

Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (Text with EEA relevance)

COMMISSION REGULATION (EU) 2017/1485

of 2 August 2017

establishing a guideline on electricity transmission system operation

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

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⁽¹⁾, and in particular Article 18(3)(d) and Article 18(5) thereof,

Whereas:

- (1) A fully functioning and interconnected internal energy market is crucial for maintaining security of energy supply, increasing competitiveness and ensuring that all consumers can purchase energy at affordable prices.
- (2) Regulation (EC) No 714/2009 sets out non-discriminatory rules governing access to the network for cross-border exchanges in electricity with a view to ensuring the proper functioning of the internal market in electricity.
- (3) Harmonised rules on system operation for transmission system operators ('TSOs'), distribution system operators ('DSOs') and significant grid users ('SGUs') should be set out in order to provide a clear legal framework for system operation, facilitate Union-wide trade in electricity, ensure system security, ensure the availability and exchange of necessary data and information between TSOs and between TSOs and all other stakeholders, facilitate the integration of renewable energy sources, allow more efficient use of the network and increase competition for the benefit of consumers.
- (4) To ensure the operational security of the interconnected transmission system, it is essential to define a common set of minimum requirements for Union-wide system operation, for the cross-border cooperation between the TSOs and for utilising the relevant characteristics of the connected DSOs and SGUs.
- (5) All TSOs should comply with the common minimum requirements on procedures necessary to prepare real-time operation, to develop individual and deliver common grid models, to facilitate the efficient and coordinated use of remedial actions which are necessary for real-time operation in order to maintain the operational security, quality and stability of the interconnected transmission system, and to support the efficient functioning of the European internal electricity market and facilitate the integration of renewable energy sources ('RES').

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- (6) While there are currently a number of voluntary regional cooperation initiatives in system operations promoted by TSOs, formalised coordination between TSOs is necessary for operating the Union transmission system in order to address the transformation of the Union electricity market. The rules for system operation provided for in this Regulation require an institutional framework for enhanced coordination between TSOs, including the mandatory participation of TSOs in regional security coordinators ('RSCs'). The common requirements for the establishment of RSCs and for their tasks set out in this Regulation constitute a first step towards further regional coordination and integration of system operation and should facilitate the achievement of the aims of Regulation (EC) No 714/2009 and ensure higher security of supply standards in the Union.
- (7) This Regulation should set out a framework for the mandated cooperation of TSOs via the appointment of RSCs. RSCs should issue recommendations to the TSOs of the capacity calculation region for which it is appointed. TSOs should, individually, decide whether to follow or not the recommendations of the RSC. The TSO should remain responsible for maintaining operational security of its control area.
- (8) Rules on operational training and certification are required in order to guarantee that system operator employees and other operational staff are skilled and well trained and that the system operator employees in real-time operation are certified to operate the transmission system in a secure way during all operational situations. The rules on training and certification strengthen and formalise existing best practices amongst TSOs and ensure that minimum standards are applied by all TSOs in the Union.
- (9) Operational testing and monitoring requirements aim at ensuring the correct functioning of the elements of the transmission system, the distribution system and of the grid users' equipment. Planning for and the coordination of operational tests are necessary to minimise disruptions in the stability, operation and economic efficiency of the interconnected system.
- (10) In view that planned outages impact grid stability also outside of a TSO's control area, each TSO should, within the scope of operational planning, monitor the feasibility of planned outages for each time-frame and where necessary, coordinate outages with and between TSOs, DSOs and SGUs when those outages have an impact on cross-border flows affecting the operational security of the transmission systems.
- (11) The operational and scheduling processes required to anticipate real-time operational security difficulties and develop relevant remedial measures involve timely and adequate data exchange. Therefore, such exchange should not be hampered by any barriers between the different actors involved.
- (12) One of the most critical processes in ensuring operational security with a high level of reliability and quality is the load-frequency control ('LFC'). Effective LFC can be made possible only if there is an obligation for the TSOs and the reserve connecting DSOs to cooperate for the operation of the interconnected transmission systems as one entity and for providers' power generating modules and providers' demand facilities to meet the relevant minimum technical requirements.

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- (13) The provisions on LFC and reserves, aim at setting out clear, objective and harmonised requirements for TSOs, reserve connecting DSOs, providers' power generating modules and providers' demand facilities in order to ensure system security and to contribute to non-discrimination, effective competition and the efficient functioning of the internal electricity market. The provisions on LFC and reserves provide the technical framework necessary for the development of cross-border balancing markets.
- (14) In order to ensure the quality of the common system frequency, it is essential that a common set of minimum requirements and principles for Union-wide LFC and reserves are defined as a basis for both the cross-border cooperation between the TSOs and, where relevant, for utilising characteristics of the connected generation, consumption and distribution systems. To that end, this Regulation addresses the LFC structure and operational rules, the quality criteria and targets, the reserve dimensioning, the reserve exchange, sharing and distribution and the monitoring related to LFC.
- (15) Synchronous areas do not stop at the Union's borders and can include the territory of third countries. The Union, Member States and TSOs should aim for secure system operation inside all synchronous areas across the Union. They should support third countries in applying similar rules to those contained in this Regulation. ENTSO for Electricity should facilitate cooperation between Union TSOs and third country TSOs concerning secure system operation.
- (16) In accordance with Article 8 of Regulation (EC) No 713/2009 of the European Parliament and of the Council⁽²⁾, the Agency for the Cooperation of Energy Regulators ('the Agency') should take a decision if the competent regulatory authorities are not able to reach an agreement on common terms and conditions or methodologies.
- (17) This Regulation has been developed in close cooperation with the Agency, ENTSO for Electricity and stakeholders, in order to adopt effective, balanced and proportionate rules in a transparent and participative manner. In accordance with Article 18(3) of Regulation (EC) No 714/2009, the Commission will consult the Agency, ENTSO for Electricity and other relevant stakeholders before proposing any amendment to this Regulation.
- (18) The measures provided for in this Regulation are in accordance with the opinion of the Committee referred to in Article 23(1) of Regulation (EC) No 714/2009,

HAS ADOPTED THIS REGULATION:

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PART I **U.K.**

GENERAL PROVISIONS

Article 1 **U.K.**

Subject matter

For the purpose of safeguarding operational security, frequency quality and the efficient use of the interconnected system and resources, this Regulation lays down detailed guidelines on:

- (a) requirements and principles concerning operational security;
- (b) rules and responsibilities for the coordination and data exchange between TSOs, between TSOs and DSOs, and between TSOs or DSOs and SGUs, in operational planning and in close to real-time operation;
- (c) rules for training and certification of system operator employees;
- (d) requirements on outage coordination;
- (e) requirements for scheduling between the TSOs' control areas; and
- (f) rules aiming at the establishment of a ^{F1}... framework for load-frequency control and reserves.

Textual Amendments

- F1** Word in [Art. 1\(f\)](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 2](#) (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 2 **U.K.**

Scope

1 The rules and requirements set out in this Regulation shall apply to the following SGUs [^{F2}within the jurisdiction of Great Britain]:

- a existing and new power generating modules that are, or would be, classified as type B, C and D in accordance with the criteria set out in Article 5 of Commission Regulation (EU) 2016/631⁽³⁾;
- b existing and new transmission-connected demand facilities;
- c existing and new transmission-connected closed distribution systems;
- d existing and new demand facilities, closed distribution systems and third parties if they provide demand response directly to the TSO ^{F3}...;
- e providers of redispatching of power generating modules or demand facilities by means of aggregation and providers of active power reserve in accordance with Title 8 of Part IV of this Regulation; and
- f existing and new high voltage direct current ('HVDC') systems in accordance with the criteria in Article 3(1) of Commission Regulation (EU) 2016/1447⁽⁴⁾.

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2 [F4Except for Article 13,] this Regulation shall apply to all transmission systems, distribution systems and interconnections [F5within the jurisdiction of Great Britain], except transmission systems and distribution systems or parts of the transmission systems and distribution systems located in islands [F6which are not part of the GB synchronous area].

3 [F7Except for Article 13, this Regulation applies to all TSOs that are certified by the regulatory authority, to the extent they are operating within the jurisdiction of Great Britain.] Where a TSO does not have a function relevant to one or more obligations under this Regulation, [F8the regulatory authority may] provide that the responsibility of a TSO to comply with one or some or all obligations under this Regulation is assigned to one or more specific TSOs.

F94

5 Where the requirements under this Regulation are to be established by a relevant system operator that is not a TSO, [F10the regulatory authority] may provide that instead the TSO be responsible for establishing the relevant requirements.

Textual Amendments

- F2** Words in Art. 2(1) inserted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F3** Words in Art. 2(1)(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F4** Words in Art. 2(2) inserted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F5** Words in Art. 2(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F6** Words in Art. 2(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(3)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F7** Words in Art. 2(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F8** Words in Art. 2(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F9** Art. 2(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 3(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F10** Words in Art. 2(5) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#),

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reg. 1(2), **Sch. 1 para. 3(7)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 3 **U.K.**

Definitions

1 [F¹¹Except where stated in this Article,] for the purposes of this Regulation, the definitions in Article 2 of [F¹²Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast)], Article 2 of Commission Regulation (EU) 2015/1222⁽⁵⁾, Article 2 of Commission Regulation (EU) 2016/631, Article 2 of Commission Regulation (EU) 2016/1388, Article 2 of Commission Regulation (EU) 2016/1447 [F¹³and]F¹⁴... Article 2 of Commission Regulation (EU) No 543/2013⁽⁶⁾ on submission and publication of data in electricity markets F¹⁵... shall apply [F¹⁶, subject to paragraphs 1A and 1B].

[F¹⁷1A The following definitions do not apply for the purposes of this Regulation—

- a the definition of “individual grid model” in Article 2 of Commission Regulation (EU) 2015/1222;
- b the definitions of “equipment certificate” and “synchronous area” in Article 2 of Commission Regulation (EU) 2016/631;
- c the definition of “closed distribution system” in Article 2 of Commission Regulation (EU) 2016/1388;
- ^{X1}d the definition of “regulatory authority” in Article 2 of Regulation (EU) 2019/943;
- e the definitions of “ancillary service” and “renewable energy” in Article 2 of Regulation (EU) 2019/943;

and instead the definitions of those terms in points (160), (162), (164), (166), (170) and (171) of paragraph 3 apply.

1B The definition of “transmission system operator” or “TSO” in Article 2 of Regulation (EU) 2019/943 applies for the purposes of this Regulation except where specified otherwise.

1C In this Regulation—

- a any reference to Commission Regulation (EU) 2015/1222 is a reference to that Regulation as it applied in EU law immediately before IP completion day.]

2 In addition, the following definitions shall apply:

- (1) ‘operational security’ means the transmission system's capability to retain a normal state or to return to a normal state as soon as possible, and which is characterised by operational security limits;
- (2) ‘constraint’ means a situation in which there is a need to prepare and activate a remedial action in order to respect operational security limits;
- (3) ‘N-situation’ means the situation where no transmission system element is unavailable due to occurrence of a contingency;
- (4) ‘contingency list’ means the list of contingencies to be simulated in order to test the compliance with the operational security limits;
- (5) ‘normal state’ means a situation in which 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;

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- (6) 'frequency containment reserves' or 'FCR' means the active power reserves available to contain system frequency after the occurrence of an imbalance;
- (7) 'frequency restoration reserves' or 'FRR' means the active power reserves available to restore system frequency to the nominal frequency and, for a synchronous area consisting of more than one LFC area, to restore power balance to the scheduled value;
- (8) 'replacement reserves' or 'RR' means the active power reserves available to restore or support the required level of FRR to be prepared for additional system imbalances, including generation reserves;
- (9) 'reserve provider' means a legal entity with a legal or contractual obligation to supply FCR, FRR or RR from at least one reserve providing unit or reserve providing group;
- (10) 'reserve providing unit' means a single or an aggregation of power generating modules and/or demand units connected to a common connection point fulfilling the requirements to provide FCR, FRR or RR;
- (11) 'reserve providing group' means an aggregation of power generating modules, demand units and/or reserve providing units connected to more than one connection point fulfilling the requirements to provide FCR, FRR or RR;
- (12) 'load-frequency control area' or 'LFC area' means a part of a synchronous area or an entire synchronous area, physically demarcated by points of measurement at interconnectors to other LFC areas, operated by one or more TSOs fulfilling the obligations of load-frequency control;
- (13) 'time to restore frequency' means the maximum expected time after the occurrence of an instantaneous power imbalance smaller than or equal to the reference incident in which the system frequency returns to the frequency restoration range for synchronous areas with only one LFC area and in the case of synchronous areas with more than one LFC area, the maximum expected time after the occurrence of an instantaneous power imbalance of an LFC area within which the imbalance is compensated;
- (14) '(N-1) criterion' means the rule according to which the elements remaining in operation within a TSO's control area after occurrence of a contingency are capable of accommodating the new operational situation without violating operational security limits;
- (15) '(N-1) situation' means the situation in the transmission system in which one contingency from the contingency list occurred;
- (16) 'active power reserve' means the balancing reserves available for maintaining the frequency;
- (17) 'alert state' means the system state in which 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;
- (18) 'load-frequency control block' or 'LFC block' means a part of a synchronous area or an entire synchronous area, physically demarcated by points of measurement at interconnectors to other LFC blocks, consisting of one or more LFC areas, operated by one or more TSOs fulfilling the obligations of load-frequency control;
- (19) 'area control error' or 'ACE' means the sum of the power control error (' ΔP '), that is the real-time difference between the measured actual real time power interchange value ('P') and the control program ('P0') of a specific LFC area or LFC block and the

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frequency control error ($K \cdot \Delta f$), that is the product of the K-factor and the frequency deviation of that specific LFC area or LFC block, where the area control error equals $\Delta P + K \cdot \Delta f$;

- (20) ‘control program’ means a sequence of set-point values for the netted power interchange of a LFC area or LFC block over alternating current (‘AC’) interconnectors;
- (21) ‘voltage control’ means the manual or automatic control actions at the generation node, at the end nodes of the AC lines or HVDC systems, on transformers, or other means, designed to maintain the set voltage level or the set value of reactive power;
- (22) ‘blackout state’ means the system state in which the operation of part or all of the transmission system is terminated;
- (23) F18 ...
- (24) F18 ...
- (25) F18 ...
- (26) F18 ...
- (27) ‘contingency analysis’ means a computer based simulation of contingencies from the contingency list;
- (28) ‘critical fault clearing time’ means the maximum fault duration for which the transmission system retains stability of operation;
- (29) ‘fault’ means all types of short-circuits (single-, double- and triple-phase, with and without earth contact), a broken conductor, interrupted circuit, or an intermittent connection, resulting in the permanent non-availability of the affected transmission system element;
- (30) ‘transmission system element’ means any component of the transmission system;
- (31) ‘disturbance’ means an unplanned event that may cause the transmission system to divert from the normal state;
- (32) ‘dynamic stability’ is a common term including the rotor angle stability, frequency stability and voltage stability;
- (33) ‘dynamic stability assessment’ means the operational security assessment in terms of dynamic stability;
- (34) ‘frequency stability’ means the ability of the transmission system to maintain frequency stable in the N-situation and after being subjected to a disturbance;
- (35) ‘voltage stability’ means the ability of a transmission system to maintain acceptable voltages at all nodes in the transmission system in the N-situation and after being subjected to a disturbance;
- (36) ‘system state’ means the operational state of the transmission system in relation to the operational security limits which can be normal state, alert state, emergency state, blackout state and restoration state;
- (37) ‘emergency state’ means the system state in which one or more operational security limits are violated;

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- (38) ‘restoration state’ means the system state in which the objective of all activities in the transmission system is to re-establish the system operation and maintain operational security after the blackout state or the emergency state;
- (39) ‘exceptional contingency’ means the simultaneous occurrence of multiple contingencies with a common cause;
- (40) ‘frequency deviation’ means the difference between the actual and the nominal frequency of the synchronous area which can be negative or positive;
- (41) ‘system frequency’ means the electric frequency of the system that can be measured in all parts of the synchronous area under the assumption of a coherent value for the system in the timeframe of seconds, with only minor differences between different measurement locations;
- (42) ‘frequency restoration process’ or ‘FRP’ means a process that aims at restoring frequency to the nominal frequency and, for synchronous areas consisting of more than one LFC area, a process that aims at restoring the power balance to the scheduled value;
- (43) ‘frequency restoration control error’ or ‘FRCE’ means the control error for the FRP which is equal to the ACE of a LFC area or equal to the frequency deviation where the LFC area geographically corresponds to the synchronous area;
- (44) ‘schedule’ means a reference set of values representing the generation, consumption or exchange of electricity for a given time period;
- (45) ‘K-factor of an LFC area or LFC block’ means a value expressed in megawatts per hertz (‘MW/Hz’), which is as close as practical to, or greater than the sum of the auto-control of generation, self-regulation of load and of the contribution of frequency containment reserve relative to the maximum steady-state frequency deviation;
- (46) ‘local state’ means the qualification of an alert, emergency or blackout state when there is no risk of extension of the consequences outside of the control area including interconnectors connected to this control area;
- (47) ‘maximum steady-state frequency deviation’ means the maximum expected frequency deviation after the occurrence of an imbalance equal to or less than the reference incident at which the system frequency is designed to be stabilised;
- (48) ‘observability area’ means a TSO's own transmission system and the relevant parts of distribution systems and neighbouring TSOs' transmission systems, on which the TSO implements real-time monitoring and modelling to maintain operational security in its control area including interconnectors;
- (49) ‘neighbouring TSOs’ means the TSOs directly connected via at least one AC or DC interconnector ^[F19] and includes a TSO operating outside the jurisdiction of Great Britain and for this purpose “TSO” has the meaning given in Article 2 of Directive 2009/72/EC];
- (50) ‘operational security analysis’ means the entire scope of the computer based, manual and automatic activities performed in order to assess the operational security of the transmission system and to evaluate the remedial actions needed to maintain operational security;

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- (51) ‘operational security indicators’ means indicators used by TSOs to monitor the operational security in terms of system states as well as faults and disturbances influencing operational security;
- (52) ‘operational security ranking’ means the ranking used by TSOs to monitor the operational security on the basis of the operational security indicators;
- (53) ‘operational tests’ means the tests carried out by a TSO or DSO for maintenance, development of system operation practices and training and to acquire information on transmission system behaviour under abnormal system conditions and the tests carried out by significant grid users for similar purposes on their facilities;
- (54) ‘ordinary contingency’ means the occurrence of a contingency of a single branch or injection;
- (55) ‘out-of-range contingency’ means the simultaneous occurrence of multiple contingencies without a common cause, or a loss of power generating modules with a total loss of generation capacity exceeding the reference incident;
- (56) ‘ramping rate’ means the rate of change of active power by a power generating module, demand facility or HVDC system;
- (57) ‘reactive power reserve’ means the reactive power which is available for maintaining voltage;
- (58) ‘reference incident’ means the maximum positive or negative power deviation occurring instantaneously between generation and demand in a synchronous area, considered in the FCR dimensioning;
- (59) ‘rotor angle stability’ means the ability of synchronous machines to remain in synchronism under N-situation and after being subject to a disturbance;
- (60) ‘security plan’ means the plan containing a risk assessment of critical TSO's assets to major physical- and cyber-threat scenarios with an assessment of the potential impacts;
- (61) ‘stability limits’ means the permitted boundaries for the operation of the transmission system in terms of respecting the limits of voltage stability, rotor angle stability and frequency stability;
- (62) ‘wide area state’ means the qualification of an alert state, emergency state or blackout state when there is a risk of propagation to the interconnected transmission systems;
- (63) ‘system defence plan’ means the technical and organisational measures to be undertaken to prevent the propagation or deterioration of a disturbance in the transmission system, in order to avoid a wide area state disturbance and blackout state;
- (64) ‘topology’ means the data concerning the connectivity of the different transmission system or distribution system elements in a substation and includes the electrical configuration and the position of circuit breakers and isolators;
- (65) ‘transitory admissible overloads’ means the temporary overloads of transmission system elements which are allowed for a limited period and which do not cause physical damage to the transmission system elements as long as the defined duration and thresholds are respected;
- (66) ‘virtual tie-line’ means an additional input of the controllers of the involved LFC areas that has the same effect as a measuring value of a physical interconnector and allows exchange of electric energy between the respective areas;

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- (67) F20 ...
- (68) ‘adequacy’ means the ability of in-feeds into an area to meet the load in that area;
- (69) F21 ...
- (70) ‘availability plan’ means the combination of all planned availability statuses of a relevant asset for a given time period;
- (71) ‘availability status’ means the capability of a power generating module, grid element or demand facility to provide a service for a given time period, regardless of whether or not it is in operation;
- (72) ‘close to real-time’ means the time lapse of not more than 15 minutes between the last intraday gate closure and real-time;
- (73) ‘consumption schedule’ means a schedule representing the consumption of a demand facility or of a group of demand facilities;
- (74) F22 ...
- (75) ‘external commercial trade schedule’ means a schedule representing the commercial exchange of electricity between market participants in different scheduling areas;
- (76) ‘external TSO schedule’ means a schedule representing the exchange of electricity between TSOs in different scheduling areas;
- (77) ‘forced outage’ means the unplanned removal from service of a relevant asset for any urgent reason that is not under the operational control of the operator of the concerned relevant asset;
- (78) ‘generation schedule’ means a schedule representing the electricity generation of a power generating module or of a group of power generating modules;
- (79) ‘internal commercial trade schedule’ means a schedule representing the commercial exchange of electricity within a scheduling area between different market participants;
- (80) ‘internal relevant asset’ means a relevant asset which is part of a TSO's control area or a relevant asset located in a distribution system, including a closed distribution system, which is connected directly or indirectly to that TSO's control area;
- (81) ‘netted area AC position’ means the netted aggregation of all AC external schedules of an area;
- (82) ‘outage coordination region’ means a combination of control areas for which TSOs define procedures to monitor and where necessary coordinate the availability status of relevant assets in all time-frames;
- (83) ‘relevant demand facility’ means a demand facility which participates in the outage coordination and the availability status of which influences cross-border operational security;
- (84) ‘relevant asset’ means any relevant demand facility, relevant power generating module, or relevant grid element partaking in the outage coordination;
- (85) ‘relevant grid element’ means any component of a transmission system, including interconnectors, or of a distribution system, including a closed distribution system, such as a single line, a single circuit, a single transformer, a single phase-shifting transformer, or a voltage compensation installation, which participates in the outage

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- coordination and the availability status of which influences cross-border operational security;
- (86) ‘outage planning incompatibility’ means the state in which a combination of the availability status of one or more relevant grid elements, relevant power generating modules, and/or relevant demand facilities and the best estimate of the forecasted electricity grid situation leads to violation of operational security limits taking into account remedial actions without costs which are at the TSO's disposal;
- (87) ‘outage planning agent’ means an entity with the task of planning the availability status of a relevant power generating module, a relevant demand facility or a relevant grid element;
- (88) ‘relevant power generating module’ means a power generating module which participates in the outage coordination and the availability status of which influences cross-border operational security;
- (89) ^{F23} ...
- (90) ‘scheduling agent’ means the entity or entities with the task of providing schedules from market participants to TSOs, or where applicable third parties;
- (91) ‘scheduling area’ means an area within which the TSOs' obligations regarding scheduling apply due to operational or organisational needs;
- (92) ‘week-ahead’ means the week prior to the calendar week of operation;
- (93) ‘year-ahead’ means the year prior to the calendar year of operation;
- (94) ‘affected TSO’ means a TSO for which information on the exchange of reserves and/or sharing of reserves ^{F24}... is needed for the analysis and maintenance of operational security;
- (95) ‘reserve capacity’ means the amount of FCR, FRR or RR that needs to be available to the TSO;
- (96) ‘exchange of reserves’ means the possibility of a TSO to access reserve capacity connected to another LFC area, LFC block, or synchronous area to fulfil its reserve requirements resulting from its own reserve dimensioning process of either FCR, FRR or RR and where that reserve capacity is exclusively for that TSO, and is not taken into account by any other TSO to fulfil its reserve requirements resulting from their respective reserve dimensioning processes;
- (97) ‘sharing of reserves’ means a mechanism in which more than one TSO takes the same reserve capacity, being FCR, FRR or RR, into account to fulfil their respective reserve requirements resulting from their reserve dimensioning processes;
- (98) ‘alert state trigger time’ means the time before alert state becomes active;
- (99) ‘automatic FRR’ means FRR that can be activated by an automatic control device;
- (100) ‘automatic FRR activation delay’ means the period of time between the setting of a new setpoint value by the frequency restoration controller and the start of physical automatic FRR delivery;
- (101) ‘automatic FRR full activation time’ means the time period between the setting of a new setpoint value by the frequency restoration controller and the corresponding activation or deactivation of automatic FRR;

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- (102) ‘average FRCE data’ means the set of data consisting of the average value of the recorded instantaneous FRCE of a LFC area or a LFC block within a given measured period time;
- (103) ‘control capability providing TSO’ means the TSO that shall trigger the activation of its reserve capacity for a control capability receiving TSO under the conditions of an agreement for sharing reserves;
- (104) ‘control capability receiving TSO’ means the TSO calculating reserve capacity by taking into account reserve capacity which is accessible through a control capability providing TSO under the conditions of an agreement for sharing reserves;
- (105) ‘criteria application process’ means the process of calculating the target parameters for the synchronous area, the LFC block and the LFC area based on the data obtained in the data collection and delivery process;
- (106) ‘data collection and delivery process’ means the process of collection of the set of data necessary in order to perform the frequency quality evaluation criteria;
- (107) ^{F25} ...
- (108) ^{F26} ...
- (109) ‘dimensioning incident’ means the highest expected instantaneously occurring active power imbalance within a LFC block in both positive and negative direction;
- (110) ‘electrical time deviation’ means the time discrepancy between synchronous time and coordinated universal time (‘UTC’);
- (111) ‘FCR full activation frequency deviation’ means the rated value of frequency deviation at which the FCR in a synchronous area is fully activated;
- (112) ‘FCR full activation time’ means the time period between the occurrence of the reference incident and the corresponding full activation of the FCR;
- (113) ‘FCR obligation’ means the part of all of the FCR that falls under the responsibility of a TSO;
- (114) ‘frequency containment process’ or ‘FCP’ means a process that aims at stabilising the system frequency by compensating imbalances by means of appropriate reserves;
- (115) ^{F27} ...
- (116) ‘frequency quality defining parameter’ means the main system frequency variables that define the principles of frequency quality;
- (117) ‘frequency quality target parameter’ means the main system frequency target on which the behaviour of FCR, FRR and RR activation processes is evaluated in normal state;
- (118) ‘frequency quality evaluation criteria’ means a set of calculations using system frequency measurements that allows the evaluation of the quality of the system frequency against the frequency quality target parameters;
- (119) ‘frequency quality evaluation data’ means the set of data that allows the calculation of the frequency quality evaluation criteria;
- (120) ‘frequency recovery range’ means the system frequency range to which the system frequency is expected to return in the GB [^{F28}synchronous area], after the occurrence

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- of an imbalance equal to or smaller than the reference incident, within the time to recover frequency;
- (121) ‘time to recover frequency’ means [^{F29}GB synchronous area], the maximum expected time after the occurrence of an imbalance smaller than or equal to the reference incident in which the system frequency returns to the maximum steady state frequency deviation;
- (122) ‘frequency restoration range’ means the system frequency range to which the system frequency is expected to return in the GB, [^{F30}synchronous area] after the occurrence of an imbalance equal to or smaller than the reference incident within the time to restore frequency;
- (123) ‘FRCE target parameters’ means the main target LFC block variables on the basis of which the dimensioning criteria for FRR and RR of the LFC block are determined and evaluated and which are used to reflect the LFC block behaviour in normal operation;
- (124) ^{F31} ...
- (125) ‘frequency setpoint’ means the frequency target value used in the FRP, defined as the sum of the nominal system frequency and an offset value needed to reduce an electrical time deviation;
- (126) ‘FRR availability requirements’ means a set of requirements defined by the TSOs of a LFC block regarding the availability of FRR;
- (127) ‘FRR dimensioning rules’ means the specifications of the FRR dimensioning process of a LFC block;
- (128) ^{F32} ...
- (129) ^{F33} ...
- (130) ‘initial FCR obligation’ means the amount of FCR allocated to a TSO on the basis of a sharing key;
- (131) ‘instantaneous frequency data’ means a set of data measurements of the overall system frequency for the synchronous area with a measurement period equal to or shorter than one second used for system frequency quality evaluation purposes;
- (132) ‘instantaneous frequency deviation’ means a set of data measurements of the overall system frequency deviations for the synchronous area with a measurement period equal to or shorter than one second used for system frequency quality evaluation purposes;
- (133) ‘instantaneous FRCE data’ means a set of data of the FRCE of a LFC block with a measurement period equal to or shorter than 10 seconds used for system frequency quality evaluation purposes;
- (134) ‘level 1 FRCE range’ means the first range used for system frequency quality evaluation purposes on LFC block level within which the FRCE should be kept for a specified percentage of the time;
- (135) ‘level 2 FRCE range’ means the second range used for system frequency quality evaluation purposes on LFC block level within which the FRCE should be kept for a specified percentage of the time;

