EirGrid and ESB Networks' decision paper for implementing SGU Key Organisational Requirements, Roles and Responsibilities (KORRR) relating to Data Exchange in accordance with Article 40(6) of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation

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NETWORKS

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1. Introduction

On the 14th September 2017, the Commission Regulation (EU) 2017/1485[1] establishing a guideline on electricity transmission system operation (hereafter referred to as "SO GL") entered into force. Article 40(6) of SO GL required all TSOs to agree on Key Organisational Requirements, Roles and Responsibilities (hereafter referred to as "KORRR") relating to Data Exchange. KORRR was approved by the All Regulatory Authorities on 19th December 2018, and will serve as the basis for what TSOs, DSOs and Significant Grid Users (SGUs) will need to do to comply with Articles 41 to 53 of SO GL. TSOs, DSOs and SGUs will need to comply with KORRR from 14th March 2019.

SGUs were the target audience of the consultation preceding this position paper. SGUs are as defined under Article 2(1) of SO GL which are;

> (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 [(2)];
>
> (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 in accordance with the criteria in Article 27 of Commission Regulation (EU) 2016/1388 [(3)];
>
> (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 SO GL; 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)].

The requirements of KORRR apply to new and existing SGUs.

Under Article 40(5) of SO GL, the TSO is required to co-ordinate with DSOs and SGUs within its Observability Area[5] as defined in SO GL on the applicability and scope of data exchange.

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[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2017.220.01.0001.01.ENG&toc=OJ:L:2017:220:TOC#d1e234-1-1

[(2)] 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).

[(3)] Commission Regulation (EU) 2016/1388 of 17 August 2016 establishing a Network Code on Demand Connection (OJ L 223, 18.8.2016, p. 10)

[(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)

Also, under Article 40(7) each TSO is to reach an agreement with relevant DSOs on the processes and formats of data exchange between them. The purpose of the consultation was:

1) To define the TSO's and DSO's proposed applicability and scope of KORRR.
2) To enable the accurate incorporation of SGU interactions under KORRR to the TSO-DSO agreement.
3) To provide SGUs with clear information of the TSO's and DSO's proposed SGU commitments under KORRR, and a mechanism for SGUs to provide feedback to the TSO and DSO ahead of the TSO-DSO agreement in March 2019
4) To address the requirement for the TSO to co-ordinate with SGUs and the DSO on the applicability and scope of specific Articles under the data exchange title of SO GL

Current data exchange practices are already largely aligned with KORRR. As a result, the positions in this SGU KORRR position paper align with current practices and the requirements of the Grid Code[6] and Distribution Code[7].

This position paper was produced jointly by EirGrid in its role as the Transmission System Operator in Ireland (TSO) and ESB Networks in its role as the Distribution System Operator in Ireland (DSO). References in this document to the Relevant System Operator (RSO) mean the operator of the system to which the demand unit is connected to i.e. TSO or DSO.

SONI in its role as the Transmission System Operator in Northern Ireland and NIE Networks in its role as the Distribution Network Operator in Northern Ireland held a similar consultation process with SGUs in Northern Ireland.

1.1. Associated documents

The TSO and DSO strongly recommend that all readers review the SO GL Network Code and KORRR[8]. All references to Article hereafter in this document refer to Articles set out in KORRR unless otherwise specified.

1.2. Definitions and Interpretations

For the purposes of this document, the terms used shall have the meaning of the definitions included in Article 2 of KORRR.

In this document, unless the context requires otherwise:

a) the singular indicates the plural and vice versa;
b) the table of contents and headings are inserted for convenience only and do not affect the interpretation of this position paper; and

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[5] 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.

[6] http://www.eirgridgroup.com/site-files/library/EirGrid/GC_VERSION_7_PUBLISHED.pdf

[7] https://www.esbnetworks.ie/docs/default-source/publications/distribution-code-v5-0.pdf?sfvrsn=6

[8] https://docstore.entsoe.eu/Documents/nc-tasks/SOGL/SOGL_A40.6_181001_KORRR_181015.pdf

c) any reference to legislation, regulations, directive, order, instrument, code or any other enactment shall include any modification, extension or re-enactment of it then in force.

1.3. Structure of this document

Section 2 Background and Section 3 Scope provide important information that guide the reader through KORRR concepts and the principles underpinning this position paper.

Section 4 sets out the positions. It details the requirement, position, and justification under each Article of KORRR that is directly relevant to SGUs.

The Articles in Section 4 Positions are those of direct relevance to SGUs where a role, requirement or responsibility had to be defined. The TSO and DSO wished to co-ordinate in an open manner with SGUs so that the proposals were transparent, proportional and efficient. The Requirements in Section 4 Positions, which are italicised and indented, quote the Articles directly from KORRR.

