning of the internal market in electricity.
- (7) According to Article 15(3) and (4) of the SO GL, the ICS annual report has to contain the operational security indicators relevant to operational security and operational planning listed in the same paragraphs (3) and (4). According to Article 15(5) of the SO GL, the ICS has to set out the process for the investigation of incidents by TSOs. According to Article 18 of the SO GL, the system states have to be classified in accordance with the criteria set out in paragraphs (1) to (5) thereof.

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<sup>3</sup> 14 September 2017.

## 4.2 Compliance with the SO GL

- (8) According to the Agency's assessment, the ICS 2018 is compliant with Articles 15 and 18 of the SO GL except where mentioned in the following sub-sections.

### 4.2.1 ICS general reporting rules

- (9) Articles 15(3) and (4) of the SO GL list specific operational security indicators that shall be included in the ICS annual report.
- (10) In its section 4.1, the ICS 2018 sets out general rules on the reporting by TSOs. One rule concerns the scope of TSOs' reporting and introduces a limitation to the reporting based on the location of the incident. According to this rule, incidents are reported (only) in case the effect(s) or initiating event(s) occur in the transmission network with an operating voltage at or above 220 kV.
- (11) The Agency deems that this is not in line with Articles 15(3) and (4) of the SO GL as these provisions do not allow excluding incidents depending on their location in the transmission system.
- (12) Moreover, the SO GL, which was developed to address cross-border network issues, confirms for several instances that network elements below 220 kV can indeed affect operational security, e.g.:
- according to Article 27(1) of the SO GL, each TSO shall endeavour to ensure that, during the normal state, the voltage remains in steady-state at the connection points of the transmission system within the ranges specified in Tables 1 and 2 of Annex II to the SO GL, where Table 1 of Annex II to the SO GL includes voltage ranges at the connection point between 110 kV and 300 kV;
  - according to Article 27(5) of the SO GL, each TSO shall agree with the transmission-connected DSOs and the transmission-connected significant grid users about voltage ranges at the connection points below 110 kV if those voltage ranges are relevant for maintaining operational security limits; and
  - according to Article 41(3)(b) of the SO GL, the TSOs shall exchange with each other a model or an equivalent of the transmission system with voltage below 220 kV with significant impact on their own transmission systems.
- (13) In addition, the common grid model methodology ('CGMM')<sup>4</sup>, developed according to Articles 67(1) and 70(1) of the SO GL, and the methodology for

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<sup>4</sup> [https://docstore.entsoe.eu/Documents/nc-tasks/EBGL/SOGL\\_A70.1\\_2.a.180212\\_cgmm-v3-as-of-2018-02-12-0800h.pdf?Web=0](https://docstore.entsoe.eu/Documents/nc-tasks/EBGL/SOGL_A70.1_2.a.180212_cgmm-v3-as-of-2018-02-12-0800h.pdf?Web=0)

coordinating operational security analysis ('CSAM')<sup>5</sup>, developed according to Article 75 of the SO GL, identify in the following instances network elements below 220 kV as important to system operation and, in particular, to TSOs' coordination:

- according to Article 5(1) of the CGMM, elements of the transmission system with voltage below 220 kV shall be included in individual grid models if they have significant impact on the TSO's transmission system; and
- according to Article 5(6) of the CSAM, each TSO shall include in its observability area all grid elements outside its control area which have an influence factor greater than the corresponding observability influence threshold values. The observability area, on which a TSO implements real-time monitoring and modelling, thus extends into the parts of distribution systems relevant for maintaining operational security in the TSO's control area, including interconnectors.

(14) Given this relevance of network elements below 220 kV, the Agency recommends including in the ENTSO-E's report incidents on system elements important for maintaining system security and aligning the ICS 2018's general rule on the scope of reporting by TSOs with Articles 27(1) and (5) and Article 41(3)(b) of the SO GL, Article 5(1) of the CGMM and Article 5(6) of the CSAM.