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- (136) ‘LFC block operational agreement’ means a multi-party agreement between all TSOs of a LFC block if the LFC block is operated by more than one TSO and means a LFC block operational methodology to be adopted unilaterally by the relevant TSO if the LFC block is operated by only one TSO;
- (137) F³⁴ ...
- (138) F³⁵ ...
- (139) ‘LFC block monitor’ means a TSO responsible for collecting the frequency quality evaluation criteria data and applying the frequency quality evaluation criteria for the LFC block;
- (140) ‘load-frequency control structure’ means the basic structure considering all relevant aspects of load-frequency control in particular concerning respective responsibilities and obligations as well as types and purposes of active power reserves;
- (141) ‘process responsibility structure’ means the structure to determine responsibilities and obligations with respect to active power reserves based on the control structure of the synchronous area;
- (142) ‘process activation structure’ means the structure to categorise the processes concerning the different types of active power reserves in terms of purpose and activation;
- (143) ‘manual FRR full activation time’ means the time period between the setpoint change and the corresponding activation or deactivation of manual FRR;
- (144) ‘maximum instantaneous frequency deviation’ means the maximum expected absolute value of an instantaneous frequency deviation after the occurrence of an imbalance equal to or smaller than the reference incident, beyond which emergency measures are activated;
- (145) ‘monitoring area’ means a part of the synchronous area or the entire synchronous area, physically demarcated by points of measurement at interconnectors to other monitoring areas, operated by one or more TSOs fulfilling the obligations of a monitoring area;
- (146) ‘prequalification’ means the process to verify the compliance of a reserve providing unit or a reserve providing group with the requirements set by the TSO;
- (147) ‘ramping period’ means a period of time defined by a fixed starting point and a length of time during which the input and/or output of active power will be increased or decreased;
- (148) ‘reserve instructing TSO’ means the TSO responsible for the instruction of the reserve providing unit or the reserve providing group to activate FRR and/or RR;
- (149) ‘reserve connecting DSO’ means the DSO responsible for the distribution network to which a reserve providing unit or reserve providing group, providing reserves to a TSO, is connected;
- (150) ‘reserve connecting TSO’ means the TSO responsible for the monitoring area to which a reserve providing unit or reserve providing group is connected;
- (151) ‘reserve receiving TSO’ means the TSO involved in an exchange with a reserve connecting TSO and/or a reserve providing unit or a reserve providing group connected to another monitoring or LFC area;

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- (152) ‘reserve replacement process’ or ‘RRP’ means a process to restore the activated FRR and ^{F36}... the activated FCR;
- (153) ‘RR availability requirements’ means a set of requirements defined by the TSOs of a LFC block regarding the availability of RR;
- (154) ‘RR dimensioning rules’ means the specifications of the RR dimensioning process of a LFC block;
- (155) ‘standard frequency range’ means a defined symmetrical interval around the nominal frequency within which the system frequency of a synchronous area is supposed to be operated;
- (156) ‘standard frequency deviation’ means the absolute value of the frequency deviation that limits the standard frequency range;
- (157) ‘steady state frequency deviation’ means the absolute value of frequency deviation after occurrence of an imbalance, once the system frequency has been stabilised;
- (158) ‘synchronous area monitor’ means a TSO responsible for collecting the frequency quality evaluation criteria data and applying the frequency quality evaluation criteria for the synchronous area;
- (159) ‘time control process’ means a process for time control, where time control is a control action carried out to return the electrical time deviation between synchronous time and UTC time to zero.
- (160) [^{F37} ‘ancillary service’ means a service necessary for the operation of a transmission or distribution system;
- (161) ‘authorised certifier’ means an entity that issues equipment certificates and power-generating module documents and whose accreditation is given by the United Kingdom Accreditation Service or such other relevant entity established for such purpose from time to time;
- (162) ‘closed distribution system’ means a distribution system classified as a closed distribution system by the regulatory authority, which distributes electricity within a geographically confined industrial, commercial or shared services site and does not supply household customers, without prejudice to incidental use by a small number of households located within the area served by the system and with employment or similar associations with the owner of the system;
- (163) ‘closed distribution system operator’ or ‘CDSO’ means a distribution system operator which is responsible for operating a closed distribution system;
- (164) ‘equipment certificate’ means a document issued by an authorised certifier for equipment used by a power generating module, demand unit, distribution system, demand facility or HVDC system. Where a range of permitted values for equipment is specified in this Regulation or another enactment, the equipment certificate must state a specific value within that range for the equipment;
- (165) ‘GB synchronous area’ means the area within the jurisdiction of Great Britain covered by synchronously interconnected TSOs;
- (166) ‘individual grid model’ means a data set describing power system characteristics (generation, load and grid topology) and related rules to change these characteristics during capacity calculation, prepared by the responsible TSOs;

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- (167) ‘the jurisdiction of Great Britain’ has the meaning given in section 4(3F)(a) of the Electricity Act 1989;
- (168) ‘national electricity transmission system operator’ means the person operating the national transmission system for Great Britain (and for this purpose “transmission system” has the same meaning as in section 4(4) of the Electricity Act 1989);
- (169) ‘regulatory authority’ means the Gas and Electricity Markets Authority;
- (170) ‘renewable energy sources’ means renewable non-fossil energy sources (wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases);
- (171) ‘synchronous area’ means an area covered by synchronously interconnected TSOs, such as the GB synchronous area and for this purpose “TSO” has the meaning given in Article 2 of Directive 2009/72/EC;
- (172) ‘Type A’, ‘Type B’, ‘Type C’ or ‘Type D’, in relation to a power generating module, has the meaning given in Article 5 of Commission Regulation (EU) 2016/631.]

Editorial Information

- X1** Editorial note: Art. 3(1A)(d) (as inserted by S.I. 2019/533, **Sch. 1 para. 4(3)**) is subject to two conflicting amendments: it is stated to be omitted (16.9.2020) by virtue of S.I. 2020/1006, regs. 1(2), **3(2)(a)(i)** and also substituted (in the form shown here) (15.9.2020) by S.I. 2020/1016, regs. 1(2), **6(3)(c)(i)**

Textual Amendments

- F11** Words in Art. 3(1) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F12** Words in Art. 3(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(2)(ab)** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(b)**); 2020 c. 1, **Sch. 5 para. 1(1)**
- F13** Word in Art. 3(1) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F14** Words in Art. 3(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F15** Words in Art. 3(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F16** Words in Art. 3(1) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(2)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F17** Art. 3(1A)–(1C) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533),

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- reg. 1(2), **Sch. 1 para. 4(3)** (as amended by S.I. 2020/1006, regs. 1(2), **3(2)** and S.I. 2020/1016, regs. 1(2), **6(2)(3)(c)**); 2020 c. 1, **Sch. 5 para. 1(1)**
- F18** Arts. 3.2(23)-(26) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F19** Words in Art. 3.2(49) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F20** Art. 3.2(67) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F21** Art. 3.2(69) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F22** Art. 3.2(74) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F23** Art. 3.2(89) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(ca)** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(d)**); 2020 c. 1, **Sch. 5 para. 1(1)**
- F24** Words in Art. 3.2(94) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F25** Art. 3.2(107) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F26** Art. 3.2(108) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F27** Art. 3.2(115) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F28** Words in Art. 3.2(120) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(f)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F29** Words in Art. 3.2(121) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(g)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F30** Words in Art. 3.2(122) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I.

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- 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(h)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F31** Art. 3.2(124) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F32** Art. 3.2(128) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F33** Art. 3.2(129) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F34** Art. 3.2(137) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F35** Art. 3.2(138) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F36** Words in Art. 3.2(152) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(j)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F37** Arts. 3.2(160)-(172) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 4(4)(k)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 4 **U.K.**

Objectives and regulatory aspects

- 1 This Regulation aims at:
 - a determining common operational security requirements and principles;
 - b determining common ^{F38}... system operational planning principles;
 - c determining common load-frequency control processes and control structures;
 - d ensuring the conditions for maintaining operational security ^{F39} ...;
 - e ensuring the conditions for maintaining a frequency quality level [^{F40}in the GB synchronous area];
 - f promoting the coordination of system operation and operational planning;
 - g ensuring and enhancing the transparency and reliability of information on transmission system operation;
 - h contributing to the efficient operation and development of the electricity transmission system and electricity sector ^{F41}
- 2 When applying this Regulation, [^{F42}the Secretary of State, the regulatory authority], and system operators shall:
 - a apply the principles of proportionality and non-discrimination;

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- b ensure transparency;
- c apply the principle of optimisation between the highest overall efficiency and lowest total costs for all parties involved;
- d ensure TSOs make use of market-based mechanisms as far as possible, to ensure network security and stability;
- e respect the responsibility assigned to the relevant TSO in order to ensure system security^{F43} ...;
- f consult with relevant DSOs and take account of potential impacts on their system; and
- g take into consideration agreed^{F44} ... standards and technical specifications.

Textual Amendments

- F38** Word in Art. 4(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F39** Words in Art. 4(1)(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F40** Words in Art. 4(1)(e) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F41** Words in Art. 4(1)(h) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F42** Words in Art. 4(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F43** Words in Art. 4(2)(e) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F44** Word in Art. 4(2)(g) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 5(3)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 5 **U.K.**

Terms and conditions or methodologies of TSOs

1 TSOs shall develop the terms and conditions or methodologies required by this Regulation and submit them for approval to [^{F45}the regulatory authority in accordance with Article 6(3) and (4) within the respective deadlines set out in this Regulation].

2 Where a proposal for terms and conditions or methodologies pursuant to this Regulation needs to be developed and agreed by more than one TSO, the participating TSOs

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shall closely cooperate. [^{F46}TSOs shall regularly inform the regulatory authority] about the progress of developing those terms and conditions or methodologies.

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9 Where TSOs fail to submit a proposal for terms and conditions or methodologies [^{F48}to the regulatory authority in accordance with Article 6(3) and (4) within the deadlines specified in this Regulation, they shall provide the regulatory authority] with the relevant drafts of the terms and conditions or methodologies, and explain why an agreement has not been reached. ^{F49} ... The [^{F50}regulatory authority] shall take the appropriate steps to make possible the adoption of the required terms and conditions or methodologies within 4 months from the receipt of [^{F51}the relevant drafts].

Textual Amendments

- F45** Words in Art. 5(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F46** Words in Art. 5(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F47** Art. 5(3)-(8) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F48** Words in Art. 5(9) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(5)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F49** Words in Art. 5(9) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(5)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F50** Words in Art. 5(9) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(5)(c)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F51** Words in Art. 5(9) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 6(5)(c)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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Article 6 **U.K.**

Approval of terms and conditions or methodologies of TSOs

1 ^{F52}The] regulatory authority shall approve the terms and conditions or methodologies developed by TSOs under paragraphs ^{F53}2, 3 and 4]. ^{F54}...

2 The proposals for the following terms and conditions or methodologies shall be subject to approval by ^{F55}the regulatory authority, on which the Secretary of State] may provide an opinion to the ^{F56}regulatory authority]:

a key organizational requirements, roles and responsibilities in relation to data exchange related to operational security in accordance with Article 40(6);

^{F57}b

^{F58}c

3 The proposals for the following terms and conditions or methodologies shall be subject to approval by ^{F59}the regulatory authority], on which ^{F60}the Secretary of State] may provide an opinion to the ^{F61}... regulatory authority:

a methodology ^{F62}... for the definition of minimum inertia in accordance with Article 39(3)(b);

^{F63}b

^{F64}c

d methodologies, conditions and values included in the synchronous area operational agreements in Article 118 concerning:

(i) the frequency quality defining parameters and the frequency quality target parameter in accordance with Article 127;

(ii) the dimensioning rules for FCR in accordance with Article 153;

(iii) the additional properties of the FCR in accordance with Article 154(2);

(iv) for the GB ^{F65}synchronous area], the measures to ensure the recovery of energy reservoirs in accordance with Article 156(6)(b);

(v) ^{F66} ...

(vi) ^{F67} ...

(vii) ^{F68}... if applicable, the limits for the exchange of FCR between TSOs in accordance with Article 163(2);

(viii) ^{F69} ...

(ix) ^{F69} ...

(x) ^{F69} ...

e methodologies and conditions included in the LFC block operational agreements in Article 119, concerning:

(i) ramping restrictions for active power output in accordance with Article 137(3) and (4);

(ii) coordination actions aiming to reduce FRCE as defined in Article 152(14);

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- (iii) measures to reduce FRCE by requiring changes in the active power production or consumption of power generating modules and demand units in accordance with Article 152(16);
 - (iv) the FRR dimensioning rules in accordance with Article 157(1);
 - f mitigation measures per synchronous area or LFC block in accordance with Article 138;
 - g common proposal per synchronous area for the determination of LFC blocks in accordance with Article 141(2).
- 4 ^[F70]The following terms and conditions or methodologies shall be subject to individual approval by the regulatory authority—
- a for the GB ^[F71]synchronous area], the proposal of each TSO specifying the level of demand loss at which the transmission system shall be in the blackout state;
 - b scope of data exchange with DSOs and significant grid users in accordance with Article 40(5);
 - c additional requirements for FCR providing groups in accordance with Article 154(3);
 - d exclusion of FCR providing groups from the provision of FCR in accordance with Article 154(4);
 - ^{F72}e
 - f FRR technical requirements defined by the TSO in accordance with Article 158(3);
 - g rejection of FRR providing groups from the provision of FRR in accordance with Article 159(7);
 - h technical requirements for the connection of RR providing units and RR providing groups defined by the TSO in accordance with Article 161(3); and
 - i rejection of RR providing groups from the provision of RR in accordance with Article 162(6).
- 5 Where an individual relevant system operator or TSO is required or permitted under this Regulation to specify or agree on requirements that are not subject to paragraph 4, ^[F73]the regulatory authority may require the relevant system operator or TSO to obtain its prior approval] of these requirements.
- 6 The proposal for terms and conditions or methodologies shall include a proposed timescale for their implementation and a description of their expected impact on the objectives of this Regulation. ^{F74}...
- ^{F75}7
- ^{F76}8
- 9 Where the approval of the terms and conditions or methodologies requires a decision by ^[F77]the regulatory authority] in accordance with paragraph 4, the ^[F78]regulatory authority] shall reach a decision within 6 months following the receipt of the terms and conditions or methodologies.
- 10 Any party can complain against a relevant system operator or TSO in relation to that relevant system operator's or TSO's obligations or decisions under this Regulation and may refer the complaint to the regulatory authority which, acting as dispute settlement authority, shall issue a decision within 2 months after receipt of the complaint. That period may be extended by a further 2 months where additional information is sought by the regulatory authority. That extended period may be further extended with the agreement of the complainant. The regulatory authority's decision shall be binding unless and until overruled on appeal.

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Textual Amendments

- F52** Word in Art. 6(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(2)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F53** Words in Art. 6(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(2)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F54** Words in Art. 6(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F55** Words in Art. 6(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(3)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F56** Words in Art. 6(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(3)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F57** Art. 6(2)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F58** Art. 6(2)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F59** Words in Art. 6(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F60** Words in Art. 6(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F61** Words in Art. 6(3) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(a)(iii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F62** Words in Art. 6(3)(a) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F63** Art. 6(3)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F64** Art. 6(3)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533),

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- reg. 1(2), **Sch. 1 para. 7(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F65** Words in Art. 6(3)(d)(iv) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(d)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F66** Art. 6(3)(d)(v) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(d)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, **Sch. 5 para. 1(1)**
- F67** Art. 6(3)(d)(vi) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(d)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, **Sch. 5 para. 1(1)**
- F68** Words in Art. 6(3)(d)(vii) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(d)(iii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F69** Art. 6(3)(d)(vii)-(x) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(4)(d)(iv)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F70** Words in Art. 6(4) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(5)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F71** Words in Art. 6(4)(a) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(5)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F72** Art. 6(4)(e) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(5)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F73** Words in Art. 6(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F74** Words in Art. 6(6) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(7)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F75** Art. 6(7) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(8)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F76** Art. 6(8) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(8)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F77** Words in Art. 6(9) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533),

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reg. 1(2), **Sch. 1 para. 7(9)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F78 Words in Art. 6(9) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 7(9)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 7 **U.K.**

Amendments to the terms and conditions or methodologies of TSOs

1 Where [^{F79}the regulatory authority requires] an amendment in order to approve the terms and conditions or methodologies submitted in accordance with paragraphs [^{F80}3 and 4] of Article 6, the relevant TSOs shall submit a proposal for amended terms and conditions or methodologies for approval within 2 months following the requirement from the regulatory [^{F81}authority]. The [^{F82}regulatory authority] shall decide on the amended terms and conditions or methodologies within 2 months following their submission.

2 Where [^{F83}the regulatory authority] requires an amendment in order to approve the terms and conditions or methodologies submitted in accordance with Article 6(4), the relevant TSO shall submit a proposal for amended terms and conditions or methodologies for approval within 2 months following the requirement from [^{F84}the regulatory authority]. The [^{F85}regulatory authority] shall decide on the amended terms and conditions or methodologies within 2 months following their submission.

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4 TSOs responsible for developing a proposal for terms and conditions or methodologies or [^{F87}the regulatory authority] in accordance with paragraphs 2, 3 and 4 of Article 6 may request amendments of those terms and conditions or methodologies. Proposals for amendment to the terms and conditions or methodologies shall be submitted to consultation if applicable in accordance with the procedure set out in Article 11 and approved in accordance with the procedure set out in Articles 5 and 6.

Textual Amendments

F79 Words in Art. 7(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(2)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F80 Words in Art. 7(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(2)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F81 Word in Art. 7(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(2)(a)(iii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F82 Words in Art. 7(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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- F83** Words in Art. 7(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(3)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F84** Words in Art. 7(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(3)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F85** Words in Art. 7(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F86** Art. 7(3) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F87** Words in Art. 7(4) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 8(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 8 **U.K.**

Publication on internet

1 TSOs responsible for specifying the terms and conditions or methodologies in accordance with this Regulation shall publish them on the internet following approval by the [^{F88}regulatory authority] or, where no such approval is required, following their specification, except where such information is considered confidential in accordance with Article 12.

- 2 The publication shall also concern:
- a enhancements of network operation tools in accordance with Article 55(1)(e);
 - b FRCE target parameters in accordance with Article 128;
 - c ramping restrictions on synchronous area level in accordance with Article 137(1);
 - d ramping restrictions on LFC block level in accordance with Article 137(3);
 - e measures taken in the alert state due to there being insufficient active power reserves in accordance with Article 152(11); and
 - f request of the reserve connecting TSO to an FCR provider to make the information available in real time in accordance with Article 154(11).

Textual Amendments

- F88** Words in Art. 8(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 9** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 9 **U.K.**

Recovery of costs

1 The costs borne by system operators subject to network tariff regulation and stemming from the obligations laid down in this Regulation shall be assessed by the [^{F89}regulatory authority]. Costs assessed as reasonable, efficient and proportionate shall be recovered through network tariffs or other appropriate mechanisms.

2 If requested by the [^{F90}regulatory authority], system operators referred to in paragraph 1 shall, within 3 months of the request, provide the information necessary to facilitate assessment of the costs incurred.

Textual Amendments

- F89** Words in Art. 9(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 10** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F90** Words in Art. 9(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 10** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 10 **U.K.**

Stakeholder involvement

The [^{F91}national electricity transmission system operator] shall organise stakeholder involvement regarding secure system operation and other aspects of the implementation of this Regulation. Such involvement shall include regular meetings with stakeholders to identify problems and propose improvements related to the secure system operation.

Textual Amendments

- F91** Words in Art. 10 substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 11** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 11 **U.K.**

Public consultation

1 TSOs responsible for submitting proposals for terms and conditions or methodologies or their amendments in accordance with this Regulation shall consult stakeholders, including the [^{F92}regulatory authority], on the draft proposals for terms and conditions or methodologies listed in [^{F93}Article 6(2)(a) and (3)]. The consultation shall last for a period of not less than 1 month.

^{F94}2

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

[^{F95}2A Any consultation undertaken before IP completion day in respect of draft proposals for terms and conditions or methodologies listed in Article 6(2)(a) is as effective for the purposes of this Regulation as consultation undertaken after IP completion day.]

3 The TSOs responsible for developing the proposal for terms and conditions or methodologies shall duly take into account the views of stakeholders resulting from the consultations prior to its submission for regulatory approval. In all cases, a sound justification for including or not including the views resulting from the consultation shall be provided together with the submission of the proposal and published in a timely manner before, or simultaneously with the publication of the proposal for terms and conditions or methodologies.

Textual Amendments

- F92** Words in Art. 11(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 12(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F93** Words in Art. 11(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 12(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F94** Art. 11(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 12(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, **Sch. 5 para. 1(1)**
- F95** Art. 11(2A) inserted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 12(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)(3)(e)); 2020 c. 1, **Sch. 5 para. 1(1)**

Article 12 U.K.

Confidentiality obligations

1 Any confidential information received, exchanged or transmitted pursuant to this Regulation shall be subject to the conditions of professional secrecy laid down in paragraphs 2, 3 and 4.

2 The obligation of professional secrecy shall apply to any persons subject to the provisions of this Regulation.

3 Confidential information received by the persons or regulatory authorities referred to in paragraph 2 in the course of their duties may not be divulged to any other person or authority, without prejudice to cases covered by [^{F96}the other provisions of this Regulation or any other enactment].

4 Without prejudice to [^{F97}any enactment], regulatory authorities, bodies or persons who receive confidential information pursuant to this Regulation may use it only for the purpose of carrying out their duties under this Regulation.

Textual Amendments

- F96** Words in Art. 12(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I.](#)

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2019/533), reg. 1(2), **Sch. 1 para. 13(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F97 Words in Art. 12(4) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 13(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F98} Article 13 **U.K.**

Agreements with TSOs not bound by this Regulation

.....

Textual Amendments

F98 Art. 13 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 14** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(f)**); 2020 c. 1, **Sch. 5 para. 1(1)**

Article 14 **U.K.**

Monitoring

1 ^{F99}The regulatory authority] shall monitor the implementation of this Regulation

^{F100} Monitoring shall cover at least the following matters:

- a operational security indicators in accordance with Article 15;
- ^{F101}b
- ^{F101}c
- ^{F101}d
- ^{F101}e
- ^{F101}f
- g identification of any difficulties concerning cooperation on secure system operation with ^{F102}neighbouring] TSOs.

^{F103}2

3 Relevant TSOs shall submit to ^{F104}the regulatory authority] the information required to perform the tasks referred to in ^{F105}paragraph 1].

^{F106}4

Textual Amendments

F99 Words in Art. 14(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(2)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F100 Words in Art. 14(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I.

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2019/533), reg. 1(2), **Sch. 1 para. 15(2)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F101 Art. 14(1)(b)-(f) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F102 Word in Art. 14(1)(g) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F103 Art. 14(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F104 Words in Art. 14(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F105 Words in Art. 14(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F106 Art. 14(4) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 15(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 15 **U.K.**

Annual report on operational security indicators

1 By 30 September, [^{F107}the national electricity transmission system operator] shall publish an annual report based on the incidents classification scale adopted in accordance with [^{F108}Article 30(1)(i) of Regulation (EU) 2019/943 as that provision applied in EU law immediately before IP completion day]. The [^{F109}regulatory authority] may provide its opinion on the format and contents of that annual report, including the geographical scope of the incidents reported ^{F110}... and any relevant historical information.

^{F111}2

3 The annual reports referred to in paragraph 1 shall contain at least the following operational security indicators relevant to operational security:

- a number of tripped transmission system elements per year per TSO;
- b number of tripped power generation facilities per year per TSO;
- c energy not supplied per year due to unscheduled disconnection of demand facilities per TSO;
- d time duration and number of instances of being in the alert and emergency states per TSO;
- e time duration and number of events within which there was a lack of reserves identified per TSO;

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- f time duration and number of voltage deviations exceeding the ranges from Tables 1 and 2 of Annex II per TSO;
 - g number of minutes outside the standard frequency range and number of minutes outside the 50 % of maximum steady state frequency deviation per synchronous area;
 - h number of system-split separations or local blackout states; and
 - i number of blackouts involving two or more TSOs.
- 4 The annual report referred to in paragraph 1 shall contain the following operational security indicators relevant to operational planning:
- a number of events in which an incident contained in the contingency list led to a degradation of the system operation state;
 - b number of the events referred to in point (a) in which a degradation of system operation conditions occurred as a result of unexpected discrepancies from load or generation forecasts;
 - c number of events in which there was a degradation in system operation conditions due to an exceptional contingency;
 - d number of the events referred to in point (c) in which a degradation of system operation conditions occurred as a result of unexpected discrepancies from load or generation forecasts; and
 - e number of events leading to a degradation in system operation conditions due to lack of active power reserves.
- 5 The annual reports shall contain explanations of the reasons for incidents at the operational security ranking scales 2 and 3 as per the incidents classification scale [F112] referred to in paragraph 1]. Those explanations shall be based on an investigation of the incidents by TSOs which process shall be set out in the incidents classification scale. TSOs shall inform the [F113] regulatory authority] about an investigation in due time before it is launched. [F114]The regulatory authority] may be involved in the investigation upon [F115]its] request.

Textual Amendments

- F107** Words in Art. 15(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 16(2)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F108** Words in Art. 15(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 16(2)(b)(i)** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(g)**); 2020 c. 1, **Sch. 5 para. 1(1)**
- F109** Words in Art. 15(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 16(2)(b)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F110** Words in Art. 15(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 16(2)(b)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F111** Art. 15(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 16(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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- F112** Words in Art. 15(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 16(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F113** Words in Art. 15(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 16(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F114** Words in Art. 15(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 16(4)(c)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F115** Word in Art. 15(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 16(4)(c)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 16 **U.K.**

Annual report on load-frequency control

1 By 30 September, [^{F116}the national electricity transmission system operator] shall publish an annual report on load-frequency control based on the information provided by the TSOs in accordance with paragraph 2. The annual report on load-frequency control shall include the information listed in paragraph 2 ^{F117}....

2 [^{F118}TSOs shall notify to the national electricity transmission system operator], by 1 March every year, the following information for the previous year:

- a the identification of the LFC blocks, LFC areas and monitoring areas ^{F119}....;
- b the identification of LFC blocks that ^{F120}... contain LFC areas and monitoring areas ^{F121}....;
- ^{F122}c
- d the data related to the frequency quality evaluation criteria for each synchronous area and each LFC block in subparagraphs [^{F123}(a) and (b)] covering each month of at least 2 previous calendar years;
- e the FCR obligation and the initial FCR obligation of each TSO ^{F124}... covering each month of at least 2 previous calendar years; and
- f a description and date of implementation of any mitigation measures and ramping requirements to alleviate deterministic frequency deviations taken in the previous calendar year in accordance with Articles 137 and 138, in which TSOs ^{F125}... were involved.

3 The data provided by the TSOs shall cover the preceding year. The information concerning ^{F126}... LFC blocks, LFC areas and monitoring areas in subparagraphs [^{F127}(a) and (b)] shall be reported once. Where these areas change, this information shall be reported by 1 March of the following year.

4 Where appropriate, all TSOs of a synchronous area or LFC block shall cooperate in collecting the data listed in paragraph 2.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

- F116** Words in Art. 16(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F117** Words in Art. 16(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F118** Words in Art. 16(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F119** Words in Art. 16(2)(a) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F120** Words in Art. 16(2)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(c)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F121** Words in Art. 16(2)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(c)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F122** Art. 16(2)(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F123** Words in Art. 16(2)(d) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F124** Words in Art. 16(2)(e) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(f)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F125** Words in Art. 16(2)(f) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(3)(g)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F126** Words in Art. 16(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F127** Words in Art. 16(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 17(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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^{F128}Article 17 U.K.

Annual report on regional coordination assessment

Textual Amendments

F128 Art. 17 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 18](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

PART II U.K.

OPERATIONAL SECURITY

TITLE 1 U.K.

OPERATIONAL SECURITY REQUIREMENTS

CHAPTER 1 U.K.

System states, remedial actions and operational security limits

Article 18 U.K.