2. Scope

The scope of this position paper is to provide SGUs with TSO and DSO positions under KORRR that are directly relevant to SGUs.

3. Background

3.1. Development of KORRR

KORRR in relation to data exchange is a requirement for all TSOs in the European Union in accordance with article 40(6) SO GL. SO GL defines the tasks and responsibilities that TSOs shall fulfil to safeguard operational security in Normal State and Alert State.

SO GL entered into force on 14th September 2017, and required all TSOs to jointly agree 6 months afterwards on KORRR. Each TSO submitted a KORRR proposal to its respective National Regulatory Authority (NRA) in March 2018. In July 2018 a request for amendment was made to all-TSOs. The revised KORRR was then re-submitted by EirGrid to the CRU in October 2018. The All Regulatory Authority made a decision to approve the amended KORRR on the 19 December 2018 which was notified to EirGrid by CRU on 21 January 2019.

The organisational requirements, roles and responsibilities have to take into account, and complement where necessary, the operational conditions of the generation and load data methodology developed in accordance with Article 16 of Regulation (EU) 2015/1222 (establishing a guideline on capacity allocation and congestion management (CACM)). They apply to all data exchange provisions in the data exchange Title in SO GL (Articles 40-53) and include organisational requirements, roles and responsibilities for the following elements:

(a) obligations for TSOs to communicate without delay to all neighbouring TSOs any changes in the protection settings, thermal limits and technical capacities at the interconnectors between their control areas;

(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 the data exchange Title in SO GL;

(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 the data exchange Title in SO GL;

(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 the data exchange Title in SO GL;

(e) detailed contents of the data and information established pursuant to the data exchange Title in SO GL, 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 the data exchange Title in SO GL.

3.2. Purpose

The purpose of KORRR is to define a common framework for data exchange between different parties to ensure the operational security of electricity systems.

KORRR has a fundamental impact on many of the objectives of SO GL, as it sets out the obligations of all the involved participants. In doing so, it removes barriers to data exchange. KORRR sets out a pan EU framework which aims to deliver an efficient and low cost process for all parties involved. By specifying minimum requirements on data exchange methods, planning, formats and content, KORRR will help achieve a more coordinated and secure system.

This common framework furthers the SO GL aim of determining common operational security requirements and principles. KORRR will address the organisation of the data exchange so each party can get the necessary data to have observability of the part of the network that impacts their operational security. This data will underpin many of the operational security processes set out in SO GL, and it is therefore required for each party to comply with the SO GL requirements.

KORRR will contribute to the efficient operation and development of the electricity transmission system and the electricity sector in the European Union. The intended observability of the system will help TSOs to perform reliable security analyses and identify means to improve their transmission systems.

3.3. Stakeholders

KORRR will establish the responsibilities at national level of who shall define and approve the detailed information to be exchanged. The parties involved in this data exchange include TSOs, DSOs and SGUs. Of these three parties, the definition of an SGU may not be as well known. As per Article 2 of SO GL, SGUs are defined as:

- existing and new power generating modules that are, or would be, classified as type B, C and D (as per Table 1) in accordance with Article 5 of the Requirements for Generators (RfG) Network Code (NC);

Table 1: RfG Banding Parameters as per CRU decision CRU/18/242

Voltage	Type	Capacity
Below 110 kV	B	≥ 100 kW and < 5,000 kW
	C	≥ 5,000 kW and < 10,000 kW
	D	≥ 10,000 kW
At 110 kV or above	D	All

- existing and new transmission-connected demand facilities;
- existing and new transmission-connected closed distribution systems;
- existing and new demand facilities, closed distribution systems and third parties if they provide demand response directly to the TSO in accordance with the criteria in Article 27 of the Demand Connection Code (DCC) NC;
- providers of re-dispatching 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 SO GL; and
- existing and new high voltage direct current systems in accordance with the criteria in Article 3(1) of the High Voltage Direct Current (HVDC) NC.

Demand facilities can only be an SGU if they are directly connected to the transmission system or they provide demand response directly to the TSO or if they provide re-dispatching with their facility. This definition ensures that households or very small loads won't be considered in SO GL. Article 40(5) of SO GL requires the TSO to co-ordinate with SGUs and the DSO on the applicability and scope of specific Articles under the data exchange title of SO GL. The consultation process addressed this requirement.

3.4. Confidentiality

The responsibility of providing data remains with the owner of the facility, even when it would be possible to delegate the task of providing the information. Indirect exchange through a third party, an Aggregator for example, shall be allowed. However, the final responsibility of the exchange and quality of the information shall always rest with the owner of the facility. The responsibility of ensuring confidentiality remains with the collecting party.