#### 4.2.2 Incidents on power generating facilities and incidents involving energy not supplied

- (15) According to Article 15(3)(b) of the SO GL, the ICS annual report shall contain the number of tripped power generation facilities per year per TSO.
- (16) Nonetheless, the first paragraph of section 2.2.5 of the ICS 2018 excludes the reporting of disconnections of generators lasting more than 15 minutes. Moreover, Table 5 of the ICS limits the reporting on tripped power generating facilities to those being larger than 200 to 600 MW, depending on the synchronous area.
- (17) The Agency deems this limitation not in line with Article 15(3)(b) of the SO GL, as this provision does not allow excluding incidents involving tripping of power generating facilities smaller than 200 to 600 MW, depending on the synchronous area.
- (18) According to Article 15(3)(c) of the SO GL, the ICS annual report shall specify also the energy not supplied due to unscheduled disconnections of demand facilities per TSO per year.

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<sup>5</sup> [https://docstore.entsoe.eu/Documents/nc-tasks/SOGL/SOGL\\_A75.1\\_180710\\_Methodology%20for%20coordinating%20operational%20security%20analysis\\_180914.pdf?Web=0](https://docstore.entsoe.eu/Documents/nc-tasks/SOGL/SOGL_A75.1_180710_Methodology%20for%20coordinating%20operational%20security%20analysis_180914.pdf?Web=0)

- (19) However, section 2.2.2 of the ICS 2018 excludes the reporting of all incidents involving disconnections of load smaller than 200 MW. Also, the ICS 2018 does not define Scale 0 incidents on load, i.e. a loss of less than 1% of the load in a TSO's control area. As a consequence, energy not supplied involving such incidents would not be reported by TSOs.
- (20) The Agency deems this exclusion not in line with Article 15(3)(c) of the SO GL as this provision does not allow excluding incidents involving energy not supplied.
- (21) Moreover, the Agency understands that Regulation (EU) No 543/2013 already prescribes the provision to ENTSO-E of information on changes in actual availability of a consumption unit in accordance with Article 7(1)(b), i.e. of 100 MW or more, and for the changes in actual availability of a generation unit in accordance with Article 15(1)(b), i.e. of 100 MW or more.
- (22) In this context, the Agency does not understand why the thresholds by scale for incidents on power generating facilities contained in Table 5 of the ICS 2018 and the thresholds by scale for incidents on load contained in Table 2 of the ICS 2018 exclude incidents already reported to ENTSO-E by generation and consumption units in accordance with Regulation (EU) No 543/2013.
- (23) Therefore, the Agency recommends using the existing data in order to ensure efficiency and prevent duplication of data requests.

#### 4.2.3 Incidents leading to frequency degradation

- (24) According to Article 15(3)(g) of the SO GL, the ICS annual report shall contain the number of minutes outside the standard frequency range and the number of minutes outside 50% of the maximum steady state frequency deviation per synchronous area. Concerning the default frequency quality target parameters, Table 2 of Annex III to the SO GL defines a maximum number of minutes outside the standard frequency range for each synchronous area. Therefore, a frequency measuring resolution, and thus also of reporting, of at least one minute is required to determine the indicator and the parameters with sufficient accuracy.
- (25) Nevertheless, Table 3 of the ICS 2018 defines a minimum threshold for the reporting on system frequency outside the standard frequency range of 3 minutes. This means that all incidents on system frequency outside the standard frequency range lasting less than 3 minutes would not be reported by TSOs.
- (26) The Agency deems this minimum threshold not in line with the provision of Article 15(3)(g) of the SO GL, as this provision does not allow excluding incidents involving the system frequency outside the standard frequency range. Also, such threshold would lead to underreporting on the number of minutes outside the standard frequency range for each synchronous area.

- (27) The Agency recommends setting the threshold for the reporting on incidents involving the system frequency outside the standard frequency range at 0 minutes, similarly as for Scale 0 incidents on the number of minutes outside 50% of the maximum steady state frequency deviation in Table 3 of the ICS 2018.