Classification of system states

- 1 A transmission system shall be in the normal state when all of the following conditions are fulfilled:
- a voltage and power flows are within the operational security limits defined in accordance with Article 25;
 - b frequency meets the following criteria:
 - (i) the steady state system frequency deviation is within the standard frequency range; or
 - (ii) the absolute value of the steady state system frequency deviation is not larger than the maximum steady state frequency deviation and the system frequency limits established for the alert state are not fulfilled;
 - c active and reactive power reserves are sufficient to withstand contingencies from the contingency list defined in accordance with Article 33 without violating operational security limits;
 - d operation of the concerned TSO's control area is and will remain within operational security limits after the activation of remedial actions following the occurrence of a contingency from the contingency list defined in accordance with Article 33.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- 2 A transmission system shall be in the alert state when:
- a voltage and power flows are within the operational security limits defined in accordance with Article 25; and
 - b the TSO's 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; or
 - c frequency meets the following criteria:
 - (i) the absolute value of the steady state system frequency deviation is not larger than the maximum steady state frequency deviation; and
 - (ii) the absolute value of the steady state system frequency deviation has continuously exceeded 50 % of the maximum steady state frequency deviation for a time period longer than the alert state trigger time or the standard frequency range for a time period longer than time to restore frequency; or
 - d at least one contingency from the contingency list defined in accordance with Article 33 leads to a violation of the TSO's operational security limits, even after the activation of remedial actions.
- 3 A transmission system shall be in the emergency state when at least one of the following conditions is fulfilled:
- a there is at least one a violation of a TSO's operational security limits defined in accordance with Article 25;
 - b frequency does not meet the criteria for the normal state and for the alert state defined in accordance with paragraphs 1 and 2;
 - c at least one measure of the TSO's system defence plan is activated;
 - d there is a failure in the functioning of tools, means and facilities defined in accordance with Article 24(1), resulting in the unavailability of those tools, means and facilities for longer than 30 minutes.
- 4 A transmission system shall be in the blackout state when at least one of the following conditions is fulfilled:
- a loss of more than 50 % of demand in the concerned TSO's control area;
 - b total absence of voltage for at least three minutes in the concerned TSO's control area, leading to the triggering of restoration plans.

A TSO of [^{F129}the GB synchronous area] may develop a proposal specifying the level of demand loss at which the transmission system shall be in the blackout state. The TSOs of [^{F129}the GB synchronous area] shall notify this instance to [^{F130}the regulatory authority].

- 5 A transmission system shall be in the restoration state when a TSO, being in the emergency or blackout state, has started to activate measures of its restoration plan.

Textual Amendments

F129 Words in Art. 18(4) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 19(a)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F130 Words in Art. 18(4) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 19(b)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 19 **U.K.**

Monitoring and determination of system states by TSOs

1 Each TSO shall, in real-time operation, determine the system state of its transmission system.

2 Each TSO shall monitor the following transmission system parameters in real-time in its control area, based on real-time telemetry measurements or on calculated values from its observability area ^{F131}....:

- a active and reactive power flows;
- b busbar voltages;
- c frequency and frequency restoration control error of its LFC area;
- d active and reactive power reserves; and
- e generation and load.

3 In order to specify the system state, each TSO shall perform contingency analysis at least once every 15 minutes, monitoring the transmission system's parameters defined in accordance with paragraph 2, against the operational security limits defined in accordance with Article 25 and the criteria for system states defined in accordance with Article 18. Each TSO shall also monitor the level of available reserves against the reserve capacity. When carrying out the contingency analysis, each TSO shall take into account the effect of remedial actions and the measures of the system defence plan.

^{F132}4

Textual Amendments

F131 Words in Art. 19(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 20(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F132 Art. 19(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 20(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 20 **U.K.**

Remedial actions in system operation

1 Each TSO shall endeavour to ensure that its transmission system remains in the normal state and shall be responsible for managing operational security violations. To achieve that objective, each TSO shall design, prepare and activate remedial actions taking into account their availability, the time and resources needed for their activation and any conditions external to the transmission system which are relevant for each remedial action.

^{F133}2

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F133 Art. 20(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 21** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 21 **U.K.**

Principles and criteria applicable to remedial actions

1 Each TSO shall apply the following principles when activating and coordinating remedial actions in accordance with Article 23:

- a for operational security violations ^{F134}..., a TSO shall design, prepare and activate remedial actions to restore the system to the normal state and to prevent the propagation of the alert or emergency state outside of the TSO's control area from the categories defined in Article 22;

^{F135}b

2 When selecting the appropriate remedial actions, each TSO shall apply the following criteria:

- a activate the most effective and economically efficient remedial actions;
- b activate remedial actions as close as possible to real-time taking into account the expected time of activation and the urgency of the system operation situation they intend to resolve;
- c consider the risks of failures in applying the available remedial actions and their impact on operational security such as:
 - (i) the risks of failure or short-circuit caused by topology changes;
 - (ii) the risks of outages caused by active or reactive power changes on power generating modules or demand facilities; and
 - (iii) the risks of malfunction caused by equipment behaviour;
- d give preference to remedial actions which make available the largest cross-zonal capacity for capacity allocation, while satisfying all operational security limits.

Textual Amendments

F134 Words in Art. 21(1)(a) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 22(2)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F135 Art. 21(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 22(3)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 22 **U.K.**

Categories of remedial actions

- 1 Each TSO shall use the following categories of remedial actions:
 - a modify the duration of a planned outage or return to service transmission system elements to achieve the operational availability of those transmission system elements;
 - b actively impact power flows by means of:
 - (i) tap changes of the power transformers;
 - (ii) tap changes of the phase-shifting transformers;
 - (iii) modifying topologies;
 - c control voltage and manage reactive power by means of:
 - (i) tap changes of the power transformers;
 - (ii) switching of the capacitors and reactors;
 - (iii) switching of the power-electronics-based devices used for voltage and reactive power management;
 - (iv) instructing transmission-connected DSOs and significant grid users to block automatic voltage and reactive power control of transformers or to activate on their facilities the remedial actions set out in points (i) to (iii) if voltage deterioration jeopardises operational security or threatens to lead to a voltage collapse in a transmission system;
 - (v) requesting the change of reactive power output or voltage setpoint of the transmission-connected synchronous power generating modules;
 - (vi) requesting the change of reactive power output of the converters of transmission-connected non-synchronous power generating modules;
 - d re-calculate day-ahead and intraday cross-zonal capacities ^{F136} ...;
 - e redispatch transmission or distribution-connected system users within the TSO's control area ^{F137} ...;
 - f countertrade between two or more bidding zones;
 - g adjust active power flows through HVDC systems;
 - h activate frequency deviation management procedures;
 - i curtail, pursuant to [^{F138}Article 16(2) of Regulation (EU) 2019/943 as that provision applied in EU law immediately before IP completion day], the already allocated cross-zonal capacity in an emergency situation where using that capacity endangers operational security, all TSOs at a given interconnector agree to such adjustment, and re-dispatching or countertrading is not possible; and
 - j where applicable, include the normal or alert state, manually controlled load-shedding.
- 2 Where necessary and justified in order to maintain operational security, each TSO may prepare and activate additional remedial actions. The TSO shall report and justify those instances to the ^{F139} ... regulatory authority and, where applicable, the [^{F140}Secretary of State], at least once every year, after the activation of the additional remedial actions. The relevant reports and justifications shall also be published. ^{F141} ...

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

- F136** Words in Art. 22(1)(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 23(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F137** Words in Art. 22(1)(e) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 23(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F138** Words in Art. 22(1)(i) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 23(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(h)**); 2020 c. 1, **Sch. 5 para. 1(1)**
- F139** Word in Art. 22(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 23(3)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F140** Words in Art. 22(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 23(3)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F141** Words in Art. 22(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 23(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 23 **U.K.**

Preparation, activation and coordination of remedial actions

1 Each TSO shall prepare and activate remedial actions in accordance with the criteria set out in Article 21(2) to prevent the system state from deteriorating on the basis of the following elements:

- a the monitoring and determination of system states in accordance with Article 19;
- b the contingency analysis in real-time operation in accordance with Article 34; and
- c the contingency analysis in operational planning in accordance with Article 72.

2 When preparing and activating a remedial action ^{F142}... or a procedure of a TSO's system defence plan which affects other TSOs, the relevant TSO shall assess, in coordination with the TSOs concerned, the impact of such remedial action or measure within and outside of its control area ^{F143}... and shall provide the TSOs concerned with the information about this impact.

3 When preparing and activating remedial actions which have an impact on the transmission-connected SGUs and DSOs, each TSO shall, if its transmission system is in normal or alert state, assess the impact of such remedial actions in coordination with the affected SGUs and DSOs and select remedial actions that contribute to maintaining normal state and secure operation of all involved parties. Each affected SGU and DSO shall provide to the TSO all necessary information for this coordination.

4 When preparing and activating remedial actions each TSO shall, if its transmission system is not in normal or alert state, coordinate to the extent possible such remedial actions

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with the affected transmission-connected SGUs and DSOs to maintain the operational security and the integrity of the transmission system.

When a TSO activates a remedial action each impacted transmission-connected significant grid user and DSO shall execute the instructions given by the TSO

5 Where constraints have only consequences on the local state within the TSO's control area and the operational security violation does not need to be managed in a coordinated way, the TSO responsible for its management may decide not to activate remedial actions with costs to relieve them.

Textual Amendments

F142 Words in Art. 23(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 24(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)(3)(i)); 2020 c. 1, Sch. 5 para. 1(1)

F143 Words in Art. 23(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 24(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 24 **U.K.**

Availability of TSO's means, tools and facilities

1 Each TSO shall ensure the availability, reliability and redundancy of the following items:

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

2 Where the TSO's tools, means and facilities referred to in paragraph 1 affect the transmission-connected DSOs or SGUs involved in supplying balancing services, ancillary services or in system defence or restoration or in delivery of real-time operational data according to Articles 44, 47, 50, 51 and 52, the relevant TSO and those DSOs and SGUs shall cooperate and coordinate to specify and ensure the availability, reliability and redundancy of these tools, means and facilities.

3 Within 18 months from the entry into force of this Regulation each TSO shall adopt a business continuity plan detailing its responses to a loss of critical tools, means and facilities, containing provisions for their maintenance, replacement and development. Each TSO shall review at least annually its business continuity plan and update it as necessary and in any case following any significant change of the critical tools, means and facilities or of the relevant system operation conditions. The TSO shall share parts of the business continuity plan which affect DSOs and SGUs with the DSOs and SGUs concerned.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 25 **U.K.**

Operational security limits

1 Each TSO shall specify the operational security limits for each element of its transmission system, taking into account at least the following physical characteristics:

- a voltage limits in accordance with Article 27;
- b short-circuit current limits according to Article 30; and
- c current limits in terms of thermal rating including the transitory admissible overloads.

2 When defining the operational security limits, each TSO shall take into account the capabilities of SGUs to prevent that voltage ranges and frequency limits in normal and alert states lead to their disconnection.

3 In case of changes of one of its transmission system elements, each TSO shall validate and where necessary update the operational security limits.

4 For each interconnector each TSO shall [^{F144}, where applicable, endeavour to] agree with the neighbouring TSO on common operational security limits in accordance with paragraph 1.

Textual Amendments

F144 Words in Art. 25(4) inserted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 25** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 26 **U.K.**

Security plan for critical infrastructure protection

1 Each TSO shall specify ^{F145}... a confidential security plan containing a risk assessment of assets owned or operated by the TSO, covering major physical or cyber threat scenarios determined by the [^{F146}Secretary of State].

2 The security plan shall consider potential impacts to the [^{F147}transmission system], and include organizational and physical measures aiming at mitigating the identified risks.

3 Each TSO shall regularly review the security plan to address changes of threat scenarios and reflect the evolution of the transmission system.

Textual Amendments

F145 Words in Art. 26(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 26(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F146 Words in Art. 26(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 26(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F147 Words in Art. 26(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 26(3)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

CHAPTER 2 **U.K.**

Voltage control and reactive power management

Article 27 **U.K.**

Obligations of all TSOs regarding voltage limits

1 In accordance with Article 18, 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 the Tables 1 and 2 of Annex II.

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3 Each TSO shall define the voltage base for the per unit values' notation.

4 Each TSO shall endeavour to ensure that, during the normal state and after the occurrence of a contingency, the voltage remains, within wider voltage ranges for limited times of operation if there is agreement about those wider voltage ranges with transmission-connected DSOs, power generating facility owners in accordance with Article 16(2) of Regulation (EU) 2016/631 or HVDC system owners in accordance with Article 18 of Regulation (EU) 2016/1447.

5 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. Each TSO shall endeavour to ensure that the voltage remains within the agreed range during the normal state and after the occurrence of a contingency.

Textual Amendments

F148 Art. 27(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 27** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 28 **U.K.**

Obligations of SGUs concerning voltage control and reactive power management in system operation

1 By 3 months after entry into force of this Regulation, all SGUs which are transmission-connected power generating modules not subject to Article 16 of Regulation (EU) 2016/631, or which are HVDC systems not subject to Article 18 of Regulation (EU) 2016/1447, shall inform their TSO about their capabilities compared to the voltage requirements in Article 16 of Regulation (EU) 2016/631 or in Article 18 of Regulation (EU) 2016/1447, declaring their voltage capabilities and the time they can withstand without disconnection.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

2 SGUs which are demand facilities subject to the requirements of Article 3 of Regulation (EU) 2016/1388 shall not disconnect due to a disturbance within the voltage ranges referred to in Article 27. By 3 months after entry into force of this Regulation, SGUs which are transmission-connected demand facilities and which are not subject to Article 3 of Regulation (EU) 2016/1388 shall inform their TSO about their capabilities in relation to the voltage requirements defined in Annex II of Regulation (EU) 2016/1388 declaring their voltage capabilities and the time they can withstand without disconnection.

3 Each SGU which is a transmission-connected demand facility shall maintain the reactive power setpoints, power factor ranges and voltage setpoints for voltage control in the range agreed with its TSO in accordance with Article 27.

Article 29 **U.K.**

Obligations of all TSOs concerning voltage control and reactive power management in system operation

1 If voltage at a connection point to the transmission system is outside the ranges defined in Tables 1 and 2 of Annex II to this Regulation, each TSO shall apply voltage control and reactive power management remedial actions in accordance with Article 22(1)(c) of this Regulation in order to restore voltage at the connection point within the range specified in Annex II and within time range specified in Article 16 of Regulation (EU) 2016/631 and Article 13 of Regulation (EU) 2016/1388.

2 Each TSO shall take into account in its operational security analysis the voltage values at which transmission-connected SGUs not subject to the requirements of Regulation (EU) 2016/631 or Regulation (EU) 2016/1388 may disconnect.

3 Each TSO shall ensure reactive power reserve, with adequate volume and time response, in order to keep the voltages within its control area and on interconnectors within the ranges set out in Annex II.

4 TSOs interconnected by AC interconnectors shall jointly specify the adequate voltage control regime in order to ensure that the common operational security limits established in accordance with Article 25(4) are respected.

5 Each TSO shall agree with each transmission-connected DSO on the reactive power setpoints, power factor ranges and voltage setpoints for voltage control at the connection point between the TSO and the DSO in accordance with Article 15 of Regulation (EU) 2016/1388. To ensure that those parameters are maintained, each transmission-connected DSO shall use its reactive power resources and have the right to give voltage control instructions to distribution-connected SGUs.

6 Each TSO shall be entitled to use all available transmission-connected reactive power capabilities within its control area for effective reactive power management and maintaining the voltage ranges set out in Tables 1 and 2 of Annex II of this Regulation.

7 Each TSO shall, directly or indirectly in coordination with the transmission-connected DSO where applicable, operate reactive power resources within its control area, including the blocking of automatic voltage/reactive power control of transformers, voltage reduction and low voltage demand disconnection, in order to maintain operational security limits and to prevent a voltage collapse of the transmission system.

8 Each TSO shall determine the voltage control actions in coordination with the transmission-connected SGUs and DSOs ^{F149}....

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

9 When relevant for the voltage control and reactive power management of the transmission system, a TSO may require, in coordination with a DSO, a distribution-connected SGU to follow voltage control instructions.

Textual Amendments

F149 Words in Art. 29(8) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 28** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

CHAPTER 3 **U.K.**

Short-circuit current management

Article 30 **U.K.**

Short-circuit current

Each TSO shall determine:

- (a) the maximum short-circuit current at which the rated capability of circuit breakers and other equipment is exceeded; and
- (b) the minimum short-circuit current for the correct operation of protection equipment.

Article 31 **U.K.**

Short-circuit current calculation and related measures

1 Each TSO shall perform short-circuit current calculations in order to evaluate the impact of neighbouring TSOs and transmission-connected SGUs and transmission-connected distribution systems including closed distribution systems on the short-circuit current levels in transmission system. Where a transmission-connected distribution system including closed distribution system has an impact on short-circuit current levels, it shall be included in the transmission system short-circuit current calculations.

2 While performing short-circuit current calculations, each TSO shall:

- a use the most accurate and high quality available data;
- b take into account international standards; and
- c consider as the basis of the maximum short-circuit current calculation such operational conditions, which provide the highest possible level of short-circuit current, including the short-circuit current from other transmission systems and distribution systems including closed distribution systems.

3 Each TSO shall apply operational or other measures to prevent deviation from the maximum and minimum short-circuit current limits referred to in Article 30, at all time-frames and for all protection equipment. If such a deviation occurs, each TSO shall activate remedial actions or apply other measures to ensure that the limits referred to in Article 30 are re-established. A deviation from those limits is allowed only during switching sequences.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

CHAPTER 4 U.K.

Power flow management

Article 32 U.K.

Power flow limits

1 Each TSO shall maintain power flows within the operational security limits defined when the system is in normal state and after the occurrence of a contingency from the contingency list referred to in Article 33(1).

2 In the (N-1)-situation, in the normal state each TSO shall maintain power flows within the transitory admissible overloads referred to in Article 25(1)(c), having prepared remedial actions to be applied and executed within the time-frame allowed for transitory admissible overloads.

CHAPTER 5 U.K.

Contingency analysis and handling

Article 33 U.K.

Contingency lists

1 Each TSO shall establish a contingency list, including the internal and external contingencies of its observability area, by assessing whether any of those contingencies endangers the operational security of the TSO's control area. The contingency list shall include both ordinary contingencies and exceptional contingencies identified by application of the methodology developed pursuant to Article 75.

2 To establish a contingency list, each TSO shall classify each contingency on the basis of whether it is ordinary, exceptional or out-of-range, taking into account the probability of occurrence and the following principles:

- a each TSO shall classify contingencies for its own control area;
- b when operational or weather conditions significantly increase the probability of an exceptional contingency, each TSO shall include that exceptional contingency in its contingency list; and
- c in order to account for exceptional contingencies with high impact on [F150its transmission system], each TSO shall include such exceptional contingencies in its contingency list.

3 Each transmission-connected DSO and SGU which is a power generating facility shall deliver all information relevant for contingency analysis as requested by the TSO, including forecast and real-time data, with possible data aggregation in accordance with Article 50(2).

F151 4

F152 5

F153 6

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

7 Each TSO shall ensure that the real-time data is sufficiently accurate to allow the convergence of load-flow calculations which are performed in the contingency analysis.

Textual Amendments

- F150** Words in Art. 33(2)(c) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 29(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F151** Art. 33(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 29(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F152** Art. 33(5) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 29(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F153** Art. 33(6) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 29(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 34 **U.K.**

Contingency analysis

1 Each TSO shall perform contingency analysis in its observability area in order to identify the contingencies which endanger or may endanger the operational security of its control area and to identify the remedial actions that may be necessary to address the contingencies, including mitigation of the impact of exceptional contingencies.

2 Each TSO shall ensure that potential violations of the operational security limits in its control area which are identified by the contingency analysis do not endanger the operational security of its transmission system ^{F154}....

3 Each TSO shall perform contingency analysis based on the forecast of operational data and on real-time operational data from its observability area. The starting point for the contingency analysis in the N-Situation shall be the relevant topology of the transmission system which shall include planned outages in the operational planning phases.

Textual Amendments

- F154** Words in Art. 34(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 30** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 35 U.K.

Contingency handling

1 Each TSO shall assess the risks associated with the contingencies after simulating each contingency from its contingency list and after assessing whether it can maintain its transmission system within the operational security limits in the (N-1) situation.

2 When a TSO assesses that the risks associated with a contingency are so significant that it might not be able to prepare and activate remedial actions in a timely manner to prevent non-compliance with the (N-1) criterion or that there is a risk of propagation of a disturbance to the interconnected transmission system, the TSO shall prepare and activate remedial actions to achieve compliance with the (N-1) criterion as soon as possible.

3 In case of an (N-1) situation caused by a disturbance, each TSO shall activate a remedial action in order to ensure that the transmission system is restored to a normal state as soon as possible and that this (N-1) situation becomes the new N-Situation.

4 A TSO shall not be required to comply with the (N-1) criterion in the following situations:

- a during switching sequences;
- b during the time period required to prepare and activate remedial actions.

5 Unless [^{F155}the regulatory authority] determines otherwise, a TSO shall not be required to comply with the (N-1) criterion as long as there are only local consequences within the TSO's control area.

Textual Amendments

F155 Words in [Art. 35\(5\)](#) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 31](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

CHAPTER 6 U.K.

Protection

Article 36 U.K.

General requirements on protection

1 Each TSO shall operate its transmission system with the protection and backup protection equipment in order to automatically prevent the propagation of disturbances that could endanger the operational security of its own transmission system and of the interconnected system.

2 At least once every 5 years, each TSO shall review its protection strategy and concepts and update them where necessary to ensure the correct functioning of the protection equipment and the maintenance of operational security.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

3 After a protection operation which had an impact outside a TSO's control area including interconnectors, that TSO shall assess whether the protection equipment in its control area worked as planned and shall undertake corrective actions if necessary.

4 Each TSO shall specify setpoints for the protection equipment of its transmission system that ensure reliable, fast and selective fault clearing, including backup protection for fault clearing in case of malfunction of the primary protection system.

F156⁵

Textual Amendments

F156 Art. 36(5) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 32** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 37 **U.K.**

Special protection schemes

Where a TSO uses a special protection scheme, it shall:

- (a) ensure that each special protection scheme acts selectively, reliably and effectively;
- (b) evaluate, when designing a special protection scheme, the consequences for the transmission system in the event of its incorrect functioning, taking into account the impact on TSOs concerned;
- (c) verify that the special protection scheme has a comparable reliability to the protection systems used for the primary protection of transmission system elements;
- (d) operate the transmission system with the special protection scheme within the operational security limits determined in accordance with Article 25; and
- (e) coordinate special protection scheme functions, activation principles and setpoints with ^{F157}... affected transmission-connected DSOs, including closed distribution systems and affected transmission-connected SGUs.

Textual Amendments

F157 Words in Art. 37(e) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 33** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 38 **U.K.**

Dynamic stability monitoring and assessment

1 Each TSO shall monitor the dynamic stability of the transmission system by studies conducted offline in accordance with paragraph 6. Each TSO shall exchange the relevant data

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for monitoring the dynamic stability of the transmission system with the other TSOs of its synchronous area.

2 Each TSO shall perform a dynamic stability assessment at least once a year to identify the stability limits and possible stability problems in its transmission system. All TSOs of each synchronous area shall coordinate the dynamic stability assessments, which shall cover all or parts of the synchronous area.

3 When performing coordinated dynamic stability assessments, concerned TSOs shall determine:

- a the scope of the coordinated dynamic stability assessment ^{F158}....;
- b the set of data to be exchanged between concerned TSOs in order to perform the coordinated dynamic stability assessment;
- c a list of commonly agreed scenarios concerning the coordinated dynamic stability assessment; and
- d a list of commonly agreed contingencies or disturbances whose impact shall be assessed through the coordinated dynamic stability assessment.

4 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 assessment shall be initiated and conducted by the concerned TSOs ^{F159}....

5 When a TSO identifies a potential influence on voltage, rotor angle or frequency stability in relation with other interconnected transmission systems, the TSOs concerned shall coordinate the methods used in the dynamic stability assessment, providing the necessary data, planning of joint remedial actions aiming at improving the stability, including the cooperation procedures between the TSOs.

6 In deciding the methods used in the dynamic stability assessment, each TSO shall apply the following rules:

- a if, with respect to the contingency list, steady-state limits are reached before stability limits, the TSO shall base the dynamic stability assessment only on the offline stability studies carried out in the longer term operational planning phase;
- b if, under planned outage conditions, with respect to the contingency list, steady-state limits and stability limits are close to each other or stability limits are reached before steady-state limits, the TSO shall perform a dynamic stability assessment in the day-ahead operational planning phase while those conditions remain. The TSO shall plan remedial actions to be used in real-time operation if necessary; and
- c if the transmission system is in the N-situation with respect to the contingency list and stability limits are reached before steady-state limits, the TSO shall perform a dynamic stability assessment in all phases of operational planning and re-assess the stability limits as soon as possible after a significant change in the N-situation is detected.

Textual Amendments

F158 Words in Art. 38(3)(a) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 34\(2\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F159 Words in Art. 38(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I.

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2019/533), reg. 1(2), **Sch. 1 para. 34(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 39 **U.K.**

Dynamic stability management

1 Where the dynamic stability assessment indicates that there is a violation of stability limits, the TSOs in whose control area the violation has appeared shall design, prepare and activate remedial actions to keep the transmission system stable. Those remedial actions may involve SGUs.

2 Each TSO shall ensure that the fault clearing times for faults that may lead to wide area state transmission system instability are shorter than the critical fault clearing time calculated by the TSO in its dynamic stability assessment carried out in accordance with Article 38.

3 In relation to the requirements on minimum inertia which are relevant for frequency stability at the synchronous area level:

- a all TSOs of that synchronous area shall conduct, not later than 2 years after entry into force of this Regulation, a common study [^{F160}for the] synchronous area to identify whether the minimum required inertia needs to be established, taking into account the costs and benefits as well as potential alternatives. All TSOs shall notify their studies to their regulatory authorities. All TSOs shall conduct a periodic review and shall update those studies every 2 years;
- b where the studies referred to in point (a) demonstrate the need to define minimum required inertia, all TSOs from the ^{F161}... synchronous area shall jointly develop a methodology for the definition of minimum inertia required to maintain operational security and to prevent violation of stability limits. That methodology shall respect the principles of efficiency and proportionality, be developed within 6 months after the completion of the studies referred to in point (a) and shall be updated within 6 months after the studies are updated and become available; and
- c each TSO shall deploy in real-time operation the minimum inertia in its own control area, according to the methodology defined and the results obtained in accordance with paragraph (b).

Textual Amendments

F160 Words in Art. 39(3)(a) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 35(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F161 Word in Art. 39(3)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 35(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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TITLE 2 U.K.

DATA EXCHANGE

CHAPTER 1 U.K.

General requirements on data exchange

Article 40 U.K.

Organisation, roles, responsibilities and quality of data exchange

1 The exchange and provision of data and information pursuant to this Title shall reflect, to the extent possible, the real and forecasted situation of the transmission system.

2 Each TSO shall be responsible for providing and using high quality data and information.

3 Each TSO shall gather the following information about its observability area and shall exchange this data with all other TSOs to the extent that it is necessary for carrying out the operational security analysis in accordance with Article 72:

- a generation;
- b consumption;
- c schedules;
- d balance positions;
- e planned outages and substation topologies; and
- f forecasts.

4 Each TSO shall represent the information in paragraph (3) as injections and withdrawals at each node of the TSO's individual grid model referred to in Article 64.

5 In coordination with the DSOs and SGUs, each TSO shall determine the applicability and scope of the data exchange based on the following categories:

- a structural data in accordance with Article 48;
- b scheduling and forecast data in accordance with Article 49;
- c real-time data in accordance with Articles 44, 47 and 50; and
- d provisions in accordance with Articles 51, 52 and 53.

6 By 6 months after entry into force of this Regulation, all TSOs shall jointly agree on key organisational requirements, roles and responsibilities in relation to data exchange. ^{F162}... They shall apply to all data exchange provisions in this Title and shall include organisational requirements, roles and responsibilities for the following elements:

- ^{F163}a
- b obligations for DSOs directly connected to the transmission system to inform the TSOs they are connected to, within the agreed timescales, of any changes in the data and information pursuant to this Title;
- c obligations for the adjacent DSOs and/or between the downstream DSO and upstream DSO to inform each other within agreed timescales of any changes in the data and information pursuant to this Title;
- d obligations for SGUs to inform their TSO or DSO, within agreed timescales, about any relevant changes in the data and information established pursuant to this Title;

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- e detailed contents of the data and information established pursuant to this Title, including main principles, type of data, communication means, format and standards to be applied, timing and responsibilities;
- f the time stamping and frequency of delivery of the data and information to be provided by DSOs and SGUs, to be used by TSOs in the different timescales. The frequency of information exchanges for real-time data, scheduled data and update of structural data shall be defined; and
- g the format for the reporting of the data and information established pursuant to this Title.

The organisational requirements, roles and responsibilities shall be published by [^{F164}the national electricity transmission system operator].

7 By 18 months after entry into force of this Regulation, each TSO shall agree with the relevant DSOs on effective, efficient and proportional processes for providing and managing data exchanges between them, including, where required for efficient network operation, the provision of data related to distribution systems and SGUs. Without prejudice to the provisions of paragraph 6(g), each TSO shall agree with the relevant DSOs on the format for the data exchange.

8 Transmission-connected SGUs shall have access to the data related to their commissioned network installations at the connection point.