3.5. Information Exchange

The three main categories of data to be exchanged are:

- **Structural information:** includes all the general and permanent characteristics and attributes of the facility and represents the capabilities of the equipment and is necessary to prepare static and dynamic models of the facilities;

- **Scheduled information:** represents the expected behaviour of the facilities and networks elements in the scheduled time frame and near future, considering near future up to one year according to provisions of SO GL. It includes information related to outage planning and generation/consumption schedules; and

- **Real time information:** represents the present behaviour of the facility.

To perform security analysis in real time, and thereby define operational security limits in the present, a combination of structural and real-time information is compulsory. To be able to reach real time safely, security analysis needs to be performed in advance. Structural and scheduled information is needed to prepare cases with the expected situation of the system in the near future. TSOs are required to electronically store this information under Article 6(10) of KORRR.

Structural Information

Examples of Structural Information:

- general data of the power generating module, including installed capacity and primary energy source or fuel type;
- Operational Reserves;
- protection data;
- reactive power control capability;
- capability of remote access to the circuit breaker;
- data necessary for performing dynamic simulations; and
- voltage level and location of each power generating module.

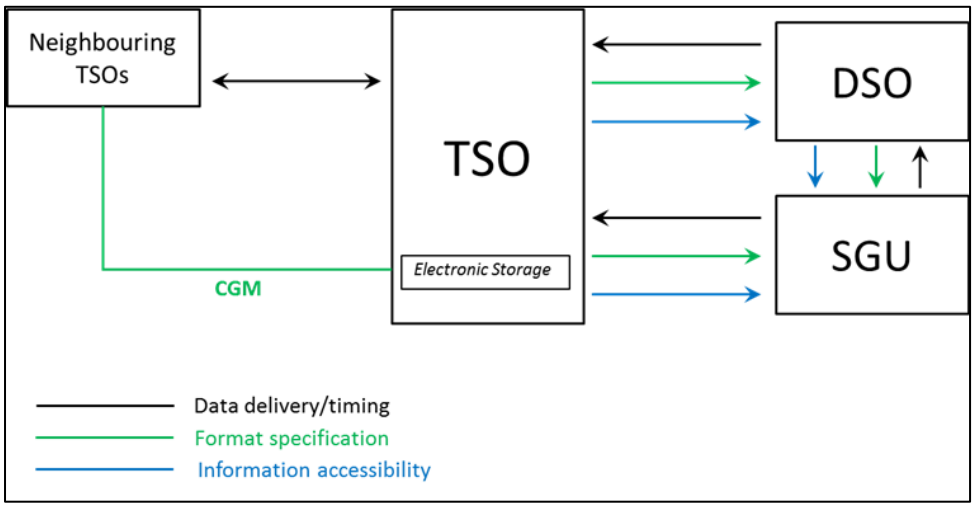


Figure 1: Structural Data Stakeholder Exchange Matrix [Source: ENTSO-E]

Scheduled Information

Scheduled Information consists of outage planning and generation-load programs.

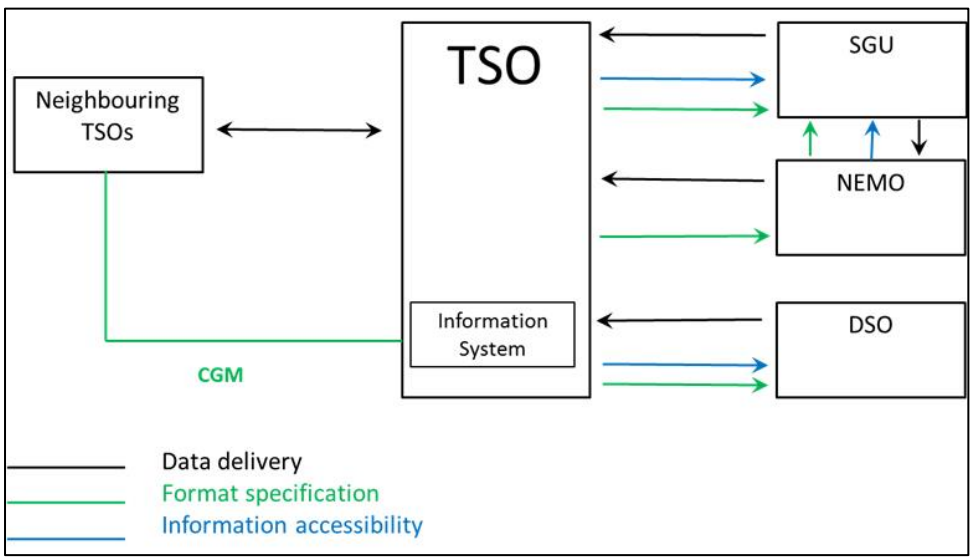


Figure 2: Scheduled Data Stakeholder Exchange Matrix [Source: ENTSO-E]

Real Time Information

All the data gathered by TSOs has to be stored in a data storage system updated and maintained by TSOs. Examples of Real Time Information:

- active and reactive power (line flows, generation, load, reserves);
- busbar voltages;
- frequency and frequency restoration control error;
- setpoints (load-frequency controller);
- tap changer positions of transformers and compensating equipment; and
- open/close position of switching equipment.