#### 4.2.4 Incidents on transmission system elements

- (28) According to Article 15(3)(a) of the SO GL, the ICS annual report shall contain the number of tripped transmission system elements per year per TSO.
- (29) Nonetheless, the first paragraph of section 2.2.4 of the ICS 2018 excludes from the reporting disconnections of alternating current transmission system elements connected to voltage levels below 220 kV. Moreover, Table 4 of the ICS 2018 limits the reporting on tripped transmission system elements to those being included in the contingency list, tie-lines and HVDC systems.
- (30) The Agency deems this exclusion not in line with Article 15(3)(a) of the SO GL, as this provision does not allow excluding incidents involving tripped transmission system elements.
- (31) The Agency recommends redefining the scales in Table 4 of the ICS 2018 so that they correctly capture the severity of tripped transmission system elements on operational security as explained in section 4.2.1 of this Opinion.

#### 4.2.5 Incidents involving voltage deviations

- (32) According to Article 15(3)(f) of the SO GL, the ICS annual report shall list the time duration and number of voltage deviations exceeding the ranges in Tables 1 and 2 of Annex II to the SO GL per TSO.
- (33) The Agency understands that voltage deviations at connection points may impact equipment owned by system users. For example, Table 6.1 of Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators sets out limits to the time period for operation outside the voltage ranges, thereby establishing minimum technical design and operational requirements for the connection to the system of power-generating modules, which correspond to those in Tables 1 and 2 of Annex II to the SO GL.
- (34) Nonetheless, thresholds by scale for violations of standards on voltage in Table 9 of the ICS 2018 exclude from the reporting all voltage deviations incidents lasting less than 30 minutes.
- (35) The Agency deems this exclusion not in line with Article 15(3)(f) of the SO GL, as this provision does not allow excluding incidents depending on their duration.

In the Agency's view, the reporting on any voltage deviations exceeding the ranges in Tables 1 and 2 of Annex II to the SO GL is an essential element of the indicator on the time duration and number of voltage deviations in accordance with Article 15(3)(f) of the SO GL.

- (36) The Agency recommends redefining the scales in Table 9 of the ICS 2018 so that time duration and number of voltage deviations exceeding the ranges from Tables 1 and 2 of Annex II to the SO GL per TSO can be fully reported.

#### 4.2.6 Incidents involving lack of reserves

- (37) According to Article 15(3)(e) of the SO GL, the ICS annual report shall set out the time duration and number of events within which there was a lack of reserves identified per TSO.
- (38) Nonetheless, section 2.2.10 of the ICS 2018 explains that reductions of reserve capacity lasting less than 15 minutes are not reported.
- (39) The Agency deems this exclusion not in line with Article 15(3)(e) of the SO GL, as this provision does not allow excluding incidents depending on their duration.
- (40) The Agency recommends redefining the scales in Table 10 of the ICS 2018 so that they capture correctly the severity of the incidents on the reduction of reserve capacity.

### 4.3 **Clarity**

- (41) Clarity of the ICS 2018 is essential, in particular because it is critical for the TSOs' obligation under Article 55(d) of the SO GL to comply with the ICS and to submit to ENTSO-E the information required to perform the tasks for producing the incidents classification scale report.

#### 4.3.1 Definitions

- (42) The ICS 2018 uses terms that it does not define and that are unclear. For example, on page 7, in defining 'Incidents on load', the ICS 2018 uses the notion of 'load', which is not defined. This notion lacks clarity and represents a risk to the implementation as it is not clear if the consumption by charging storage devices and by pumping of the pump-storage power-generating facilities, the consumption by power plants auxiliaries and network losses constitute a load. Also, 'energy not supplied', 'isolated systems', 'asynchronous systems' and 'reduction in capacity' used in the ICS 2018 are undefined terms.
- (43) Since the use of clear and coherent definitions is key to a correct implementation of the ICS 2018, the Agency recommends referring to and using in the ICS 2018,

to the extent possible, definitions established in the SO GL and other relevant EU legislation. Where this is not possible, the ICS 2018 should introduce clear and robust definitions.