9 Each TSO shall agree with the transmission-connected DSOs on the scope of additional information to be exchanged between them concerning commissioned network installations.

10 DSOs with a connection point to a transmission system shall be entitled to receive the relevant structural, scheduled and real-time information from the relevant TSOs and to gather the relevant structural, scheduled and real-time information from the neighbouring DSOs. Neighbouring DSOs shall determine, in a coordinated manner, the scope of information that may be exchanged.

Textual Amendments

F162 Words in Art. 40(6) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 36\(a\)\(i\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F163 Art. 40(6)(a) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 36\(a\)\(ii\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F164 Words in Art. 40(6) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 36\(b\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

^{F165} ... U.K.

^{F165} ...

^{F166} Article 41 U.K.

Structural and forecast data exchange

Textual Amendments

F166 Art. 41 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 37** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F167} Article 42 U.K.

Real-time data exchange

Textual Amendments

F167 Art. 42 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 37** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Textual Amendments

F165 Title 2 Ch. 2 number and heading omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 37** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

CHAPTER 3 U.K.

Data exchange between TSOs and DSOs within the TSO's control area

Article 43 U.K.

Structural data exchange

1 Each TSO shall determine the observability area of the transmission-connected distribution systems which is needed for the TSO to determine the system state accurately and efficiently, based on the methodology [^{F168} which must be developed by the regulatory authority from time to time].

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

2 If a TSO considers that a non-transmission-connected distribution system has a significant influence in terms of voltage, power flows or other electrical parameters for the representation of the transmission system's behaviour, such distribution system shall be defined by the TSO as being part of the observability area ^{F169}....

3 The structural information related to the observability area referred to in paragraphs 1 and 2 provided by each DSO to the TSO shall include at least:

- a substations by voltage;
- b lines that connect the substations referred to in point (a);
- c transformers from the substations referred to in point (a);
- d SGUs; and
- e reactors and capacitors connected to the substations referred to in point (a).

4 Each transmission-connected DSO shall provide the TSO with an update of the structural information in accordance with paragraph 3 at least every 6 months.

5 At least once a year, each transmission-connected DSO shall provide the TSO, per primary energy sources, the total aggregated generating capacity of the type A power generating modules subject to requirements of Regulation (EU) 2016/631 and the best possible estimates of generating capacity of type A power generating modules not subject to or derogated from Regulation (EU) 2016/631, connected to its distribution system, and the related information concerning their frequency behaviour.

Textual Amendments

F168 Words in Art. 43(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 38(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F169 Words in Art. 43(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 38(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 44 **U.K.**

Real-time data exchange

Unless otherwise provided by the TSO, each DSO shall provide its TSO, in real-time, the information related to the observability area of the TSO as referred to in Article 43(1) and (2), including:

- (a) the actual substation topology;
- (b) the active and reactive power in line bay;
- (c) the active and reactive power in transformer bay;
- (d) the active and reactive power injection in power generating facility bay;
- (e) the tap positions of transformers connected to the transmission system;
- (f) the busbar voltages;

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- (g) the reactive power in reactor and capacitor bay;
- (h) the best available data for aggregated generation per primary energy source in the DSO area; and
- (i) the best available data for aggregated demand in the DSO area.

CHAPTER 4 U.K.

Data exchange between TSOs, owners of interconnectors or other lines and power generating modules connected to the transmission system

Article 45 U.K.

Structural data exchange

1 Each SGU which is a power generating facility owner of a type D power generating module connected to the transmission system shall provide the TSO with at least the following data:

- a general data of the power generating module, including installed capacity and primary energy source;
- b turbine and power generating facility data including time for cold and warm start;
- c data for short-circuit current calculation;
- d power generating facility transformer data;
- e FCR data of power generating modules offering or providing that service, in accordance with Article 154;
- f FRR data of power generating modules offering or providing that service, in accordance with Article 158;
- g RR data of power generating modules that offer or provide that service in accordance with Article 161;
- h data necessary for restoration of the transmission system;
- i data and models necessary for performing dynamic simulation;
- j protection data;
- ^{F170}k
- l voltage and reactive power control capability.

2 Each SGU which is a power generating facility owner of a type B or a type C power generating module connected to the transmission system shall provide the TSO with at least the following data:

- a general data of the power generating module, including installed capacity and primary energy source;
- b data for short-circuit current calculation;
- c FCR data ^{F171}... for power generating modules offering or providing that service;
- d FRR data for power generating modules that offer or provide that service;
- e RR data for power generating modules that offer or provide that service;
- f protection data;
- g reactive power control capability;
- ^{F172}h
- i data necessary for performing dynamic stability assessment according to Article 38.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

3 A TSO may request the power generating facility owner of a power generating module connected to the transmission system to provide further data where appropriate for operational security analysis in accordance with Title 2 of Part III.

4 Each HVDC system owner or interconnector owner shall provide the TSO with the following data regarding the HVDC system or interconnector:

- a nameplate data of the installation;
- b transformers data;
- c data on filters and filter banks;
- d reactive power compensation data;
- e active power control capability;
- f reactive power and voltage control capability;
- g active or reactive operational mode prioritization, if existing;
- h frequency response capability;
- i dynamic models for dynamic simulation;
- j protection data; and
- k fault-ride-through capability.

5 Each AC interconnector owner shall provide the TSO with at least the following data:

- a nameplate data of the installation;
- b electrical parameters;
- c associated protections.

Textual Amendments

- F170** Art. 45(1)(k) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 39\(2\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F171** Words in Art. 45(2)(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 39\(3\)\(a\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F172** Art. 45(2)(h) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 39\(3\)\(b\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 46 U.K.

Scheduled data exchange

1 Each SGU which is a power generating facility owner of a type B, C or D power generating module connected to the transmission system shall provide the TSO with at least the following data:

- a active power output and active power reserves amount and availability, on a day-ahead and intra-day basis;
- b without any delay, any scheduled unavailability or active power restriction;
- c any forecasted restriction in the reactive power control capability ^{F173} ...

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F173 d

- 2 Each HVDC system operator shall provide the TSOs with at least the following data:
 - a active power schedule and availability on a day-ahead and intra-day basis;
 - b without delay its scheduled unavailability or active power restriction; and
 - c any forecast restriction in the reactive power or voltage control capability.
- 3 Each AC interconnector or line operator shall provide its scheduled unavailability or active power restriction data to the TSOs.

Textual Amendments

F173 Art. 46(1)(d) and word omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 40** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 47 U.K.

Real-time data exchange

- 1 Unless otherwise provided by the TSO, each significant grid user which is a power generating facility owner of type B, C or D power generating module shall provide the TSO, in real-time, at least the following data:
 - a position of the circuit breakers at the connection point or another point of interaction agreed with the TSO;
 - b active and reactive power at the connection point or another point of interaction agreed with the TSO; and
 - c in the case of power generating facility with consumption other than auxiliary consumption net active and reactive power.
- 2 Unless otherwise provided by the TSO, each HVDC system or AC interconnector owner shall provide, in real-time, at least the following data regarding the connection point of the HVDC system or AC interconnector to the TSOs:
 - a position of the circuit breakers;
 - b operational status; and
 - c active and reactive power.

CHAPTER 5 U.K.

Data exchange between TSOs, DSOs and distribution-connected power generating modules

Article 48 U.K.

Structural data exchange

- 1 Unless otherwise provided by the TSO, each power generating facility owner of a power generating module which is a SGU pursuant to Article 2(1)(a) and by aggregation of the

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SGUs pursuant to Article 2(1)(e) connected to the distribution system shall provide at least the following data to the TSO and to the DSO to which it has a connection point:

- a general data of the power generating module, including installed capacity and primary energy source or fuel type;
- b FCR data ^{F174} ... for power generating facilities offering or providing the FCR service;
- c FRR data for power generating facilities offering or providing the FRR service;
- d RR data for power generating modules offering or providing the RR service;
- e protection data;
- f reactive power control capability;
- g capability of remote access to the circuit breaker;
- h data necessary for performing dynamic simulation according to the provisions in Regulation (EU) 2016/631; and
- i voltage level and location of each power generating module.

2 Each power generating facility owner of a power generating module which is a SGU in accordance with Article 2(1)(a) and (e) shall inform the TSO and the DSO to which it has a connection point, within the agreed time and not later than the first commissioning or any changes to the existing installation, about any change in the scope and the contents of the data listed in paragraph 1.

Textual Amendments

F174 Words in Art. 48(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 41** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 49 **U.K.**

Scheduled data exchange

Unless otherwise provided by the TSO, each power generating facility owner of a power generating module which is a SGU in accordance with Article 2(1)(a) and 2(1)(e) connected to the distribution system shall provide the TSO and the DSO to which it has the connection point, with at least the following data:

- (a) its scheduled unavailability, scheduled active power restriction and its forecasted scheduled active power output at the connection point;
- (b) any forecasted restriction in the reactive power control capability ^{F175} ...
- (c) ^{F175} ...

Textual Amendments

F175 Art. 49(c) and word omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 42** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 50 **U.K.**

Real-time data exchange

1 Unless otherwise provided by the TSO, each power generating facility owner of a power generating module which is a SGU in accordance with Article 2(1)(a) and (e) connected to the distribution system shall provide the TSO and the DSO to which it has the connection point, in real-time, at least the following data:

- a status of the switching devices and circuit breakers at the connection point; and
- b active and reactive power flows, current, and voltage at the connection point.

2 Each TSO shall define in coordination with the responsible DSOs which SGUs may be exempted from providing the real-time data listed in paragraph 1 directly to the TSO. In such cases, the responsible TSOs and DSOs shall agree on the aggregated real-time data of the SGUs concerned to be delivered to the TSO.

Article 51 **U.K.**

Data exchange between TSOs and DSOs concerning significant power generating modules

1 Unless otherwise provided by the TSO, each DSO shall provide to its TSO the information specified in Articles 48, 49 and 50 with the frequency and level of detail requested by the TSO.

2 Each TSO shall make available to the DSO, to whose distribution system SGUs are connected, the information specified in Articles 48, 49 and 50 as requested by the DSO.

3 A TSO may request further data from a power generating facility owner of a power generating module which is a SGU in accordance with Article 2(1)(a) and (e) connected to the distribution system, if it is necessary for the operational security analysis and for the validation of models.

CHAPTER 6 **U.K.**

Data exchange between TSOs and demand facilities

Article 52 **U.K.**

Data exchange between TSOs and transmission-connected demand facilities

1 Unless otherwise provided by the TSO, each transmission-connected demand facility owner shall provide the following structural data to the TSO:

- a electrical data of the transformers connected to the transmission system;
- b characteristics of the load of the demand facility; and
- c characteristics of the reactive power control.

2 Unless otherwise provided by the TSO, each transmission-connected demand facility owner shall provide the following data to the TSO:

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- a scheduled active and forecasted reactive power consumption on a day-ahead and intraday basis, including any changes of those schedules or forecast;
 - b any forecasted restriction in the reactive power control capability;
 - c in case of participation in demand response, a schedule of its structural minimum and maximum power range to be curtailed^{F176} ...
 - ^{F176}d
- 3 Unless otherwise provided by the TSO, each transmission-connected demand facility owner shall provide the following data to the TSO in real-time:
- a active and reactive power at the connection point; and
 - b the minimum and maximum power range to be curtailed.
- 4 Each transmission-connected demand facility owner shall describe to its TSO its behaviour at the voltage ranges referred to in Article 27.

Textual Amendments

F176 Art. 52(2)(d) and word omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 43** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 53 **U.K.**

Data exchange between TSOs and distribution-connected demand facilities or third parties participating in demand response

- 1 Unless otherwise provided by the TSO, each SGU which is a distribution-connected demand facility and which participates in demand response other than through a third party shall provide the following scheduled and real-time data to the TSO and to the DSO:
- a structural minimum and maximum active power available for demand response and the maximum and minimum duration of any potential usage of this power for demand response;
 - b a forecast of unrestricted active power available for demand response and any planned demand response;
 - c real-time active and reactive power at the connection point; and
 - d a confirmation that the estimations of the actual values of demand response are applied.
- 2 Unless otherwise provided by the TSO, each SGU which is a third party participating in demand response as defined in Article 27 of Regulation (EU) 2016/1388, shall provide the TSO and the DSO at the day-ahead and close to real-time and on behalf of all of its distribution-connected demand facilities, with the following data:
- a structural minimum and maximum active power available for demand response and the maximum and minimum duration of any potential activation of demand response in a specific geographical area defined by the TSO and DSO;
 - b a forecast of unrestricted active power available for the demand response and any planned level of demand response in a specific geographical area defined by the TSO and DSO;
 - c real-time active and reactive power; and
 - d a confirmation that the estimations of the actual values of demand response are applied.

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TITLE 3 U.K.

COMPLIANCE

CHAPTER 1 U.K.

Roles and responsibilities

Article 54 U.K.

Responsibility of the SGUs

1 Each SGU shall notify the TSO or DSO to which it has a connection point about any planned modification of its technical capabilities which could have an impact on its compliance with the requirements of this Regulation, prior to its execution.

2 Each SGU shall notify the TSO or DSO to which it has a connection point about any operational disturbance in its facility which could have an impact on its compliance with the requirements of this Regulation as soon as possible after its occurrence.

3 Each SGU shall notify the TSO or DSO to which it has a connection point of the planned test schedules and procedures to be followed for verifying the compliance of its facility with the requirements of this Regulation, in due time and prior to their launch. The TSO or DSO shall approve in advance and in a timely manner the planned test schedules and procedures and the approval shall not be unreasonably withheld. Where the SGU has a connection point to the DSO and interacts, pursuant to paragraph 2, only with the DSO, the TSO shall be entitled to request from the concerned DSO any compliance testing results, which are relevant for the operational security of its transmission system.

4 Upon request from the TSO or DSO, pursuant to Article 41(2) of Regulation (EU) 2016/631 and Article 35(2) of Regulation (EU) 2016/1388, the SGU shall carry out compliance tests and simulations in accordance with those Regulations at any time throughout the lifetime of its facility and in particular after any fault, modification or replacement of any equipment, which could have an impact on the facility's compliance with the requirements of this Regulation regarding the capability of the facility to achieve the values declared, the time requirements applicable to those values and the availability or contracted provision of ancillary services. Third parties providing demand response directly to the TSO, providers of redispatching of power generating modules or demand facilities by means of aggregation, and other providers of active power reserves shall ensure that the facilities in their portfolio comply with the requirements of this Regulation.

Article 55 U.K.

Tasks of TSOs regarding system operation

Each TSO shall be responsible for the operational security of its control area and, in particular, it shall:

- (a) develop and implement network operation tools that are relevant for its control area and related to real-time operation and operational planning;
- (b) develop and deploy tools and solutions for the prevention and remedy of disturbances;

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- (c) use services provided by third parties, through procurement when applicable, such as redispatching or countertrading, congestion management services, generation reserves and other ancillary services;
- (d) comply with the incidents classification scale adopted ^{F177}... in accordance with [^{F178}Article 30(1)(i) of Regulation (EU) 2019/943 as that provision applied in EU law immediately before IP completion day] and submit to [^{F179}the national electricity transmission system operator] the information required to perform the tasks for producing the incidents classification scale; and
- (e) monitor on an annual basis the appropriateness of the network operation tools established pursuant to points (a) and (b) required to maintain operational security. Each TSO shall identify any appropriate improvements to those network operation tools, taking into account the annual reports prepared by [^{F180}the national electricity transmission system operator] based on the incidents classification scale in accordance with Article 15. Any identified enhancement shall be implemented subsequently by the TSO.

Textual Amendments

F177 Words in Art. 55(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 44(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F178 Words in Art. 55(d) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 44(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(j)**); 2020 c. 1, **Sch. 5 para. 1(1)**

F179 Words in Art. 55(d) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 44(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F180 Words in Art. 55(e) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 44(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

CHAPTER 2 **U.K.**

Operational testing

Article 56 **U.K.**

Purpose and responsibilities

1 Each TSO and each transmission-connected DSO or SGU may perform operational testing respectively of its transmission system elements and of their facilities under simulated operational conditions and for a limited period of time. When doing so, they shall provide notification in due time and prior to the test launch and shall minimise the effect on real-time system operation. The operational testing shall aim at providing:

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- a proof of compliance with all relevant technical and organisational operational provisions of this Regulation for a new transmission system element at its first entry into operation;
- b proof of compliance with all relevant technical and organisational operational provisions of this Regulation for a new facility of the SGU or of DSO at its first entry into operation;
- c proof of compliance with all relevant technical and organisational operational provisions of this Regulation upon any change of a transmission system element or a facility of the SGU or of the DSO, which is relevant for system operation;
- d assessment of possible negative effects of a failure, short-circuit or other unplanned and unexpected incident in system operation, on the transmission system element, or on the facility of the SGU or of the DSO.

2 The results of the operational testing referred to in paragraph 1 shall be used by a TSO, DSO or a SGU, in order for:

- a the TSO to ensure correct functioning of transmission system elements;
- b the DSO and SGUs to ensure correct functioning of distribution systems and of the SGUs' facilities;
- c the TSO, DSO or SGU to maintain existing and develop new operational practices;
- d the TSO to ensure fulfilment of ancillary services;
- e the TSO, DSO or SGU to acquire information about performance of transmission system elements and facilities of the SGUs and DSOs under any conditions and in compliance with all relevant operational provisions of this Regulation, in terms of:
 - (i) controlled application of frequency or voltage variations aimed at gathering information on transmission system and elements' behaviour; and
 - (ii) tests of operational practices in emergency state and restoration state.

3 Each TSO shall ensure that operational testing does not endanger the operational security of its transmission system. Any operational testing may be postponed or interrupted due to unplanned system conditions, or due to safety of personnel, of the general public, of the plant or apparatus being tested, or of transmission system elements or of the facilities of the DSO or SGU.

4 In the event of degradation of the state of the transmission system in which the operational testing is performed, the TSO of that transmission system shall be entitled to interrupt the operational testing. If conducting a test affects another TSO and its system state is also degraded, the TSO or SGU or DSO conducting the test shall, upon being informed by the TSO concerned, immediately cease the operational test.

5 Each TSO shall ensure that the results of relevant operational tests carried out together with all related analyses are:

- a incorporated into the training and certification process of the employees in charge of real-time operation;
- ^{F181}b
- c used to improve operational practices including also those in emergency and restoration state.

Textual Amendments

F181 Art. 56(5)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I.](#)

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2019/533), reg. 1(2), **Sch. 1 para. 45** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

Article 57 **U.K.**

Performing operational tests and analysis

1 Each TSO or DSO to which the SGU has a connection point retains the right to test a SGU's compliance with the requirements of this Regulation, the SGU's expected input or output and the SGU's contracted provision of ancillary services at any time throughout the lifetime of the facility. The procedure for those operational tests shall be notified to the SGU by the TSO or DSO in due time prior to the launch of the operational test.

2 The TSO or DSO to which the SGU has a connection point shall publish the list of information and documents to be provided as well as the requirements to be fulfilled by the SGU for operational testing of compliance. Such list shall cover at least the following information:

- a all documentation and equipment certificates to be provided by the SGU;
- b details of the technical data of the SGU facility with relevance for the system operation;
- c requirements for models for dynamic stability assessment; and
- d studies by the SGU demonstrating expected outcome of the dynamic stability assessment, where applicable.

3 Where applicable, each TSO or DSO shall publish the allocation of responsibilities of the SGU and of the TSO or DSO for operational testing of compliance.

TITLE 4 **U.K.**

TRAINING

Article 58 **U.K.**

Training program

1 By 18 months after entry into force of this Regulation each TSO shall develop and adopt:

- a an initial training program for the certification and a rolling program for the continuous training of its employees in charge of real-time operation of the transmission system;
- b a training program for its employees in charge of operational planning. ^{F182} ...
- c a training program for its employees in charge of balancing.

2 The TSO's training programs shall include the knowledge of the transmission system elements, the operation of the transmission system, use of the on-the-job systems and processes, inter-TSO operations, market arrangements, recognising of and responding to exceptional situations in system operation, operational planning activities and tools.

3 TSO employees in charge of real-time operation of transmission system shall, as a part of its initial training, undergo training on interoperability issues between transmission systems based upon operational experiences ^{F183} ... ^{F184} ...

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

4 Each TSO shall include in its training program for the employees in charge of real-time operation of the transmission system the frequency of the trainings and the following components:

- a a description of the transmission system elements;
- b operation of the transmission system in all system states including restoration;
- c use of the on-the-job systems and processes;
- d coordination of inter-TSO operations and market arrangements;
- e recognition of and response to exceptional operational situations;
- f relevant areas of electrical power engineering;
- ^{F185}g
- h relevant aspects of the network codes or guidelines adopted according to Articles 6 and 18 of Regulation (EC) No 714/2009 [^{F186}before 1 January 2020 or according to Articles 59 and 61 of Regulation (EU) 2019/943 as they apply in domestic law];
- i safety and security of persons, nuclear and other equipment in transmission system operation;
- j inter-TSO cooperation and coordination in real-time operation and in operational planning at the level of main control rooms ^{F187}....;
- k joint training with transmission-connected DSOs and SGUs, where appropriate;
- l behavioural skills with particular focus on stress management, human acting in critical situation, responsibility and motivation skills; and
- m operational planning practices and tools ^{F188}....

5 The training program for employees in charge of operational planning shall include at least the aspects in points (c), (f), ^{F189}... (h), (j) and (m) of paragraph 4.

6 The training program for employees in charge of balancing shall include at least the aspects in points (c) ^{F190}... and (h) of paragraph 4.

7 Each TSO shall maintain records of employees' training programs for their period of employment. Upon request of the ^{F191}... regulatory authority, each TSO shall provide the scope and details of its training programs.

8 Each TSO shall review its training programs at least annually or following significant system changes. Each TSO shall update its training programs to reflect changing operational circumstances, market rules, network configuration and system characteristics, with particular focus on new technologies, changing generation and demand patterns and market evolution.

Textual Amendments

F182 Words in Art. 58(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 46\(2\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F183 Words in Art. 58(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 46\(3\)\(a\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F184 Words in Art. 58(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 46\(3\)\(b\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- F185** Art. 58(4)(g) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F186** Words in Art. 58(4)(h) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)(3)(k)**); 2020 c. 1, **Sch. 5 para. 1(1)**
- F187** Words in Art. 58(4)(j) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F188** Words in Art. 58(4)(m) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(4)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F189** Word in Art. 58(5) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F190** Word in Art. 58(6) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F191** Word in Art. 58(7) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 46(7)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 59 **U.K.**

Training conditions

1 Each TSO's training programs for employees in charge of real-time operation shall include on-the-job and offline training. On-the-job training shall be carried out under the supervision of an experienced employee in charge of real-time operation. Offline training shall be carried out in an environment which simulates the control room and with network modelling details at a level appropriate to the tasks being trained for.

2 Each TSO shall implement training for employees in charge of real-time operation based on a comprehensive database model of their network with respective data from other networks of, at least, the observability area, at a level of detail which is sufficient to replicate inter-TSO operational issues. Training scenarios shall be based on real and simulated system conditions. Where relevant, the role of other TSOs, transmission-connected DSOs and significant grid users shall also be simulated unless they can be directly represented in joint trainings.

3 Each TSO shall coordinate the offline training of the employees in charge of real-time operation with the transmission-connected DSOs and SGUs regarding the impact of their facilities on real-time operation of the transmission system, in a comprehensive and proportionate manner, reflecting the up-to-date network topology and characteristics of

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

secondary equipment. When relevant, TSOs, transmission-connected DSOs and SGUs shall run joint offline training simulations or training workshops.

Article 60 **U.K.**

Training coordinators and trainers

- 1 The training coordinator's responsibilities shall include the designing, monitoring and updating of the training programs, as well as the determination of:
 - a the qualifications and selection process for TSO employees to be trained;
 - b the training required for certification of the system operator employees in charge of real-time operation;
 - c the processes, including relevant documentation, for the initial and the rolling training programs;
 - d the process for certification of system operator employees in charge of real-time operation; and
 - e the process for extension of a training period and certification period for the system operator employees in charge of real-time operation.
- 2 Each TSO shall determine the skills and the level of competence of on-the-job trainers. On-the-job trainers shall have an appropriate level of operational experience following their certification.
- 3 Each TSO shall have a register of the system operator employees in charge of real-time operation who carry out the functions of on-the-job trainers and review their capability to provide practical training when deciding upon the extension of their certification.

Article 61 **U.K.**

Certification of system operator employees in charge of real-time operation

- 1 An individual may become a system operator employee in charge of real-time operation provided he or she is trained and subsequently certified by a nominated representative from his or her TSO for the concerned tasks within the timescale defined in the training programme. A system operator employee in charge of real-time operation shall not work unsupervised in the control room unless he or she is certified.
- 2 By 18 months after entry into force of this Regulation, each TSO shall define and implement a process, including the level of competence, for the certification of the system operator employees in charge of real-time operation.
- 3 TSO employees in charge of real-time operation shall be certified following a successful formal assessment which shall comprise an oral and/or a written exam, and/or a practical assessment with pre-defined success criteria.
- 4 The TSO shall keep a copy of the issued certificate and of the formal assessment results. Upon request by the regulatory authority, the TSO shall provide a copy of the certification examination records.
- 5 Each TSO shall record the period of validity of the certification issued to any employee in charge of real-time operation.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

6 Each TSO shall determine the maximum period of the certification, which shall not exceed 5 years but which may be extended on the basis of criteria determined by each TSO, and may take into account the participation of employees in charge of real-time operation in a continuous training programme with sufficient practical experience.

^{F192}Article 62 U.K.

Common language for communication between the system operator employees in charge of real time operation

Textual Amendments

F192 Art. 62 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 47** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F193}Article 63 U.K.

Cooperation between TSOs on training

Textual Amendments

F193 Art. 63 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 47** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

PART III U.K.

OPERATIONAL PLANNING

TITLE 1 U.K.

DATA FOR OPERATIONAL SECURITY ANALYSIS IN OPERATIONAL PLANNING

Article 64 U.K.

General provisions regarding individual ^{F194}... grid models

1 To perform operational security analysis pursuant to Title 2 of this Part, each TSO shall prepare individual grid models [^{F195}for each of the following time frames]:

a year-ahead, in accordance with Articles 66 ^{F196}... and 68;

^{F197}b

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- c day-ahead^{F198} ...; and
 d intraday^{F199}
- F200²
- F201³

Textual Amendments

- F194** Words in Art. 64 heading omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F195** Words in Art. 64(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F196** Word in Art. 64(1)(a) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F197** Art. 64(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(3)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F198** Words in Art. 64(1)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(3)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F199** Words in Art. 64(1)(d) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(3)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F200** Art. 64(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F201** Art. 64(3) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 48(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 65 **U.K.**

Year-ahead scenarios

1 All TSOs shall jointly develop a common list of year-ahead scenarios against which they assess the operation of the interconnected transmission system for the following year. Those scenarios shall allow the identification and the assessment of the influence of the interconnected transmission system on operational security. The scenarios shall include the following variables:

- a electricity demand;
- b the conditions related to the contribution of renewable energy sources;

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- c determined import/export positions, including agreed reference values allowing the merging task;
 - d the generation pattern, with a fully available production park;
 - e the year-ahead grid development.
- 2 When developing the common list of scenarios, TSOs shall take into account the following elements:
- a the typical cross-border exchange patterns for different levels of consumption and of renewable energy sources and conventional generation;
 - b the probability of occurrence of the scenarios;
 - c the potential deviations from operational security limits for each scenario;
 - d the amount of power generated and consumed by the power generating facilities and demand facilities connected to distribution systems.
- 3 Where TSOs do not succeed in establishing the common list of scenarios referred to in paragraph 1, they shall use the following default scenarios:
- a Winter Peak, 3rd Wednesday of January current year, 10:30 CET;
 - b Winter Valley, 2nd Sunday of January current year, 03:30 CET;
 - c Spring Peak, 3rd Wednesday of April current year, 10:30 CET;
 - d Spring Valley, 2nd Sunday of April current year, 03:30 CET;
 - e Summer Peak, 3rd Wednesday of July previous year, 10:30 CET;
 - f Summer Valley, 2nd Sunday of July previous year, 03:30 CET;
 - g Autumn Peak, 3rd Wednesday of October previous year, 10:30 CET;
 - h Autumn Valley, 2nd Sunday of October previous year, 03:30 CET.
- 4 ^[F202]The national electricity transmission system operator shall publish every year, by 15 July, the common list of scenarios established for the following year, including the description of those scenarios and the period during which these scenarios are to be used.

Textual Amendments

F202 Words in Art. 65(4) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 49** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 66 U.K.

Year-ahead individual grid models

- 1 Each TSO shall determine a year-ahead individual grid model for each of the scenarios developed pursuant to Article 65, using its best estimates of the variables defined in Article 65(1). ^{F203}...
- 2 When defining its year-ahead individual grid model, each TSO shall:
- ^{F204}a
 - b balance for each scenario the sum of:
 - (i) net exchanges on AC lines;
 - (ii) estimated power flows on HVDC systems;

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- (iii) load, including an estimation of losses; and
- (iv) generation.