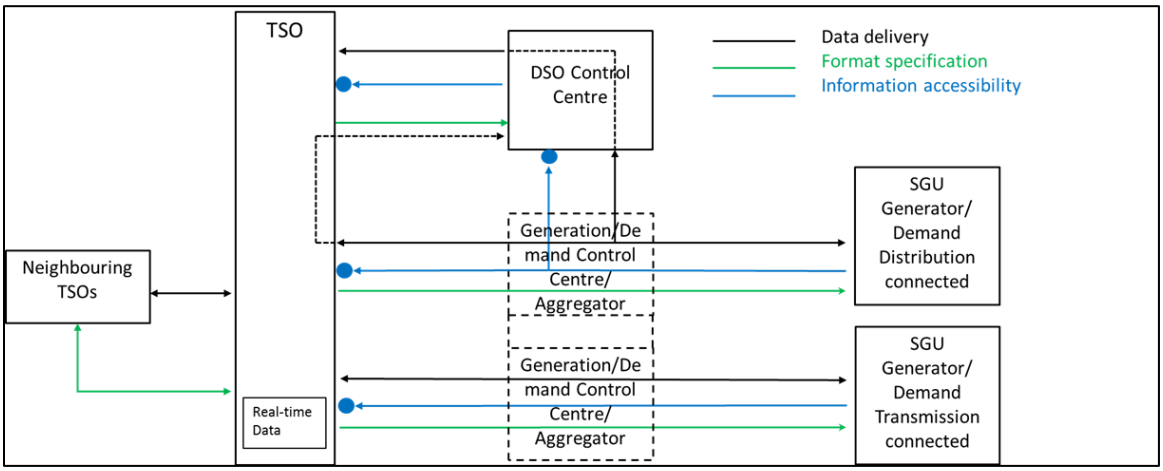


Figure 3: Real Time Data Stakeholder Exchange Matrix [Source: ENTSO-E]

4. Positions

4.1. KORRR Article 3(2)

Requirement

> *"On the basis of Articles 48 to 50 and 53 of the SO GL, the KORRR renders the provision of data both to TSOs and DSOs as the default option. This approach can be revised at a national level in order to allow SGUs the provision of data only to the TSO or to the DSO to which they are connected unless otherwise required to provide services to the system. In those cases where an SGU only provides data to a TSO or to a DSO to which they are connected, the TSO and the DSO shall exchange between them the data related to that SGU."*

KORRR Article 3(2)

Position

SGUs shall provide data to the TSO or DSO to which they are connected in compliance with the applicable Distribution Code or Grid Code, unless otherwise agreed.

The TSO and the DSO shall exchange between them the data related to an SGU upon request by a System Operator (SO), to comply with the requirements of the SO GL provisions.

Justification

Articles 48 to 50 and 53 of SO GL concern distribution connected power generating modules and demand response providers. In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations. The TSO and DSO may exchange between them data related to an SGU upon request by a System Operator (SO). This approach will enable data exchange between parties that will enhance operational security.

4.2. KORRR Article 3(3)

Requirement

> *"Subject to approval by the competent regulatory authority or by the entity designated by the Member State and according to Article 40 of the SO GL, it shall be determined at a national level whether distribution connected SGUs in their TSOs control area shall provide the structural, scheduled and real-time data to the TSO directly or through their connecting DSOs or to both. The decision on the data exchange model may be independent for each type of information and SGU, if required. When the data is provided to the DSO, the DSO shall provide the required data to the TSO with a data granularity necessary to comply with the requirements of the SO GL provisions."*

KORRR Article 3(3)

Position

SGUs shall provide data to the TSO or DSO to which they are connected in compliance with the applicable Distribution Code or Grid Code, unless otherwise agreed.

The TSO and the DSO shall exchange between them the data related to an SGU upon request by a System Operator (SO), to comply with the requirements of the SO GL provisions.

Justification

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations. The TSO and DSO may exchange between them data related to an SGU upon request by a System Operator (SO). This approach will enable data exchange between parties that will enhance operational security.