#### 4.3.2 Incidents involving inter-area oscillations

- (44) Article 15(3) of the SO GL contains a non-exhaustive list of operational security indicators relevant to operational security. The Agency therefore understands there could be other system operation areas which need to be included in the ICS. One such example represents poorly damped inter-area oscillations that affect the operational security of interconnected systems.
- (45) According to Article 38(4) of the SO GL, in case of stability problems due to poorly damped inter-area oscillations affecting several TSOs within a synchronous area, each TSO shall participate in a coordinated dynamic stability assessment at the synchronous area level as soon as practicable and provide the data necessary for that assessment. Such assessments shall be initiated and conducted by the concerned TSOs or by ENTSO-E.
- (46) Although not explicitly prescribed in the SO GL or in Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a network code on electricity emergency and restoration, the Agency deems the inclusion in the ICS of reporting on inter-area oscillations related incidents affecting system stability instrumental to reaching the objectives of the SO GL.
- (47) The Agency recommends to include in the ICS reporting on inter-area oscillations related incidents affecting system stability. Applicable scales for incidents on frequency stability and necessary data exchange should be defined as appropriate.

#### 4.3.3 Treatment of non-EU countries and isolated systems

- (48) The SO GL does not apply to non-EU countries, nor to transmission and distribution systems located on islands of Member States whose systems are not operated synchronously with the Continental Europe, Great Britain, Nordic, Ireland and Northern Ireland or Baltic synchronous areas. However, it is not clear how such transmission and distribution systems correspond to the notion of isolated systems used in the ICS 2018.
- (49) Similarly as in all TSOs' proposal for the determination of Load-Frequency Control blocks for the Continental Europe synchronous area, in accordance with Article 141(2) of the SO GL, the description of isolated systems and non-EU countries could be included in an explanatory note annexed to the ICS 2018, which explains the cooperation and organisation of work concerning the data collection and analysis of incidents involving non-EU countries and isolated systems.



#### 4.3.4 Separation from the grid

- (50) It is not clear from where the thresholds by scale for separation from the grid as defined in Table 7 of the ICS 2018 are derived. Moreover, it is not clear how incidents involving more than one TSO with a load smaller than 1500 MW are considered.
- (51) Page 14 of the ICS 2018 prescribes additional data that need to be reported. Amongst this additional data is the notion of "*Information about the management of the separated network*". However, this notion lacks clarity and as such represents a risk to the efficiency and effectiveness of the analyses and investigations of such incidents.
- (52) The Agency recommends clarifying which information is required in case of separated networks in the explanatory note and in the amendments to the ICS, as appropriate.

#### 4.3.5 Loss of tools and facilities

- (53) Table 8 of the ICS 2018 aims at defining the thresholds by scale for loss of tools and facilities. However, these scales refer to the loss of tools only and fail to address the failure in the functioning of tools, means and facilities defined in accordance with Article 18(3)(d) of the SO GL. Also, concerning the definition of Scale 2 incidents, the criteria are not clear as to whether such a loss of tools needs to endure for more than 30 minutes simultaneously for each and every tool.
- (54) The Agency recommends revising the thresholds in Table 8 of the ICS 2018 for clarity and consistency with Article 18(3)(d) of the SO GL on availability of TSO's means, tools and facilities.

#### 4.3.6 Violation of standards on voltage

- (55) Table 9 of the ICS 2018 specifies thresholds by scale for violations of standards on voltage by referring to voltages in substations. However, a typical substation has more than one busbar that can be operated independently, e.g. as a remedial action to divert flows on branches. Therefore, it is not clear what to report in case only one busbar within a substation exceeds the reporting voltage threshold.
- (56) The Agency recommends to revise the thresholds in Table 9 of the ICS 2018 for clarity in the implementation.
- (57) Table 2 of Annex II to the SO GL defines 1.05 p.u. as the upper threshold for the range of voltage levels between 300 kV and 400 kV systems. Nevertheless, on page 16, the ICS 2018 states: 'Where the relevant TSO in the Netherlands operates nodes at a nominal voltage of 380 kV it reports voltage violations above 418 kV'. It is not clear where the TSO in the Netherlands operates nodes at a nominal

voltage of 380 kV and why the relevant TSO in the Netherlands should be treated differently from other TSOs operating their nodes at a nominal voltage of 380 kV.

- (58) The Agency recommends addressing this in the explanatory note and in the amendments to the ICS 2018, as appropriate.

#### 4.3.7 Risk of double counting

- (59) Table 11 of the ICS 2018 contains rules on the calculation of the indicators OS-E2, OS-F1 and OS-F2. These rules envisage aggregating all relevant incidents counted by any criteria. For example, as per the ICS 2018, OS-E2 is calculated by adding 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. The Agency wonders if there are safeguards in place to prevent possible double counting when adding up incidents reported under different criteria.