3 Each TSO shall include in its year-ahead individual grid models the aggregated power outputs for power generating facilities connected to distribution systems. Those aggregated power outputs shall:

- a be consistent with the structural data provided in accordance with the requirements of Articles ^{F205}... 43, 45 and 48;
- b be consistent with the scenarios developed in accordance with Article 65; and
- c distinguish the type of primary energy source.

Textual Amendments

F203 Words in Art. 66(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 50(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F204 Art. 66(2)(a) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 50(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F205 Word in Art. 66(3)(a) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 50(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F206} Article 67 **U.K.**

Year-ahead common grid models

Textual Amendments

F206 Art. 67 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 51** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 68 **U.K.**

Updates of year-ahead individual ^{F207}... grid models

1 When a TSO modifies or notices a modification of its best estimates for the variables used for determining its year-ahead individual grid model established in accordance with Article 66(1), which is significant for operational security, it shall update its year-ahead individual grid model ^{F208}....

^{F209}2

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

- F207** Words in Art. 68 heading omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 52(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F208** Words in Art. 68(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 52(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F209** Art. 68(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 52(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F210} Article 69 **U.K.**

Week-ahead individual and common grid models

Textual Amendments

- F210** Arts. 69-71 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 53** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F210} Article 70 **U.K.**

Methodology for building day-ahead and intraday common grid models

Textual Amendments

- F210** Arts. 69-71 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 53** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F210} Article 71 **U.K.**

Quality control for grid models

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F210 Arts. 69-71 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 53** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 2 **U.K.**

OPERATIONAL SECURITY ANALYSIS

Article 72 **U.K.**

Operational security analysis in operational planning

1 Each TSO shall perform ^{F211}... operational security analyses for at least the following time-frames:

- a year-ahead;
- ^{F212}b
- c day-ahead; and
- d intraday.

^{F213}2

3 To perform operational security analyses, each TSO shall, in the N-Situation, simulate each contingency from its contingency list established in accordance with Article 33 and verify that, in the (N-1)-situation, the operational security limits defined in accordance with Article 25 are not exceeded in its control area.

^{F214}4

^{F215}5

Textual Amendments

F211 Word in [Art. 72\(1\)](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 54(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F212 [Art. 72\(1\)\(b\)](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 54(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F213 [Art. 72\(2\)](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 54(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F214 [Art. 72\(4\)](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 54(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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F215 Art. 72(5) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 54(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 73 **U.K.**

Year-ahead ^{F216} ... operational security analysis

1 Each TSO shall perform year-ahead ^{F217} ... operational security analyses in order to detect at least the following constraints:

- a power flows and voltages exceeding operational security limits;
- b violations of stability limits of the transmission system identified in accordance with Article 38(2) and (6); and
- c violations of short-circuit thresholds of the transmission system.

2 When a TSO detects a possible constraint, it shall design remedial actions in accordance with Articles 20 to 23. If remedial actions without costs are not available and the constraint is linked to the planned unavailability of some relevant assets, the constraint shall constitute an outage planning incompatibility and the TSO shall initiate outage coordination in accordance with Article 95 or 100 depending of the time of the year when this action is initiated.

Textual Amendments

F216 Words in Art. 73 heading omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 55(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F217 Words in Art. 73(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 55(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 74 **U.K.**

Day-ahead, intraday and close to real-time operational security analysis

1 Each TSO shall perform day-ahead, intraday and close to real-time operational security analyses to detect possible constraints and prepare and activate the remedial actions with any other concerned TSOs and, if applicable, affected DSOs or SGUs.

2 Each TSO shall monitor load and generation forecasts. When those forecasts indicate a significant deviation in load or generation, the TSO shall update its operational security analysis.

3 When performing close to real-time operational security analysis in its observability area, each TSO shall use state estimation.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

^{F218}Article 75 **U.K.**

Methodology for coordinating operational security analysis

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F218}Article 76 **U.K.**

Proposal for regional operational security coordination

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F218}Article 77 **U.K.**

Organisation for regional operational security coordination

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F218}Article 78 **U.K.**

Regional operational security coordination

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F218}Article 79 **U.K.**

Common grid model building

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F218}Article 80 **U.K.**

Regional outage coordination

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F218}Article 81 **U.K.**

Regional adequacy assessment

Textual Amendments

F218 Arts. 75-81 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 56** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

TITLE 3 **U.K.**

OUTAGE COORDINATION

CHAPTER 1 **U.K.**

Outage [^{F219}planning agents], relevant assets

^{F220}Article 82 **U.K.**

Outage coordination objective

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F220}Article 83 **U.K.**

Regional coordination

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F220}Article 84 **U.K.**

Methodology for assessing the relevance of assets for outage coordination

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

^{F220}Article 85 **U.K.**

Lists of relevant power generating modules and relevant demand facilities

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F220}Article 86 **U.K.**

Update of the lists of relevant power generating modules and relevant demand facilities

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F220}Article 87 **U.K.**

Lists of relevant grid elements

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F220}Article 88 **U.K.**

Update of the list of relevant grid elements

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F220 Arts. 82-88 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 58** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 89 **U.K.**

Appointment of outage planning agents

- 1 Each TSO shall act as the outage planning agent for each relevant grid element it operates.
- 2 For all other relevant assets, the owner shall appoint, or act as, the outage planning agent for the concerned relevant asset and shall inform its TSO about that appointment.

Article 90 **U.K.**

Treatment of relevant assets located in a distribution system or in a closed distribution system

- 1 Each TSO shall coordinate with the DSO the outage planning of internal relevant assets connected to its distribution system.
- 2 Each TSO shall coordinate with the CDSO the outage planning of internal relevant assets connected to its closed distribution system.

Textual Amendments

F219 Words in [Pt. 3 Title 3 Ch. 1](#) substituted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 57** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

CHAPTER 2 **U.K.**

Development and update of availability plans of relevant assets

Article 91 **U.K.**

Variations to deadlines for the year-ahead outage coordination

All TSOs within a synchronous area may jointly agree to adopt and implement a time-frame for the year-ahead outage coordination that deviates from the time-frame defined in Articles 94, 97 and 99 ^{F221}....

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F221 Words in [Art. 91](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), [reg. 1\(2\)](#), [Sch. 1 para. 59](#) (as amended by [S.I. 2020/1016](#), [regs. 1\(2\)](#), [6\(2\)](#)); 2020 c. 1, [Sch. 5 para. 1\(1\)](#)

Article 92 U.K.

General provisions on availability plans

- 1 The availability status of a relevant asset shall be one of the following:
 - a ‘available’ where the relevant asset is capable of and ready for providing service regardless of whether it is or it is not in operation;
 - b ‘unavailable’ where the relevant asset is not capable of or ready for providing service;
 - c ‘testing’ where the capability of the relevant asset for providing service is being tested.
- 2 The ‘testing’ status shall only apply in case of a potential impact on the transmission system and for the following time periods:
 - a between first connection and final commissioning of the relevant asset; and
 - b directly following maintenance of the relevant asset.
- 3 The availability plans shall contain at least the following information:
 - a the reason for the ‘unavailable’ status of a relevant asset;
 - b where such conditions are identified, the conditions to be fulfilled before applying the ‘unavailable’ status of a relevant asset in real-time;
 - c the time required to restore a relevant asset back to service where necessary in order to maintain operational security.
- 4 The availability status for each relevant asset in the year-ahead time-frame shall be provided with daily resolution.
- 5 When generation schedules and consumption schedules are submitted to the TSO pursuant to Article 111, the time resolution of the availability statuses shall be consistent with those schedules.

Article 93 U.K.

Long-term indicative availability plans

- 1 By 2 years before the start of any year-ahead outage coordination, each TSO shall assess the corresponding indicative availability plans for internal relevant assets, provided by the outage planning agents in accordance with Articles 4, 7 and 15 of Regulation (EU) No 543/2013, and shall provide its preliminary comments including any detected outage planning incompatibilities, to all affected outage planning agents.
- 2 Each TSO shall carry out the assessment concerning the indicative availability plans for internal relevant assets referred to in paragraph 1 every year until the start of the year-ahead outage coordination.

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Article 94 **U.K.**

Provision of year-ahead availability plan proposals

1 Before 1 August of each calendar year, an outage planning agent other than a TSO ^{F222} ..., a DSO or a CDSO, shall submit to the TSO(s) ^{F222} ..., and where relevant to the DSO(s) or CDSO(s), an availability plan covering the following calendar year for each of its relevant assets.

2 The TSO(s) referred to in paragraph 1 shall endeavour to examine the requests for amendment of an availability plan when received. Where this is not possible, it shall examine the requests for amendment of an availability plan after the year-ahead outage coordination has been finalised.

3 The TSO(s) referred to in paragraph 1 shall examine the requests for amendment of an availability plan after the year-ahead outage coordination has been finalised:

- a following the order in which the requests were received; and
- b applying the procedure established in accordance with Article 100.

Textual Amendments

F222 Words in Art. 94(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 60** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 95 **U.K.**

Year-ahead coordination of the availability status of relevant assets for which the outage planning agent is not a TSO ^{F223} ..., nor a DSO or a CDSO

1 Each TSO shall assess on a year-ahead time-frame whether outage planning incompatibilities arise from the availability plans received pursuant to Article 94.

2 When a TSO detects outage planning incompatibilities, it shall implement the following process:

- a inform each affected outage planning agent of the conditions it shall fulfil to mitigate the detected outage planning incompatibilities;
- b the TSO may request that one or more outage planning agents submit an alternative availability plan fulfilling the conditions referred to in point (a); and
- c the TSO shall repeat the assessment pursuant to paragraph 1 to determine whether any outage planning incompatibilities remain.

3 Following a TSO's request in accordance with point (b) of paragraph 2, if the outage planning agent fails to submit an alternative availability plan aimed at mitigating all outage planning incompatibilities, the TSO shall develop an alternative availability plan which shall:

- a take into account the impact reported by the affected outage planning agents as well as the DSO or CDSO where relevant;
- b limit the changes in the alternative availability plan to what is strictly necessary to mitigate the outage planning incompatibilities; and

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- c notify [^{F224}the regulatory authority], the affected DSOs and CDSOs if any, and the affected outage planning agents about the alternative availability plan, including the reasons for developing it, as well as the impact reported by the affected outage planning agents and, where relevant, the DSOs or CDSOs.

Textual Amendments

- F223** Words in Art. 95 heading omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 61(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F224** Words in Art. 95(3)(c) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 61(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 96 **U.K.**

Year-ahead coordination of the availability status of relevant assets for which the outage planning agent is a TSO ^{F225} ..., a DSO or a CDSO

- 1 Each TSO shall plan the availability status of relevant grid elements interconnecting different control areas for which it acts as an outage planning agent in coordination with [^{F226}other TSOs].
- 2 Each TSO, DSO and CDSO shall plan the availability status of the relevant grid elements for which they perform duties of outage planning agents and that are not interconnecting different control areas, using as a basis the availability plans developed in accordance with paragraph 1.
- 3 When establishing the availability status of relevant grid elements in accordance with paragraphs 1 and 2, the TSO, DSO and CDSO shall:
- minimize the impact on the market while preserving operational security; and
 - use as a basis the availability plans submitted and developed in accordance with Article 94.
- 4 Where a TSO detects an outage planning incompatibility, the TSO shall be entitled to propose a change to the availability plans of the internal relevant assets for which the outage planning agent is neither a TSO ^{F227} ..., nor a DSO or a CDSO and shall identify a solution in coordination with the outage planning agents, DSOs and CDSOs concerned, using the means at its disposal.
- 5 Where the ‘unavailable’ status of a relevant grid element has not been planned after taking the measures in paragraph 4 and the absence of such planning would threaten operational security, the TSO shall:
- take the necessary actions to plan the ‘unavailable’ status while ensuring operational security, taking into account the impact reported to the TSO by affected outage planning agents;
 - notify the actions referred to in point (a) to all affected parties; and
 - notify the [^{F228}regulatory authority], the affected DSOs or CDSOs if any and the affected outage planning agents of the actions taken, including the rationale for such actions,

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the impact reported by affected outage planning agents and the DSOs or CDSOs where relevant.

6 Each TSO shall make available [^{F229}to the other TSOs of the GB synchronous area] all information at its disposal about grid-related conditions to be fulfilled and remedial actions to be prepared and activated before executing the ‘unavailable’ or ‘testing’ availability status of a relevant grid element.

Textual Amendments

- F225** Words in Art. 96 heading omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 62(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F226** Words in Art. 96(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 62(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F227** Words in Art. 96(4) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 62(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F228** Words in Art. 96(5)(c) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 62(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F229** Words in Art. 96(6) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 62(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 97 **U.K.**

Provision of preliminary year-ahead availability plans

1 Before 1 November of each calendar year, each TSO shall provide to all other TSOs [^{F230}of the GB synchronous area] the preliminary year-ahead availability plans for the following calendar year for all the internal relevant assets.

2 Before 1 November of each calendar year, for each internal relevant asset located in a distribution system, the TSO shall provide the DSO with the preliminary year-ahead availability plan.

3 Before 1 November of each calendar year, for every internal relevant asset located in a closed distribution system, the TSO shall provide the CDSO with the preliminary year-ahead availability plan.

Textual Amendments

- F230** Words in Art. 97(1) substituted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I.

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2019/533), reg. 1(2), **Sch. 1 para. 63** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 98 **U.K.**

Validation of year-ahead availability plans ^{F231} ...

1 Each TSO shall analyse whether any outage planning incompatibility arises when taking into account all the preliminary year-ahead availability plans.

^{F232}2

3 If a TSO detects an outage planning incompatibility, the involved TSOs ^{F233} ... shall jointly identify a solution in coordination with the concerned outage planning agents, DSOs and CDSOs, using the means at their disposal, while respecting to the extent possible the availability plans submitted by outage planning agents, which are neither a TSO ^{F234} ... nor a DSO or a CDSO, and developed in accordance with Articles 95 and 96. Where a solution is identified, all TSOs ^{F235} ... shall update and validate the year-ahead availability plans for all relevant assets.

4 Where no solution is found for an outage planning incompatibility each concerned TSO, subject to approval by the [^{F236}regulatory authority], shall:

- a force to ‘available’ status all the ‘unavailable’ or ‘testing’ statuses for the relevant assets involved in an outage planning incompatibility during the period concerned; and
- b notify to the [^{F237}regulatory authority], the affected DSOs or CDSOs, if any, and the affected outage planning agents of the actions taken including the rationale for such actions, the impact reported by affected outage planning agents and the DSOs or CDSOs where relevant.

5 All TSOs ^{F238} ... shall consequently update and validate the year-ahead availability plans for all relevant assets.

Textual Amendments

F231 Words in Art. 98 heading omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F232 Art. 98(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F233 Words in Art. 98(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(4)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F234 Words in Art. 98(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(4)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F235 Words in Art. 98(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I.

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2019/533), reg. 1(2), **Sch. 1 para. 64(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F236 Words in Art. 98(4) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(5)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F237 Words in Art. 98(4)(b) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(5)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F238 Words in Art. 98(5) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 64(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 99 U.K.

Final year-ahead availability plans

- 1 Before 1 December of each calendar year, each TSO shall:
 - a finalise the year-ahead outage coordination of internal relevant assets; and
 - b finalise the year-ahead availability plans for internal relevant assets ^{F239} ...
- 2 Before 1 December of each calendar year, the TSO shall provide to its outage planning agent the final year-ahead availability plan of each internal relevant asset.
- 3 Before 1 December of each calendar year, the TSO shall provide to the relevant DSO the final year-ahead availability plan for each internal relevant asset located in a distribution system.
- 4 Before 1 December of each calendar year, the TSO shall provide to the relevant CDSO the final year-ahead availability plan for each internal relevant asset located in a closed distribution system.

Textual Amendments

F239 Words in Art. 99(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 65** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 100 U.K.

Updates to the final year-ahead availability plans

- 1 An outage planning agent shall be able to launch a procedure for the amendment of the final year-ahead availability plan in the time between the finalisation of the year-ahead outage coordination and its real-time execution.

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2 The outage planning agent which is not a TSO ^{F240}... shall be able to submit to the relevant TSO(s) a request for amendment of the final year-ahead availability plan of the relevant assets under its responsibility.

3 In case of a request for amendment pursuant to paragraph 2, the following procedure shall be applied:

- a the recipient TSO shall acknowledge the request and assess as soon as reasonably practicable whether the amendment leads to outage planning incompatibilities;
- b where outage planning incompatibilities are detected, the involved TSOs ^{F241}... shall jointly identify a solution in coordination with the outage planning agents concerned and, if relevant, the DSOs and CDSOs, using the means at their disposal;
- c where no outage planning incompatibility has been detected or if no outage planning incompatibility remains, the recipient TSO shall validate the requested amendment, and the TSOs concerned shall consequently notify all affected parties and update the final year-ahead availability plan ^{F242}...; and
- d where no solution is found for outage planning incompatibilities the recipient TSO shall reject the requested amendment.

4 When a TSO ^{F243}... intends to amend the final year-ahead availability plan of a relevant asset for which it acts as the outage planning agent, it shall initiate the following procedure:

- a the requesting TSO shall prepare a proposal for amendment to the year-ahead availability plan, including an assessment of whether it could lead to outage planning incompatibilities and shall submit its proposal to [^{F244}the involved TSOs];
- b where outage planning incompatibilities are detected, the involved TSOs ^{F245}... shall jointly identify a solution in coordination with the concerned outage planning agents and, if relevant, the DSOs and the CDSOs, using the means at their disposal;
- c where no outage planning incompatibility has been detected or if a solution to an outage planning incompatibility is found, the concerned TSOs shall validate the requested amendment and consequently they shall notify all affected parties and update the final year-ahead availability plan ^{F246}...;
- d where no solution to outage planning incompatibilities are found, the requesting TSO shall retract the procedure for amendment.

Textual Amendments

- F240** Words in Art. 100(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 66(2) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F241** Words in Art. 100(3)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 66(3)(a) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F242** Words in Art. 100(3)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 66(3)(b) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F243** Words in Art. 100(4) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 66(4)(a) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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- F244** Words in Art. 100(4)(a) substituted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 66(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F245** Words in Art. 100(4)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 66(4)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F246** Words in Art. 100(4)(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 66(4)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

CHAPTER 3 **U.K.**

Execution of availability plans

Article 101 **U.K.**

Management of the ‘testing’ status of relevant assets

1 The outage planning agent of a relevant asset the availability status of which has been declared as ‘testing’ shall provide the TSO, and, if connected to a distribution system, including closed distribution systems, the DSO or the CDSO within 1 month before the start of the ‘testing’ status, with:

- a a detailed test plan;
- b an indicative generation or consumption schedule if the concerned relevant asset is a relevant power generating module or a relevant demand facility; and
- c changes to the topology of the transmission system or distribution system if the concerned relevant asset is a relevant grid element.

2 The outage planning agent shall update the information referred to in paragraph 1 as soon as it is subject to any change.

3 The TSO of a relevant asset the availability status of which has been declared as ‘testing’ shall provide the information received in accordance with paragraph 1 to all other TSOs ^{F247}..., upon their request.

4 Where the relevant asset referred to in paragraph 1 is a relevant grid element interconnecting two or more control areas, the TSOs of the concerned control areas shall agree on the information to be provided pursuant to paragraph 1.

Textual Amendments

- F247** Words in Art. 101(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 67** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 102 **U.K.**

Procedure for handling forced outages

1 Each TSO shall develop a procedure to address the case where a forced outage would endanger its operational security. The procedure shall allow the TSO to ensure that the ‘available’ or ‘unavailable’ status of other relevant assets in its control area can be changed to ‘unavailable’ or ‘available’ respectively.

2 The TSO shall follow the procedure referred to in paragraph 1 only where no agreement is reached with outage planning agents regarding solutions to forced outages. The TSO shall notify the regulatory authority accordingly.

3 When undertaking the procedure, the TSO shall respect, to the extent possible, the technical limits of the relevant assets.

4 An outage planning agent shall notify the forced outage of one or more of its relevant assets to the TSO and, if connected to a distribution system or to a closed distribution system, the DSO or the CDSO respectively, as soon as possible following the start of the forced outage.

5 When notifying the forced outage, the outage planning agent shall provide the following information:

- a the reason for the forced outage;
- b the expected duration of the forced outage; and
- c where applicable, the impact of the forced outage on the availability status of other relevant assets for which it is the outage planning agent.

6 When the TSO detects that one or several forced outages referred to in paragraph 1 could lead the transmission system out of the normal state, it shall inform the affected outage planning agent(s) about the deadline at which operational security can no longer be maintained unless their relevant asset(s) in forced outage returns to ‘available’ status. The outage planning agents shall inform the TSO whether they are capable of respecting that deadline and shall provide reasoned justifications where they are unable to respect that deadline.

F248-7

Textual Amendments

F248 Art. 102(7) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 68** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 103 **U.K.**

Real-time execution of the availability plans

1 Each power generating facility owner shall ensure that all relevant power generating modules it owns and which are declared ‘available’ are ready to produce electricity pursuant to their declared technical capabilities when necessary to maintain operational security, except in case of forced outages.

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2 Each power generating facility owner shall ensure that all relevant power generating modules it owns and which are declared ‘unavailable’ do not produce electricity.

3 Each demand facility owner shall ensure that all relevant demand facilities it owns and which are declared ‘unavailable’ do not consume electricity.

4 Each relevant grid element owner shall ensure that all relevant grid elements it owns and which are declared ‘available’ are ready to transport electricity pursuant to their declared technical capabilities when necessary to maintain operational security, except in case of forced outages.

5 Each relevant grid element owner shall ensure that all relevant grid elements it owns and which are declared ‘unavailable’ do not transport electricity.

6 Where specific grid-related conditions apply for the execution of the ‘unavailable’ or ‘testing’ status of a relevant grid element in accordance with Article 96(6), the TSO, DSO or CDSO concerned shall assess the fulfilment of those conditions before the execution of that status. If those conditions are not fulfilled, it shall instruct the relevant grid element owner to not execute the ‘unavailable’ or ‘testing’ status or a part thereof.

7 Where a TSO identifies that executing an ‘unavailable’ or ‘testing’ status of a relevant asset leads or could lead the transmission system out of normal state, it shall instruct the owner of the relevant asset when it is connected to the transmission system, or the DSO or CDSO if connected to a distribution system or to a closed distribution system, to delay the execution of that ‘unavailable’ or ‘testing’ status of that relevant asset according to its instructions and to the extent possible, while respecting the technical and safety limits.

TITLE 4 U.K.

ADEQUACY

Article 104 U.K.

Forecast for control area adequacy analysis

Each TSO shall make any forecast used for control area adequacy analyses pursuant to Articles 105 and 107 available to all other TSOs ^{F249}

Textual Amendments

F249 Words in Art. 104 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 69](#) (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 105 U.K.

Control area adequacy analysis

1 Each TSO shall perform control area adequacy analysis by assessing the possibility for the sum of generation within its control area and cross-border import capabilities to meet

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the total load within its control area under various operational scenarios, taking into account the required level of active power reserves set out in Articles 118 and 119.

2 When performing a control area adequacy analysis pursuant to paragraph 1, each TSO shall:

- a use the latest availability plans and the latest available data for:
 - (i) the capabilities of power generating modules provided pursuant to Article 43(5) and Articles 45 and 51;
 - (ii) cross-zonal capacity;
 - (iii) possible demand response provided pursuant to Articles 52 and 53;
- b take into account the contributions of generation from renewable energy sources and load;
- c assess the probability and expected duration of an absence of adequacy and the expected energy not supplied as a result of such absence.

3 As soon as possible, following the assessment of an absence of adequacy within its control area, each TSO shall notify the absence to [^{F250}the regulatory authority], and where applicable, any affected party.

^{F251}4

Textual Amendments

F250 Words in Art. 105(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 70(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F251 Art. 105(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 70(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 106 **U.K.**

Control area adequacy ^{F252} ...

^{F253}1

2 Twice a year, each TSO shall perform a control area adequacy analysis for the following summer and winter respectively ^{F254} ...

3 Each TSO shall update its control area adequacy analyses if it detects any probable changes to the availability status of power generating modules, load estimations, renewable energy sources estimations or cross zonal capacities that could significantly affect the expected adequacy.

Textual Amendments

F252 Words in Art. 106 heading omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#)

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(S.I. 2019/533), reg. 1(2), **Sch. 1 para. 71(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F253 Art. 106(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 71(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F254 Words in Art. 106(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 71(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 107 U.K.

Control area adequacy in day-ahead and intraday

1 Each TSO shall perform a control area adequacy analysis in a day-ahead and intraday time-frame on the basis of:

- a schedules referred to in Article 111;
- b forecasted load;
- c forecasted generation from renewable energy sources;
- d active power reserves in accordance with the data provided pursuant to Article 46(1)(a);
- e control area import and export capacities ^{F255} ...
- f capabilities of power generating modules in accordance with the data provided pursuant to Article 43(4) and Articles 45 and 51 and their availability statuses; and
- g capabilities of demand facilities with demand response in accordance with the data provided pursuant to Articles 52 and 53 and their availability statuses.

2 Each TSO shall evaluate:

- a the minimum level of import and the maximum level of export compatible with its control area adequacy;
- b the expected duration of a potential absence of adequacy; and
- c the amount of energy not supplied in the absence of adequacy.

3 Where, following the analysis in paragraph 1, adequacy is not fulfilled, each TSO shall notify the absence of adequacy to [^{F256}the regulatory authority]. The TSO shall provide [^{F256}the regulatory authority] with an analysis of the causes of the absence of adequacy and propose mitigating actions.

Textual Amendments

F255 Words in Art. 107(1)(e) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 72(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F256 Words in Art. 107(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 72(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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TITLE 5 **U.K.**

ANCILLARY SERVICES

Article 108 **U.K.****Ancillary services**

- 1 Each TSO shall monitor the availability of ancillary services.
- 2 With regard to active power and reactive power services, and [^{F257}endeavouring to do so] in coordination with [^{F258}neighbouring] TSOs where appropriate, each TSO shall:
 - a design, set up and manage the procurement of ancillary services;
 - b monitor, on the basis of data provided pursuant to Title 2 of Part II, whether the level and location of available ancillary services allows ensuring operational security; and
 - c use all available economically efficient and feasible means to procure the necessary level of ancillary services.
- 3 Each TSO shall publish the levels of reserve capacity necessary to maintain operational security.
- 4 Each TSO shall communicate the available level of active power reserves to other TSOs upon request.

Textual Amendments

F257 Words in Art. 108(2) inserted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 73(2)(a)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F258 Word in Art. 108(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 73(2)(b)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 109 **U.K.****Reactive power ancillary services**

- 1 For each operational planning time-frame, each TSO shall assess, against their forecasts, whether its available reactive power ancillary services are sufficient to maintain the operational security of the transmission system.
- 2 In order to increase the efficiency of operation of its transmission system elements, each TSO shall monitor:
 - a the available reactive power capacities of power generating facilities;
 - b the available reactive power capacities of transmission-connected demand facilities;
 - c the available reactive power capacities of DSOs;
 - d the available transmission-connected equipment dedicated to providing reactive power; and

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- e the ratios of active power and reactive power at the interface between the transmission system and transmission-connected distribution systems.
- 3 Where the level of reactive power ancillary services is not sufficient for maintaining operational security, each TSO shall:
- a inform neighbouring TSOs; and
 - b prepare and activate remedial actions pursuant to Article 23.

TITLE 6 U.K.

SCHEDULING

Article 110 U.K.

Establishment of scheduling processes

F259¹

2 Where a bidding zone covers only one control area, the geographical scope of the scheduling area is equal to the bidding zone. Where a control area covers several bidding zones, the geographical scope of the scheduling area is equal to the bidding zone. Where a bidding zone covers several control areas, TSOs within that bidding zone may jointly decide to operate a common scheduling process, otherwise, each control area within that bidding zone is considered a separate scheduling area.

3 For each power generating facility and demand facility subject to requirements for scheduling set out in the national terms and conditions, the concerned owner shall appoint or act as a scheduling agent.

4 Each market participant and shipping agent, subject to requirements for scheduling set out in the national terms and conditions, shall appoint or act as a scheduling agent.

5 Each TSO operating a scheduling area shall establish arrangements necessary to process the schedules provided by scheduling agents.

6 Where a scheduling area covers more than one control area, the TSOs responsible for the control areas shall agree about which TSO shall operate the scheduling area.

Textual Amendments

F259 Art. 110(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 74** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 111 U.K.

Notification of schedules within scheduling areas

1 Each scheduling agent, except scheduling agents of shipping agents, shall submit to the TSO operating the scheduling area, if requested by the TSO, and, where applicable, to third party, the following schedules:

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- a generation schedules;
- b consumption schedules;
- c internal commercial trade schedules; and
- d external commercial trade schedules.