4.3. KORRR Article 6(5)

Requirement

> *"Subject to approval of the competent regulatory authority or approval of the entity designated by the Member State in accordance with Article 40(5) of the SO GL, each TSO, in coordination with the DSOs and SGUs, shall define which SGUs in its control area shall provide the real-time data."*
>
> **KORRR Article 6(5)**

Position

All SGUs connected to the Transmission System shall provide real-time data as per Grid Code and current TSO processes.

Power generating modules connected to the Distribution System shall provide real-time data as per Table 2.

Table 2: Real-time data exchange requirements for power generating modules connected to the Distribution System

Power generating module	Requirement
RTU or other means as specified by the RSO, is in place to give effect to provision of real-time data.	Provide real-time data as per the applicable Distribution Code or Grid Code, to the RSO, unless otherwise agreed.
No RTU or other means as specified by the RSO, is in place to give effect to provision of real-time data.	Provide data to the connected SO to enable a real-time approximation model, unless otherwise agreed.

Justification

SGUs connected to the transmission system or providing services to the TSO are already required to provide real-time information sufficient to comply with KORRR under Grid Code.

Power generating modules (generators) have different thresholds which require the specification of a Remote Terminal Unit (RTU) to gather real-time data. These specifications are made via the System Operators Connection Agreement (SOCA), which also forms part of the DSO's connection offer. This position therefore seeks to apply the same real-time requirements to power generation modules specified to have an RTU. This will also include SGUs who have undergone significant modifications as per the RfG, DCC or HVDC NC. The SO's are aware that clarity is needed around significant modifications, and will work to provide clarity on this in due course.

For power generating modules specified without RTUs, which can be considered separate to the group described in the previous paragraph, an approximation model will be used. This is the current process that the TSO uses, and involves the use of structural data. Generation profiles are estimated from this structural data. This process is suitable for those units from 100 kW to 5 MW that may not have an RTU specified.

With respect to power generating modules, an increasing use of renewable energy sources worldwide has seen a shift from a small number of larger conventional fossil-fuel generators to a large number of more widely distributed small-scale renewable generators. The telecommunication protocols to enable two-way communication

between these new generators is developing, and as such, practices for gathering real-time information will need to consider this. A mixture of RTU and approximation model information are currently used to view the electricity system in real-time. The data which feeds the approximation models used by TSO is gathered during the connection offer process, which means there will be little if no additional requests for data from power generating modules who's real-time information is approximated.

Applying real-time KORRR data requirements to power generating modules ≥ 100 kW as summarised in Table 2, will enable an efficient means to view the electricity system in real-time without placing additional real-time data requirements on power generating modules. This is in line with current practices, and it is therefore the intention of the SOs to continue this approach to real-time data. As telecommunication technology develops, this can be reviewed, but for now current practices are sufficient. Any changes that are required in the future for real-time data provision may be captured in respective DSO and TSO processes, Grid Code and/or Distribution Code.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following the proposed real-time data transfer requirements as described.

4.4. KORRR Article 7(2)

Requirement

> *"Each TSO shall specify the format and may publish templates for the structural data that transmission connected SGUs and distribution connected SGUs that exchange data directly with the TSO shall provide, in line with Article 40(7) of the SO GL. The agreement between each TSO and the relevant DSOs referred to in Article 40(7) of the SO GL shall only be required for the involved DSOs. The format or template has to include the detailed content of the structural data that have to be provided."*

KORRR Article 7(2)

Position

SGUs providing structural data directly to the TSO shall provide it in compliance with the applicable Distribution Code or Grid Code, unless otherwise agreed.

Justification

Structural data requirements for SGUs in KORRR are captured in the Distribution Code and Grid Code. This data is gathered during the connection offer process. The existing format in the Distribution Code or Grid Code will be used.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations.

4.5. KORRR Article 9(3)

Requirement

> *"In coordination with SGUs or third parties within TSOs´ control area, each TSO shall define and publish the format of the information for the exchange of scheduled data."*

KORRR Article 9(3)

Position

SGUs shall provide scheduled data to the TSO or DSO to which they are connected in compliance with the applicable Distribution Code or Grid Code, unless otherwise agreed.

Justification

Scheduled data requirements for transmission connected SGUs in KORRR are captured in the Grid Code. Scheduled data requirements for distribution connected SGUs in KORRR will be in the Distribution Code. The format in the Distribution Code or Grid Code will be used.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations.