- (60) The Agency recommends addressing this issue in the explanatory note and in the amendments to the ICS 2018, as appropriate.

#### 4.3.8 Investigation procedure

- (61) Concerning the procedure for the investigation of scale 2 and scale 3 incidents set out in section 5 of the ICS 2018, it is not clear which national regulatory authorities (NRAs) are supposed to be informed and in turn involved in the investigation. Also, deadlines for the notification to the NRAs and the Agency of the investigation by TSOs and ENTSO-E are missing in the ICS 2018.

- (62) The Agency recommends that TSOs and ENTSO-E notify the respective NRAs and the Agency of each investigation, without undue delay, before it is launched, but in any case no later than a week in advance of the first meeting of the expert panel.

- (63) In relation to the content of the final report set out in section 5.5 of the ICS 2018, the inclusion of the evaluation of the functioning of the equipment lacks clarity as to which equipment is referred to.

- (64) The Agency recommends addressing this issue in the explanatory note and in the amendments to the ICS 2018, as appropriate.

#### 4.3.9 ICS annual report

- (65) Section 6.2 of the ICS 2018 sets out the main tasks and milestones concerning the process for the preparation of the ICS annual report. However, deadlines for the preparation of the ICS annual report by ENTSO-E's Subgroup Incident Classification Scale are missing.

- (66) In order to increase clarity in the implementation by the TSOs and ENTSO-E, the Agency recommends ENTSO-E to include key deadlines in the ICS 2018 for the preparation of the ICS annual report.

#### 4.3.10 Annex 1

- (67) Annex 1 to the ICS 2018 on common data for reporting prescribes a minimum data set that needs to be reported for each incident. However, it is not clear how to understand the requirement m) to report on the highest voltage level involved in the incident. For example, is the reporting focusing on the voltage level at which the cause of the incident occurred or on the voltage level where the consequences occurred?
- (68) The Agency recommends addressing this issue in the explanatory note and in the amendments to the ICS 2018, as appropriate.

#### 4.3.11 Annex 3

- (69) Annex 3 to the ICS 2018 prescribes additional data that needs to be reported for the investigation of scale 2 and scale 3 incidents. Nevertheless, communication with neighbouring TSOs, DSOs and significant grid users (SGUs) (scope of the communication and timing) seems to be missing.
- (70) The Agency recommends including the scope of the communication and timing with neighbouring TSOs, DSOs and SGUs in the list of additional data reported for scale 2 and scale 3 incidents. This will improve the efficiency and clarity in the investigation of scale 2 and scale 3 incidents.

## 5. CONCLUSION

- (71) The Agency did not identify elements in the ICS 2018 that would suggest that the ICS 2018 has negative effects on non-discrimination and effective competition.
- (72) However, in the Agency's view, the ICS 2018 raises concerns regarding its compliance with the SO GL and, therefore, also with the objective of an efficient and secure functioning of the internal market in electricity. In addition, parts of the ICS 2018 lack clarity.
- (73) The Agency invites ENTSO-E to revise the ICS 2018 and to resubmit the revised document for an Agency's opinion, within six months following the date of this Opinion.
- (74) To facilitate this process, the Agency has included in this Opinion recommendations on how to improve the ICS 2018. The Agency also encourages ENTSO-E to maintain a close cooperation with the Agency at working level during the period prior to the resubmission of the revised ICS 2018. Given that

the ICS 2018 implements the provisions of the SO GL, the involvement of the European Commission seems also advisable,

HAS ADOPTED THIS OPINION:

1. The Agency is not convinced that the ICS 2018 is fully in line with Regulation (EU) 2017/1485 and with the objective of an efficient and secure functioning of the internal market in electricity. Moreover, the Agency is of the view that parts of the ICS 2018 are not sufficiently clear.
2. The Agency invites ENTSO-E to revise the ICS 2018 and to resubmit the revised document, along with the explanatory note, for an Agency's opinion, within six months following the date of this Opinion.

Done at Ljubljana on 9 January 2019.

  
*For the Agency*  
*Director ad Interim*  
Alberto POTOTSCHNIG