F260₂

Textual Amendments

F260 Art. 111(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 75** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 112 **U.K.**

Coherence of schedules

1 Each TSO operating a scheduling area shall check whether the generation, consumption, external commercial trade schedules and external TSO schedules in its scheduling area are in sum balanced.

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Textual Amendments

F261 Art. 112(2)-(6) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 76** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F262}*Article 113* **U.K.**

Provision of information to other TSOs

.....

Textual Amendments

F262 Art. 113 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 77** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F263 ... **U.K.**

F263 ...

^{F264} Article 114 **U.K.**

General provisions for ENTSO for Electricity operational planning data environment

Textual Amendments

F264 Arts. 114-117 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 78** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

^{F264} Article 115 **U.K.**

Individual grid models, common grid models and operational security analysis

Textual Amendments

F264 Arts. 114-117 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 78** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

^{F264} Article 116 **U.K.**

Outage coordination

Textual Amendments

F264 Arts. 114-117 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 78** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

^{F264} Article 117 **U.K.**

System adequacy

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F264 Arts. 114-117 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 78** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

Textual Amendments

F263 Pt. 3 Title 7 number and heading omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 78** (as amended by S.I. 2020/1016, regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

PART IV **U.K.**

LOAD-FREQUENCY CONTROL AND RESERVES

TITLE 1 **U.K.**

OPERATIONAL AGREEMENTS

Article 118 **U.K.**

Synchronous area operational agreements

1 By 12 months after entry into force of this Regulation, all TSOs of [^{F265}the GB synchronous area] shall jointly develop common proposals for:

- a the dimensioning rules for FCR in accordance with Article 153;
- b additional properties of FCR in accordance with Article 154(2);
- c the frequency quality defining parameters and the frequency quality target parameters in accordance with Article 127;

- ^{F266}d
- e the methodology to assess the risk and the evolution of the risk of exhaustion of FCR of the synchronous area in accordance with Article 131(2);
- f the synchronous area monitor in accordance with Article 133;
- g the calculation of the control program from the netted area AC position with a common ramping period for ACE calculation for a synchronous area with more than one LFC area in accordance with Article 136;
- h if applicable, restrictions for the active power output of HVDC interconnectors between synchronous areas in accordance with Article 137;
- i the LFC structure in accordance with Article 139;
- j if applicable, the methodology to reduce the electrical time deviation in accordance with Article 181;
- k whenever the synchronous area is operated by more than one TSO, the specific allocation of responsibilities between TSOs in accordance with Article 141;

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- l operational procedures in case of exhausted FCR in accordance with Article 152(7);
- m ^{F267} ... measures to ensure the recovery of energy reservoirs in accordance with to Article 156(6)(b);
- n operational procedures to reduce the system frequency deviation to restore the system state to normal state and to limit the risk of entering into the emergency state in accordance with Article 152(10);
- ^{F268} O
 p requirements concerning the availability, reliability and redundancy of the technical infrastructure in accordance with Article 151(2);
- q common rules for the operation in normal state and alert state in accordance with Article 152(6) and the actions referred to in Article 152(15);
- ^{F269} r
^{F270} s
 t if applicable, ^{F271} ... limits for the exchange of FCR between the TSOs in accordance with Article 163(2);
- u [^{F272}if applicable,] the roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO as regards the exchange of FRR and RR defined in accordance with Article 165(1);
- v [^{F273}if applicable,] the roles and responsibilities of the control capability providing TSO, the control capability receiving TSO and the affected TSO for the sharing of FRR and RR defined in accordance with Article 166(1);
- ^{F274} w
^{F274} x
^{F274} y
^{F274} z
^{F275} aa

2 All TSOs of [^{F276}the GB synchronous area] shall submit the methodologies and conditions listed in Article 6(3)(d) for approval by [^{F277}the regulatory authority]. Within 1 month after the approval of these methodologies and conditions, all TSOs of [^{F278}the GB] synchronous area shall conclude a synchronous area operational agreement which shall enter into force within 3 months after the approval of the methodologies and conditions.

Textual Amendments

- F265** Words in Art. 118(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F266** Art. 118(1)(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F267** Words in Art. 118(1)(m) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F268** Art. 118(1)(o) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F269** Art. 118(1)(r) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F270** Art. 118(1)(s) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F271** Words in Art. 118(1)(t) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F272** Words in Art. 118(1)(u) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(f)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F273** Words in Art. 118(1)(v) inserted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(f)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F274** Art. 118(1)(w)-(z) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(g)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F275** Art. 118(1)(aa) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(2)(g)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F276** Words in Art. 118(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(3)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F277** Words in Art. 118(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(3)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F278** Words in Art. 118(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 79(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 119 U.K.

LFC block operational agreements

1 By 12 months after entry into force of this Regulation, all TSOs of each LFC block shall jointly develop common proposals for:

- a where the LFC block consists of more than one LFC area, FRCE target parameters for each LFC area defined in accordance with Article 128(4);

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- b LFC block monitor in accordance with Article 134(1);
- c ramping restrictions for active power output in accordance with [^{F279}Article 137(4)];
- d where the LFC block is operated by more than one TSO, the specific allocation of responsibilities between TSOs within the LFC block in accordance with Article 141(9);
- e if applicable, appointment of the TSO responsible for the tasks in Article 145(6);
- f additional requirements for the availability, reliability and redundancy of technical infrastructure defined in accordance with Article 151(3);
- g operational procedures in case of exhausted FRR or RR in accordance with Article 152(8);
- h the FRR dimensioning rules defined in accordance with Article 157(1);
- i the RR dimensioning rules defined in accordance with Article 160(2);
- j where the LFC block is operated by more than one TSO, the specific allocation of responsibilities defined in accordance with Article 157(3), and, if applicable, the specific allocation of responsibilities defined in accordance Article 160(6);
- k the escalation procedure defined in accordance with Article 157(4) and, if applicable, the escalation procedure defined in accordance with Article 160(7);
- l the FRR availability requirements, the requirements on the control quality defined in accordance with Article 158(2), and if applicable, the RR availability requirements and the requirements on the control quality defined in accordance with Article 161(2);
- m if applicable, any limits on ^{F280}... the exchange of FRR or RR between the LFC areas of an LFC block of a synchronous area consisting of more than one LFC block defined in accordance with Article 163(2), Article 167 and Article 169(2);
- ^{F281}n
- ^{F282}o
- ^{F283}p
- q coordination actions aiming to reduce the FRCE as defined in Article 152(14); and
- r measures to reduce the FRCE by requiring changes in the active power production or consumption of power generating modules and demand units in accordance with Article 152(16).

2 All TSOs of each LFC block shall submit the methodologies and conditions listed in Article 6(3)(e) for approval by [^{F284}the regulatory authority]. Within 1 month after the approval of these methodologies and conditions, all TSOs of each LFC block shall conclude an LFC block operational agreement which shall enter into force within 3 months after the approval of the methodologies and conditions.

Textual Amendments

- F279** Words in Art. 119(1)(c) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 80(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F280** Words in Art. 119(1)(m) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 80(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F281** Art. 119(1)(n) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 80(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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- F282** Art. 119(1)(o) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 80(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F283** Art. 119(1)(p) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 80(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F284** Words in Art. 119(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 80(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 120 **U.K.**

LFC area operational agreement

By 12 months after entry into force of this Regulation, all TSOs of each LFC area shall establish an LFC area operational agreement that shall include at least:

- (a) the specific allocation of responsibilities between TSOs within the LFC area in accordance with Article 141(8);
- (b) the appointment of the TSO responsible for the implementation and operation of the frequency restoration process in accordance with Article 143(4).

Article 121 **U.K.**

Monitoring area operational agreement

By 12 months after entry into force of this Regulation, all TSOs of each monitoring area shall establish a monitoring area operational agreement that shall include at least the allocation of responsibilities between TSOs within the same monitoring area in accordance with Article 141(7).

^{F285} Article 122 **U.K.**

Imbalance netting agreement

Textual Amendments

- F285** Arts. 122-126 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 81** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

^{F285} Article 123 **U.K.**

Cross-border FRR activation agreement

Textual Amendments

F285 Arts. 122-126 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 81** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F285} Article 124 **U.K.**

Cross-border RR activation agreement

Textual Amendments

F285 Arts. 122-126 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 81** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F285} Article 125 **U.K.**

Sharing agreement

Textual Amendments

F285 Arts. 122-126 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 81** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F285} Article 126 **U.K.**

Exchange agreement

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F285 Arts. 122-126 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), [Sch. 1 para. 81](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 2 U.K.

FREQUENCY QUALITY

Article 127 U.K.

Frequency quality defining and target parameters

- 1 The frequency quality defining parameters shall be:
 - a the nominal frequency ^{F286} ...;
 - b the standard frequency range ^{F286} ...;
 - c the maximum instantaneous frequency deviation ^{F286} ...;
 - d the maximum steady-state frequency deviation ^{F286} ...;
 - e the time to restore frequency ^{F286} ...;
 - f the time to recover frequency ^{F287} ...;
 - g the frequency restoration range ^{F288} ...;
 - h the frequency recovery range ^{F289} ...; and
 - i the alert state trigger time ^{F290}
- 2 The nominal frequency shall be 50 Hz ^{F291}
- 3 The default values of the frequency quality defining parameters listed in paragraph 1 are set out in Table 1 of Annex III.
- 4 The frequency quality target parameter shall be the maximum number of minutes outside the standard frequency range per year per synchronous area and its default value per synchronous area are set out in Table 2 of Annex III.
- 5 The values of the frequency quality defining parameters in Table 1 of Annex III and of the frequency quality target parameter in Table 2 of Annex III shall apply unless all TSOs of [^{F292}the GB synchronous area] propose different values pursuant to paragraphs ^{F293} ... 7 and 8.
- ^{F294}6
- 7 All TSOs of the GB [^{F295}synchronous area] shall have the right to propose in the synchronous area operational agreement values different from those set out in Tables 1 and 2 of Annex III regarding:
 - a time to restore frequency;
 - b the alert state trigger time; and
 - c the maximum number of minutes outside the standard frequency range.

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8 The proposal for modification of the values pursuant to paragraph ^{F296}... 7 shall be based on an assessment of the recorded values of the system frequency for a period of at least 1 year and the synchronous area development and it shall meet the following conditions:

- a the proposed modification of the frequency quality defining parameters in Table 1 of Annex III or the frequency quality target parameter in Table 2 of Annex III takes into account:
 - (i) the system's size, based on the consumption and generation of the synchronous area and the inertia of the synchronous area;
 - (ii) the reference incident;
 - (iii) grid structure and/or network topology;
 - (iv) load and generation behaviour;
 - (v) the number and response of power generating modules with limited frequency sensitive mode — over frequency and limited frequency sensitive mode — under frequency as defined in Article 13(2) and Article 15(2)(c) of Regulation (EU) 2016/631;
 - (vi) the number and response of demand units operating with activated demand response system frequency control or demand response very fast active power control as defined in Articles 29 and 30 of Regulation (EU) 2016/1388; and
 - (vii) the technical capabilities of power generating modules and demand units;
- b all TSOs of the synchronous area shall conduct a public consultation concerning the impact on stakeholders of the proposed modification of the frequency quality defining parameters in Table 1 of Annex III or the frequency quality target parameter in Table 2 of Annex III.

9 All TSOs shall endeavour to comply with the values for the frequency quality defining parameters or for the frequency quality target parameter. All TSOs shall verify the fulfilment of the frequency quality target parameter at least annually.

Textual Amendments

- F286** Words in art. 127(1)(a)-(e) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 82(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F287** Words in Art. 127(1)(f) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 82(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F288** Words in Art. 127(1)(g) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 82(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F289** Words in Art. 127(1)(h) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 82(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F290** Words in Art. 127(1)(i) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I.](#)

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- 2019/533), reg. 1(2), **Sch. 1 para. 82(2)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F291** Words in Art. 127(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 82(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F292** Words in Art. 127(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 82(4)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F293** Word in Art. 127(5) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 82(4)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F294** Art. 127(6) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 82(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F295** Words in Art. 127(7) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 82(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F296** Words in Art. 127(8) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 82(7)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 128 **U.K.**

FRCE target parameters

- F297**₁
- F297**₂
- F297**₃

4 Where an LFC block consists of more than one LFC area, all TSOs of the LFC block shall specify in the LFC block operational agreement the values of the FRCE target parameters for each LFC area.

5 For the GB [^{F298}synchronous area] the Level 1 FRCE range shall be equal to or larger than 200 mHz and the Level 2 FRCE range shall be equal to or larger than 500 mHz.

6 All TSOs of the GB [^{F299}synchronous area] shall endeavour to comply with the following FRCE target parameters of a synchronous area:

- a the maximum number of time intervals outside the Level 1 FRCE range shall be less than or equal to the value in the Table of Annex IV as a percentage of the time intervals per year;
- b the maximum number of time intervals outside the Level 2 FRCE range shall be less than or equal to the value in the Table of Annex IV as a percentage of the time intervals per year.

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7 All TSOs shall verify, at least annually, that the FRCE target parameters are fulfilled.

Textual Amendments

- F297** Art. 128(1)-(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 83(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F298** Words in Art. 128(5) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 83(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F299** Words in Art. 128(6) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 83(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 129 **U.K.**

Criteria application process

The criteria application process shall comprise:

- (a) the collection of frequency quality evaluation data; and
- (b) the calculation of frequency quality evaluation criteria.

Article 130 **U.K.**

Frequency quality evaluation data

- 1 The frequency quality evaluation data shall be:
 - a for the synchronous area:
 - (i) the instantaneous frequency data; and
 - (ii) the instantaneous frequency deviation data;
 - b for each LFC block of the synchronous area, the instantaneous FRCE data.
- 2 The measurement accuracy of the instantaneous frequency data and of the instantaneous FRCE data, where measured in Hz, shall be 1 mHz or better.

Article 131 **U.K.**

Frequency quality evaluation criteria

- 1 The frequency quality evaluation criteria shall comprise:
 - a for the synchronous area during operation in normal state or alert state as determined by Article 18(1) and (2), on a monthly basis, for the instantaneous frequency data:
 - (i) the mean value;

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- (ii) the standard deviation;
- (iii) the 1-,5-,10-, 90-,95- and 99-percentile;
- (iv) the total time in which the absolute value of the instantaneous frequency deviation was larger than the standard frequency deviation, distinguishing between negative and positive instantaneous frequency deviations;
- (v) the total time in which the absolute value of the instantaneous frequency deviation was larger than the maximum instantaneous frequency deviation, distinguishing between negative and positive instantaneous frequency deviations;
- (vi) the number of events in which the absolute value of the instantaneous frequency deviation of the synchronous area exceeded 200 % of the standard frequency deviation and the instantaneous frequency deviation was not returned to ^{F300}... the frequency restoration range for the GB [^{F301}synchronous area], within the time to restore frequency. The data shall distinguish between negative and positive frequency deviations;
- (vii) for the GB [^{F302}synchronous area] the number of events for which the absolute value of the instantaneous frequency deviation was outside of the frequency recovery range and was not returned to the frequency recovery range within the time to recover frequency, distinguishing between negative and positive frequency deviations;

^{F303}b

- c for the LFC blocks of the GB ^{F304}... synchronous area, during operation in normal state or alert state in accordance with Article 18(1) and (2), on a monthly basis and for a data-set containing the average values of the FRCE of the LFC block over time intervals with a length of one minute: the number of events for which the absolute value of the FRCE exceeded the maximum steady-state frequency deviation and the FRCE was not returned to 10 % of the maximum steady-state frequency deviation within the time to restore frequency, distinguishing between negative and positive FRCE.

2 All TSOs of [^{F305}the GB synchronous area] shall specify in the synchronous area operational agreement a common methodology to assess the risk and the evolution of the risk of exhaustion of FCR in the synchronous area. That methodology shall be performed at least annually and shall be based at least on historical instantaneous system frequency data for not less than 1 year. All TSOs of [^{F305}the GB synchronous area] shall provide the required input data for this assessment.

Textual Amendments

- F300** Words in Art. 131(1)(a)(vi) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 84(2)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F301** Words in Art. 131(1)(a)(vi) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 84(2)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F302** Words in Art. 131(1)(a)(vii) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I.

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2019/533), reg. 1(2), **Sch. 1 para. 84(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F303 Art. 131(1)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 84(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F304 Words in Art. 131(1)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 84(2)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F305 Words in Art. 131(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 84(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 132 **U.K.**

Data collection and delivery process

- 1 The data collection and delivery process shall comprise the following:
 - a measurements of the system frequency;
 - b calculation of the frequency quality evaluation data; and
 - c delivery of the frequency quality evaluation data for the criteria application process.
- 2 The data collection and delivery process shall be implemented by the synchronous area monitor appointed in accordance with Article 133.

Article 133 **U.K.**

Synchronous area monitor

- 1 All TSOs of [^{F306}the GB synchronous area] shall appoint one TSO of that synchronous area in the synchronous area operational agreement as synchronous area monitor.
- 2 The synchronous area monitor shall implement the data collection and delivery process of the synchronous area referred to in Article 132.
- 3 The synchronous area monitor shall implement the criteria application process referred to in Article 129.
- 4 The synchronous area monitor shall collect the frequency quality evaluation data of its synchronous area and perform the criteria application process, including the calculation of the frequency quality evaluation criteria, once every 3 months and within 3 months after the end of the analysed period.

Textual Amendments

F306 Words in Art. 133(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 85** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 134 **U.K.**

LFC block monitor

- 1 All TSOs of a LFC block shall appoint one TSO of that LFC block in the LFC block operational agreement as LFC block monitor.
- 2 The LFC block monitor shall collect the frequency quality evaluation data for the LFC block in accordance with the criteria application process referred to in Article 129.
- 3 Each TSO of a LFC area shall provide the LFC block monitor with the LFC area measurements necessary for collecting frequency quality evaluation data for the LFC block.
- 4 The LFC block monitor shall deliver the frequency quality evaluation data of the LFC block and its LFC areas once every 3 months and within 2 months after the end of the analysed period.

Article 135 **U.K.**

Information on load and generation behaviour

In accordance with Article 40, each connecting TSO shall have the right to request the information necessary from SGUs to monitor the load and generation behaviour related to imbalances. That information may include:

- (a) the time-stamped active power setpoint for real-time and future operation; and
- (b) the time-stamped total active power output.

^{F307} Article 136 **U.K.**

Ramping period within the synchronous area

.....

Textual Amendments

F307 Art. 136 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 86** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 137 **U.K.**

Ramping restrictions for active power output

^{F308}₁

^{F309}₂

- 3 All connecting TSOs of an HVDC interconnector shall have the right to determine in the LFC block operational agreement common restrictions for the active power output of

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that HVDC interconnector to limit its influence on the fulfilment of the FRCE target parameter of the connected LFC blocks by agreeing on ramping periods and/or maximum ramping rates for this HVDC interconnector. Those common restrictions shall not apply for imbalance netting, frequency coupling as well as cross-border activation of FRR and RR over HVDC interconnectors. All TSOs of [^{F310}the GB synchronous area] shall coordinate these measures within the synchronous area.

4 All TSOs of an LFC block shall have the right to determine in the LFC block operational agreement the following measures to support the fulfilment of the FRCE target parameter of the LFC block and to alleviate deterministic frequency deviations, taking into account the technological restrictions of power generating modules and demand units:

- a obligations on ramping periods and/or maximum ramping rates for power generating modules and/or demand units;
- b obligations on individual ramping starting times for power generating modules and/or demand units within the LFC block; and
- c coordination of the ramping between power generating modules, demand units and active power consumption within the LFC block.

Textual Amendments

F308 Art. 137(1) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 87\(1\)\(a\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F309 Art. 137(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 87\(1\)\(a\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F310 Words in Art. 137(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 87\(1\)\(b\)](#) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 138 U.K.

Mitigation

Where the values calculated for the period of one calendar year concerning the frequency quality target parameters or the FRCE target parameters are outside the targets set for [^{F311}the GB synchronous area] or for the LFC block, all TSOs of [^{F312}the GB synchronous area] or of the relevant LFC block shall:

- (a) analyse whether the frequency quality target parameters or the FRCE target parameters will remain outside the targets set for [^{F311}the GB synchronous area] or for the LFC block and in case of a justified risk that this may happen, analyse the causes and develop recommendations; and
- (b) develop mitigation measures to ensure that the targets for [^{F311}the GB synchronous area] or for the LFC block can be met in the future.

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Textual Amendments

- F311** Words in Art. 138 substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 88(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F312** Words in Art. 138 substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 88(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 3 U.K.

LOAD-FREQUENCY CONTROL STRUCTURE

Article 139 U.K.

Basic structure

- 1 All TSOs of [^{F313}the GB synchronous area] shall specify the load-frequency-control structure for the synchronous area in the synchronous area operational agreement. Each TSO shall be responsible for implementing the load-frequency-control structure of [^{F314}the GB synchronous area] and operating in accordance with it.
- 2 The load-frequency control structure of [^{F315}the GB synchronous area] shall include:
 - a a process activation structure in accordance with Article 140; and
 - b a process responsibility structure in accordance with Article 141.

Textual Amendments

- F313** Words in Art. 139(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 89(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F314** Words in Art. 139(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 89(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F315** Words in Art. 139(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 89(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 140 U.K.

Process activation structure

- 1 The process activation structure shall include:
 - a a FCP pursuant to Article 142;

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- b a FRP pursuant to Article 143 ^{F316}...
- ^{F316}c
- 2 The process activation structure may include:
- a a RRP pursuant to Article 144;
- ^{F317}b
- ^{F318}c
- ^{F319}d
- e ^{F320} ... a time control process pursuant to Article 181.

Textual Amendments

- F316** Art. 140(1)(c) and word omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 90(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F317** Art. 140(2)(b) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 90(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F318** Art. 140(2)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 90(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F319** Art. 140(2)(d) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 90(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F320** Words in Art. 140(2)(e) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 90(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 141 U.K.

Process responsibility structure

- 1 When specifying the process responsibility structure, all TSOs of [^{F321}the GB synchronous area] shall take into account at least the following criteria:
- a the size and the total inertia, including synthetic inertia, of the synchronous area;
 - b the grid structure and/or network topology; and
 - c the load, generation and HVDC behaviour.
- 2 By 4 months after entry into force of this Regulation, all TSOs of [^{F322}the GB synchronous area] shall jointly develop a common proposal regarding the determination of the LFC blocks, which shall comply with the following requirements:
- a a monitoring area corresponds to or is part of only one LFC area;
 - b a LFC area corresponds to or is part of only one LFC block;
 - c a LFC block corresponds to or is part of only one synchronous area; and

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- d each network element is part of only one monitoring area, only one LFC area and only one LFC block.
- 3 All TSOs of each monitoring area shall continuously calculate and monitor the real-time active power interchange of the monitoring area.
- 4 All TSOs of each LFC area shall:
- continuously monitor the FRCE of the LFC area;
 - implement and operate a FRP for the LFC area;
 - endeavour to fulfil the FRCE target parameters of the LFC area as defined in Article 128; and
 - have the right to implement one or several of the processes referred to in Article 140(2).
- 5 All TSOs of each LFC block shall:
- endeavour to fulfil the FRCE target parameters of the LFC block as defined in Article 128; and
 - comply with the FRR dimensioning rules in accordance with Article 157 and the RR dimensioning rules in accordance with Article 160.
- 6 All TSOs of [^{F323}the GB synchronous area] shall:
- implement and operate a FCP for the synchronous area;
 - comply with FCR dimensioning rules in accordance with Article 153; and
 - endeavour to fulfil the frequency quality target parameters in accordance with Article 127.
- 7 All TSOs of each monitoring area shall specify in the monitoring area operational agreement the allocation of responsibilities between TSOs in the monitoring area for the implementation of the obligation set out in paragraph 3.
- 8 All TSOs of each LFC area shall specify in the LFC area operational agreement the allocation of responsibilities between TSOs in the LFC area for the implementation of the obligations set out in paragraph 4.
- 9 All TSOs of each LFC block shall specify in the LFC block operational agreement the allocation of responsibilities between TSOs in the LFC block for the implementation of the obligations set out paragraph 5.
- 10 All TSOs of [^{F324}the GB synchronous area] shall specify in the synchronous area operational agreement the allocation of responsibilities between TSOs in the synchronous area for the implementation of the obligations set out in paragraph 6.

^{F325}11

Textual Amendments

F321 Words in Art. 141(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 91(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F322 Words in Art. 141(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 91(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- F323** Words in Art. 141(6) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 91(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F324** Words in Art. 141(10) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 91(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F325** Art. 141(11) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 91(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 142 U.K.

Frequency containment process

- 1 The control target of FCP shall be the stabilization of the system frequency by activation of FCR.
- 2 The overall characteristic for FCR activation in [^{F326}the GB synchronous area] shall reflect a monotonic decrease of the FCR activation as a function of the frequency deviation.

Textual Amendments

F326 Words in Art. 142(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 92** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 143 U.K.

Frequency restoration process

- [^{F327}1 The control target of the FRP shall be to regulate the FRCE towards zero within the time to restore frequency.]
- 2 The FRCE is:
 - a the ACE of an LFC area, where there is more than one LFC area in a synchronous area; or
 - b the frequency deviation, where one LFC area corresponds to the LFC block and the synchronous area.
- 3 The ACE of a LFC area shall be calculated as the sum of the product of the K-Factor of the LFC area with the frequency deviation plus de subtraction of:
 - a the total interconnector and virtual tie-line active power flow; and
 - b the control program in accordance with Article 136.

^{F328}4

^{F329}5

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

- F327** Art. 143(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 93(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F328** Art. 143(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 93(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F329** Art. 143(5) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 93(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 144 **U.K.**

Reserve replacement process

- 1 The control target of the RRP shall be to fulfil at least one of the following goals by activation of RR:
- progressively restore the activated FRR;
 - support FRR activation;
 - ^{F330} ... to progressively restore the activated FCR and FRR.
- 2 The RRP shall be operated through instructions for manual RR activation in order to fulfil the control target in accordance with paragraph 1.

Textual Amendments

- F330** Words in Art. 144(1)(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 94** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 145 **U.K.**

Automatic and manual frequency restoration process

- 1 Each TSO of each LFC area shall implement an automatic frequency restoration process ('aFRP') and a manual frequency restoration process ('mFRP').
- 2 By 2 years after entry into force of this regulation, the TSOs of GB [^{F331}synchronous area] may each submit a proposal to [^{F332}the regulatory authority] requesting not to implement an aFRP. Those proposals shall include a cost-benefit analysis demonstrating that implementation of an aFRP would lead to higher costs than benefits. In case the proposal is approved by the [^{F333}regulatory authority], the respective TSOs and [^{F334}the regulatory authority] shall re-evaluate such decision at least every 4 years.

^{F335}

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

4 The aFRP shall be operated in a closed-loop manner where the FRCE is an input and the setpoint for automatic FRR activation is an output. The setpoint for automatic FRR activation shall be calculated by a single frequency restoration controller operated by a TSO within its LFC area. ^{F336} ...

- a be an automatic control device designed to reduce the FRCE to zero;
- b have proportional-integral behaviour;
- c have a control algorithm which prevents the integral term of a proportional-integral controller from accumulating the control error and overshooting; and
- d have functionalities for extraordinary operational modes for the alert and emergency states.

5 The mFRP shall be operated through instructions for manual FRR activation in order to fulfil the control target in accordance with Article 143(1).

6 In addition to the aFRP implementation in the LFC areas, all TSOs of an LFC block which consists of more than one LFC area shall have the right to appoint one TSO of the LFC block in the LFC block operational agreement to:

- a calculate and monitor the FRCE of the whole LFC block; and
- b take the FRCE of the whole LFC block into account for the calculation of the setpoint value for aFRR activation in accordance with Article 143(3) in addition to the FRCE of its LFC area.

Textual Amendments

F331 Words in Art. 145(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 95(2)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F332 Words in Art. 145(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 95(2)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F333 Words in Art. 145(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 95(2)(b)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F334 Words in Art. 145(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 95(2)(b)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F335 Art. 145(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 95(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F336 Words in Art. 145(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 95(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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^{F337} Article 146 **U.K.**

Imbalance netting process

Textual Amendments

F337 Arts. 146-150 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 96** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F337} Article 147 **U.K.**

Cross-border FRR activation process

Textual Amendments

F337 Arts. 146-150 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 96** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F337} Article 148 **U.K.**

Cross-border RR activation process

Textual Amendments

F337 Arts. 146-150 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 96** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F337} Article 149 **U.K.**

General requirements for cross-border control processes

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F337 Arts. 146-150 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 96** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F337} *Article 150* **U.K.**

TSO notification

Textual Amendments

F337 Arts. 146-150 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 96** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 151 **U.K.**

Infrastructure

1 All TSOs shall assess what technical infrastructure is necessary to implement and operate the processes referred to in Article 140 and considered critical pursuant to the security plan referred to in Article 26.