4.6. KORRR Article 9(4)

Requirement

> *"Each TSO shall define and publish the technical requirements, including time stamping, for the exchange of scheduled data with SGUs, DSOs or third parties within its control area. The technical requirements should where possible, be in accordance with an international standard recommended by all TSOs and with current technologies to guarantee the security, confidentiality and redundancy of the communications."*

KORRR Article 9(4)

Position

SGUs shall provide scheduled data to the TSO in compliance with the Grid Code.

SGUs shall provide scheduled data to the DSO in compliance with the Distribution Code.

Scheduled data shall be provided as proposed, unless otherwise agreed.

Justification

Scheduled data requirements for transmission connected SGUs in KORRR are captured in the Grid Code. Scheduled data requirements for distribution connected SGUs in KORRR will be captured in the Distribution Code. The format in the Distribution Code or Grid Code will be used.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations.

4.7. KORRR Article 10(2)

Requirement

> *"Each TSO, in coordination with SGUs and DSOs, shall specify and publish the list of detailed content for real-time data exchange and the format for real-time data exchange related to SGUs within its control area."*
>
> **KORRR Article 10(2)**

Position

The detailed content of real-time data shall be housed in the Distribution Code and Grid Code and signals list issued by the RSO.

Justification

SGUs connected to the transmission system or providing services to the TSO are already required to provide real-time information sufficient to comply with KORRR under Grid Code. The list and format of real-time data for these SGUs will be as per Grid Code and the signals list issued by the TSO.

Power generating modules (generators) specified with a Remote Terminal Unit (RTU) will continue to gather real-time data as per the applicable Distribution Code or Grid Code, and the signals list issued by the RSO.

For power generating modules specified without RTUs, which can be considered separate to the group described in the previous paragraph, an approximation model will be used. This is the current process that the TSO uses, and involves the use of structural data. Generation profiles are estimated from this structural data. This process is suitable for those units from 100 kW to 5 MW that may not have an RTU specified.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following the proposed real-time data transfer requirements as described.

4.8. KORRR Article 10(5)

Requirement

> *"Each TSO shall define the refresh rate for the real-time data exchanges in its control area. It shall not be longer than 1 minute."*
>
> **KORRR Article 10(5)**

Position

All SGUs specified with an RTU or similar that are connected to the Transmission System or Distribution System shall have a refresh rate for real-time data exchange as per the relevant Grid Code and Distribution Code. .

Justification

SGUs connected to the transmission system or providing services to the TSO are already required to provide real-time information sufficient to comply with KORRR under Grid Code.

Power generating modules (generators) have different thresholds which require the specification of a Remote Terminal Unit (RTU) to gather real-time data. These specifications are made via the System Operators Connection Agreement (SOCA), which also forms part of the DSO's connection offer. This position therefore seeks to apply the same real-time requirements to power generation modules specified to have an RTU. This will also include SGUs who have undergone significant modifications as per the RfG, DCC or HVDC NC.

The refresh rate of RTUs is sufficient to comply with the KORRR requirement of less than 1 minute. The refresh rate capability of an SGU is noted during the Grid Code and Distribution Code compliance testing procedures, during which the signal list is checked.

For power generating modules specified without RTUs, which can be considered separate to the group described in the previous paragraph, an approximation model will be used. This is the current process that the TSO uses, and involves the use of structural data. Generation profiles are estimated from this structural data. This process is suitable for those units from 100 kW to 5 MW that may not have an RTU specified. Therefore, refresh rate requirements will not apply to power generating modules specified without an RTU, or other means as specified by the RSO to give effect to the provision of real-time data.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following the proposed real-time data transfer requirements as described.

4.9. KORRR Article 11(2)

Requirement

> *"Each DSO, in coordination with TSOs and SGUs, shall specify the format and may publish templates for the structural data that distribution connected SGUs that exchange directly data with the DSO shall provide. The format or template has to include the detailed content of the structural data to be provided. In addition, in the case SGUs send the data both to the TSO and DSO, for efficiency and consistency reasons, the specified format should be, to the extent possible, the same as the one specified by TSOs according to Article 7(2) of KORRR."*

KORRR Article 11(2)

Position

SGUs providing structural data directly to the DSO shall provide it in compliance with the applicable Distribution Code or Grid Code, unless otherwise agreed.

Justification

Structural data requirements for SGUs in KORRR are captured in the Distribution Code and Grid Code. This data is gathered during the connection offer process. The existing format in the Distribution Code or Grid Code will be used.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations.

4.10.KORRR Article 14(1)

Requirement

> *"Each SGU connected to the transmission system shall provide to its TSO the structural data according to Articles 45 and 52(1) of the SO GL in the format specified by its TSO."*

KORRR Article 14(1)

Position

SGUs connected to the transmission system shall provide structural data to the TSO in compliance with the Grid Code, unless otherwise agreed.

Justification

Structural data requirements for transmission connected SGUs in KORRR are captured in the Grid Code. This data is gathered during the connection offer process. The existing format in the Grid Code will be used.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements in the Grid Code, and those requirements documented between an SGU and the TSO e.g. Connection Agreement, Derogations.

4.11.KORRR Article 14(2)

Requirement

> *"Each SGU connected to the distribution system shall provide directly to the TSO or through its connecting DSO or to both, as defined in Article 3(3), the structural data according to Articles 48 and 53 of the SO GL in the format specified by its TSO or DSO."*

KORRR Article 14(2)

Position

SGUs shall provide data to the TSO or DSO to which they are connected in compliance with the applicable Distribution Code or Grid Code, unless otherwise agreed.

The TSO and the DSO shall exchange between them the data related to an SGU upon request by a System Operator (SO), to comply with the requirements of the SO GL provisions.

Justification

Articles 48 and 53 of SO GL concern distribution connected power generating modules and demand response providers. Structural data requirements for SGUs in KORRR are captured in the Distribution Code and Grid Code. This data is gathered during the connection offer process. The existing format in the Distribution Code or Grid Code will be used.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations. The TSO and DSO may exchange between them data related to an SGU upon request by a System Operator (SO). This approach will enable data exchange between parties that will enhance operational security.

4.12.KORRR Article 15(1)

Requirement

> *"Each SGU shall review the structural information it shares with the DSOs or TSOs of the control area the SGU belongs to, at least every 6 months. Each SGU shall provide updated information to the TSO and/or DSO as defined at a national level or, if it's not defined at a national level, in the following situations, however in both cases not less than 3 months before:*
>
> *a. the planned commissioning of a new network element or SGU;*
>
> *b. the planned final removal from service of the network element or SGU; and*
>
> *c. the planned significant modifications in the network element or SGU.*
>
> *Moreover, each SGU shall provide updated information as soon as an error in the data set transmitted earlier is detected and in case of an unforeseeable modification, the SGU shall inform the TSO without delay."*

KORRR Article 15(1)

Position

SGUs shall provide updated structural information to the TSO or DSO to which they are connected 3 months before:

a. the planned commissioning of a new SGU;

b. the planned final removal from service of an SGU; and

c. the planned significant modifications in an SGU.

Updated structural information will not be required from SGUs every 6 months.

Justification

It should be noted that this mandatory requirement under KORRR to date has not formed part of any formal agreements. The requirements of this position may need to be reflected in the SO's procedures. The existing structural information provided via Distribution Code and Grid Code is sufficient. Therefore, there is no need to place additional requirements on SGUs other than those detailed in the position in points a, b and c.

4.13.KORRR Article 16(1)

Requirement

> *"All SGUs within the control area of the TSO shall provide scheduled data to the TSO. Transmission connected SGUs shall provide data directly to the TSO. Distribution connected SGUs shall provide data directly to the TSO or through its connecting DSO or to both, as defined in Article 3(3) of KORRR."*

KORRR Article 16(1)

Position

SGUs connected to the transmission system or providing services to the TSO shall provide scheduled data to the TSO directly in compliance with Grid Code, unless otherwise agreed.

SGUs connected to the distribution system shall provide scheduled data to both the TSO and DSO where an outage at or within the SGU itself results in the loss of 5 MW or greater of generation capacity, unless otherwise agreed.

The TSO and DSO shall exchange between them the data related to an SGU upon request by a System Operator (SO), to comply with the requirements of the SO GL provisions.

Justification

Scheduled data requirements for transmission connected SGUs in KORRR are captured in the Grid Code. The Grid Code considers an outage of 5 MW or greater important when planning the operation of the electricity system. To apply KORRR in a fair and transparent manner, the Distribution Code will be updated to capture scheduled data requirements in due course. Notification of an outage of 5 MW or greater on the distribution system, to both the TSO and DSO, will form part of this.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations. The TSO and DSO may exchange between them data related to an SGU upon request by a System Operator (SO). This approach will enable data exchange between parties that will enhance operational security.

4.14.KORRR Article 16(2)

Requirement

> *"SGUs shall comply with the requirements defined by the relevant TSO, and/or by the DSO when the SGU is required to provide data through the DSO according to Article 3(3) of KORRR, to exchange scheduled data. The frequency of delivery of scheduled data shall be defined at a national level."*
>
> **KORRR Article 16(2)**

Position

SGUs connected to the transmission system or providing services to the TSO shall provide scheduled data to the TSO directly in compliance with Grid Code, unless otherwise agreed.