2 All TSOs of [^{F338}the GB synchronous area] shall specify, in the synchronous area operational agreement, minimum requirements for the availability, reliability and redundancy of the technical infrastructure referred to in paragraph 1 including:

- a the accuracy, resolution, availability and redundancy of active power flow and virtual tie-line measurements;
- b the availability and redundancy of digital control systems;
- c the availability and redundancy of communication infrastructure; and
- d communication protocols.

3 All TSOs of a LFC block shall set out additional requirements for the availability, reliability and redundancy of the technical infrastructure in the LFC block operational agreement.

4 Each TSO of a LFC area shall:

- a ensure a sufficient quality and availability of the FRCE calculation;
- b perform real-time quality monitoring of the FRCE calculation;
- c take action in case of FRCE miscalculation; and
- d where the FRCE is determined by the ACE, perform an *ex-post* quality monitoring of the FRCE calculation by comparing FRCE to reference values at least on an annual basis.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F338 Words in Art. 151(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 97** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 4 **U.K.**

OPERATION OF LOAD-FREQUENCY CONTROL

Article 152 **U.K.**

System states related to system frequency

1 Each TSO shall operate its control area with sufficient upward and downward active power reserve, which may include shared or exchanged reserves, to face imbalances between demand and supply within its control area. Each TSO shall control the FRCE as defined in the Article 143 in order to reach the required frequency quality within [^{F339}the GB synchronous area] in cooperation with all TSOs in the same synchronous area.

2 Each TSO shall monitor close to real-time generation and exchange schedules, power flows, node injections and withdrawals and other parameters within its control area relevant for anticipating a risk of a frequency deviation and shall take, in coordination with other TSOs of [^{F340}the GB synchronous area], measures to limit their negative effects on the balance between generation and demand.

3 All TSOs of [^{F341}the GB synchronous area] shall specify a real-time data exchange in accordance with Article 42 which shall include:

- a the system state of the transmission system in accordance with Article 18; and
- b the real-time measurement data of the FRCE of the LFC blocks and LFC areas of the synchronous area.

4 The synchronous area monitor shall determine the system state with regard to the system frequency in accordance with Article 18(1) and (2).

5 The synchronous area monitor shall ensure that all TSOs of [^{F342}the GB synchronous area] are informed in case the system frequency deviation fulfils one of the criteria for the alert state referred to in Article 18.

6 All TSOs of [^{F343}the GB synchronous area] shall define in the synchronous area operational agreement common rules for the operation of load-frequency control in the normal state and alert state.

7 All TSOs of the GB [^{F344}synchronous area] shall specify in the synchronous area operational agreement operational procedures for case of exhausted FCR. In those operational procedures the TSOs of [^{F345}the GB synchronous area] shall have the right to require changes in the active power production or consumption of power generating modules and demand units.

8 All TSOs of a LFC block shall specify operational procedures for cases of exhausted FRR or RR in the LFC block operational agreement. In those operational procedures the TSOs

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of a LFC block shall have the right to require changes in the active power production or consumption of power generating modules and demand units.

9 The TSOs of a LFC block shall endeavour to avoid FRCEs which last longer than the time to restore frequency.

10 All TSOs of [^{F346}the GB synchronous area] shall specify in the synchronous area operational agreement the operational procedures for the alert state due to a violation of system frequency limits. The operational procedures shall aim at reducing the system frequency deviation in order to restore the system state to the normal state and to limit the risk of entering the emergency state. The operational procedures shall include the right of TSOs to deviate from the obligation set in Article 143(1).

11 If the system state is in the alert state due to insufficient active power reserves in accordance with Article 18, the TSOs of the concerned LFC blocks shall, in close cooperation with the other TSOs of [^{F347}the GB synchronous area], act to restore and replace the necessary levels of active power reserves. For that purpose, the TSOs of a LFC block shall have the right to require changes in the active power production or consumption of power generating modules or demand units within its control area to reduce or to remove the violation of the requirements concerning active power reserve.

12 If the 1-minute average of the FRCE of a LFC block is above the Level 2 FRCE range at least during the time necessary to restore frequency and where the TSOs of a LFC block do not expect that FRCE will be sufficiently reduced by undertaking the actions in paragraph 15, TSOs shall have the right to require changes in the active power production or consumption of power generating modules and demand units within their respective areas to reduce the FRCE as specified in paragraph 16.

^{F348}13

14 The LFC block monitor shall be responsible for identifying any violation of the limits in [^{F349}paragraph 12] and:

- a shall inform the other TSOs of the LFC block; and
- b together with the TSOs of the LFC block shall implement coordinated actions to reduce the FRCE which shall be specified in the LFC block operational agreement.

15 For the cases referred to in paragraphs 11 [^{F350}and 12] all the TSOs of [^{F351}the GB synchronous area] shall specify in the synchronous area operational agreement actions to enable the TSOs of a LFC block to actively reduce the frequency deviation with the cross-border activation of reserves. In cases referred to in paragraphs 11 [^{F352}and 12] the TSOs of [^{F353}the GB synchronous area] shall endeavour to enable the TSOs of the concerned LFC block to reduce their FRCE.

16 The TSOs of a LFC block shall specify, in the LFC block operational agreement, measures to reduce the FRCE by means of changes in the active power production or consumption of power generating modules and demand units within their area.

Textual Amendments

F339 Words in Art. 152(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 98(2)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F340 Words in Art. 152(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I.](#)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- 2019/533), reg. 1(2), **Sch. 1 para. 98(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F341** Words in Art. 152(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F342** Words in Art. 152(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(5)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F343** Words in Art. 152(6) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F344** Words in Art. 152(7) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(7)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F345** Words in Art. 152(7) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(7)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F346** Words in Art. 152(10) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(8)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F347** Words in Art. 152(11) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(9)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F348** Art. 152(13) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(10)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F349** Words in Art. 152(14) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(11)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F350** Words in Art. 152(15) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(12)(a)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F351** Words in Art. 152(15) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(12)(a)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F352** Words in Art. 152(15) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 98(12)(b)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F353** Words in Art. 152(15) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

2019/533), reg. 1(2), **Sch. 1 para. 98(12)(b)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 5 **U.K.**

FREQUENCY CONTAINMENT RESERVES

Article 153 **U.K.**

FCR dimensioning

1 All TSOs of [^{F354}the GB synchronous area] shall determine, at least annually, the reserve capacity for FCR required for the synchronous area and the initial FCR obligation of each TSO in accordance with paragraph 2.

2 All TSOs of [^{F355}the GB synchronous area] shall specify dimensioning rules in the synchronous area operational agreement in accordance with the following criteria:

a the reserve capacity for FCR required for the synchronous area shall cover at least the reference incident ^{F356} ...

[^{F357}b the size of the reference incident shall be either—

i the largest imbalance that may result from an instantaneous change of active power such as that of a single power generating module, single demand facility, or single HVDC interconnector or from a tripping of an AC line; or

ii the maximum instantaneous loss of active power consumption due to the tripping of one or two connection points,

and the reference incident shall be determined separately for positive and negative direction;]

^{F358}c

d the shares of the reserve capacity on FCR required for each TSO as initial FCR obligation shall be based on the sum of the net generation and consumption of its control area divided by the sum of net generation and consumption of [^{F359}the GB synchronous area] over a period of 1 year.

Textual Amendments

F354 Words in Art. 153(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 99(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F355 Words in Art. 153(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 99(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F356 Words in Art. 153(2)(a) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 99(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F357 Art. 153(2)(b) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533),

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reg. 1(2), **Sch. 1 para. 99(3)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F358 Art. 153(2)(c) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 99(3)(d)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F359 Words in Art. 153(2)(d) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 99(3)(e)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 154 **U.K.**

FCR technical minimum requirements

1 Each reserve connecting TSO shall ensure that the FCR fulfils the properties listed for ^{F360}the GB synchronous area] in the Table of Annex V.

2 All TSOs of ^{F361}the GB synchronous area] shall have the right to specify, in the synchronous area operational agreement, common additional properties of the FCR required to ensure operational security in the synchronous area, by means of a set of technical parameters and within the ranges in Article 15(2)(d) of Regulation (EU) 2016/631 and Articles 27 and 28 of Regulation (EU) 2016/1388. Those common additional properties of FCR shall take into account the installed capacity, structure and pattern of consumption and generation of ^{F362}the GB synchronous area]. The TSOs shall apply a transitional period for the introduction of additional properties, defined in consultation with the affected FCR providers.

3 The reserve connecting TSO shall have the right to set out additional requirements for FCR providing groups within the ranges in Article 15(2)(d) of Regulation (EU) 2016/631 and Articles 27 and 28 of Regulation (EU) 2016/1388 in order to ensure operational security. Those additional requirements shall be based on technical reasons such as the geographical distribution of the power generating modules or demand units belonging to an FCR providing group. The FCR provider shall ensure that the monitoring of the FCR activation of the FCR providing units within a reserve providing group is possible.

4 The reserve connecting TSO shall have the right to exclude FCR providing groups from the provision of FCR in order to ensure operational security. This exclusion shall be based on technical reasons such as the geographical distribution of the power generating modules or demand units belonging to an FCR providing group.

5 Each FCR providing unit and each FCR providing group shall have only one reserve connecting TSO.

6 Each FCR providing unit and each FCR providing group shall comply with the properties required for FCR in the Table of Annex V and with any additional properties or requirements specified in accordance with paragraphs 2 and 3 and activate the agreed FCR by means of a proportional governor reacting to frequency deviations or alternatively based on a monotonic piecewise linear power-frequency characteristic in case of relay activated FCR. They shall be capable of activating FCR within the frequency ranges specified in Article 13(1) of Regulation (EU) 2016/631.

^{F363}7

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

8 Each reserve connecting TSO shall monitor its contribution to the FCP and its FCR activation with respect to its FCR obligation, including FCR providing units and FCR providing groups. Each FCR provider shall make available to the reserve connecting TSO, for each of its FCR providing units and FCR providing groups, at least the following information:

- a time-stamped status indicating if FCR is on or off;
- b time-stamped active power data needed to verify FCR activation, including time-stamped instantaneous active power;
- c droop of the governor for type C and type D power generating modules as defined in Article 5 of Regulation (EU) 2016/631 acting as FCR providing units, or its equivalent parameter for FCR providing groups consisting of type A and/or type B power generating modules as defined in Article 5 of Regulation (EU) 2016/631, and/or demand units with demand response active power control as defined in Article 28 of Regulation (EU) 2016/1388.

9 Each FCR provider shall have the right to aggregate the respective data for more than one FCR providing unit if the maximum power of the aggregated units is below 1,5 MW and a clear verification of activation of FCR is possible.

10 At the request of the reserve connecting TSO, the FCR provider shall make the information listed in paragraph 9 available in real-time, with a time resolution of at least 10 seconds.

11 At the request of the reserve connecting TSO and where necessary for the verification of the activation of FCR, a FCR provider shall make available the data listed in paragraph 9 concerning technical installations that are part of the same FCR providing unit.

Textual Amendments

- F360** Words in Art. 154(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 100(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F361** Words in Art. 154(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 100(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F362** Words in Art. 154(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 100(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F363** Art. 154(7) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 100(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 155 U.K.

FCR prequalification process

1 By 12 months after entry into force of this regulation, each TSO shall develop an FCR prequalification process and shall make publicly available the details of the FCR prequalification process.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

2 A potential FCR provider shall demonstrate to the reserve connecting TSO that it complies with the technical and the additional requirements set out in Article 154 by completing successfully the prequalification process of potential FCR providing units or FCR providing groups, described in paragraphs 3 to 6 of this Article.

3 A potential FCR provider shall submit a formal application to the reserve connecting TSO together with the required information of potential FCR providing units or FCR providing groups. Within 8 weeks from receipt of the application, the reserve connecting TSO shall confirm whether the application is complete. Where the reserve connecting TSO considers that the application is incomplete, the potential FCR provider shall submit the additional required information within 4 weeks from receipt of the request for additional information. Where the potential FCR provider does not supply the requested information within that deadline, the application shall be deemed withdrawn.

4 Within 3 months from confirmation that the application is complete, the reserve connecting TSO shall evaluate the information provided and decide whether the potential FCR providing units or FCR providing groups meet the criteria for an FCR prequalification. The reserve connecting TSO shall notify its decision to the potential FCR provider.

5 Where the compliance with certain requirements of this Regulation has already been verified by the reserve connecting TSO, it will be recognised in the prequalification.

6 The qualification of FCR providing units or FCR providing groups shall be re-assessed:

- a at least once every 5 years;
- b in case the technical or availability requirements or the equipment have changed; and
- c in case of modernisation of the equipment related to FCR activation.

Article 156 U.K.

FCR provision

1 Each TSO shall ensure the availability of at least its FCR obligations agreed between all TSOs of [^{F364}the GB synchronous area in accordance with Articles 153 and 163].

2 All TSOs of [^{F365}the GB synchronous area] shall determine, at least on an annual basis, the size of the K-factor of the synchronous area, taking into account at least the following factors:

- a the reserve capacity on FCR divided by the maximum steady-state frequency deviation;
- b the auto-control of generation;
- c the self-regulation of load, taking into account the contribution in accordance with Articles 27 and 28 of Regulation (EU) 2016/1388;

^{F366}d

- e the LFSM and FSM activation in accordance with Articles 13 and 15 of Regulation (EU) 2016/631.

^{F367}3

4 An FCR provider shall guarantee the continuous availability of FCR, with the exception of a forced outage of a FCR providing unit, during the period of time in which it is obliged to provide FCR.

5 Each FCR provider shall inform its reserve connecting TSO, as soon as possible, about any changes in the actual availability of its FCR providing unit and/or its FCR providing group, in whole or in part, relevant for the results of prequalification.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

6 Each TSO shall ensure, or shall require its FCR providers to ensure that the loss of a FCR providing unit does not endanger the operational security by:

- ^{F368}a
 b excluding the FCR provided by the unit defining the reference incident of the synchronous area from the dimensioning process for [^{F369}the GB synchronous area]; and
 c replacing the FCR which is made unavailable due to a forced outage or the unavailability of an FCR providing unit or FCR providing group as soon as technically possible and in accordance with the conditions that shall be defined by the reserve connecting TSO.

7 An FCR providing unit or FCR providing group with an energy reservoir that does not limit its capability to provide FCR shall activate its FCR for as long as the frequency deviation persists. For the GB [^{F370}synchronous area], a FCR providing unit or FCR providing group with an energy reservoir that does not limit its capability to provide FCR shall activate its FCR until it activates its FRR or for the period specified in the synchronous area operational agreement.

8 A FCR providing unit or FCR providing group with an energy reservoir that limits its capability to provide FCR shall activate its FCR for as long as the frequency deviation persists, unless its energy reservoir is exhausted in either the positive or negative direction. For the GB [^{F371}synchronous area], a FCR providing unit or FCR providing group with an energy reservoir that limits its capability to provide FCR shall activate its FCR until it activates its FRR or for the period specified in the synchronous area operational agreement.

^{F372}9

^{F372}10

^{F372}11

12 The FCR provider shall specify the limitations of the energy reservoir of its FCR providing units or FCR providing groups in the prequalification process in accordance with Article 155.

[^{F373}13 A FCR provider using FCR providing units or FCR providing group with an energy reservoir that limits their capability to provide FCR shall ensure the recovery of the energy reservoirs in the positive or negative directions for the GB synchronous area, using the methods specified in the synchronous area operational agreement.]

Textual Amendments

F364 Words in Art. 156(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F365 Words in Art. 156(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F366 Art. 156(2)(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F367 Art. 156(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533),

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

reg. 1(2), **Sch. 1 para. 101(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F368 Art. 156(6)(a) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(5)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F369 Words in Art. 156(6)(b) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(5)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F370 Words in Art. 156(7) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F371 Words in Art. 156(8) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(6)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F372 Art. 156(9)-(11) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(7)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F373 Art. 156(13) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 101(8)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 6 **U.K.**

FREQUENCY RESTORATION RESERVES

Article 157 **U.K.**

FRR dimensioning

1 All TSOs of a LFC Block shall set out FRR dimensioning rules in the LFC Block operational agreement.

2 The FRR dimensioning rules shall include at least the following:

- F374** a
- F374** b
- F374** c

- d the TSOs of a LFC block shall determine the size of the reference incident which shall be the largest imbalance that may result from an instantaneous change of active power of a single power generating module, single demand facility, or single HVDC interconnector or from a tripping of an AC line within the LFC block;
- e all TSOs of a LFC block shall determine the positive reserve capacity on FRR, which shall not be less than the positive dimensioning incident of the LFC block;
- f all TSOs of a LFC block shall determine the negative reserve capacity on FRR, which shall not be less than the negative dimensioning incident of the LFC block;

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g all TSOs of a LFC block shall determine the reserve capacity on FRR of a LFC block, any possible geographical limitations for its distribution within the LFC block and any possible geographical limitations for any exchange of reserves or sharing of reserves with other LFC blocks to comply with the operational security limits;

F375 h

F376 i

j all TSOs of a LFC block may reduce the positive reserve capacity on FRR of the LFC block resulting from the FRR dimensioning process by concluding a FRR sharing agreement with other LFC blocks in accordance with provisions in Title 8. [F377 The sharing agreement for the GB synchronous area shall require that the positive reserve capacity on FRR and the risk of non-delivery due to sharing shall be assessed continually by the TSOs of the LFC block.]

k all TSOs of a LFC block may reduce the negative reserve capacity on FRR of the LFC block, resulting from the FRR dimensioning process by concluding a FRR sharing agreement with other LFC blocks in accordance with the provisions of Title 8. [F378 The sharing agreement shall require that the negative reserve capacity on FRR and the risk of non-delivery due to sharing shall be assessed continually by the TSOs of the LFC block.]

3 All TSOs of a LFC block where the LFC block comprises more than one TSO shall set out, in the LFC block operational agreement, the specific allocation of responsibilities between the TSOs of the LFC areas for the implementation of the obligations established in paragraph 2.

4 All TSOs of a LFC block shall have sufficient reserve capacity on FRR at any time in accordance with the FRR dimensioning rules. The TSOs of a LFC block shall specify in the LFC block operational agreement an escalation procedure for cases of severe risk of insufficient reserve capacity on FRR in the LFC block.

Textual Amendments

F374 Art. 157(2)(a)-(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 102(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F375 Art. 157(2)(h) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 102(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F376 Art. 157(2)(i) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 102(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F377 Words in Art. 157(2)(j) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 102(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F378 Words in Art. 157(2)(k) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 102(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

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Article 158 U.K.

FRR minimum technical requirements

- 1 The FRR minimum technical requirements shall be the following:
 - a each FRR providing unit and each FRR providing group shall be connected to only one reserve connecting TSO;
 - b a FRR providing unit or FRR providing group shall activate FRR in accordance with the setpoint received from the reserve instructing TSO;
 - c the reserve instructing TSO shall be the reserve connecting TSO or a TSO designated by the reserve connecting TSO in an FRR exchange agreement pursuant to Article 165(3)^{F379} ...;
 - d a FRR providing unit or FRR providing group for automatic FRR shall have an automatic FRR activation delay not exceeding 30 seconds;
 - e a FRR provider shall ensure that the FRR activation of the FRR providing units within a reserve providing group can be monitored. For that purpose, the FRR provider shall be capable of supplying to the reserve connecting TSO and the reserve instructing TSO real-time measurements of the connection point or another point of interaction agreed with the reserve connecting TSO concerning:
 - (i) time-stamped scheduled active power output;
 - (ii) time-stamped instantaneous active power for:
 - each FRR providing unit,
 - each FRR providing group, and
 - each power generating module or demand unit of a FRR providing group with a maximum active power output larger than or equal to 1,5 MW;
 - f a FRR providing unit or FRR providing group for automatic FRR shall be capable of activating its complete automatic reserve capacity on FRR within the automatic FRR full activation time;
 - g a FRR providing unit or FRR providing group for manual FRR shall be capable of activating its complete manual reserve capacity on FRR within the manual FRR full activation time;
 - h a FRR provider shall fulfil the FRR availability requirements; and
 - i a FRR providing unit or FRR providing group shall fulfil the ramping rate requirements of the LFC block.
- 2 All TSOs of a LFC block shall specify FRR availability requirements and requirements on the control quality of FRR providing units and FRR providing groups for their LFC block in the LFC block operational agreement pursuant to Article 119.
- 3 The reserve connecting TSO shall adopt the technical requirements for the connection of FRR providing units and FRR providing groups to ensure the safe and secure delivery of FRR.
- 4 Each FRR provider shall:
 - a ensure that its FRR providing units and FRR providing groups fulfil the FRR technical minimum requirements, the FRR availability requirements and the ramping rate requirements in paragraphs 1 to 3; and

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- b inform its reserve instructing TSO about a reduction of the actual availability of its FRR providing unit or its FRR providing group or a part of its FRR providing group as soon as possible.

5 Each reserve instructing TSO shall ensure the monitoring of the compliance with the FRR minimum technical requirements in paragraph 1, the FRR availability requirements in paragraph 2, the ramping rate requirements in paragraph 1 and the connection requirements in paragraph 3 by its FRR providing units and FRR providing groups.

Textual Amendments

F379 Words in Art. 158(1)(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 103** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 159 U.K.

FRR prequalification process

1 By 12 months after entry into force of this Regulation each TSO shall develop a FRR prequalification process and shall clarify and make publicly available its details.

2 A potential FRR provider shall demonstrate to the reserve connecting TSO or the TSO designated by the reserve connecting TSO in the FRR exchange agreement that it complies with the FRR minimum technical requirements in Article 158(1), the FRR availability requirements in Article 158(2), the ramping rate requirements in Article 158(1) and the connection requirements in Article 158(3) by completing successfully the prequalification process of potential FRR providing units or FRR providing groups, described in paragraphs 3 to 6 of this Article.

3 A potential FRR provider shall submit a formal application to the relevant reserve connecting TSO or the designated TSO together with the required information of potential FRR providing units or FRR providing groups. Within 8 weeks from receipt of the application, the reserve connecting TSO or the designated TSO shall confirm whether the application is complete. Where the reserve connecting TSO or the designated TSO considers that the application is incomplete they shall request additional information and the potential FRR provider shall submit the additional required information within 4 weeks from the receipt of the request. Where the potential FRR provider does not supply the requested information within that deadline, the application shall be deemed to be withdrawn.

4 Within 3 months after the reserve connecting TSO or the designated TSO confirms that the application is complete, the reserve connecting TSO or the designated TSO shall evaluate the information provided and decide whether the potential FRR providing units or FRR providing groups meet the criteria for a FRR prequalification. The reserve connecting TSO or the designated TSO shall notify their decision to the potential FRR provider.

5 The qualification of FRR providing units or FRR providing groups by the reserve connecting TSO or the designated TSO shall be valid for the entire LFC Block.

6 The qualification of FRR providing units or FRR providing groups shall be re-assessed:

- a at least once every 5 years; and

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b where the technical or availability requirements or the equipment have changed.

7 To ensure operational security, the reserve connecting TSO shall have the right to exclude FRR providing groups from the provision of FRR based on technical arguments such as the geographical distribution of the power generating modules or demand units belonging to a FRR providing group.

TITLE 7 **U.K.**

REPLACEMENT RESERVES

Article 160 **U.K.**

RR dimensioning

1 All TSOs of an LFC block shall have the right to implement a reserve replacement process.

2 To comply with the FRCE target parameters referred to in Article 128, all TSOs of a LFC block with a RRP, performing a combined dimensioning process of FRR and RR to fulfil the requirements of Article 157(2), shall define RR dimensioning rules in the LFC block operational agreement.

3 The RR dimensioning rules shall comprise at least the following requirements:

- [^{F380}a there shall be sufficient positive reserve capacity on RR to restore the required amount of positive FCR and positive FRR;]
- [^{F381}b there shall be sufficient negative reserve capacity on RR to restore the required amount of negative FCR and negative FRR;]
- c there shall be sufficient reserve capacity on RR, where this is taken into account to dimension the reserve capacity on FRR in order to respect the FRCE quality target for the period of time concerned; and
- d compliance with the operational security within a LFC block to determine the reserve capacity on RR.

4 All TSOs of an LFC block may reduce the positive reserve capacity on RR of the LFC block, resulting from the RR dimensioning process, by developing a RR sharing agreement for that positive reserve capacity on RR with other LFC blocks in accordance with the provisions of Title 8 of Part IV. The control capability receiving TSO shall limit the reduction of its positive reserve capacity on RR in order to:

- a guarantee that it can still meet its FRCE target parameters set out in Article 128;
- b ensure that operational security is not endangered; and
- c ensure that the reduction of the positive reserve capacity on RR does not exceed the remaining positive reserve capacity on RR of the LFC block.

5 All TSOs of a LFC block may reduce the negative reserve capacity on RR of the LFC block, resulting from the RR dimensioning process, by developing a RR sharing agreement for that negative reserve capacity on RR with other LFC blocks in accordance with the provisions of Title 8 of Part IV. The control capability receiving TSO shall limit the reduction of its negative reserve capacity on RR in order to:

- a guarantee that it can still meet its FRCE target parameters set out in Article 128;
- b ensure that operational security is not endangered; and

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- c ensure that the reduction of the negative reserve capacity on RR does not exceed the remaining negative reserve capacity on RR of the LFC block.

6 Where a LFC block is operated by more than one TSO and if the process is necessary for the LFC block, all TSOs of that LFC block shall specify in the LFC block operational agreement the allocation of responsibilities between the TSOs of different LFC areas for the implementation of the dimensioning rules set out in paragraph 3.

7 A TSO shall have sufficient reserve capacity on RR in accordance with the RR dimensioning rules at any time. The TSOs of a LFC block shall specify in the LFC block operational agreement an escalation procedure for cases of severe risk of insufficient reserve capacity on RR in the LFC block.

Textual Amendments

F380 Art. 160(3)(a) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 104(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F381 Art. 160(3)(b) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 104(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 161 **U.K.**

RR minimum technical requirements

1 RR providing units and RR providing groups shall comply with the following minimum technical requirements:

- a connection to only one reserve connecting TSO;
- b RR activation according to the setpoint received from the reserve instructing TSO;
- c the reserve instructing TSO shall be the reserve connecting TSO or a TSO that shall be designated by the reserve connecting TSO in the RR exchange agreement pursuant to Article 165(3) ^{F382} ...;
- d activation of complete reserve capacity on RR within the activation time defined by the instructing TSO;
- e de-activation of RR according to the setpoint received from the reserve instructing TSO;
- f a RR provider shall ensure that the RR activation of the RR providing units within a reserve providing group can be monitored. For that purpose, the RR provider shall be capable of supplying to the reserve connecting TSO and the reserve instructing TSO real-time measurements of the connection point or another point of interaction agreed with the reserve connecting TSO concerning:
 - (i) the time-stamped scheduled active power output, for each RR providing unit and group and for each power generating module or demand unit of a RR providing group with a maximum active power output larger than or equal to 1,5 MW;
 - (ii) the time-stamped instantaneous active power, for each RR providing unit and group, and for each power generating module or demand unit of a RR

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providing group with a maximum active power output larger than or equal to 1,5 MW;

g fulfilment of the RR availability requirements.

2 All TSOs of a LFC block shall specify RR availability requirements and requirements on the control quality of RR providing units and RR providing groups in the LFC block operational agreement.

3 The reserve connecting TSO shall adopt the technical requirements for the connection of RR providing units and RR providing groups to ensure the safe and secure delivery of RR in the prequalification process description.

4 Each RR provider shall:

- a ensure that its RR providing units and RR providing groups fulfil the RR technical minimum requirements and the RR availability requirements referred to in paragraphs 1 to 3; and
- b inform its reserve instructing TSO about a reduction of the actual availability or a forced outage of its RR providing unit or its RR providing group or a part of its RR providing group as soon as possible.

5 Each reserve instructing TSO shall ensure compliance with the RR technical requirements, the RR availability requirements and the connection requirements referred to in this Article with regard to its RR providing units and RR providing groups.

Textual Amendments

F382 Words in Art. 161(1)(c) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), [Sch. 1 para. 105](#) (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 162 U.K.

RR prequalification process

1 Each TSO of a LFC block which has implemented a RRP shall develop a RR prequalification process within 12 months after entry into force of this Regulation and shall clarify and make publicly available the details thereof.

2 A potential RR provider shall demonstrate to the reserve connecting TSO or the TSO designated by the reserve connecting TSO in the RR exchange agreement that it complies with the RR technical minimum requirements, the RR availability requirements and the connection requirements referred to in Article 161 by completing successfully the prequalification process of potential RR providing units or RR providing groups, described in paragraphs 3 to 6.

3 A potential RR provider shall submit a formal application to the relevant reserve connecting TSO or the designated TSO together with the required information of potential RR providing units or RR providing groups. Within 8 weeks from receipt of the application, the reserve connecting TSO or the designated TSO shall confirm whether the application is complete. Where the reserve connecting TSO or the designated TSO considers that the application is incomplete, the potential RR provider shall submit the additional required information within 4 weeks from the receipt of the request for additional information. Where

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the potential RR provider does not supply the requested information within that deadline, the application shall be deemed withdrawn.