SGUs connected to the distribution system shall provide scheduled data to both the TSO and DSO where an outage at or within the SGU itself results in the loss of 5 MW or greater of generation capacity, unless otherwise agreed. This shall be provided at least 3 weeks in advance of real-time, and as the information is available.

The TSO and DSO shall exchange between them the data related to an SGU upon request by a System Operator (SO), to comply with the requirements of the SO GL provisions.

Justification

Scheduled data requirements for transmission connected SGUs in KORRR are captured in the Grid Code. The Grid Code considers an outage of 5 MW or greater important when planning the operation of the electricity system. To apply KORRR in a fair and transparent manner, the Distribution Code will be updated to capture scheduled data requirements in due course. Notification of an outage of 5 MW or greater on the distribution system, to both the TSO and DSO, will form part of this. Notification at least 3 weeks in advance allows the SOs to co-ordinate and plan the secure operation of the electricity system. This also reflects current Grid Code practice. As outages may not always be known 3 weeks in advance, the position reflects the need to accommodate information closer to real-time.

In consideration of Article 1(5) of KORRR, the highest overall efficiency and lowest total cost will be achieved for new and existing SGUs by following data transfer requirements of the applicable Distribution Code or Grid Code, and those requirements documented between an SGU and SO e.g. Connection Agreement, Derogations. The TSO and DSO may exchange between them data related to an SGU upon request by a System Operator (SO). This approach will enable data exchange between parties that will enhance operational security.

4.15.KORRR Article 17(1)

Requirement

> *"Subject to Article 6(5) of KORRR, all concerned SGUs connected to the transmission system shall provide the real-time data directly to the TSO. Subject to Article 6(5) of KORRR, all concerned distribution connected SGUs shall provide the real-time data to the TSO directly or through its connecting DSO or to both, as defined in Article 3(3). All SGUs which are power generating modules not subject to the NC RfG, or which are HVDC systems not subject to the NC HVDC, or which are demand facilities not subject to the NC DCC, shall inform to the TSO about their technical capabilities for real-time data provision. The evaluation process to exempt particular SGUs, in case of non-compliance with the requirement to provide real-time data, shall be defined at a national level."*

KORRR Article 17(1)

Position

SGUs connected to the transmission system or providing services to the TSO shall provide real-time data directly to the TSO.

SGUs connected to the distribution system shall provide real-time data directly to the DSO, unless otherwise agreed.

SGUs which are power generating modules not subject to the NC RfG, or which are HVDC systems not subject to the NC HVDC, or which are demand facilities not subject to the NC DCC, shall notify the TSO and the DSO if they are non-compliant with Article 17(1) of KORRR. The evaluation process to exempt particular SGUs, in case of non-compliance with the requirement to provide real-time data, will be on a case-by-case basis. The evaluation process will be defined at a later date.

Justification

SGUs connected to the transmission system or providing services to the TSO are already required to provide real-time information sufficient to comply with KORRR under Grid Code.

Power generating modules (generators) specified with a Remote Terminal Unit (RTU) will continue to gather real-time data as per the applicable Distribution Code or Grid Code.

For power generating modules specified without RTUs, which can be considered separate to the group described in the previous paragraph, an approximation model will be used. This is the current process that the TSO uses, and involves the use of structural data. Generation profiles are estimated from this structural data. This process is suitable for those units from 100 kW to 5 MW that may not have an RTU specified.

Existing SGUs will therefore continue to provide real-time data to the SO they are providing it to already. Under the position, SGUs connected to the distribution system will be instructed if they need to provide real-time data directly to both the DSO and TSO. The real-time data requirements under KORRR, with accompanying positions in this paper, should be such that most SGUs are already compliant. Assuming compliance unless otherwise notified is an approach the SOs shall practice in consideration of Article 1(5) of KORRR, which aims to achieve the highest overall efficiency and lowest total cost for all parties involved.

4.16.KORRR Article 17(2)

Requirement

> *"Each SGU providing data directly to the TSO or the DSO when the data is directly provided to the DSO shall fulfil the requirements defined by the TSO in terms of:*
>
> *a. logical connections between parties and protocols used;*
>
> *b. network architecture including redundancy;*
>
> *c. network security rules;*
>
> *d. identification code (ID) and/or naming convention and data quality;*
>
> *e. data transmission parameters and performance;*
>
> *f. rules of conduct in the case of planned outages and disturbances of communication equipment."*

KORRR Article 17(2)

Position

SGUs shall fulfil their requirements for real-time data exchange as defined in the positions of this paper and in line with the Grid Code and Distribution Code and existing processes as relevant.

Justification

The requirements for SGUs proposed in this position paper in relation to real-time data exchange provide sufficient detail to enhance operational security and to comply with the requirements of the SO GL provisions.