4 Within 3 months from confirmation of the completeness of the application, the reserve connecting TSO or the designated TSO shall evaluate the information provided and decide whether the potential RR providing units or RR providing groups meet the criteria for a RR prequalification. The reserve connecting TSO or the designated TSO shall notify its decision to the potential RR provider.

5 The qualification of RR providing units or RR providing groups shall be reassessed:

- a at least once every 5 years; and
- b where the technical or availability requirements or the equipment have changed.

6 To ensure operational security, the reserve connecting TSO shall have the right to reject the provision of RR by RR providing groups, based on technical arguments such as the geographical distribution of the power generating modules or demand units establishing a RR providing group.

TITLE 8 U.K.

EXCHANGE AND SHARING OF RESERVES

CHAPTER 1 U.K.

Exchange and sharing of reserves within a synchronous area

Article 163 U.K.

Exchange of FCR within a synchronous area

1 All TSOs involved in the exchange of FCR within [^{F383}the GB synchronous area] shall comply with the requirements set out in paragraphs 2 to 9. The exchange of FCR implies a transfer of a FCR obligation from the reserve receiving TSO to the reserve connecting TSO for the corresponding reserve capacity on FCR.

2 All TSOs involved in the exchange of FCR within [^{F384}the GB synchronous area] shall respect the limits and requirements for the exchange of FCR within the synchronous area specified in the Table of Annex VI.

3 In case of exchange of FCR, the reserve connecting TSO and reserve receiving TSO shall notify it in accordance with Article 150.

4 Any reserve connecting TSO, reserve receiving TSO or affected TSO involved in the exchange of FCR may refuse the exchange of FCR where it would result in power flows that violate the operational security limits when activating the reserve capacity on FCR subject to the exchange of FCR.

5 Each affected TSO shall verify that its reliability margin, established in accordance with Article 22 of Regulation (EU) 2015/1222, is sufficient to accommodate the power flows resulting from the activation of the reserve capacity on FCR subject to the exchange of FCR.

6 All TSOs of a LFC area shall adjust the parameters of their FRCE calculation to account for the exchange of FCR.

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7 The reserve connecting TSO shall be responsible for the requirements referred to in Articles 154 and 156 as regards the reserve capacity on FCR subject to the exchange of FCR.

8 The FCR providing unit or group shall be responsible towards its reserve connecting TSO for FCR activation.

9 The concerned TSOs shall ensure that exchange of FCR does not prevent any TSO from fulfilling the reserve requirements in Article 156.

Textual Amendments

F383 Words in Art. 163(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 106** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F384 Words in Art. 163(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 106** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 164 **U.K.**

Sharing of FCR within a synchronous area

A TSO shall not share FCR with other TSOs of [^{F385}the GB synchronous area] to fulfil its FCR obligation and to reduce the total amount of FCR of the synchronous area in accordance with Article 153.

Textual Amendments

F385 Words in Art. 164 substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 107** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 165 **U.K.**

General requirements for the exchange of FRR and RR within a synchronous area

1 All TSOs of [^{F386}the GB synchronous area] shall define in the synchronous area operational agreement the roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO for the exchange of FRR and/or RR.

2 Where an exchange of FRR/RR takes place, the reserve connecting TSO and reserve receiving TSO shall notify that exchange pursuant to the notification requirements in Article 150.

3 The reserve connecting and reserve receiving TSOs participating in the exchange of FRR/RR shall specify in a FRR or RR exchange agreement their roles and responsibilities, including:

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- a the responsibility of the reserve instructing TSO for the reserve capacity on FRR and RR subject to the exchange of FRR/RR;
 - b the amount of the reserve capacity on FRR and RR subject to the exchange of FRR/RR;
 - ^{F387} c
 - ^{F387} d
 - e the implementation of the FRR/RR prequalification for the reserve capacity on FRR and RR subject to exchange in accordance with Articles 159 and 162;
 - f the responsibility to monitor the fulfilment of the FRR/RR technical requirements and FRR/RR availability requirements for the reserve capacity on FRR and RR subject to exchange in accordance with Articles 158(5) and 161(5); and
 - g procedures to ensure that the exchange of FRR/RR does not lead to power flows which violate the operational security limits.
- 4 Any reserve connecting TSO, reserve receiving TSO or affected TSO involved in the exchange of FRR or RR may refuse the exchange referred to in paragraph 2 where it would result in power flows that violate the operational security limits when activating the reserve capacity on FRR and RR subject to the exchange of FRR or RR.
- 5 The concerned TSOs shall ensure that exchange of FRR/RR does not prevent any TSO from complying with the reserve requirements established in the FRR or RR dimensioning rules in Articles 157 and 160.
- 6 All TSOs of a LFC block shall specify in the LFC block operational agreement the roles and responsibilities of the reserve connecting TSO, the reserve receiving TSO and the affected TSO for the exchange of FRR and/or RR with TSOs of other LFC blocks.

Textual Amendments

- F386** Words in Art. 165(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 108(2)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F387** Art. 165(3)(c)(d) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 108(3)** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 166 U.K.

General requirements for sharing FRR and RR within a synchronous area

- 1 All TSOs of [^{F388}the GB synchronous area] shall specify in the synchronous area operational agreement the roles and responsibilities of the control capability providing TSO, the control capability receiving TSO and the affected TSO for sharing FRR/RR.
- 2 Where FRR/RR sharing takes place, the control capability providing TSO and control capability receiving TSO shall notify that sharing pursuant to the notification requirements in Article 150.
- 3 The control capability receiving TSO and the control capability providing TSO participating in the sharing of FRR/RR shall specify in a FRR or RR sharing agreement their roles and responsibilities, including:

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- a the amount of reserve capacity on FRR and RR subject to the sharing of FRR/RR;
- ^{F389}b
- c procedures to ensure that the activation of the reserve capacity on FRR and RR subject to the sharing of FRR/RR does not lead to power flows that violate the operational security limits.

4 Any control capability providing TSO, control capability receiving TSO or affected TSO involved in the sharing of FRR/RR may refuse sharing of FRR/RR where it would result in power flows that violate the operational security limits when activating the reserve capacity on FRR and RR subject to the sharing of FRR/RR.

5 In case of sharing of FRR/RR, the control capability providing TSO shall make available to the control capability receiving TSO a share of its own reserve capacity on FRR and RR required to comply with its reserve requirements for FRR and/or RR resulting from the FRR/RR dimensioning rules in Articles 157 and 160. [^{F390}The control capability providing TSO can be the reserve instructing TSO for the reserve capacity on FRR and RR, subject to the sharing of FRR/RR.]

6 Each control capability receiving TSO shall be responsible for coping with incidents and imbalances in case the reserve capacity on FRR and RR subject to the sharing of FRR/RR are unavailable due to:

- a restrictions to provide frequency restoration or adjust the control program related to operational security; and
- b partial or full usage of the reserve capacity on FRR and RR by the control capability providing TSO.

7 All TSOs of a LFC block shall specify in the LFC block operational agreement their roles and responsibilities of the control capability providing TSO, the control capability receiving TSO and the affected TSO for the sharing of FRR and RR with TSOs of other LFC blocks.

Textual Amendments

- F388** Words in Art. 166(1) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 109(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F389** Art. 166(3)(b) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 109(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F390** Words in Art. 166(5) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 109(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F391}Article 167 **U.K.**

Exchange of FRR within a synchronous area

.....

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F391 Arts. 167-170 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 110** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F391} Article 168 **U.K.**

Sharing of FRR within a synchronous area

Textual Amendments

F391 Arts. 167-170 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 110** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F391} Article 169 **U.K.**

Exchange of RR within a synchronous area

Textual Amendments

F391 Arts. 167-170 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 110** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F391} Article 170 **U.K.**

Sharing of RR within a synchronous area

Textual Amendments

F391 Arts. 167-170 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 110** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

CHAPTER 2 **U.K.**

Exchange and sharing of reserves between synchronous areas

Article 171 **U.K.**

General requirements

1 Each operator and/or owner of an HVDC interconnector which interconnects synchronous areas shall provide to the connecting TSOs the capability to perform the exchange and sharing of FCR, FRR and RR if this technology is installed.

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Textual Amendments

F392 Art. 171(2)-(9) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 111** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393}Article 172 **U.K.**

Frequency coupling between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

^{F393} Article 173 **U.K.**

Exchange of FCR between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393} Article 174 **U.K.**

Sharing of FCR between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393} Article 175 **U.K.**

General requirements for sharing of FRR and RR between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393} Article 176 **U.K.**

Exchange of FRR between synchronous areas

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393} Article 177 **U.K.**

Sharing of FRR between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393} Article 178 **U.K.**

Exchange of RR between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F393} Article 179 **U.K.**

Sharing of RR between synchronous areas

Textual Amendments

F393 Arts. 172-179 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019](#) (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 112** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F394 ... U.K.

F394 ...

F395 Article 180 U.K.

Cross-border activation process for FRR/RR

Textual Amendments

F395 Art. 180 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 113** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Textual Amendments

F394 Ch. number and heading preceding Art. 180 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 113** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 9 U.K.

TIME CONTROL PROCESS

Article 181 U.K.

Time control process

- 1 The control target of the electrical time control process shall be to control the average value of the system frequency to the nominal frequency.
- 2 Where applicable, all TSOs of [^{F396}the GB synchronous area] shall define in the synchronous area operational agreement the methodology to correct the electrical time deviation, which shall include:
 - a the time ranges within which TSOs shall endeavour to maintain the electrical time deviation;
 - b the frequency setpoint adjustments to return electrical time deviation to zero; and
 - c the actions to increase or decrease the average system frequency by means of active power reserves.
- 3 The synchronous area monitor shall:
 - a monitor the electrical time deviation;
 - b calculate the frequency setpoint adjustments; and
 - c coordinate the actions of the time control process.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F396 Words in Art. 181(2) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 114** (as amended by [S.I. 2020/1016](#), regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

TITLE 10 U.K.

COOPERATION WITH DSOS

Article 182 U.K.

Reserve providing groups or units connected to the DSO grid

1 TSOs and DSOs shall cooperate in order to facilitate and enable the delivery of active power reserves by reserve providing groups or reserve providing units located in the distribution systems.

2 For the purposes of the prequalification processes for FCR in Article 155, FRR in Article 159 and RR in Article 162, each TSO shall develop and specify, in an agreement with its reserve connecting DSOs and intermediate DSOs, the terms of the exchange of information required for these prequalification processes for reserve providing units or groups located in the distribution systems and for the delivery of active power reserves. The prequalification processes for FCR in Article 155, FRR in Article 159 and RR in Article 162 shall specify the information to be provided by the potential reserve providing units or groups, which shall include:

- a voltage levels and connection points of the reserve providing units or groups;
- b the type of active power reserves;
- c the maximum reserve capacity provided by the reserve providing units or groups at each connection point; and
- d the maximum rate of change of active power for the reserve providing units or groups.

3 The prequalification process shall rely on the agreed timeline and rules concerning information exchanges and the delivery of active power reserves between the TSO, the reserve connecting DSO and the intermediate DSOs. The prequalification process shall have a maximum duration of 3 months from the submission of a complete formal application by the reserve providing unit or group.

4 During the prequalification of a reserve providing unit or group connected to its distribution system, each reserve connecting DSO and each intermediate DSO, in cooperation with the TSO, shall have the right to set limits to or exclude the delivery of active power reserves located in its distribution system, based on technical reasons such as the geographical location of the reserve providing units and reserve providing groups.

5 Each reserve connecting DSO and each intermediate DSO shall have the right, in cooperation with the TSO, to set, before the activation of reserves, temporary limits to the delivery of active power reserves located in its distribution system. The respective TSOs shall agree with their reserve connecting DSOs and intermediate DSOs on the applicable procedures.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

TITLE 11 U.K.

TRANSPARENCY OF INFORMATION

Article 183 U.K.

General transparency requirements

1 All TSOs shall ensure that the information listed in this Title is published at a time and in a format that does not create an actual or potential competitive advantage or disadvantage to any individual party or category of party and taking due account of sensitive commercial information.

F397 2

3 Each TSO shall ensure the availability and the accuracy of the information [F398 published] in accordance with Articles 184 to 190.

F399 4

Textual Amendments

- F397 Art. 183(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 115(2) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
F398 Word in Art. 183(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 115(3) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
F399 Art. 183(4) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), Sch. 1 para. 115(4) (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 184 U.K.

Information on operational agreements

1 Each TSO shall share the contents of its synchronous area operational agreement with [F400 the regulatory authority] no later than 1 month before its entry into force.

2 [F401 All TSOs in the GB synchronous area shall publish] the contents of their synchronous area operational agreement F402 ... no later than 1 week after its entry into force.

3 Each TSO of each LFC block shall share the contents of its LFC block operational agreement with [F403 the regulatory authority].

Textual Amendments

- F400 Words in Art. 184(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

2019/533), reg. 1(2), **Sch. 1 para. 116(2)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F401 Words in Art. 184(2) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 116(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F402 Words in Art. 184(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 116(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F403 Words in Art. 184(3) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 116(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 185 **U.K.**

Information on frequency quality

1 Where the TSOs of [^{F404}the GB synchronous area] propose to modify the values for the frequency quality defining parameters or the frequency quality target parameter in accordance with Article 127, they shall [^{F405}publish] the modified values ^{F406}... at least 1 month before the entry into force of the synchronous area operational agreement.

2 Where applicable, all TSOs of [^{F407}the GB synchronous area] shall [^{F408}publish] the values of the FRCE target parameters for each LFC block and each LFC area ^{F409}... at least 1 month before their applicability.

3 All TSOs of [^{F407}the GB synchronous area] shall [^{F408}publish] the methodology used to determine the risk of exhaustion of FCR ^{F409}... at least 3 months before the application of the synchronous area operational agreement.

4 The synchronous area monitor of [^{F407}the GB synchronous area] shall [^{F408}publish] the results of the criteria application process for their synchronous area ^{F409}... within 3 months after the last time-stamp of the measurement period and at least four times a year. Those results shall include at least:

- a the values of the frequency quality evaluation criteria calculated for the synchronous area and for each LFC block within the synchronous area in accordance with Article 133(3); and
- b the measurement resolution, measurement accuracy and calculation method specified in accordance with Article 132;

5 All TSOs of [^{F407}the GB synchronous area] shall [^{F408}publish] the ramping period specified in accordance with Article 136 ^{F409}... at least 3 months before their applicability.

Textual Amendments

F404 Words in Art. 185(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 117(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- F405** Word in Art. 185(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 117(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F406** Words in Art. 185(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 117(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F407** Words in art. 185(2)-(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 117(3)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F408** Words in art. 185(2)-(5) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 117(3)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F409** Words in art. 185(2)-(5) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 117(3)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 186 **U.K.**

Information on the load-frequency control structure

1 All TSOs of [^{F410}the GB] synchronous area shall [^{F411}publish] the following information ^{F412}... at least 3 months before the application of the synchronous area operational agreement:

- a information on the process activation structure of the synchronous area, including at least information on the monitoring areas, LFC areas and LFC blocks defined and their respective TSOs; and
- b information on the process responsibility structure of the synchronous area, including at least information on the processes developed in accordance with Article 140(1) and (2).

^{F413}2

Textual Amendments

- F410** Words in Art. 186(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 118(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F411** Word in Art. 186(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 118(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F412** Words in Art. 186(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 118(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F413 Art. 186(2) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 118(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 187 U.K.

Information on FCR

1 All TSOs of [^{F414}the GB synchronous area] shall [^{F415}publish] the dimensioning approach for FCR for their synchronous area in accordance with Article 153(2) ^{F416}... at least 1 month before its applicability.

2 Where applicable, all TSOs of [^{F414}the GB synchronous area] shall [^{F415}publish] the total amount of reserve capacity on FCR and the shares of reserve capacity on FCR required for each TSO specified in accordance with Article 153(1) as the initial FCR obligation ^{F416}... at least 1 month before their applicability.

3 All TSOs of [^{F414}the GB synchronous area] shall [^{F415}publish] the FCR properties established for their synchronous area in accordance with Article 154(2) and the additional requirements for FCR providing groups in accordance with Article 154(3) ^{F416}... at least 3 months before their applicability.

Textual Amendments

F414 Words in art. 187(1)-(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 119(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F415 Words in art. 187(1)-(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 119(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F416 Words in art. 187(1)-(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 119(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 188 U.K.

Information on FRR

1 All TSOs of each LFC block shall [^{F417}publish] the FRR availability requirements and requirements for the control quality specified in accordance with Article 158(2) and the technical requirements for the connection specified in accordance with Article 158(3) for their LFC block ^{F418}... at least 3 months before their applicability.

2 All TSOs of each LFC block shall [^{F417}publish] the FRR dimensioning rules specified for their LFC block in accordance with Article 157(1) ^{F418}... at least 3 months before the applicability of the LFC block operational agreement.

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

3 All TSOs of [^{F419}the GB synchronous area] shall [^{F417}publish], by 30 November of each year, an outlook of the reserve capacities on FRR of each LFC block for the next year ^{F418}....

4 All TSOs of [^{F419}the GB synchronous area] shall [^{F417}publish], within 30 days after the end of the quarter, the actual reserve capacities on FRR of each LFC block of the past quarter ^{F418}....

Textual Amendments

F417 Words in art. 188(1)-(4) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 120(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F418 Words in art. 188(1)-(4) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 120(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F419 Words in Art. 188(3)(4) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 120(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Article 189 U.K.

Information on RR

1 All TSOs of each LFC block that operates a reserve replacement process shall [^{F420}publish] the RR availability requirements specified in accordance with Article 161(2) and the technical requirements for the connection specified in accordance with Article 161(3) for their LFC block available ^{F421}... within 3 months before their applicability.

2 All TSOs of [^{F422}the GB synchronous area] shall [^{F420}publish], by 30 November of each year, an outlook of the reserve capacities RR of each LFC block for the following year ^{F421}....

3 All TSOs of [^{F422}the GB synchronous area] shall [^{F420}publish], within 30 days after the end of the quarter, the actual reserve capacities RR of each LFC block of the past quarter ^{F421}....

Textual Amendments

F420 Words in art. 189(1)-(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 121(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F421 Words in art. 189(1)-(3) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 121(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F422 Words in Art. 189(2)(3) substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 121(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Article 190 U.K.

Information on sharing and exchange

1 All TSOs of [^{F423}the GB synchronous area] shall [^{F424}publish] the annual compilations of the agreements for the sharing of FRR and for the sharing of RR for each LFC block within the synchronous area ^{F425}... in accordance with Articles 188(3) and 189(2). Those compilations shall include the following information:

- a the identity of the LFC blocks where there is an agreement for the sharing of FRR or RR; and
- b the share of FRR and RR reduced due to each agreement for the sharing of FRR or RR.

^{F426}2

3 Where applicable, all TSOs shall publish the information on the exchange of ^{F427}... FRR and RR.

Textual Amendments

- F423** Words in Art. 190(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 122(2)(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F424** Word in Art. 190(1) substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 122(2)(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F425** Words in Art. 190(1) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 122(2)(c)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F426** Art. 190(2) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 122(3)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F427** Word in Art. 190(3) omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 122(4)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

PART V U.K.

FINAL PROVISIONS

Article 191 U.K.

Amendments to contracts and general terms and conditions

All relevant clauses in contracts and general terms and conditions of TSOs, DSOs and significant grid users relating to system operation shall comply with the requirements of this Regulation. To that effect, those contracts and general terms and conditions shall be modified accordingly.

Article 192 U.K.

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Articles 41 to 53 shall apply 18 months after the entry into force of this Regulation. Where other articles foresee the provision or use of data as described in Articles 41 to 53, in the period between entry into force of this Regulation and Articles 41 to 53 becoming applicable, the latest available equivalent data shall be used, in a data format as determined by the entity responsible for the delivery of data, unless otherwise agreed.

F428

Textual Amendments

F428 Words in Art. 192 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 123** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F429

Done at Brussels, 2 August 2017.

For the Commission

The President

Jean-Claude JUNCKER

Textual Amendments

F429 Words in [Signature](#) omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I.](#)

PART V

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Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) [View outstanding changes](#)

2019/533), reg. 1(2), **Sch. 1 para. 124** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F430 ANNEX I U.K.

Textual Amendments

F430 Annex 1 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 125** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

ANNEX II U.K.

Voltage ranges referred to in Article 27:

TABLE 1

Voltage ranges at the connection point between 110 kV and 300 kV

Synchronous area	Voltage range
F431	F431
...	...
F431	F431
...	...
Great Britain	0,90 pu-1,10 pu
F431	F431
...	...
F431	F431
...	...

Textual Amendments

F431 Words in Annex 2 Table 1 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 126** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, **Sch. 5 para. 1(1)**

TABLE 2

Voltage ranges at the connection point between 300 kV and 400 kV

Synchronous area	Voltage range
F432	F432
...	...
F432	F432
...	...

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Great Britain	0,90 pu-1,05 pu
F432	F432
...	...
F432	F432
...	...

Textual Amendments

F432 Words in Annex 2 Table 2 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 126** (as amended by [S.I. 2020/1016](#), regs. 1(2), **6(2)**); 2020 c. 1, **Sch. 5 para. 1(1)**

ANNEX III **U.K.**

Frequency quality defining parameters referred to in Article 127:

TABLE 1

Frequency quality defining parameters of [^{F433}the GB synchronous area]

	F434	GB	F434	F434

standard frequency range	F434	± 200 mHz	F434	F434

maximum instantaneous frequency deviation	F434	800 mHz	F434	F434

maximum steady-state frequency deviation	F434	500 mHz	F434	F434

time to recover frequency	F434	1 minute	F434	F434

frequency recovery range	F434	± 500 mHz	F434	F434

time to restore frequency	F434	15 minutes	F434	F434

frequency restoration range	F434	± 200 mHz	F434	F434

alert state trigger time	F434	10 minutes	F434	F434

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Textual Amendments

F433 Words in Annex 3 Table 1 heading substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 127(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F434 Words in Annex 3 Table 1 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 127(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

Frequency quality target parameters referred to in Article 127:

TABLE 2

Frequency quality target parameters of [^{F435}the GB synchronous area]

	F436	GB	F436	F436

maximum number of minutes outside the standard frequency range	F436	15 000	F436	F436

Textual Amendments

F435 Words in Annex 3 Table 2 heading substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 127(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F436 Words in Annex 3 Table 2 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 127(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

ANNEX IV U.K.

FRCE target parameters referred to in Article 128:

TABLE

FRCE target parameters for GB

F437

...	GB	F438
		...

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

Level 1	3 %	F438 ...
Level 2	1 %	F438 ...

Textual Amendments

F437 Words in Annex 4 heading omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 128(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F438 Words in Annex 4 omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 128(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

ANNEX V U.K.

FCR technical minimum requirements referred to in Article 154:

TABLE

FCR properties in ^{F439}the GB synchronous area]

Minimum accuracy of frequency measurement	F440 ...	10 mHz or the industrial standard if better
Maximum combined effect of inherent frequency response insensitivity and possible intentional frequency response dead band of the governor of the FCR providing units or FCR providing groups.	F440 ...	F441 ...
	F440 ...	15 mHz
	F440 ...	F441 ...
	F440 ...	F441 ...
FCR full activation time	F440 ...	F441 ...
	F440 ...	10 s
	F440 ...	F441 ...
	F440 ...	F441 ...

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

FCR full activation frequency deviation.	F440	F441

	F440	± 500 mHz
	...	
	F440	F441
...	...	
	F440	F441

	F440	F441

	F440	F441

Textual Amendments

F439 Words in Annex 5 Table heading substituted (E.W.S.) (31.12.2020) by The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 129(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F440 Words in Annex 5 Table omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 129(b)(i)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

F441 Words in Annex 5 Table omitted (E.W.S.) (31.12.2020) by virtue of The Electricity Network Codes and Guidelines (System Operation and Connection) (Amendment etc.) (EU Exit) Regulations 2019 (S.I. 2019/533), reg. 1(2), **Sch. 1 para. 129(b)(ii)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

ANNEX VI U.K.

Limits and requirements for the exchange of FCR referred to in Article 163:

TABLE

Limits and requirements for the exchange of FCR

Synchronous area	Exchange of FCR allowed between:	Limits for the exchange of FCR
F442	F442	F442
...
	F442	F442

[^{F443} GB synchronous area]	TSOs of the synchronous area	— The TSOs of the synchronous area shall have the right to specify in the synchronous

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

		area operational agreement limits for the exchange of FCR in order to: <ul style="list-style-type: none">— avoid internal congestions in case of the activation of FCR;— ensure an even distribution of FCR in case of network splitting; and— avoid that the stability of the FCP or the operational security is affected.
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Textual Amendments

- F442** Words in Annex 6 Table omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 130(a)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)
- F443** Words in Annex 6 Table substituted (E.W.S.) (31.12.2020) by [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 130(b)** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

^{F444}ANNEX VII U.K.

Textual Amendments

- F444** Annexes 7, 8 omitted (E.W.S.) (31.12.2020) by virtue of [The Electricity Network Codes and Guidelines \(System Operation and Connection\) \(Amendment etc.\) \(EU Exit\) Regulations 2019 \(S.I. 2019/533\)](#), reg. 1(2), **Sch. 1 para. 131** (as amended by S.I. 2020/1016, regs. 1(2), 6(2)); 2020 c. 1, Sch. 5 para. 1(1)

.....

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

F⁴⁴⁴ ANNEX VIII U.K.

.....

Changes to legislation: Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations. (See end of Document for details) View outstanding changes

- (1) [OJ L 211, 14.8.2009, p. 15.](#)
- (2) 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 ([OJ L 211, 14.8.2009, p. 1.](#))
- (3) Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators ([OJ L 112, 27.4.2016, p. 1.](#))
- (4) Commission Regulation (EU) 2016/1447 of 26 August 2016 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules ([OJ L 241, 8.9.2016, p. 1.](#))
- (5) Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management ([OJ L 197, 25.7.2015, p. 24.](#))
- (6) Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council ([OJ L 163, 15.6.2013, p. 1.](#))

Changes to legislation:

Commission Regulation (EU) 2017/1485 is up to date with all changes known to be in force on or before 25 June 2024. There are changes that may be brought into force at a future date. Changes that have been made appear in the content and are referenced with annotations.

[View outstanding changes](#)

Changes and effects yet to be applied to :

- Art. 3(1) words substituted by [S.I. 2024/706 reg. 44\(a\)\(i\)](#)
- Art. 3(1B) omitted by [S.I. 2024/706 reg. 44\(a\)\(ii\)](#)
- Art. 10 words substituted by [S.I. 2024/706 reg. 44\(b\)](#)
- Art. 13 substituted by [S.I. 2019/533 Sch. 1 para. 14](#) (This amendment not applied to legislation.gov.uk. Sch. 1 para. 14 substituted (15.9.2020) by S.I. 2020/1016, regs. 1(2), 6(3)(f))
- Art. 15 words substituted by [S.I. 2024/706 reg. 44\(b\)](#)
- Art. 15(1) words inserted by [S.I. 2019/533 Sch. 1 para. 16\(2\)\(a\)\(ii\)](#) (This amendment not applied to legislation.gov.uk. Sch. 1 para. 16(2)(a)(ii) substituted (15.9.2020) by S.I. 2020/1016, regs. 1(2), 6(3)(g))
- Art. 16 words substituted by [S.I. 2024/706 reg. 44\(b\)](#)
- Art. 40 words substituted by [S.I. 2024/706 reg. 44\(b\)](#)
- Art. 55 words substituted by [S.I. 2024/706 reg. 44\(b\)](#)
- Art. 58(4)(h) words inserted by [S.I. 2019/533 Sch. 1 para. 46\(4\)\(b\)](#) (This amendment not applied to legislation.gov.uk. Sch. 1 para. 44(2)(b) substituted (15.9.2020) by S.I. 2020/1016, regs. 1(2), 6(3)(k))
- Art. 65 words substituted by [S.I. 2024/706 reg. 44\(b\)](#)

Changes and effects yet to be applied to the whole legislation item and associated provisions

- Art. 2(3A) inserted by [S.I. 2019/533 Sch. 1 para. 3\(5\)](#) (This amendment not applied to legislation.gov.uk. Sch. 1 para. 3(5) omitted (15.9.2020) by virtue of S.I. 2020/1016, regs. 1(2), 6(3)(a))
- Art. 3.2(168) omitted by [S.I. 2024/706 reg. 44\(a\)\(iii\)](#)
- Art. 55(d) words inserted by [S.I. 2019/533 Sch. 1 para. 44\(2\)\(b\)](#) (This amendment not applied to legislation.gov.uk. Sch. 1 para. 44(2)(b) substituted (15.9.2020) by S.I. 2020/1016, regs. 1(2), 6(3)(j))